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

March 14, 2014

Pages 2440 to 2708

2441

```
 1                        APPEARANCES

 2  Bob Peters                    )Board Counsel

 3  Sven Hombach

 4

 5  Patti Ramage                  )Manitoba Hydro

 6  Marla Boyd

 7

 8  Byron Williams                )CAC

 9

10  William Gange                 )GAC

11  Peter Miller                  )

12

13  Antoine Hacault               )MIPUG

14

15  George Orle                   )MKO

16  Michael Anderson (np)         )

17

18  Jessica Saunders              )MMF

19  Corey Shefman                 )

20

21  Christian Monnin              )IEC

22  Michael Weinstein             )

23

24

25
```

2442
1   TABLE OF CONTENTS

2   Page No.

5

6 MANITOBA HYDRO PANEL 4 CONTINUED:

7 ADAM BORISON, Previously Sworn

8 DAVE BOWEN, Previously Sworn

9 DAVID CORMIE, Previously Sworn

10 JOANNE FLYNN, Previously Sworn

11 BILL HAMLIN, Previously Sworn

12 TERRY MILES, Previously Sworn

13 DAVID JACOBSON, Previously Sworn

14 DEAN MURPHY, Previously Sworn

15 IAN PAGE, Previously Sworn

16 ED WOJCZYNSKI, Previously Sworn

17

2443

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

2444

1   LIST OF EXHIBITS

2   EXHIBIT NO.   DESCRIPTION   PAGE NO.

3   MH-110   Response to Undertaking 31   2446

4   MIPUG-21   List of six (6) Pre-asks from

5   MIPUG and CAC to Manitoba Hydro   2451

6   HILL-7-2   Book of documents   2457

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

2445

1   LIST OF UNDERTAKINGS

2 NO.   DESCRIPTION   PAGE NO.

3 43   Manitoba Hydro to provide a high

4   level variance analysis of revised

5   capital costs relating to Keeyask

6   and Conawapa   2602

7 44   Manitoba Hydro to explain why its

8   historical accuracy doesn't align

9   with the probabilistic analysis

10   presented in Exhibit 103   2703

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

2446

1 --- Upon commencing at 9:03 a.m.

2

3   THE CHAIRPERSON: Good morning. I

4 believe that we're ready to resume the proceedings. I

5 wonder if there are any documents to acknowledge, Ms.

6 Boyd.

7   MS. MARLA BOYD: Thank you and good

8 morning. We do have one (1) undertaking to file. It's

9 in response to Undertaking number 31. We would propose

10 that it be Manitoba Hydro Exhibit number 110. The

11 undertaking is for Manitoba Hydro to provide provision

12 of DSM plan evaluations from the perspective of the

13 Manitoba Hydro impact with the utility cost incentive

14 and loss revenue included.

15

16 --- EXHIBIT NO. MH-110:   Response to Undertaking 31

17

18   MS. MARLA BOYD: And if you'd like to

19 take just a moment, I think if Mr. Wojczynski sort of

20 walks you through it, it will be a little easier to

21 understand.

22

23 MANITOBA HYDRO PANEL 4 CONTINUED:

24   ADAM BORISON, Previously Sworn

25   DAVE BOWEN, Previously Sworn

2447

1   DAVID CORMIE, Previously Sworn

2   JOANNE FLYNN, Previously Sworn

3   BILL HAMLIN, Previously Sworn

4   TERRY MILES, Previously Sworn

5   DAVID JACOBSON, Previously Sworn

6   DEAN MURPHY, Previously Sworn

7   IAN PAGE, Previously Sworn

8   ED WOJCZYNSKI, Previously Sworn

9

10   MR. ED WOJCZYNSKI: If you would like,

11   I'll just give a very quick explanation. Manitoba

12   Hydro had provided on Monday, I guess it was, the

13   analysis of the levels of DSM on a TRC basis, 'TRC

14   basis' meaning it's the cost to -- not to Manitoba

15   Hydro, per se, but to Manitoba Hydro and the customers

16   together. And rate impacts are ignored in that. And

17   that's the societal test, in effect, like -- like a

18   societal test for DSM. And -- and that's the primary

19   one used to evaluate is DSM economic or not.

20   The second test that is applied is,

21   well, what happens to the rates when you -- at

22   different levels of DSM? And the financial people are

23   working on providing that. And we've given a schedule

24   for that earlier.

25   What we had indicated the day of the

2448

1 undertaking is that we could provide an evaluation of -

2 - an NPV evaluation of what the impact would be to

3 Manitoba Hydro alone, including the impacts on -- on

4 rates and the reduction of domestic revenue from the

5 different levels of DSM, and it's not as good as the

6 financial analysis, but it gives you a preliminary

7 indication of what you will see in the financial

8 analysis.

9   So that's what this is. And what it

10 is, is if we could just look at the All Gas column, and

11 you'll see that it starts at zero, so we're using the

12 base DSM as -- as the starting point, as the reference

13 point here. Base DSM being the DSM from 2013 that

14 you've heard about before, and then you just go down

15 the column. So you can -- you only compare these

16 numbers down the column, not across the rows.

17   So assuming the All Gas Plan, we varied

18 the levels of the DSM, and you can see that on Manitoba

19 Hydro's net revenues, going from base DSM to Level 1

20 DSM is positive. Going to Level 2 is positive. Level

21 3 is -- is positive. One -- one moment. I -- I just

22 got mixed up. There's a reason we're explaining this.

23 Sorry, let me start that again.

24   Going from base DSM to Level 1 DSM, you

25 see it increases from zero to four twenty-six (426).

 1 That's positive. Going from Level 1 to Level 2 is

 2 positive, and that's going four twenty-six (426) to

 3 seven twenty-three (723). But then you see we drop

 4 from seven twenty-three (723) to three seventy-five

 5 (375). That's negative.

 6   And so that, from a Manitoba Hydro point

 7 of view, there's a -- there's a -- a overall reduction

 8 in revenues by going from two (2) to three (3), which

 9 will imply there will be an increase in rates. The

10 other levels you would expect overall in the long term,

11 they would be -- the -- they would be favourable and

12 have a reduction in rates.

13   So this con -- this is consistent with

14 our economic analysis from a -- a TRC point of view

15 that says, Levels 1 and 2 are good, and Level 3 is

16 uneconomic, or in this case, Level 3 causes rate

17 increases.

18   We also looked at Level 2 DSM with the

19 pipeline load, and Level 3 DSM with the pipeline load,

20 and you see in that case, you go from 15 million

21 positive for Level 2 DSM with the pipeline to minus

22 three forty-three (343) with the Level 3 DSM with the

23 pipeline load, so it's the same story.

24   Going to level 3 DSM is unfavourable

25 from this metric, and would suggest that there would be

2450

1 rate increases in the long term with that plan.

2   If you look at Plan 5 or Plan 14 --

3 let's just look at Plan 14. It's the same story. If

4 you go from base DSM to Level 1, it -- it goes up to --

5 to one seventy-six (176), then it goes up to three

6 ninety-three (393), and then when you go to Level 3, it

7 drops.

8   And again, from Level 2 DSM with the

9 pipeline to Level 3 with the pipeline, it gets more

10 negative, so it's -- it's a consistent story regardless

11 of which plan you have. Going -- increasing the DSM up

12 to Level 2 is positive, and then going above that is

13 negative. Thank you.

14

15   (BRIEF PAUSE)

16

17   THE CHAIRPERSON: Thank you, Mr.

18 Wojczynski. Over to you, M. Hacault.

19   MR. ANTOINE HACAULT: Bonjour, M.

20 President. Good morning, members of the panel. First

21 an administrative matter. Mr. Byron Williams had

22 indicated yesterday that MIPUG and CAC had combined

23 together to send some pre-asks on Wednesday to Manitoba

24 Hydro, so we have provided to Board secretary the list

25 of six (6) Pre-asks, and we would propose to have that

2451

1 list marked as Exhibit MIPUG-21.

2

3 --- EXHIBIT NO. MIPUG-21: List of six (6) Pre-asks

4   from MIPUG and CAC to

5   Manitoba Hydro

6

7   MR. ANTOINE HACAULT: We believe that

8 number 2 in that pre-ask has been substantially

9 answered.

10   MS. MARLA BOYD: I wonder if you have

11 hard copies of that? It just popped up in my email a

12 couple of minutes ago, so my panel hasn't looked at it.

13

14   (BRIEF PAUSE)

15

16   THE CHAIRPERSON: This is Exhibit 21 of

17 MIPUG?

18   MR. ANTOINE HACAULT: Yes.

19

20   (BRIEF PAUSE)

21

22   MR. ANTOINE HACAULT: I would note for

23 the record that, again, Manitoba Hyd -- Hydro has been

24 doing an outstanding job trying to respond to the

25 remaining IRs. There's some, and we'll try to identify

2452

1 them in our second round, that are probably not as

2 important to be answered anymore. So we'll communicate

3 with Manitoba Hydro with respect to reducing the

4 workload and trying to knock off some of the ones that

5 we think may not be as much as a priority.

6   So the next matter administratively is I

7 had advised -- or canvassed counsel last night, given

8 that we have two (2) experts that need to leave this

9 afternoon, as to whether they would be prepared to

10 start this morning with their cross-examination, if

11 any, of those two (2) gentlemen. And there might be

12 some overlap with the Hydro panel on their questions.

13 But they indicated that that would be possible.

14   So my suggestion, with the leave of the

15 -- the Board, is that I would stand down my cross-

16 examination to allow them to ask their questions to

17 make sure any questions of those gentlemen have been

18 dealt with before they need to leave. And I would also

19 do the same when I start my cross-examination. The

20 ones I think they may be involved in, I would ask, and

21 then I would continue my cross-examination, if that

22 makes sense?

23   THE CHAIRPERSON: Yes, it would be.

24   MS. MARLA BOYD: Just before we move

25 one, Mr. Chairman, with respect to MIPUG Exhibit 21, we

1 do certainly appreciate the cooperation that MIPUG has

2 shown and we will appreciate any effort there is to

3 reduce the workload that's expected here. But in terms

4 of actually responding to each of the items in that

5 exhibit, I would suggest that Manitoba Hydro will be in

6 a position to respond to the request for information

7 there, in terms of putting our position on the record

8 as to whether or not these things can be accomplished,

9 after the break.

10   MR. ANTOINE HACAULT: That's

11 acceptable. Thank you very much.

12

13 CONTINUED CROSS-EXAMINATION BY MS. JESSICA SAUNDERS:

14   MS. JESSICA SAUNDERS: Good morning,

15 Mr. Chair. Jessica Saunders. So I have a few

16 questions for the panel related to the seventy-eight

17 (78) year study period. While I think my question is

18 going to be answered by Mr. Wojczynski, I noted earlier

19 that members of the panel have commented on questions

20 posed to other panel members. And so I thought it

21 appropriate to ask these questions now in case there

22 may be any comments from Drs. Borison and Murphy.

23   Jessica Saunders. I represent the

24 Manitoba Metis Federation. And so I'm just wondering,

25 what study period was used in Wuskwatim?

 1   MR. ED WOJCZYNSKI: My recollection it

 2 was thirty-five (35) years.

 3   MS. JESSICA SAUNDERS: Okay. Has

 4 Manitoba Hydro expanded the study period in considering

 5 the PDP beyond that which was used in -- it obviously

 6 has expanded the study period, and I'm just wondering

 7 why?

 8   MR. ED WOJCZYNSKI: In Wuskwatim, how -

 9 - we -- just like in -- in this NFAT -- in the

10 Wuskwatim NFAT, just like this NFAT, the Hydro projects

11 there ha -- also had, of course, a sixty-seven (67)

12 year life, which was beyond the thirty-five (35) year

13 study period. In Wuskwatim NFAT, how we dealt with

14 that was we calculated residual value. And that is the

15 value of the asset at the end of the study period, how

16 much is remaining of that asset. We calculated a

17 residual value using the salvage value technique.

18   And -- and what that is, it -- it

19 calculates -- at that point if you've got forty-four

20 (44) years of life left, you determine how much of the

21 asset effectively has been used or depreciated in a --

22 in -- and with an even use of the project over each of

23 the years. So you allocate the project's use over each

24 of the years and effectively calculate a depreciation

25 and then say at the end of that, What's the NPV of --

2455

1 of the remaining asset.

2   That only -- that does not really

3 calculate the benefit of the project beyond the thirty-

4 five (35) years. It just says how much of the asset

5 value is left. A -- and that's a poor estimate of the

6 residual value. A better estimate of the residual

7 value is to do an estimate of what is the market value

8 of that asset at the end of the study period.

9   So we decided, as a whole bunch of

10 lessons learned from Wuskwatim, to do a number of

11 things differently in our evaluation process. You've

12 already heard about some of them, and the -- the --

13 perhaps one of the biggest ones is we went and dealt

14 more thoroughly with -- with uncertainty analysis and

15 risks and scenarios, and did a whole bunch of work on

16 risks that were not done on Wuskwatim, including using

17 the probabilistic scenarios.

18   Another thing we did was to improve the

19 method of estimating that residual value, and that was

20 through using a second study period that was not a

21 full-scale, detailed study period; it was an estimation

22 of the competitive market value of that asset. So

23 that's why we did that.

24   MS. JESSICA SAUNDERS: Thank you.

25 Those are all my questions.

 1   MR. CHRISTIAN MONNIN: Merci, Messr.

 2 President. Earlier this week, Mr. Miles asked me how

 3 it was back over here, and I said it was fine. But

 4 subject to the -- the change in time, the hour change,

 5 a little bad. But I'm pleased to say that on a clear

 6 day, I can see My Friend, Mr. Hombach, across the way

 7 here.

 8   MR. SVEN HOMBACH: And on that note, if

 9 you'd like to move to the front, I see that there's

10 currently an empty chair.

11   MR. CHRISTIAN MONNIN: I -- I prefer to

12 -- to pontificate from this vantage point, thank you.

13

14 CONTINUED CROSS-EXAMINATION BY MR. CHRISTIAN MONNIN:

15   MR. CHRISTIAN MONNIN: Dr. Borison, I

16 just have some questions for you with respect to

17 utilitarian, rather than regret, approach that's set

18 out in -- in your report. And we did provide a book of

19 documents, and if you could bring that up to page 7 and

20 8, Tab 1, please.

21   THE CHAIRPERSON: M. Monnin, we should

22 probably assign an exhibit number to this before you

23 start.

24   MR. CHRISTIAN MONNIN: Yes, Mr. Chair.

25 I -- I believe this would be 7-2 from Hill Co. on the

2457

1 exhibit list.

2

3 --- EXHIBIT NO. HILL-7-2: Book of documents

4

5 CONTINUED BY MR. CHRISTIAN MONNIN:

6   MR. CHRISTIAN MONNIN: Dr. Borison,

7 some very simpleton questions from -- from me here. Is

8 -- is utilitarian the same as expected value?

9   DR. ADAM BORISON: Technically, it's

10 the same as expected utility, but very similar.

11   MR. CHRISTIAN MONNIN: Okay.

12   DR. ADAM BORISON: If you'd like me to

13 explain more about that -- utility theory basically --

14 not electric utility theory, but utility theory --

15 takes numbers and turns them into some measure --

16 utiles, they're called -- some measure of their quality

17 or their value. And then you take the expectation or

18 average of those.

19   In most economic financial applications,

20 you typically don't do that piece very often. So you

21 would take the expectation over the actual financial

22 values. So I use the term 'expected utility', but most

23 often that is equivalent -- is very close to an

24 expected value kind of approach.

25   MR. CHRISTIAN MONNIN: And -- and with

2458

1 respect to -- and in reading -- looking at page 7 and 8

2 of the exhibit in front of you, which, depending on

3 where you look on your report, it's either page 18 of

4 24 or page 15.

5   Having gone through that, do I

6 understand your -- your opinion in there is that La

7 Capra has adopted or uses the regret approach?

8   DR. ADAM BORISON: Yes, but let me

9 clarify that. The term 'regret', obviously we all use

10 that term, so it's not always a technical term. In --

11 from my understanding, in this form of analysis, the

12 fundamental principle behind the regret approach is to

13 find some base alternative, kind of business as usual,

14 and compare your life to that.

15   And to the extent La Capra did that with

16 the All Gas alternative, it is the regret approach. In

17 other words, the La Capra approach, as I understand it,

18 puts zeros in every scenario with the All Gas

19 alternative, thereby saying, I'm going to compare

20 myself to how I would have felt if I had done the All

21 Gas in that scenario.

22   That is the essence of regret:

23 disappointment, relief. It's not, How much do I

24 actually have? But, How would I have done compared to

25 if I'd done something different? And that is a

2459

1 descriptive approach. That particular approach, people

2 take that all the time. We all do that in -- we --

3 that's the way we often think of life, right? I should

4 have done that instead, or, I'm so glad I didn't do

5 that.

6   But in -- that's why it's called

7 descriptive. It describes what we do. But in

8 practice, when you try to recommend what to do, in

9 general, that's not viewed very favourably. Instead,

10 we should say, How better off am I, not, Oh, I really

11 would have been better if I had done something

12 different.

13   And the expected utility, or utilitarian

14 approach, does have a base, which, in most of our

15 graphics, is an All Gas case, but it is All Gas

16 ref/ref/ref. It is a single fixed point as a -- just

17 as an arbitrary, really, reference point, and we

18 compare our situation to that fixed point, and that is

19 the expected value, expected utility, or utilitarian

20 approach. How much better off or worse off am I

21 really, not, How much better off or worse off am I than

22 I would have been if I'd only been smart enough to do

23 something different?

24   And that's why call it that they -- the

25 approach they have taken. Whether they would like to

2460

 1 call it regret or not is, I believe, in the literature,

 2 generally viewed as a regret approach. I hope that

 3 makes sense.

 4   MR. CHRISTIAN MONNIN: So it's regret

 5 approach but not necessary regret approach?

 6   DR. ADAM BORISON: No, it is a regret

 7 approach. The part they did not do, as far as I could

 8 tell in that -- in the -- in the paper, is often when

 9 you apply -- when you calculate, there's disappointment

10 or relief, which is -- with the -- all the zeros, and

11 then you compare everything and say, How much better do

12 I feel or not?

13   Often, in the regret approach, you apply

14 some fancy terminology, mini/max, maxi/min. You apply

15 some approach to deciding how much regret or

16 disappointment or relief you want to have, so there is

17 that difference. They did not apply this mini/max or

18 maxi/min particular philosophy to those numbers.

19   But using the numbers that way, in my

20 opinion, is effectively taking a regret view, which,

21 again, is different than an expected utility view, and

22 the evidence of that is in the vertical lines you see

23 in their work for All Gas, as if that has no

24 possibility of risk, which I don't think makes sense.

25   That's because you're now saying, All

2461

1 Gas, that is the -- the baseline, and I'm going to

2 think about everything I do as how it compares to how I

3 would have felt if I'd only done that. And that --

4 again, descriptive. Very common that you might think

5 that way, but not generally viewed as a good way of

6 recommending decisions.

7   MR. CHRISTIAN MONNIN: Thank you, Dr.

8 Borison. Then could you please go to the next page of

9 this -- this tab? That would be page 8, and the third

10 full paragraph, Dr. Borison, which starts with:

11   "In the utilitarian approach, each

12   outcome represents a difference

13   between a specific plan and a

14   specific scenario and fixed-based

15   value."

16   The next sentence:

17   "Manitoba Hydro considered and

18   rejected the alternative regret

19   approach, (except as a supplement),

20   where planned outcomes are compared

21   with a specific scenario on a

22   scenario-by-scenario basis."

23   I need to better understand that

24 comment. What do you mean by that?

25   DR. ADAM BORISON: What I meant by that

2462

1 is, as I think there's some evidence for that in some

2 of the articles that I think we've referenced, it is

3 certainly natural for stakeholders to ask the question,

4 How does this compare to what would have happened if

5 we'd done something different?

6   So my view, and I -- I have to ask

7 Manitoba Hydro, I think, if they -- if they say that

8 view, I think they do, is that it is -- there is no

9 reason that you might not want to do something like

10 that to display for people who are interested what the

11 implications might be. And, in fact, I think that's

12 what many of the experts in that field would say. This

13 is a useful thing to do. People have disappointment.

14 They have relief. It is a reasonable emotion to have.

15   It wouldn't be surprising if someone

16 were to ask that question, If we do the plan A are we

17 all going to be really upset? Is the PUB or someone

18 going to be really mad? That, Boy, you wish you would

19 have done something different.

20   And so I think my feel -- feeling was

21 that showing those as an output is very reasonable for

22 people that might have that interest. But again,

23 that's separate from saying, How would you actually

24 recommend we make that decision, which I view as a

25 distinct -- a separate activity. So that's what I mean

2463

1 by a supplement.

2   MR. CHRISTIAN MONNIN: And do you have

3 any -- like, can you point to any particular area or

4 section of the filings where Hydro has used that as a

5 supplement?

6   MS. JOANNE FLYNN: We did supply the --

7 the regret table in the Appendix 9.3 for kind of this

8 very reason, that -- just to show it there and so that

9 people could have that chance to look at it from that

10 descriptive perspective, and it was also referenced in

11 the executive summary of the filing.

12   MR. CHRISTIAN MONNIN: And -- and thank

13 you, that -- that's very helpful, and I -- I think

14 we're on the same wavelength, which for me is -- is

15 good.

16   If you go to Tab 5 of our book of

17 documents, which ought to be page 13 -- no, that would

18 be page 14 you're on, I believe, at least from what I'm

19 reading. Let me go back.

20

21   (BRIEF PAUSE)

22

23   MR. CHRISTIAN MONNIN: Sorry, page 12.

24 I apologize for the quality, but Ms. Flynn, is that --

25 that's the table that you're referring to, Appendix

2464

1 9.3?

2   MS. JOANNE FLYNN: Yes, it is.

3   MR. CHRISTIAN MONNIN: Okay. And --

4 and again, if you can go to page 11, that's Table 2 of

5 the executive summary.

6   That's again where you're using what

7 I'll term as the regrets approach?

8   MR. ED WOJCZYNSKI: Yes.

9   MR. CHRISTIAN MONNIN: That's in

10 Chapter 14. And -- and one (1) last time, page 13 of -

11 - of the book of documents, please. Again, in the

12 executive summary it's Table 3.

13   Is this a -- a modified version of the

14 regrets approach?

15   MR. ED WOJCZYNSKI: Yes, but you can

16 calculate this table whether you use the regrets

17 approach or the utility approach.

18

19   (BRIEF PAUSE)

20

21   MR. CHRISTIAN MONNIN: And again, can

22 you enlighten me, Dr. Borison, the purpose of why we --

23 we use --

24   MR. ED WOJCZYNSKI: All right. I can

25 back up. I said -- I said it was also -- it can be

2465

1 calculated with the utility approach. Actually, this

2 was calculated with the utility approach.

3   MR. CHRISTIAN MONNIN: Okay.

4

5   (BRIEF PAUSE)

6

7   MR. CHRISTIAN MONNIN: And -- and the

8 reason why we used the regrets approach on at least two

9 (2) of the tables that we've gone through, again, is --

10 is -- that was -- what was the purpose of that as

11 opposed to a utilitarian approach right through the --

12 the report?

13   MR. ED WOJCZYNSKI: The executive

14 summary was intended to be an introductory explanation

15 to the whole business case, and we had the overview,

16 which is like an abstract, and then we had the

17 executive summary. And the -- the purpose of having

18 used the regret approach there is it's more -- and it -

19 - it's easier for someone who is first trying to

20 understand the -- what's happening with the different

21 plans, and with the variation in the economics.

22   It's -- it's more easily intuitively

23 understandable when looking at that, but it's -- it's

24 not as good for decision making, but the intent in the

25 -- in the executive summary was to give some

2466

1 preliminary introductory understanding, and then once

2 people had that, then it would be easier for them to

3 deal with the more -- slightly more complicated

4 approach was the utilitarian, and that was a conscious

5 decision by me as the author of the executive summary.

6   MR. CHRISTIAN MONNIN: Thank you. Dr.

7 Borison, if you could turn to page 18 of the book of

8 documents? Now, this is a -- it's a -- an IR Response

9 from La Capra, LCA079. It's four (4) pages. And, Mr.

10 Chair, I appreciate this is quite likely the first time

11 that Dr. Borison has the opportunity to read it. And

12 I'm wondering if we could give him the oppor -- in

13 fairness, provide him with a few minutes to -- to

14 digest what's in this rather lengthy IR?

15   DR. ADAM BORISON: Which tab is it?

16   MR. CHRISTIAN MONNIN: It would be Tab

17 8, Dr. Borison, starting at page 18. It's a four (4)

18 page IR.

19

20   (BRIEF PAUSE)

21

22   DR. ADAM BORISON: I think I understand

23 the basis -- basic idea, yes.

24   MR. CHRISTIAN MONNIN: And -- and

25 again, appreciating that you've just had the

2467

1 opportunity to first read this, but also appreciating

2 that you know this stuff a lot better than -- than

3 myself.

4   Having read this, has this changed the

5 opinion that you have at all in -- in your report that

6 we referenced earlier?

7   DR. ADAM BORISON: In a word? Not at

8 all, no. In a single word, no. I can explain why if

9 you'd like.

10   MR. CHRISTIAN MONNIN: I -- please, do.

11   DR. ADAM BORISON: The fundamental

12 question that I believe is -- or maybe the -- perhaps

13 there's misunderstanding of what was done and what --

14 but I think there's a -- a very fundamental view of

15 what should be done.

16   All -- virtually all the theory about

17 how to do decision making on uncertainty says you

18 should compare things to a fixed base. That you should

19 -- you should look at your current wealth, let's say,

20 and say, If I did this, I'd be this much wealthier; if

21 I did that, I'd be that much wealthier.

22   That is the fundamental theoretical

23 basis of utility theory, utilitarian, that you want to

24 look at actually how you -- what you've got -- you

25 know, I'm wearing certain clothes -- and -- and think

2468

1 about what the uncertainty and risk in that might be,

2 and that's how you make a decision.

3   That's -- that is what Manitoba Hydro

4 did. It may have been called, at times, regret.

5 Regret may have a -- there may be an element of, in

6 some texts, about regret, but that is basically the

7 approach. What is the real impact this has on me, the

8 customers, stakeholders? That is what the utility

9 theory is all about.

10   The approach that is descriptive, that

11 might be helpful but is not really well regarded as a

12 guideline, is to -- as I said, to compare where you are

13 to what would have happened in that particular

14 scenario. And I use the term -- I -- I refer to that

15 as the regret approach. I think maybe there's --

16 perhaps -- again, regret approach has more elements to

17 it than that. But that is the fundamental difference,

18 is comparing -- having a bunch of zeros for any

19 alternative in all scenarios is effectively saying, I'm

20 going to compare things to what might have happened in

21 that scenario.

22   So the two (2) -- the fundamental

23 difference is there is a -- where there's a single zero

24 on our tables, most of them, there is a fixed base.

25 And even -- even gas has risk with respect to that

2469

1 zero. There's another alternative that has zeros

2 everywhere for one (1) alternative across the board,

3 and that has no risk, which you can't regret that one,

4 because it's got all zeros.

5   And so that second one, whatever you

6 want to call it, I think is, frankly, unconventional

7 and misleading, comparatively speaking. So I think

8 there may be some confusion about terminology, which is

9 perfectly reasonable, given all the words have been

10 thrown around.

11   But this -- no, this does not change my

12 view that the fundamental approach that was taken by

13 and large by Manitoba Hydro is more appropriate and

14 that the use of this regret idea, or a lot of zeros in

15 a column, is more a supplement to provide an insight to

16 stakeholders who -- who like to think in those terms.

17   So it has not changed my opinion.

18   MR. CHRISTIAN MONNIN: If we could go

19 to page 20 of the book of documents, please.

20   MR. TERRY MILES: Could we just have

21 one (1) minute? I just found the reference for Dr.

22 Borison in the LCA, their technical Appendix 9A, page

23 153. I just wanted to give Dr. Borison a chance just

24 to look at that, that's where the -- the quote was

25 taken from, if that's okay.

2470

1   MR. CHRISTIAN MONNIN: Absolutely, but

2 I could -- the question I was going to ask doesn't

3 refer to that quote, but thank you.

4   DR. ADAM BORISON: Yes. No, that's

5 what -- I recall that, yes. Thank you.

6   MR. TERRY MILES: I just wanted to give

7 him the background of the code, because the code is

8 small, so -- and the context around it.

9   MR. CHRISTIAN MONNIN: Okay. Thank

10 you. Just a second, please. Back to page 20, starting

11 at line 22:

12   "Further, we note that Manitoba

13   Hydro's analysis and analysis

14   provided by LCA is an uncertainty

15   analysis. Neither analysis is a

16   regrets-approach decision making.

17   The proper comparative analysis of

18   alternative development plans under

19   uncertainty can be useful whether a

20   decision is to be made on an expected

21   value criterion, a regrets-based

22   criterion, or any other decision

23   criterion.

24   LCA's analysis provides information

25   that one could use for regrets-based

2471

1   decision criterion, but our report

2   does not offer any recommendation on

3   such criterion."

4   Is it possible that there are two (2)

5 different ways to do an uncertainty analysis?

6   DR. ADAM BORISON: There are many ways.

7 Let me see if this helps a little further. As you

8 pointed out, I think there are -- there are two (2) --

9 and I think as I've mentioned, there are two (2) pieces

10 that could be different. One (1) is the numbers you

11 calculate, and the other is how you process those

12 numbers to come up with a recommendation.

13   And I think what LCA seems to be

14 focussing on is the second one, which is, Once I've got

15 the numbers, do I take an expected value, do I find the

16 maximum, the minimum? And that is absolutely correct,

17 that regret often takes a maximum/minimum kind of

18 approach.

19   But what I see that they are missing

20 here is the calculation of the numbers in the first

21 place. That's where -- that's the focus. My view is

22 that, having a quilt that has zeros for any alternative

23 in all scenarios is just not appropriate. Whatever

24 criterion you apply to that -- I can't -- there's no

25 criterion I can apply to a bunch of zeros to come up

2472

1 with anything that's risky. Can't do it.

2   So my view is that the fundamental

3 calculation of getting -- the fundamental approach to

4 coming up with the numbers themselves, independent of

5 what I do after that to process them, which is ver --

6 fairly relevant, is just not what I would recommend.

7 That's the distinction.

8   So here, again, to repeat, they're

9 focussing on how I process the numbers. They seem to

10 have missed the fact these two (2) approaches are very

11 different just in terms of the basic numbers that are

12 calculated.

13   MR. CHRISTIAN MONNIN: And my takeaway

14 from that, Dr. Borison, is that is your opinion that

15 where they write:

16   "Neither analysis is a regrets

17   approach to decision -- decision

18   making."

19   Do I understand that your opinion is

20 that's incorrect?

21   DR. ADAM BORISON: Again, I would

22 hesitate. People have different backgrounds. It is

23 certainly possible that in some back -- in some worlds,

24 when you say 'regret approach,' you are really

25 referring to, as I said, this mini/max or maxi/min

2473

1 criterion. So I would hesitate to say -- to be too

2 strong about that, but what I would say is that, in my

3 experience, the way you calculate the numbers is a

4 critical piece of the approach you take, and that one

5 (1) -- the approach that was taken here is more

6 associated with the utility theory and the expected

7 utility approach and the other is more associated with,

8 and to me, a fundamental part of the regret approach.

9   So I don't know if that answers your

10 question directly, but that's -- that's how I would

11 phrase it. I -- I -- yeah, that's essentially what I

12 would -- how I would calculate it.

13   MR. CHRISTIAN MONNIN: That -- that

14 assists us a lot. Thank you very much. Again, if I

15 understand it -- it's quite likely that I don't.

16   If I understand, it's -- one (1)

17 doctor's regret approach might not be another doctor's

18 regret approach?

19   DR. ADAM BORISON: Well, of course I --

20 yeah. You would not be surprised if I think my view is

21 the -- is the right one or the better one. Again, I

22 would -- I'd have to review the literature more

23 closely, but I do think that many people -- I do

24 believe that the -- the -- a fundamental part of the

25 regret approach is the fact that you try to calculate

2474

1 regret. And so when LCA recommends, Calculate regret,

2 take the expected regret, or some other metric, I view

3 that as pretty close to the regret approach and that

4 they're recommending something like that.

5   So I -- I think -- that's -- in my

6 opinion, their approach is strongly recommending --

7 well, yeah, a regret-like approach, if we can call it

8 that. But it is -- it is essentially a regret -- a

9 regret view, where regret is again how you would have

10 done compared to something else you could have done.

11 And that's the essence of regret.

12   MR. CHRISTIAN MONNIN: I tweaked the --

13 the last few words you said, that they are strongly

14 recommending. And I'm trying to square that with line

15 26 and 27 again on the page in front of you:

16   "LCA's analysis provides information

17   that one could use for a regrets-

18   based decision criterion, but our

19   report does not offer any

20   recommendation on such a criterion."

21   DR. ADAM BORISON: Again, we're getting

22 -- it's -- it's quite technical, and -- and certainly

23 stop me if you think we're going too far down that

24 path. As I said, I think -- and I'd be happy to have

25 this conversation directly with them. I -- I do think

2475

1 that the essence of -- there -- there are these two (2)

2 distinct parts of doing an analysis. One is coming up

3 with a number for every alternative in every scenario.

4 The other is saying, Now that I have that quilt of

5 numbers, how do I process it to come up with an answer?

6   And they're basically saying, We didn't

7 -- on that processing part, we didn't recommend a

8 mini/max, maxi/min, some -- we didn't recommend some --

9 some approach to that. And they're saying, so we're

10 not recommending regret. I -- I understand they said

11 that.

12   But what they did say is -- the numbers

13 you calculate are only used, in my experience, when

14 someone is thinking about regret. Taking the expected

15 value of that -- of that -- take -- taking an

16 expectation of those numbers is essentially an

17 expectation of regret.

18   And so that's why I keep saying, even

19 though they do not like to call it that, they have

20 essentially been recommending the essence of a regret

21 approach. That's -- that's the -- and so I'm saying

22 the same thing many times, but that's -- that's my

23 view.

24   MR. CHRISTIAN MONNIN: So a rose by any

25 other name is still a rose, and regardless of what they

2476

1 say, it's a regrets approach?

2   DR. ADAM BORISON: I think it's

3 fundamentally that, but I also -- I also don't think

4 the wording -- the -- what they -- what one calls it I

5 don't think is the issue, right? It's -- it's, Is it

6 in fact sensical (phonetic) -- is -- that's a -- that's

7 a word -- sensible to have an alternative that has all

8 zeros in it?

9   What does that mean? What does it mean

10 to have any -- you could have put PDP. You could have

11 said, That's got all zeros and we're going to compare

12 regret to that. What is that? I mean, that -- to me,

13 whether -- whatever you call that doesn't make sense to

14 me.

15   Any alternative you choose has risk,

16 right? Even the All Gas alternative, if gas prices go

17 way up, we're not going to be happy, our customers

18 won't be happy. And we'd like an approach that

19 reflects that.

20   Any approach that puts zeros misses

21 that. And I -- again, and I'm not that concerned what

22 you call it. I call it regret. But I think that

23 particular vision, in my mind, doesn't quite match what

24 should be done.

25   MR. CHRISTIAN MONNIN: Okay. Thank

2477

 1 you.

 2   MR. RICHARD BEL: Sorry. I was looking

 3 at page 20. I'm getting confused on who's doing what.

 4 So on page 20, lines 7 to 17, which is an extract from

 5 something, it says -- it's talking about Manitoba

 6 Hydro's approach. And the criticism La Capra's giving

 7 is that the All Gas Plan is ruled -- ruled out, I

 8 think, in that quote.

 9   Am I correct? If you -- if you look at

10 this, page -- line 7 to 17, so who's using the -- the

11 all zeros? I think it's -- these guys are saying

12 Manitoba Hydro is. No?

13   DR. ADAM BORISON: No, no. The

14 confusion may be that when you do the expected utility

15 approach or similar approach, you have to have a fixed

16 base --

17   MR. RICHARD BEL: Right.

18   DR. ADAM BORISON: -- which in general,

19 although not always, is arbitrary because everything

20 can be moved by that. And in this work we chose the

21 base to be All Gas in the ref/ref/ref case, so there is

22 a zero in that matrix. There could have been a zero

23 somewhere else. We could have chosen something else as

24 the base, but there is a single zero in the -- in this,

25 which is a floor.

2478

1   And again, you could think of this from

2   your perspective in making personal decisions. You

3   could make -- you could take your bank account and have

4   that as your base. You could take your bank account

5   and your house as having that as your base. You could

6   have zero as your base, and think about your

7   investments. And -- but the base isn't really the

8   issue. It's, How much does that change what I actually

9   own?

10   And, so here, the base is a single view

11   of the world, one (1) zero, All Gas ref/ref/ref, and

12   that could be moved around and it wouldn't make a

13   difference. In the approach that I believe LCA is

14   recommending, there is an entire column, which I think

15   typically was the All Gas one, that's all zeros, and

16   that is -- that is their recommendation, whatever we

17   want to -- I think, whatever we want to call it. Does

18   that help?

19   MR. RICHARD BEL: I think so.

20   DR. ADAM BORISON: Okay.

21   MR. RICHARD BEL: Thanks. Okay.

22   DR. HUGH GRANT: Can I pile in on this?

23   I find the regret versus utilitarian scenarios sort of

24   secondary to the sort of bigger issue around, how are

25   you going to get from expected values to, you keep

2479

 1 saying expected utility?

 2   DR. ADAM BORISON: Yeah, sure. Right.

 3   DR. HUGH GRANT: Quite a different

 4 thing, and so clearly, we need some sort of assumption

 5 about peoples' risk preferences, or we need to think as

 6 a utility, or as a utility Board about how to translate

 7 what's in the best interest of the public in terms, Are

 8 they risk averse or risk takers?

 9   Now, I would assume that most Hydro

10 consumers are risk averse, that they don't want to

11 gamble on a hundred dollar ($100) bill one (1) week and

12 three hundred dollars ($300) in, you know, the next.

13 They'd rather have -- lock in at some sort of more --

14 at a different rate.

15   So if that's, in fact, the case, is it

16 really sufficient in all of this analysis to just say

17 under the 10 percent -- percentile risk scenario, or

18 the 90 percent, you know, these are the best options?

19   DR. ADAM BORISON: Let me speak to

20 that, but I do think the -- and Joanne may want to

21 speak to that, as well. What -- the role that this

22 analysis played in the discussion we're having now is

23 around the economic evaluation. And additional work

24 was done to look at other issues in multiple accounts,

25 and financial evaluation, and understand those -- those

2480

 1 issues and exactly what you're saying. That customers

 2 -- others may have different attitudes about risk, and

 3 they don't want to have high rates. All those things

 4 were touched upon elsewhere.

 5   For this work, we were really trying to

 6 understand largely what it makes -- what's -- you know,

 7 what is the economic wealth being created? And as you

 8 -- I'm sure you know, the theory there is more focussed

 9 on expected value than expected utility, so even

10 showing S-curves, some people might say is

11 inappropriate because that's not how economics work.

12   But so, I completely agree with you.

13 What I'd say is, I don't believe this work was the be-

14 all and end-all of the understanding of what this might

15 do to various stakeholders in various cases, but I'll

16 defer to the -- to the -- Ed and Joanne.

17   MR. ED WOJCZYNSKI: I'm not sure if

18 this is going to be helpful or not, but I'll try.

19 First of all, in terms of expected value, whether you

20 use the regrets approach or the utilitarian approach,

21 the expected value -- expected NPV doesn't change when

22 you look at the different between the plans, so you get

23 the same expected value.

24   It's when you start looking at the risks

25 in the P10s and the P90s that you start getting some

2481

1 differences, and so when you're assessing risk and

2 you're assessing upside you want to be able to do that

3 properly.

4   But in the end, obviously the NP -- the

5 ref/ref/ref is the single scenario we place the most

6 importance on. It's our single best estimate of the

7 future. The expected value, what -- regardless of

8 which technique you use to calculate it, is a very

9 important one, because it takes into account the full

10 range of scenarios.

11   And then thirdly, from an economics

12 points of view, we look at the individual scenarios

13 that have risk to understand what's driving the risks

14 and the upsides, and you need to understand, obviously,

15 if export prices are high, these plans will do better,

16 if gas prices are low, these prices -- scenarios are

17 better. We all need to understand that, and I think we

18 have that.

19   So we take all of that information and

20 combine it with the other factors that we talked about

21 so many times, all those perspectives, and so you --

22 the utilitarian approach -- I'm not an expert on this

23 issue, but I -- but I'm -- by all the people who are

24 experts, I'm informed that the utilitarian approach

25 gives us the assessment of risk and uncertainty that is

 1 more meaningful.

 2   So I hope that helps.

 3   DR. HUGH GRANT: Can I pose it this

 4 way? Suppose an All Gas approach and some other plan

 5 with Conawapa had identical sort of expected values but

 6 the distribution of one was widely different from the

 7 other.   So let's suppose for the sake of

 8 argument that Conawapa -- you roll the dice, it could

 9 work out tremendously or it could be a disaster, but it

10 had the same sort of overall expected value as an All

11 Gas approach.

12   So would your advice in that situation

13 be to take the risk-averse approach, which would be the

14 All Gas, you know, to avoid those -- you know, the

15 outcome with the more extended S-curve, I suppose, is

16 my question?

17   MR. ED WOJCZYNSKI: Yeah. We've

18 actually thought a lot about that, as you need to when

19 looking at the future having -- and as it always has

20 had. I've been doing planning for twenty-five (25)

21 years, and -- and I studied resource planning -- or

22 system planning in my -- in my master's, and there's

23 always been huge uncertainty. So you have to deal with

24 that and focus on it.

25   So if you end up having a situation

2483

1 where two (2) plans have the identical expected value

2 using the -- the weighted average cost of capital, so

3 what are the things we look at? First of all, it's not

4 that they give equal return. As we explained earlier

5 in this proceeding, if you have one (1) plan that has

6 much higher investment than the other, that in your

7 return on equity you're still going to get much more

8 return even though the weighted average NPV is the

9 same. So that's one (1) thing to keep in mind.

10   The second thing is we'd look at the --

11 the S-curve or the upside benefits, downside risks.

12 And in this case, Conawapa would have better upside

13 benefits and -- but the -- have a bigger risk than the

14 gas on the downside. I think that's your question.

15   In -- in that scenario, the first thing

16 we would look at is, if the downside risk happens,

17 could the Corporation survive, or is it -- is it

18 something that we're not going to be able to manage

19 that we can't mitigate somehow?

20   And so that is where we come into -- in

21 the Preferred Plan, we look and say -- and this is all

22 that discussion of learning yesterday -- if between now

23 and 2018 shale gas prices don't rise at all and stay --

24 and drop from where they are now, if they drop a dollar

25 and then stay at three fifty (3.50), and if none of our

2484

1 export contracts we're negotiating work out, and if the

2 capital cost, well, let's just say go up or stay the

3 same -- excuse me -- we -- we in that -- we have an

4 opportunity to push it back or to not proceed with

5 Conawapa in that bad situation. So we -- there's a way

6 of managing that risk.

7 But we wouldn't stop there. We'd say,

8 We have to look at all the other perspectives and look

9 at it from a provincial point of view. This isn't just

10 the economics to Manitoba Hydro. This is a choice of

11 the future energy supply in Manitoba for generations to

12 come.

13 And you have to look at the overall

14 perspective. This isn't just a private investor

15 deciding to what to do as their next investment. And

16 so we're looking at the economics in the long-term.

17 We're looking at the risks. We have to look at the

18 other perspectives.

19 We've talked about reliability energy

20 security. We obviously have to look at the rates, as

21 well. And -- and our analyses do say in the long term

22 they rates are lower, but in the short term they're

23 higher, so we know there's a balance in there.

24 The transfers to the province are

25 significant. There's no question they're large. And

2485

1 they -- those transfers do not help Manitoba Hydro.

2 But when you take the bigger society view in Manitoba,

3 the transfers are worth billion. And in the long run,

4 those are paid for out of the exports, not out of

5 domestic ratepayers.

6   In the -- in the short run, the domestic

7 ratepayers will be paying something more. But in the

8 long run, they'd be better off. And those billions of

9 dollars -- or 3/4 billion to $1 1/2 billion NPV, that

10 comes from exports. And then we look at the

11 environmental benefits, the social benefits, the ones

12 to the communities, the -- the training, all of those

13 things that is done in the fourth (sic) panel where we

14 do the social benefit cost.

15   So when -- so the simple story is if

16 they have exactly the same expected value, as long as

17 we can manage the risk and we don't think it's an

18 unacceptable risk and we have all these other benefits,

19 you go with the thing that has all these other

20 benefits.

21   DR. HUGH GRANT: Can I just take that

22 one (1) step further, or maybe down another tangent?

23 Just following up what you just said about transfers

24 and payments and water rights and stuff, would it be

25 fair to say that Manitoba Hydro had never done a pure

 1 economic evaluation per se, in that you look at a

 2 market valuation, which is Hydro's perspective, and you

 3 look at the impact on the government perspective of the

 4 economy.

 5   But at -- at any stage is there an

 6 evaluation done to say, These are the total resources

 7 being used and these are the benefits being generated

 8 regardless of who receives the benefits? And I say

 9 that because within the La Capra report, I think it

10 said that Manitoba Hydro rightly argues that water

11 rights are a pure income transfer. They're not a

12 proper cost. There's no benefit being delivered for

13 the payment.

14   And so if you take that out of the

15 analysis as not a cost, then the present values of all

16 these projects goes up -- goes up immensely, right?

17 And so, you know, I -- I think I would have wanted to

18 start with that pure analysis to say, Are these project

19 themselves attractive in terms of net present value?

20 Now let's talk about the distribution of the benefits

21 from those, whether it's going to water rights to the

22 province, or to ratepayers or such?

23   MR. ED WOJCZYNSKI: Well, I -- I thank

24 you, panel member Grant, for that question and -- and

25 the -- and the Chair and -- and the rest of the panel.

1 I'm going to give you a very simple answer to that.

2 And that's at panel 4 (sic), we have that analysis.

3 And that's the social benefit cost analysis that is

4 being -- has been provided in the submission, will be

5 presented in panel 4 (sic).

6   And if I understood Dr. Grant's question

7 properly, I think that does provide that. And it

8 accounts for the transfers that are a benefit in the

9 long run to the Manitobans. It recognizes that, for

10 example, one of the adjustments is that a significant

11 amount of the employment from these projects are from -

12 - for Northern Aboriginal people, and -- and others in

13 Manitoba, but -- but specifically -- and there's a high

14 unemployment rate.

15   So whereas in the market valuation for

16 Manitoba Hydro, I don't know what the hourly rate is,

17 but I guess it doesn't matter, whatever the hourly rate

18 we've assumed, the -- one of the largest costs is

19 labour. So we call that total labour cost a cost to

20 Manitoba Hydro, which it is. But if you're taking

21 people who are unemployed or underemployed, and then

22 you're giving them a much higher salary, that amount is

23 actually a benefit to Manitoba and to Manitobans. And

24 so that is adjusted in this -- this analysis.

25   So that's one (1) example. So I think

2488

1 the analysis you're referring to is that one. And it's

2 in Chapter 13 of the submission, and will be discussed

3 in the fourth (sic) panel.

4   DR. HUGH GRANT: Okay. I won't

5 belabour it now then, but my suggestion is that there's

6 never a proper economic evaluation of the project's

7 specific -- these are the specific costs and these are

8 the specific benefits. But I'll pursue it at that

9 time, I guess.

10   MR. ED WOJCZYNSKI: Yeah. Maybe just

11 one (1) more comment that may help with that, but we

12 can pursue it more then. When you say, "the specific

13 project," I think you might be talking about, say --

14 are you talking about the plan or are you talking about

15 the individual project, like let's say Keeyask or

16 Conawapa?

17   DR. HUGH GRANT: Just calculating the

18 net present value of the different plans. I guess my --

19   MR. ED WOJCZYNSKI: Oh.

20   DR. HUGH GRANT: -- only point is that

21 La Capra says something that's actually, I think,

22 supportive of Hydro in the sense that they agree that

23 the water transfer rights and the capital tax are not a

24 true cost.

25   MR. ED WOJCZYNSKI: M-hm.

2489

1   DR. HUGH GRANT: They're a distribution

2   in the sense of the benefits if you -- these projects--

3   MR. ED WOJCZYNSKI: Yes.

4   DR. HUGH GRANT: -- are undertaken.

5   And so they shouldn't really be trea -- in a pure

6   economic evaluation that takes the actual resources

7   being used and the benefits being generated, you should

8   take those out. And then suddenly, because they're

9   quite substantial, suddenly the net present value of

10 all these projects rise significantly.

11   And I realize that the mark -- that's

12 not necessarily from Hydro's approach. They still have

13 to pay them, but yeah. But, yeah. But we'll -- we can

14 discuss that in --

15   MR. ED WOJCZYNSKI: Yeah. And that is

16 done in the social benefit one. And I might just add

17 something. There is a debate, a valid debate, on the

18 debt guarantee fee transfer, whether or not that is a

19 cost or whether it's a transfer, if we can

20 differentiate that way.

21   And in the social benefit cost analysis,

22 Dr. Shaffer did not include the debt guarantee fee

23 because of that. It's -- it's in between somewhere.

24 So to be conservative, he did not include that. And I

25 think that's consistent with what La Capra was

2490

1 suggesting, and -- and we don't argue with that.

2   In our presentation here this week, we -

3 -that's why we deliberately took the -- the water

4 rental and capital taxes, the first adjustment, and

5 then we put in the debt guarantee fee to -- to

6 differentiate between them, but I -- I think we'll have

7 a -- a fruitful discussion in the fourth week.

8   DR. ADAM BORISON: If I -- if I could

9 add just one (1) brief comment. The issue of risk

10 aversion and utility, and again, at the risk of too

11 technical, what we have done actually, as if you seen,

12 I think, is there was an effort to not only calculate

13 the expected value and talk about those differences,

14 which are very stable, as we've said, but also to

15 attempt to represent the -- the range and the

16 uncertainty.

17   And, in fact, I believe -- I could find

18 the IR exactly -- there were presentations on the

19 efficient frontier. What is the risk return tradeoff

20 between the expected value and -- and the downside

21 risk, and if you did -- if you did -- did feel risk

22 averse, which would you chose, and there was a

23 discussion about Plan 10, Plan 5, versus Plan 14, and

24 relative values and risks.

25   So we certainly are aware that it's not

2491

1 just the expected value, but you're right, we didn't go

2 as far to assess a -- a risk preference function and

3 apply that.

4   THE CHAIRPERSON: Just an observation

5 that while -- while corporately, Manitoba Hydro has

6 addressed the downside risk, you know, the -- the plan

7 did not work out as expected, and -- and you've

8 invested significant dollars and -- and we're into a

9 negative present -- net present value scenario.

10   The reality is, the base reference case

11 from a ratepayer perspective is three point nine-five

12 (3.95) per year for the next twenty-one (21) years.

13 That's the base case. If it goes south, we're into a

14 zone where it's much more than three point nine-five

15 (3.95) per year.

16   So part -- I think part of what we need

17 to think about is What's the risk to the ratepayer?

18 Manitoba Hydro may be able to -- be able to cope with

19 it, but that suggests to me that the ratepayer has got

20 to be the one bearing the load.

21   MR. ED WOJCZYNSKI: I agree 100 percent

22 with you. The -- the thing I would add to that, when I

23 talked about mitigating the risk by, for instance,

24 deferring Conawapa, that would also reduce the impact

25 on -- on the ratepayer as well. So I wasn't just

2492

1 thinking of Manitoba Hydro's risk being mitigated, I

2 was also thinking about the ratepayer risk being

3 mitigated.

4   THE CHAIRPERSON: M. Monnin, s'il vous

5 plait?

6   MR. CHRISTIAN MONNIN: Merci, Messr.

7 President.

8

9 CONTINUED BY MR. CHRISTIAN MONNIN:

10   MR. CHRISTIAN MONNIN: I'd like to use

11 a line from My Friend Mr. Williams, I just have a few

12 more short questions. Regretfully, these -- these next

13 pages are not in our book of documents. They can be

14 found in Manitoba Hydro Exhibit 85, and if I've done

15 this correctly this morning, I'm looking at page 177 of

16 192 should be where I would like to drive everyone's

17 attention.

18

19   (BRIEF PAUSE)

20

21   MR. ED WOJCZYNSKI: Pardon me, which

22 page was that again, please?

23   MR. CHRISTIAN MONNIN: It should be one

24 seventy-seven (177) of the -- of -- of Manitoba Hydro-

25 85. If you're looking at the Navigant report, if

1 you're looking at the top right-hand side, it should be

2 page 9 of 24, and if you're looking at the bottom

3 right-hand, it's page 6. We've got a page for

4 everyone.

5   And if you could scroll down to the

6 bottom of that page, please? And -- and where I'd like

7 to draw your attention is the -- the last sentence,

8 which reads as follows, "The discount rate reflects" --

9 sorry, the penultimate sentence:

10   "The discount rate reflects the

11   return at financial markets, both

12   debt and equity, required for the

13   type of investment in question. In

14   their book, 'Introduction of -- to

15   Corporate Finance', Booth & Cleary

16   simply state that..."

17   Now going to the next page:

18   "...discount rate is the estimate of

19   the required rate of return on the

20   project. This is distinct from the

21   use of discount rates in other

22   contexts to capture issues such as

23   stakeholder time preference."

24   In -- in this particular -- in that

25 statement, whose requirement is -- is being -- is being

1 met? Do you know?

2   Who -- who were you referring to?

3   MR. IAN PAGE: In that sentence, we're

4 referring to Manitoba -- the Manitoba Hydro

5 perspective, which is what we used when we were doing

6 the -- the simple economics. In practice, it's a

7 little cloudier than that because of the way Manitoba

8 Hydro operates. It's almost more of a co-op type of a

9 model.

10   So it -- while we're looking at it from

11 Manitoba Hydro's perspective, we're not bind to the --

12 the ratepayer's perspective, but we try to take -- to

13 take -- to more specifically look at the ratepayer's

14 percep -- perspective, but we try to take -- to take --

15 to more specifically look at the ratepayers' perce --

16 perspective when we're doing a financial analysis.

17   MR. CHRISTIAN MONNIN: Sorry, I have a

18 voice of God moment here. Who is -- who is speaking?

19 Oh, hello. Thank you. Thank you.

20   MR. ED WOJCZYNSKI: That was Mr. Page.

21   MR. CHRISTIAN MONNIN: Thank you, Mr.

22 Page. Thank you. That -- that's -- that helps. And

23 if you go to page 179, which would be page 11 of 24,

24 and the second paragraph in:

25   "This treatment of discount rate

2495

 1   uncertainty in the economic

 2   evaluation is distinct from the

 3   broader issue of discount rate

 4   sensitivity analysis. Outside the

 5   economic evaluation, it is certainly

 6   possible to use different discount

 7   rates to see how stakeholders with

 8   different time preferences would

 9   judge the alternatives."

10   This is in your report, Dr. Borison, so

11 I'll put the question to you. I'm not sure if you'll

12 provide the answer. Is it -- in your opinion, is this

13 something that Hydro has done as part of its business

14 case?

15   Have they fleshed out the potentially

16 varying perspectives for time value of money from

17 different stakeholders?

18   MR. IAN PAGE: Perhaps I can answer

19 that. Ian Page again. The -- as I mentioned, the

20 Manitoba Hydro perspective was the view that was taken

21 during -- in the financial evaluation. When we looked

22 at the -- the different stakeholders' perspectives,

23 that's -- that was the focus of the -- the other two

24 (2) major parts of the analysis.

25   So there's the -- the financial, which

2496

1 is where we use that -- a pure time preference rate,

2 and then the multiple account analysis uses a broader

3 societal view of the -- an appropriate cost of capital.

4   MR. CHRISTIAN MONNIN: Thank you. One

5 (1) more question, and I mean that. Page 185 of this

6 particular document, which if I'm correct ought to be

7 page 17 of 24. And again, scrolling down to the bottom

8 of the page and the last sentence, which reads:

9   "In non-financial applications, these

10   outputs are generally more useful

11   than standard summary risk measures,

12   such as 10-90 ranges and standard

13   deviations."

14   In a 30,000 foot view, what is the --

15 the ten (10) -- what are these 10-90 ranges?

16   DR. ADAM BORISON: Sorry. The 10-90

17 range is typically -- it's called the, I think,

18 interdecile range. The 10-90 is the 10th percentile of

19 an uncertainty distribution, and the ninetieth is the

20 90th percentile.

21   So the 10-90 range is essentially what's

22 the width of this uncertainty distribution? And the

23 bigger -- the bigger that width, the more, in a sense,

24 risky people think it might be. The standard deviation

25 is really just another way of representing that width,

 1 effectively.

 2   MR. CHRISTIAN MONNIN: Okay. And do

 3 you know, were these -- were these such standards some

 4 of your risk measures calculated for the various

 5 development plans presented in the business case?

 6   DR. ADAM BORISON: I'll give you my --

 7 my understanding. I think at several times in our --

 8 in our discussions, these were, I think, calculated and

 9 discussed. But our conclusion frankly, and I think

10 it's represented here, was they might not be the best -

11 - best measures to use in a risk-return context. But

12 that's -- I'll -- I'll defer to the others.

13

14   (BRIEF PAUSE)

15

16   MR. ED WOJCZYNSKI: We, Manitoba Hydro,

17 looked at a wide range of metrics we could have

18 presented. And there was so much information that

19 could be presented, we focussed on what we thought was

20 just the most meaningful interpretation and the most --

21 pardon me -- the most meaningful metrics.

22   So if you go back, and as was -- we just

23 saw a few minutes ago in our summary tables, we

24 provided the ref -- the reference numbers, the refer --

25 reference scenario, we've provided the expected value,

2498

1 and then we provided the P10 and P90 values.

2   We didn't focus on the difference

3 between P10 and P90. We actually presented the P10 and

4 the P90 values, and -- and one of the reasons is that

5 that, in our view, gives a better indication of risk

6 because if you just look at the amount of different

7 between P10 and 90, that isn't as useful as looking at

8 the individual components.

9   Now, why do I say that? That's because

10 when you -- you look at the -- the range, you can have

11 situations where a lot of that range is you've got an

12 expected value, and then you've got an expected value

13 and then you've got a large amount of upside.

14   So if you're going from an expected

15 value up to a high amount of upside, you can call that

16 risk, because it's uncertainty. But actually, that's

17 an upside risk, or a benefit and you have some

18 opportunity. And in our view, it's better to look at

19 the individual components, the downside risk, which is

20 the P10, and then the upside risk, which is -- pardon

21 me, the upside benefit, which is the P90, rather than

22 just taking the range, which doesn't tell you, is this

23 range due to a lot of variation in benefit or a lot of

24 variation in risk.

25   So we felt presenting the individual

2499

 1 P10s and P90s was more meaningful.

 2   DR. HUGH GRANT: I think the -- the

 3 concern here though is looking at the P10s and the

 4 P90s. If we were a responsible PUB, what -- what

 5 weights would we assign to the upside and the downside

 6 risk? And I think the general consensus would be there

 7 was a tendency towards risk aversion. And so we'd

 8 probably give more attention to that P10.

 9   I'm wondering if I could just get a

10 question in to Dr. Murphy. I know we may be missing

11 him, but I've been -- something I've been trying to get

12 my head around in terms of risk aversion, I suppose.

13 In some ways you could look at a large hydro project as

14 -- I'm thinking in a world where the greatest

15 uncertainty is around future energy prices. And so a

16 utility could undertake a large hydro project, which in

17 some ways guarantees them some certainty about their

18 own electricity costs into the future.

19   So let's say for the sake of argument

20 you could guarantee yourself a 3.95 percent, you know,

21 increase in rates. Now, I don't want to put you on the

22 spot, but is that a gamble -- would you rather play the

23 energy markets, or would you -- would you like to lock

24 in at 3.95 percent in -- in nominal dollar terms into

25 the future?

2500

1   Like, do you understan -- I'm not asking

2 you if you play the futures market in -- in energy, but

3 is that the risk-averse approach, I mean, given the

4 uncertainty around energy prices?

5   DR. DEAN MURPHY: This is actually very

6 closely related to what Dr. Borison was discussion with

7 the utilitarian versus the regret approach. And it --

8 and it's a question of what is your reference point,

9 risk with respect to what? In the regret approach, and

10 -- and I'm not talking about the approach that was used

11 by LCA here, because I'm not familiar with that. But

12 in the regret approach you do take your reference point

13 as some particular -- some particular plan and how that

14 plan would have fared under this particular scenario.

15 So your reference changes from one scenario to another.

16   In the utilitarian approach your

17 reference point doesn't change. You always use the

18 same reference point. And so to your question, is a

19 hydro project less risky, once you get beyond the

20 capital cost uncertainty, which presents some risk, but

21 if we can put that aside for the moment, if you know

22 what a project is going to cost, then over time you

23 know what your energy costs will be.

24   And there's a -- a reasonable argument

25 to be made that this is -- once you're in that world,

2501

1 you've committed to that, you've paid that cost, you

2 know what your energy prices will be over time. And

3 that is a lower risk strategy than, say, We're going to

4 go the All Gas route, put in a lot of gas plants, and

5 then we don't know what our cost will be over time,

6 because we don't yet know whether gas prices will be

7 high or low.

8   So I think there's a reasonable argument

9 to be made that locking in your energy prices through a

10 strategy that is not dependent on future outcomes of

11 fuel prices is lower risk in a sense. You do always

12 have to remember risk with respect to what. And -- and

13 I -- I think it's reasonable to -- to take a perspect -

14 - to take a perspective like that, because in -- in the

15 greater social perspective energy is just one (1)

16 piece, and a relatively small piece, of all the things

17 that we do as a society.

18   It's -- and -- and so to say that with

19 respect to all the things we do as a society, if I can

20 fix that piece by an initial large capital investment

21 that is followed by certainty, then that does lead to a

22 lower risk in a sense.

23

24 CONTINUED BY MR. CHRISTIAN MONNIN:

25   MR. CHRISTIAN MONNIN: Merci, Messr.

2502

1 President.

2   Dr. Borison, thank you very much for

3 your time and for your patience with my questions this

4 morning. That's it. Thank you. Thanks to everyone

5 else, as well.

6   THE CHAIRPERSON: Back to you, M.

7 Hacault.

8   MR. ANTOINE HACAULT: Strategy was

9 good, because counsel opposite only had a couple

10 questions, but the session lasted about an hour and a

11 quarter instead of about half an hour. In any event,

12 thank you.

13   MR. WILLIAM GANGE: Excuse me, Mr.

14 Hacault, it's Bill Gange back here. Mr. Chair, one of

15 the questions -- or one of the strategies was for --

16 for all counsel that might have questions of Dr.

17 Borison or Dr. Murphy. There is one little -- or one -

18 - one part that arises out of the -- the production of

19 the Brattle Group Report on CO2 emission displacement

20 that was -- that was circulated on Wednesday after our

21 cross-examination that Dr. Murphy has -- pardon me,

22 that Dr. Miller has a couple of questions arising out

23 of that.

24   So if I can just jump in before Mr.

25 Hacault, that would be appreciated.

2503

 1   THE CHAIRPERSON: Please do.

 2

 3 CROSS-EXAMINATION CONTINUED BY DR. PETER MILLER:

 4   DR. PETER MILLER: I'll try to be

 5 brief. It was -- Dr. Murphy, maybe you could switch

 6 places with...

 7   MR. TERRY MILES: I'll just let Dr.

 8 Murphy come to the front here so they can make eye

 9 contact.

10   DR. PETER MILLER: Yeah.

11

12   (BRIEF PAUSE)

13

14   DR. PETER MILLER: Hello again. Your

15 report was presented in a PowerPoint format. Is there

16 an underlying report for that?

17   DR. DEAN MURPHY: The PowerPoint deck

18 that you have is the only report.

19   DR. PETER MILLER: That's the only

20 report, okay, thank you. Your modelling is based on

21 economic dispatch and generation replacement under

22 various societal conditions. And you argue that there

23 -- roughly thirty (30) years before the point eight-

24 five (.85) ratio, or tonnes of CO_2 get reduced, I'm

25 going back to that footnote about how hydro

1 displacement might have no value perhaps at an earlier

2 stage if you had cap and trade in place.

3   I think the province's thinking was that

4 with cap and trade, you have a certain limit on

5 emissions in a region; and if hydro is not being

6 exported, they will have to meet that cap by some other

7 means. And therefore hydro display -- hydro will not

8 displace greenhouse gas emissions.

9   Could you comment on that prospect?

10   DR. DEAN MURPHY: I'm sorry, are you

11 referring to a particular footnote in the report?

12   DR. PETER MILLER: It was your comment

13 -- well, it's the overall approach of the measures that

14 you consider, which all cash out into a CO2 price.

15   DR. DEAN MURPHY: Yes.

16   DR. PETER MILLER: Okay, I'm -- it's

17 your general approach. Okay. And -- and the question

18 is -- and -- and you're trying to answer the question

19 of whether hydro exports would displace CO2 emissions

20 in the States.

21   DR. DEAN MURPHY: Yes

22   DR. PETER MILLER: And so I'm going to

23 one (1) of your assumptions about -- that it all

24 translates into an economic price of CO2. And

25 considering another prospect, namely cap and trade,

2505

 1 would that change the picture if a regional cap for CO2

 2 emissions was established so that if they couldn't use

 3 hydro to reach that cap, they'd have to find some other

 4 means?

 5   I'm suggesting that may be the thinking

 6 behind the other report that we talked about.

 7   DR. DEAN MURPHY: I did not look at

 8 that question in particular in this study. But I am

 9 familiar with the argument that under -- under

10 appropriate circumstances, if there is a cap and trade

11 system in place that is a firm cap and trade, i.e.,

12 it's not -- it -- it's not allowable to exceed the cap

13 under some circumstances, that qualitatively, the

14 argument is as follows, that if you've got a firm cap

15 and trade, then nothing that you do will change the

16 total CO2 emissions, the argument being that, If I

17 don't reduce emissions by this means, then I'll have to

18 reduce emissions by some other means, and I will always

19 find myself at that cap.

20   And, therefore, according to this

21 argument, there's no value to -- the -- there's no

22 value in terms of emissions reductions attributable to

23 any particular mechanism for reducing emissions. There

24 might be different costs associated with different

25 ones.

2506

1   And I suppose that that approach has

2 some theoretical merit, but it does depend on some very

3 strong assumptions, for one, that the -- the cap is a -

4 - is a strict cap and -- and will be met and not

5 exceeded, or in -- won't -- not exceed in either

6 direction.

7   I -- I think most of the -- the -- it --

8 it depends a little bit about whether you're talking

9 about a cap on electric sector CO_2 emissions or an

10 economy-wide cap, because those can push emissions from

11 one to the other.

12   I -- I suppose an argument could be made

13 that under a strict US cap and trade system, if that

14 system was sufficiently well designed to prevent all

15 leakage across international borders, that you'd use

16 this conceptual argument to say that, Well, any

17 reduction that Manitoba -- Manitoba Hydro's exports

18 into the US would cause in US CO_2 emissions would just

19 be offset by an increase somewhere else so that the US

20 were to stay at the same overall cap.

21   And -- and under that scenario, the only

22 way to actually reduce emissions is to reduce the cap.

23 I -- I'm not sure if that addresses your question.

24   DR. PETER MILLER: Okay. Yes, that's

25 very good. And could you comment on the likelihood of

2507

1 that regime occurring?

2   DR. DEAN MURPHY: By 'that regime', you

3 mean a -- a cap and trade system that would have those

4 properties?

5   DR. PETER MILLER: That you just

6 described, yes.

7   DR. DEAN MURPHY: That -- well, we -- a

8 -- a few years back in the US, I and others felt that

9 it was likely that we would get a cap and trade system,

10 an economy-wide cap and trade system that -- that might

11 have some of those properties, but that didn't pass.

12   And so, at some level, I suspect you're

13 asking me to do a political prognostication as to what

14 the form of future climate policy in the US may be. My

15 own personal view is that the sentiment has swung away

16 somewhat from cap and trade and perhaps more toward

17 putting a price on carbon through a tax or a fee.

18   As an economist, I think that's a good

19 thing, because I think it would be more effective and

20 more efficient, and -- and would lead to either greater

21 -- greater emissions reductions or greater economic

22 efficiency of a given level of emissions reductions,

23 so.

24   But in the end, I can't say what kind of

25 climate policy will be passed in the US. That -- that

2508

1 remains an uncertainty.

2   DR. PETER MILLER: Thank you for that.

3 One (1) other question. You are, no doubt, familiar

4 with Nicholas Stern, a British economist?

5   DR. DEAN MURPHY: Yes, the Stern

6 Report.

7   DR. PETER MILLER: Yes. And just this

8 brief quote:

9   "Climate change is a result of the

10   greatest market failure the world has

11   seen. The evidence on the

12   seriousness of the risks from

13   inaction or delayed action is now

14   overwhelming. The problem of climate

15   change involves a fundamental failure

16   of markets. Those who damage others

17   by emitting greenhouse gases

18   generally do not pay."

19   You're familiar with that?

20   DR. DEAN MURPHY: I am familiar with

21 that, yes.

22   DR. PETER MILLER: When you talk about

23 the economic dispatch of -- of generation or capital

24 investments in new generation, that economics that

25 plays in the -- in the marketplace does not include

2509

1 these externalities?

2   DR. DEAN MURPHY: Unless you've got a -

3 - and the appropriate carbon price, which is the way of

4 internalizing those externalities. In the -- in the

5 situation we are in now, where there is no carbon

6 price, it's true, there are externalities. There are

7 harm to others that are done by the burning of fossil

8 fuels that is not paid by the parties that are burning

9 those fossil fuels.

10   DR. PETER MILLER: And have you done

11 any research, or your firm, on what would be an

12 appropriate carbon price or -- or other way of

13 internalizing that cost?

14   DR. DEAN MURPHY: I have not directly

15 try -- myself tried to put a social value on carbon. I

16 am aware of a number of studies that -- that attempt to

17 do that, and they come up with widely varying numbers.

18   The -- the US administration recently --

19 as an example of one of those studies, the US

20 administration recently updated its social cost of

21 carbon, which the federal government uses in its own

22 planning -- the US federal government uses in its own

23 planning to determine the -- the costs of various

24 alternatives. So they impute a cost to carbon

25 emissions.

 1   And they calculated this cost of carbon

 2 under several different sets of assumptions. And I

 3 don't recall the precise results, but I do recall that

 4 the -- it was either a median or an average of some of

 5 the scenarios they looked at was approximately forty

 6 (40) -- forty-three (43) or perhaps it was forty-seven

 7 dollars ($47) per tonne of carbon as the social cost of

 8 carbon.

 9   That -- the answer that you get to an

10 analysis like that depends on a number of things. One,

11 what do you -- which costs do you count because there

12 are many, and it's difficult to ensure that you've

13 counted them all.

14   Another is -- that's very important is

15 the discount rate that you apply, because much of the

16 cost of carbon emissions will come relatively far in

17 the future, and your choice of discount rate can have a

18 big effect on -- on the current value of emitting a

19 tonne of carbon. I've seen values well over a hundred

20 dollars ($100). I've seen other calculations that put

21 it in single-digit dollars, at least in the near term.

22   DR. DEAN MURPHY: Thanks for that.

23   MR. BILL HAMLIN: This is Bill Hamlin.

24 I could just supplement that for the multiple accounts

25 analysis, it was based on a -- on an assumption of

2511

1 forty dollars ($40) a tonne CO2 in 2014, rising to

2 eighty dollars ($80) a tonne by 2048. And -- and those

3 -- those estimates were based on -- on both the

4 Environment Canada and the US federal government's

5 social cost of carbon.

6   DR. DEAN MURPHY: And if I might add

7 just one (1) more point. Your question earlier about

8 the -- the externalities and whether the cost of carbon

9 is included in -- in our dispatch, as I say I've seen a

10 number of studies of the social cost of carbon.

11 They've come up with a wide range of results. I have

12 not seen one that has come up with a zero. But that's

13 the price that we are currently putting on carbon in

14 the -- in the market.

15   DR. PETER MILLER: Thank you for that.

16 Dr. Borison, this may be redundant, but would you agree

17 that these larger externality costs should be included

18 in the expected utility approach?

19   DR. ADAM BORISON: Yeah, I may have a

20 personal opinion. I'm not sure that I would -- could

21 make a -- could state that in some -- on some

22 principle. Well, I guess what I'd say on principle is

23 that the stakeholders involved, whether they be the --

24 the Board here or others, need to determine what the

25 factors are they want to consider.

2512

 1   And if the social cost of carbon was one

 2 (1) of those factors, then, yes, that should be

 3 included. But I would say probably -- I would -- I

 4 would hesitate to basically tell you or anyone

 5 precisely which factors should be included.

 6   DR. PETER MILLER: Oh, so you're --

 7 you're not talking about utiles in general but only

 8 those that -- the subset that are selected by whoever?

 9   DR. ADAM BORISON: I guess if I could

10 speak on economic principles, just like Dr. Murphy, it

11 is -- it is clearly true that an economist would say

12 that any impact that is created for -- for the world

13 that is not paid for through market mechanisms is

14 appropriate. It's appropriate -- appropriate to

15 include that in one's analysis, and I would extend that

16 to all such effects that the idea of internalizing

17 externalities is a fundamental principle underlying

18 much of economics.

19   So to that extent, I -- I would say yes.

20 But again, the specifics of which ones should be

21 included and what prices should be associated with

22 those is beyond my particular area here.

23   MR. KURT SIMONSEN: Mr. Chair, Kurt

24 Simonsen here. I just remind all parties that it's

25 10:30, and we do have to accommodate Mr. Hacault as

2513

1 well and the others with respect to their cross of this

2 panel. So if I could ask Peter Miller as to how much

3 time he has left.

4   DR. PETER MILLER: I'm done, thanks.

5   MR. KURT SIMONSEN: Thank you.

6   THE CHAIRPERSON: Unfortunately for M.

7 Hacault, it is time for a break. So I suggest we take

8 ten (10) minutes and then Mr. Hacault will resume his -

9 - his questioning. Thank you.

10

11 --- Upon recessing at 10:31 a.m.

12 --- Upon resuming at 10:45 a.m.

13

14   THE CHAIRPERSON: I believe we're ready

15 to resume the proceedings. Any documents to

16 acknowledge before we start?

17   MS. MARLA BOYD: I have no documents,

18 but I do have one (1) matter to attend to. Mr. Bowen

19 has a matter to clarify with respect to page 1,454 of

20 the transcript. If I could just turn the mic over to

21 him, he can just deal with one (1) small issue.

22   THE CHAIRPERSON: Mr. Bowen...?

23   MR. DAVE BOWEN: Sure. I'd like to

24 clarify the record. So line 6 and 7 from page 1,454

25 indicated that -- I -- I indicated that, to the best of

2514

1 my knowledge, there's no sunk costs for the equipment,

2 construction equipment, to our conversation back on

3 Monday.

4   There is some costs included in the --

5 in the analysis. That sunk cost amount is -- is $10

6 million.

7   THE CHAIRPERSON: Thank you for that.

8   M. Hacault, s'il vous plait?

9   MR. ANTOINE HACAULT: Thank you.

10 Merci, Messr. President.

11

12 CONTINUED CROSS-EXAMINATION BY MR. ANTOINE HACAULT:

13   MR. ANTOINE HACAULT: The -- the first

14 area, and I hope it's going to be fairly quick as a

15 result of a new exhibit that was filed by Manitoba

16 Hydro, is the issue of including common costs in the

17 economic analysis.

18   So, Dr. Borison, are you -- are we all

19 in agreement that common costs should be excluded for

20 the purpose of the analysis?

21   DR. ADAM BORISON: Yes, but may I

22 clarify slightly, or expand slightly? Sorry. I'll say

23 yes. That's fine. I'll say yes.

24   MR. ANTOINE HACAULT: And I'm trying to

25 see whether I can deal with this in a fairly expedited

2515

1 matter (sic). If we turn to our book of documents, and

2 in particular pages 5 -- starting at page 5, this is an

3 extract from Appendix 9.3 of Manitoba Hydro's

4 documents, correct?

5   MR. TERRY MILES: That's correct, yes.

6   MR. ANTOINE HACAULT: And if we look at

7 the top column, this is an extract of a table that

8 deals with the All Gas Plan and shows out the numbers

9 that get used in -- in that analysis, correct?

10   MR. TERRY MILES: That's correct, yes.

11   MR. ANTOINE HACAULT: And we have done

12 specific costs. If we go down the top -- or to the top

13 titles, there's -- oh, no. Top. You were okay,

14 document management person. Capital taxes.

15   Those capital taxes are specific to the

16 units that would be put in place for gas, correct?

17   MR. TERRY MILES: That's correct, yes.

18   MR. ANTOINE HACAULT: So that's an

19 example of choosing a particular cost and seeing what

20 it's going to be for that particular option, and not

21 including the common costs of the entire system,

22 correct?

23   MR. TERRY MILES: That's correct.

24   MR. ANTOINE HACAULT: Another example

25 of that is the next column on the top. We've got fixed

2516

1 O&M, and again that fixed O&M, as -- as I understand

2 it, is very specific to the gas pathway, correct?

3   MR. TERRY MILES: That's correct, yes.

4   MR. ANTOINE HACAULT: The one (1) thing

5 that -- unrelated to the gas would have been if we go

6 further to the right, there's a water rental column,

7 correct?

8   MR. TERRY MILES: That's correct, yes.

9   MR. ANTOINE HACAULT: Would I be

10 correct that that's one (1) of the items that was taken

11 out in the new quilt that was provided as Exhibit 104-

12 2?

13   MR. TERRY MILES: That's correct.

14 There's several items. I could --

15   MR. ANTOINE HACAULT: Okay.

16   MR. TERRY MILES: -- just qualify

17 those.

18   MR. ANTOINE HACAULT: Yeah. If you can

19 just list the common costs that you excluded in the new

20 analysis that forms part of Exhibit 104, then we'll go

21 to Exhibit 104-2.

22   MR. TERRY MILES: Okay.

23

24   (BRIEF PAUSE)

25

2517

 1   MR. TERRY MILES: Okay, sorry about

 2 that. Just -- so just to clarify. The costs that were

 3 there not -- aren't necessarily an exclusion of the

 4 costs. But when we did the comparative for the -- the

 5 uncertainty analysis, the costs related to export

 6 revenues as -- as represented in the All Gas -- the

 7 base case, or the reference case, import costs as

 8 represented in the All Gas case are purchases in the

 9 All Gas case, thermal burn costs associated with the

10 All Gas case, as well as water rental costs associated

11 with the All Gas case were essentially subtracted or

12 removed from all of the plans. And in doing so, then

13 those costs that are common amongst those -- amongst

14 the plans are, in essence, accounted for.

15   So -- so by -- by doing that, in

16 essence, that removes the water rental cost, if you

17 will, from the analysis of the All Gas Plan that aren't

18 associated with the All Gas Plan or the incremental

19 additions of the -- of the All Gas Plan.

20   MR. ANTOINE HACAULT: Okay. On this

21 particular slide, they were all ref/ref/ref. That's at

22 the right-hand side of the table.

23   MR. TERRY MILES: That's correct.

24   MR. ANTOINE HACAULT: And we see energy

25 price, discount rate, and capital costs. So did you

2518

1 conduct that same exercise -- when you're saying you

2 removed them, did you remove them at the different

3 levels also?

4   MR. TERRY MILES: No, we did not, only

5 for the ref/ref/ref case, because as you go to the

6 different levels, there may be operational changes that

7 happen for the All Gas Plan that don't happen for other

8 plans just by the nature of the resources that are in

9 that plan.

10   So if you change costs in the All Gas

11 Plan, you may change how you operate the hydro system.

12 You may change the water rentals that are there. You

13 may change the burn costs associated with how you

14 operate other resources. So those incremental costs

15 weren't necessarily changed.

16   But from the ref/ref/ref case, those

17 ones associated just with the base case of comparison,

18 in essence, were subtracted out before we did the NPV.

19 So previously what had happened, as we would take all

20 of these costs, we would NPV all of these costs and

21 revenues for all plans and then take the differences.

22   So what we have done now is that we've

23 subtracted those costs before we do the NPVs. And --

24 and, in essence, I think some of the concerns with

25 having those common costs in the NPVs are now removed.

2519

 1   MR. ANTOINE HACAULT: Okay. Thank you.

 2 If the document management person could go to Exhibit

 3 104-2, Manitoba Hydro Exhibit 104-2. And in

 4 particular, and I'm not too sure how we're going to do

 5 this on the screen, what was provided in this document

 6 at page 4 of 7...

 7   Can you do a screen split, document

 8 management person? Page 4 and 6. We've got two (2)

 9 quilts. Well, if people have the paper copy, maybe we

10 can start until it shows up on the screen. Page 4 of

11 7, if we go to the upper left-hand corner, so that's

12 low, low, and high capital costs, that area, and rough

13 costs and low costs, we see it's -- it's all red on

14 page 4 of 7.

15   We start at minus 4 billion something

16 for the high capital costs, 3 billion approximately for

17 the rough costs -- capital costs, and a little bit over

18 2 billion for the low capital costs.

19   I'll just maybe wait. I think Mr.

20 Chairman hasn't found that yet.

21

22   (BRIEF PAUSE)

23

24   MR. ANTOINE HACAULT: So we're at page

25 4 of 7.

2520

1   (BRIEF PAUSE)

2

3   MR. ANTOINE HACAULT: And we were

4   looking at the top right-hand corner. We see the --

5   the red, 4 billion, 3 billion, and 2 billion going down

6   in the top left-hand corner.

7   And then if we keep the other schedule -

8   - or page 6 of 7, it's the same quilt, except the

9   revision on common factors, correct?

10   MR. TERRY MILES: That's correct.

11   MR. ANTOINE HACAULT: So comparing

12 these two (2) quilts shows us the methodol -- the

13 change as a result of the method in taking out the

14 common costs, correct?

15   MR. TERRY MILES: That's correct, yes.

16   MR. ANTOINE HACAULT: So if we look at

17 the -- the top corner that I had mentioned on page 6,

18 we see that the All Gas Plan, which was 4 billion to

19 the bad, so we had a line that went really extremely,

20 if we're doing an -- an S-curve, to the left.

21   Now that S-curve changes significantly,

22 I would say, by about $3 billion, correct?

23   MR. TERRY MILES: That's correct.

24   MR. ANTOINE HACAULT: And if we look at

25 the low energy prices, low discount rate, and ref, and

2521

 1 compare those two (2), we're comparing 3 billion to the

 2 negative down to 68 million.

 3   So nearly a change of $3 billion by the

 4 change of methodology, correct?

 5   MR. TERRY MILES: That's correct, yes.

 6   MR. ANTOINE HACAULT: So that our S-

 7 curve changes significantly and the downside in that

 8 particular box changes also significantly, correct?

 9   MR. TERRY MILES: That's correct, yes.

10   MR. ANTOINE HACAULT: And if we can

11 bring down and look, for example, at ref. So if we

12 could bring both documents up, but the reference energy

13 prices. And a higher discount rate, which is the

14 second column, and we go to the extreme right. So

15 reference energy price, high discount rate, we go to

16 the extreme right.

17   In one (1) case, being before the

18 change, we're showing -- at the high capital costs

19 we're expecting 268 million on the Preferred

20 Development Plan, correct? Have we found that?

21 Reference energy prices, high discount rate, high

22 capital costs. It shows up in white.

23   MR. TERRY MILES: Yes.

24   MR. ANTOINE HACAULT: And then if we do

25 the same line with the new methodology, the Preferred

 1 Investment Plan moves from a positive of 268 million to

 2 a negative of 1 billion.

 3   Do you see that?

 4   MR. TERRY MILES: Yes, I see that.

 5   MR. ANTOINE HACAULT: So not only with

 6 respect to the Gas Plan does the S-curve change and the

 7 extremes change; those curves also change, or the

 8 Preferred Plan, when we're changing the discount rate,

 9 correct?

10   MS. JOANNE FLYNN: They will change for

11 all the plans, but you might -- on a parallel path

12 there if you go back to your low energy prices, low

13 discount rate, high capital cost, where we saw in the

14 top right corner for -- left corner for All Gas the 4

15 billion -- minus 4 billion, minus 3 billion, minus 2

16 billion, would be reduced to ten sixty-two (1062) minus

17 sixty-eight (68) and plus seven thirty-four (734).

18   In the same analysis you also see with

19 respect to the Preferred Plan numbers of firstly minus

20 twenty (20) -- on the extreme right in the far column,

21 the minus twenty-eight forty-one (2841) become plus one

22 forty (140). You see minus fourteen ten (1410) become

23 plus one billion, five seventy-one (1,571,000,000).

24 You see minus two ninety-two (292) become plus twenty-

25 six eighty-nine (2689).

 1   So when you look at the S-curves

 2 compared to one another, you actually see greater

 3 upside potential out of the Hydro Plan than you did in

 4 the original analysis. You see lower downside risk for

 5 all the plans as we -- as we have stated in -- in the

 6 document, except the Preferred Plan, but the expected

 7 values still remain the same. So it's really about the

 8 distribution of the -- the risk in the plans.

 9   MR. ANTOINE HACAULT: And that's a very

10 good point, and if we look at page 6 of 6 and compare

11 it to page -- oh, sorry, 6 of 7 -- keep the same pages,

12 document manager -- the worst outlook for the Preferred

13 Development Plan was actually on page 4 of 7 in the top

14 right-hand corner, which was low energy prices, low

15 discount rates, and then varying levels of capital

16 cost.

17   That was the worst that that quilt was

18 showing us, correct? That -- that particular

19 combination, because we went down to 2.8 billion was

20 the maximum negative values? And it's in that top

21 corner that we see that happening on page 4 of 7.

22   Are you following me so far?

23   MS. JOANNE FLYNN: Yes.

24   MR. ANTOINE HACAULT: But if we go to

25 page 6 of 7, when we change the methodology, the quilt

2524

1 is telling us something else. It's actually in a

2 different box where we're having this general

3 aggregation of negative results.

4 It's still in the low energy prices, but

5 the box has switched from low discount rates to high

6 discount rates. So if we do the high discount rates,

7 the quilt is telling us with the revised methodology

8 that that's the riskier area, correct?

9 MS. JOANNE FLYNN: That is -- that is

10 the -- the combination of low energy prices, high

11 discount rates, and high capital costs is yielding the

12 lowest net present value for the Preferred Plan, yes.

13 MR. ANTOINE HACAULT: And you agree

14 with me that the change in methodology leads to a quilt

15 that tells us a different story as to what's the

16 highest risk area, correct?

17

18 (BRIEF PAUSE)

19

20 MS. JOANNE FLYNN: Yes, it does.

21 MR. ED WOJCZYNSKI: Could I just -- I'm

22 -- I'm -- just make a comment, and -- and I think this

23 is a good expiration (sic) and -- and an important one.

24 I think the inclusion from the last little sentence was

25 that the Preferred Plan -- using the changed

2525

1 methodology, the Preferred Plan risk increases as we

2 just talked about.

3   If you look at the All Gas Plan --

4 pardon me, if you look at the Keeyask/Gas/750 Plan, the

5 opposite happens, whereas on page 4, your -- your most

6 extreme risk was under low energy prices, low discount

7 rate, high capital cost. It was minus two eight five

8 five (2,855), nearly $3 billion.

9   And when you go to the new methodology

10 on page 6, it becomes positive one twenty-seven (127),

11 but you -- your highest risk under Keeyask/Gas is now

12 one thousand (1,000) -- minus one thousand eighty-nine

13 (1,089), which is almost $2 billion less. So the

14 Keeyask/Gas/750 Plan becomes much less risky from that

15 point of view, although there is an increase in the

16 Preferred Plan.

17   MR. ANTOINE HACAULT: Thank you. And I

18 -- and I'm a pretty visual guy, so I look at those S-

19 curves and see how all this numbering kind of relates

20 to how we -- where we switch and how the S-curve kind

21 of switches.

22   So if we look on page 5 of 7, and 7 of

23 7...

24

25   (BRIEF PAUSE)

 1   MR. ANTOINE HACAULT: I think she's

 2 getting there. Okay. Just stop there, document

 3 manager. A -- a little bit higher up. I want to see

 4 the green line prominently on the screen for both

 5 plans. So that -- the top S-curve was the old

 6 methodology, or, say, the previous methodology, which

 7 included common costs, correct?

 8   MS. JOANNE FLYNN: It is the original

 9 one, yes.

10   MR. ANTOINE HACAULT: Which included

11 some common costs, correct?

12   MS. JOANNE FLYNN: Included some of

13 them, yes.

14   MR. ANTOINE HACAULT: Okay. Now, the

15 bottom one is the revised calculations, excluding

16 common costs as described by Mr. Miles, correct?

17   MS. JOANNE FLYNN: Yes, with the

18 recalculation.

19   MR. ANTOINE HACAULT: Okay. So we see

20 that gas moves a little bit to the right, and that's

21 the All Gas. That's the blue line. But what this

22 redefined methodology is telling me, and I want to know

23 whether you agree, is that at the top of this S-curve,

24 there's a significant benefit that's being illustrated

25 compared -- when we look at your revised calculation,

1 the green goes way far to the right as compared to the

2 old calculation. So there's more upside to the

3 Preferred Plan under your revised calculation.

4   Do you agree with that?

5   MS. JOANNE FLYNN: I agree with that.

6 I think I heard you say that the All Gas moves to the

7 right, but in fact, it moves to the left.

8   MR. ANTOINE HACAULT: Okay. So the gas

9 doesn't move as much, so we don't see -- I -- I don't

10 know if -- if -- where Dr. Grant -- he knows how to

11 read these better than I do, but it -- you're right, it

12 -- it's not as far to the right, so we don't have as

13 much benefit and the S-curve isn't as pronounced,

14 correct?

15   MS. JOANNE FLYNN: Correct.

16   MR. ANTOINE HACAULT: Now, if we look -

17 - and if the document manager can bring the bottom of

18 the graph in both pages? Focussing firstly on the gas,

19 which is the blue line, we see that the former

20 calculation depicted a very extreme low side to the gas

21 plan when we included the common costs.

22   It goes past the $6 billion range,

23 correct?

24   MS. JOANNE FLYNN: I'm sorry. Could

25 you just repeat the last part?

2528

 1   MR. ANTOINE HACAULT: Okay. The

 2 original calculations for the All Gas show an extreme

 3 downside going past the $6 billion mark, correct?

 4   MS. JOANNE FLYNN: Yes.

 5   MR. ANTOINE HACAULT: And with the

 6 revised calculation which takes out these common costs,

 7 it moves somewhere between the 4 billion and $2 billion

 8 mark, correct?

 9   MS. JOANNE FLYNN: Yes.

10   MR. ANTOINE HACAULT: So that on the

11 downside, gas with the revised calculation now appears

12 to be less risky.

13   MS. JOANNE FLYNN: Definitely less

14 risky than was -- was say -- was shown in the original.

15   MR. ANTOINE HACAULT: Yeah. Thank you.

16 The only other area which I'd like to explore with

17 respect to this calculation is whether the discount

18 rate really tells us much about the cost of interest on

19 the $6 billion capital project of Keeyask, for example.

20   So at page 8 of our book of documents,

21 we'll see firstly that the top left-hand corner, if

22 people are making notes, is Keeyask19/C25, so that's

23 the Preferred Development Plan, correct?

24   MS. JOANNE FLYNN: Yes, it is.

25   MR. ANTOINE HACAULT: And in that

2529

1 Preferred Development Plan, if we go across the top of

2 the document, we see the heading "Keeyask GS."

3   Do you see that?

4   MS. JOANNE FLYNN: Yes.

5   MR. ANTOINE HACAULT: And under that,

6 there are costs that start at 2014 and continue to

7 2021, correct?

8   MS. JOANNE FLYNN: Yes.

9   MR. ANTOINE HACAULT: There are no

10 costs after that, and am I right in understanding that

11 when you put the costs in that particular column,

12 they're the base capital costs of constructing the

13 facility?

14   MR. TERRY MILES: That's correct, yes.

15   MR. ANTOINE HACAULT: The changing of

16 turbines and -- in thirty (30) or forty (40) years,

17 whenever those would need to be changed, are taken into

18 account in the column that's further to the right,

19 which is entitled, "Fixed O&M."

20   Is that correct?

21   MR. TERRY MILES: That's correct.

22   MR. ANTOINE HACAULT: So now, if we can

23 go to the bottom of that chart, we see that this

24 particular chart has a present PV at -- done at 5.05

25 percent.

2530

1   That's in the bottom left-hand corner,

2 correct?

3   MR. TERRY MILES: That's correct, yes.

4   MR. ANTOINE HACAULT: And the -- that

5 results in -- and you'll have to take my word that

6 that's the proper column, in a two point eight-five-

7 seven (2.857) present value number for Keeyask

8 construction costs, correct?

9   MR. TERRY MILES: That's correct.

10   MR. ANTOINE HACAULT: Now, the one (1)

11 thing I want to see is, if we flip to the next slide,

12 we -- present value at three point zero-five (3.05) if

13 we go to the bottom of that chart.

14   So we're still in the Preferred Plan,

15 correct?

16   MR. TERRY MILES: That's correct. Just

17 -- you meant -- three point three-five (3.35) I have on

18 the page here. Is that --

19   MR. ANTOINE HACAULT: Yeah, three point

20 three-five (3.35) --

21   MR. TERRY MILES: Okay.

22   MR. ANTOINE HACAULT: -- in the bottom

23 left-hand side. So we're still in the same plan, but

24 what we're doing is we're looking at what happens when

25 we do -- we present value the investment at 3.35

2531

1 percent, correct?

2   MR. TERRY MILES: Correct.

3   MR. ANTOINE HACAULT: And what that

4 does is it gives us a present value of $2.939 billion

5 for the construction costs of Keeyask, correct?

6   MR. TERRY MILES: Correct.

7   MR. ANTOINE HACAULT: So there's about

8 a hundred million, not quite, of difference between the

9 two (2).

10   It's a bit lower, correct?

11   MR. TERRY MILES: About 80 million,

12 yeah.

13   MR. ANTOINE HACAULT: Eighty million.

14   MR. TERRY MILES: Yeah.

15   MR. ANTOINE HACAULT: Okay. And, yeah,

16 I'm just used to rounding numbers here, because Mr.

17 Wojczynski says a hundred thousand is just dust.

18   MR. ED WOJCZYNSKI: A hundred million.

19   MR. ANTOINE HACAULT: Yeah, I'd say a

20 hundred thousand. I'm not even used to the millions

21 yet.

22   So let's keep those two (2) in mind, and

23 then if we look at the next slide, which is continuing

24 the Preferred Development Plan, correct? It's on page

25 10 of our document book if you look on the top left-

2532

1 hand side.

2   MR. TERRY MILES: That's correct, yeah.

3   MR. ANTOINE HACAULT: And if we go to

4 the bottom, what's done is we now have present value,

5 but at a percentage rate of 6.5, correct?

6   MR. TERRY MILES: That's correct, yes.

7   MR. ANTOINE HACAULT: And that leads to

8 a -- a present value for the construction costs of

9 Keeyask at $2.81 billion, correct?

10   MR. TERRY MILES: That's correct, yes.

11   MR. ANTOINE HACAULT: And that's about

12 $47 million difference from the ref. The ref case was

13 two point eight-five-seven (2.857), correct?

14   MR. TERRY MILES: That's correct, yes.

15   MR. ANTOINE HACAULT: So I was pretty

16 naive when I -- doing some property valuations and

17 stuff like this. You think, Well, you're changing your

18 rates from -- you know, by a -- a certain percentage.

19 I thought there would have been a lot more difference.

20   Can you explain why we don't see much of

21 a difference, even though we change our percentage on

22 the PV calculation? Why is it so tight?

23   You know, if I was paying 6.5 percent on

24 a debt for that time period, up to 2090, I would expect

25 to see a lot more interest being paid.

2533

 1   Does discount and interest necessarily

 2 coincide, or do we have to be careful?

 3   MR. IAN PAGE: I can answer that, Mr.

 4 Hacault. I think it's important to understand the

 5 difference between the financial and the economic

 6 analysis. The economic analysis is looking at things

 7 from a pure cash basis. Our discount rate is inherent

 8 -- has inherently built within it our interest rates,

 9 so it does -- so there is, in effect -- there is a one

10 (1) for one (1) correlation in that way.

11   Why -- when you are looking at the

12 present valuing, you're saying, What's -- a -- a cash

13 flow that's only a few years out, and you're saying,

14 Well that's -- because a dollar today is worth more

15 than a dollar tomorrow, there's not very many tomorrows

16 away, so it -- it doesn't change very much. If you

17 look at the difference on the -- on some of those other

18 columns, you'll see very large differences.

19   So when you're looking at a present

20 value, you're looking at the difference today. When

21 you're looking at it from the financial perspective,

22 really, what you're looking at is once you -- you add

23 the financing effects. What you're going to be looking

24 at is not from today's perspective, but from the point

25 of view in that year, or in the year subsequent to the

2534

 1 project being built, because there's no interest --

 2 these -- if I look -- if you just scroll up a little

 3 bit here, you'll see that there's cash flows for

 4 Keeyask. They -- they start in 2014, whereas if you

 5 were looking on the financials there -- there'd be no

 6 finance expense on that until it went into service in

 7 2019/'20.

 8   So the cash flows are -- are treated

 9 sooner in the economic analysis, and -- and they're

10 viewed from today's perspective. In the financial

11 they're looked at -- they're looked at from the

12 perspective of the ratepayer, and the ratepayer doesn't

13 see those expenses until after the project is built

14 rather than before, and they'll -- and they will see

15 those -- those interest expenses going for a long time.

16   So on the financial perspective in -- in

17 the trailing years out, you'll see quite a big

18 difference in those years, but it is -- does -- does

19 reflect the same -- exact same cost of capital in both

20 cases.

21   MR. ANTOINE HACAULT: I think Dr.

22 Borison had something he wanted to explain to the panel

23 also, so if you could -- if you've got a different way

24 to try and explain that to the panel, go ahead, sir.

25   DR. ADAM BORISON: Yes, I think -- I

1 think this might help. First, I should say that I did

2 -- Dr. Grant, I -- I did find a reference to the use of

3 -- of hyperbolic discounting. It is, in fact, true

4 that the UK treasury requires, I believe that's the

5 right term, the use of -- of treatment of discount rate

6 uncertainty for long-term investments, investments that

7 are more than thirty (30) years, and they refer to a

8 document to support that which, in fact, uses the term

9 'hyperbolic discounting'.

10   So in fact, there is, surprisingly

11 enough, some actual regulatory support for this very

12 idea. So I -- I just wanted to mention that, because I

13 think what we're talking about here is really discount

14 rates, discount rate uncertainty, what does that really

15 do? And the -- the point I was -- I wanted to make

16 specifically in this context is that what you're seeing

17 in Keeyask and in any particular column here is the

18 impact on, let's say, one (1) investment occurring over

19 some period of time.

20   But what the discount rate uncertainty

21 is attempting to do is to say, Over the long run, what

22 will be the effect of a -- a change in the view that

23 people have with the return they require on capital?

24   And so you apply that over the entire --

25 to all cash flows over the entire time frame, and what

2536

1 you're saying here is, What would it mean if -- to our

2 entire plan over many, many years, if we decided that,

3 in fact, the return we require on -- on some investment

4 is lower or higher?

5   And again, that's a -- this is -- this

6 is, in fact, as I understand it, what people recommend

7 doing for long-term investments to reflect these long-

8 term issues. So the effect you see, again, just to

9 repeat, the overall effect on the entire plan is not

10 simply the effect of the capital required to build a --

11 a dam, but essentially, all the cash flows for the

12 entire time frame, or the effect is much more

13 significant.

14   MR. ANTOINE HACAULT: First, there

15 aren't any investment or loan terms that we could buy

16 today that bring us to 2090, correct?

17   MR. IAN PAGE: Could you repeat that?

18   MR. ANTOINE HACAULT: You -- you can't

19 go out in the market and say, I want to borrow $6

20 billion and I want to fix the rate until 2090.

21   You can't get that on the market,

22 correct?

23   MR. IAN PAGE: That's probably more

24 appropriate for next week's panel, but to the best of

25 my knowledge, no.

2537

1   MR. ANTOINE HACAULT: And would you

2 agree then, if -- if I -- if I was looking at discount

3 rates in an economic analysis to say, Well, what's the

4 impact of interest if interest goes up to 6 or 7

5 percent on the weighted average of my cost, this

6 analysis really doesn't tell me much about my ongoing

7 interest costs for the project. It -- it takes a

8 different perspective of -- of the analysis. It's an

9 economic perspective.

10   MR. IAN PAGE: It -- it does. You

11 could -- if you really wanted to, you could get some --

12 try to get a -- a similar approach at the economics and

13 the financial, you could calculate future values rather

14 than present value, so you're looking at it from the

15 other end of the cashflow stream rather than the -- the

16 front end.

17   It's -- it's not all that helpful in

18 terms of a -- an investment decision today, because I

19 don't think any of us are going to want to wait seven

20 (7) to eight (8) years to assess whether we should do

21 something or not.

22   So -- but in terms of the interest rate

23 sensitivity, if you look at the present values of -- of

24 the entire cash flow streams, not just the -- of the

25 Conawapa or Keeyask columns, you will see quite a big

2538

1 difference between them on -- around -- on the -- at

2 the different interest -- at the different discount

3 rates which do represent different forecast ranges of

4 interest rates.

5   DR. HUGH GRANT: Could I -- could I

6 interject on this, because I think I had the same sort

7 of sense when I looked at the very -- with Conawapa,

8 say, the Preferred Development Plan, I was surprised

9 how seemingly insensitive the net present value was to

10 pretty big variations in the discount rate, and

11 because, you know, you initially think that whenever

12 you have a project with a large capital outlay at the

13 beginning, then -- then a high discount rate is going

14 to make that -- well, the discount rate is going to be

15 very important to the outcome.

16   But is it -- is -- part of the issue is

17 that a lot of the expenditures from Conawapa are coming

18 fifteen (15) years out, and so they're being -- they

19 end up being discounted fairly heavily in any event.

20 So I guess I'm thinking it's a more discount rate

21 neutral than you might expect because the -- these big

22 capital outlays aren't happening in period zero.

23 They're happening in per -- you know, 2015, and -- and

24 out some distance in the future.

25   MR. IAN PAGE: Yes. The cash flows

 1 that are most sensitive to -- to discount rates are the

 2 ones that happen quite a ways further out, and on those

 3 -- if you see the production costs, like the export

 4 revenues and the thermal costs, and stuff vary -- vary

 5 a large amount on that, and essentially, if you're

 6 using the higher discount rates, essentially the value

 7 to those is -- is really approaching zero at the higher

 8 discount rates. Even at the lower discount rates, they

 9 can be -- they'll be pretty heavily discounted, I

10 think, or over 98 percent discounted by the tail end,

11 even at the -- at the reference discount rate.

12   MR. ED WOJCZYNSKI: Part -- could we,

13 on that question, Dr. Grant, I -- I might be confused

14 as to what you were saying. so if I could just check

15 that we're understanding what you said?

16   DR. HUGH GRANT: Yeah. I guess when I

17 was just looking at these initial results, when I first

18 read them, I was surprised that the Preferred

19 Development Plan, the net present value wasn't a lot

20 more sensitive to the chosen discount rate you used,

21 and I was just trying to understand intuitively why

22 that would be the case, because, you know, in my

23 initial mind, it's like you make a huge expenditure in

24 some year zero, and the stream of benefits follows

25 afterwards.

2540

1   But I think for my own mind, the reason

2 that it's less sensitive is that these capital

3 expenditures are actually not happening in this initial

4 year zero. They're being spread out over the first ten

5 (10), fifteen (15) years of the time horizon, and so

6 that some of the capital outlays on Conawapa are

7 actually coming in year fifteen (15), and they're

8 fairly highly discounted at that time.

9   So, you know, I was just sort of

10 satisfying myself in terms of the intuition of why you

11 wouldn't see more variation in net present value based

12 on the discount rate.

13   MR. ED WOJCZYNSKI: Do we, perhaps -- I

14 think this is an important topic, so it's worth

15 spending a couple of minutes.

16   Exhibit 104-2 -- well, it's the -- it's

17 also in -- in the MIPUG piece, but I -- I don't happen

18 to have that number. MIPUG-1-4 -- Manitoba Hydro-104-

19 2. It's the -- it's the new quilt. Page 2, sorry.

20 Yeah. And if we go to reference energy prices, and

21 let's just use reference capital costs. So these are

22 the latest numbers we have, this quilt with the -- the

23 -- the quilt with the -- the latest capital cost.

24   So if we go to ref/ref/ref, meaning

25 we're using the ref discount rate, we get a posi -- for

2541

1 the Preferred Plan, we get a positive seven nine eight

2 (798), and then if you go to the low discount rate, it

3 goes to plus four three two six (4,326), and if you go

4 to the high discount rate it flips over and becomes a

5 minus seven nine eight (798), which -- so there is

6 quite a large swing in the -- in the PV -- the NPV when

7 you change the discount rate.

8   So I'm not sure where you were

9 concluding that there isn't a significant change with

10 the discount rate.

11   DR. HUGH GRANT: Yeah. I thought the

12 discount rate sensitivity would be much greater for the

13 Preferred Development Plan than it would be, say, for

14 an All Gas Plan, because the Preferred Development

15 Plan, in my mind, at least initially, had most of the

16 capital outlays, the cost occurring early in the

17 period.

18   So I guess I was just expressing my

19 surprise that they -- in a comparative sense, the

20 discount rate didn't have more impact on the outcome,

21 and -- and more of a negative impact on the Preferred

22 Development Plan.

23   Does that make sense?

24   MR. ED WOJCZYNSKI: Yeah. Well, it --

25 it -- I -- it's -- let's just say we aren't surprised

2542

1 to see this, this range, and -- and we -- we think --

2 we see that as quite significant. If you go to the All

3 Gas, you'll see that -- that the range is not as big

4 and that it's not as sensitive to that -- that discount

5 rate. The range is a smaller range, and -- and that's

6 also what we would expect.

7   So now, I guess we're dealing with how

8 much. But definitely directionally, the -- the

9 Preferred Plan is more sensitive to discount rate or

10 interest rates than the All Gas Plan would be, and it -

11 - and this is a much wider range, around five thousand

12 (5,000) -- pardon me, five bil -- $5 billion for the

13 Preferred Plan, and about 1 1/2 billion for the All Gas

14 Plan, so it's like three (3) times as sensitive from

15 that point of view.

16   Now, I guess you -- maybe you were

17 expecting to see a much bigger ratio, so that -- that

18 would be a surprise, yes, but I have to say, from our

19 point of view, this is the kind of variation we would

20 expect to see.

21   DR. HUGH GRANT: I -- I think my last

22 point would be, given the huge variation in suggested

23 discount rates one might use, in some -- some ways, I'm

24 worried about creating a false precision to all of

25 this, right, because no one really knows what discount

2543

1 rate to use and no one the heck knows what a discount

2 rate's going to look like in fifty (50) years or so,

3 and I think that's where the hyperbolic issue comes in?

4   So I -- I respect the fact that you have

5 to use some number, and I'm -- in any event, I think

6 we're in -- I think we're in agreement that -- yeah,

7 I'll leave it at that.

8

9 CONTINUED BY MR. ANTOINE HACAULT:

10   MR. ANTOINE HACAULT: I think there's

11 one (1) other point I'd like to clarify with respect to

12 the discussion that's been happening between Board --

13 Dr. Grant and -- and Mr. Wojczynski in looking at the

14 quilts, and if we look at page 4 of 7, which was the

15 original quilt, page 4 of 7, the original quilt, and if

16 we go to the Preferred Development Plan, and I'm going

17 to look at three (3) numbers related -- so I start with

18 ref/ref/ref. This was the original quilt.

19   If we go to the extreme right, we see

20 that we started at 1.696 billion, correct?

21   MR. ED WOJCZYNSKI: Correct.

22   MR. ANTOINE HACAULT: We have -- if we

23 go up and use ref energy prices but the low discount

24 rate, so now we're just doing the variance on low

25 discount rate and keep the capital costs at ref, we go

2544

1 across the line, we see 2 billion -- two point eight-

2 four (2.84). So there's only -- I shouldn't say only,

3 but about a $600 million spread there.

4   And this was why, until they provided

5 the revised table, I was going to spend a fair amount

6 of time, and I am indirectly, on why we were of the

7 view that the original quilt wasn't giving us an

8 accurate picture because it was putting common costs in

9 there and discounting common costs.

10   You see that -- the numbers that Mr.

11 Wojczynski has provided under the revised quilt, there

12 is a bigger spread. So we have a better idea of what's

13 happening when the discount rate changes.

14   MR. ED WOJCZYNSKI: We fully agree with

15 this -- the suggestion that this is an improved

16 approach, which is why we used it. And Ms. Flynn was

17 referring to that the other day. And -- and we

18 appreciate all the useful information and suggestions

19 we have had from people, and we try and incorporate

20 them when we receive them. And this was one of them.

21   MR. ANTOINE HACAULT: And if we do the

22 same thing but with respect to gas, intuitively gas was

23 less capital expensive, and under the original quilt we

24 saw a huge change.

25   And so if we look under the All Gas

2545

1 column, let's start at ref/ref/ref, it's at zero.

2   MR. ED WOJCZYNSKI: I'm sorry --

3   MR. ANTOINE HACAULT: And we go --

4   MR. ED WOJCZYNSKI: I'm sorry, Mr.

5 Hacault, can I just interrupt and correct something?

6   MR. ANTOINE HACAULT: Yeah.

7   MR. ED WOJCZYNSKI: I'm informed by the

8 people who actually do this stuff that we had found

9 this -- and our staff had found this problem, as well,

10 and that -- and that -- so you're -- you found the same

11 problems we had. It wasn't just others that found it,

12 so I spoke too quickly there.

13   MR. ANTOINE HACAULT: Thank you. Can

14 we just confirm that intuitively the original quilt

15 then -- and I was going to take the panel through some

16 of the numbers; ref/ref/ref, we had zero. And then if

17 we do reference energy prices and go to the low

18 discount rate and keep capital cost at the reference,

19 we had negative swing by changing the discount rate of

20 $4 billion, correct?

21   Have we found that?

22

23   (BRIEF PAUSE)

24

25   MR. ED WOJCZYNSKI: Could you repeat

1 that, please? My apologies.

2   MR. ANTOINE HACAULT: Okay. I'm

3 looking to see whether or not the original methodology

4 -- what the impact of changing the rate on the All Gas

5 Plan was.

6   MR. ED WOJCZYNSKI: Okay.

7   MR. ANTOINE HACAULT: And intuitively,

8 the Gas Plan is less capital intensive, so we should

9 see less of a swing.

10   Do you agree with that?

11   MR. ED WOJCZYNSKI: It's more -- it's

12 less capital intensive, but it has huge production

13 costs in the future due to the huge reliance on natural

14 gas. So --

15   MR. ANTOINE HACAULT: Okay.

16   MR. ED WOJCZYNSKI: -- when you have to

17 discount the large amount of gas cost at ten (10),

18 thirty (30), forty (40), fifty (50) years down the

19 road, that -- that -- the capital cost of the gas

20 turbines wouldn't be as sensitive, but the production

21 cost component related to the gas cost would be quite

22 sensitive.

23   MR. ANTOINE HACAULT: Okay. So I just

24 want to confirm -- compare this quilt and that

25 particular number, and I'll move on. I'll ask for some

 1 documents.

 2   But we saw a difference between

 3 ref/ref/ref of zero on the All Gas Plan to the ref

 4 energy prices, low discount rate, it was a $4 billion

 5 swing, correct, to the negative?

 6

 7   (BRIEF PAUSE)

 8

 9   MR. ANTOINE HACAULT: Another person

10 can answer if they found it.

11   MR. ED WOJCZYNSKI: Yes.

12   MR. ANTOINE HACAULT: Now, if we change

13 --

14   MR. ED WOJCZYNSKI: Yes.

15   MR. ANTOINE HACAULT: -- if we change

16 to the revised schedule, which is on page 2, we see the

17 impact of changing the methodology.

18   MR. ED WOJCZYNSKI: I -- I think you

19 meant page 6, perhaps?

20   MR. ANTOINE HACAULT: Page 6 is okay,

21 too.

22   MR. ED WOJCZYNSKI: Yea, 'cause on page

23 2 you got both --

24   MR. ANTOINE HACAULT: Okay.

25   MR. ED WOJCZYNSKI: -- capital cost --

2548

1   MR. ANTOINE HACAULT: Okay.

2   MR. ED WOJCZYNSKI: -- although I guess

3 the gas cost -- okay.

4   MR. ANTOINE HACAULT: If we change to

5 page 6. Page 6.

6   MR. ED WOJCZYNSKI: Yes.

7   MR. ANTOINE HACAULT: If we do

8 ref/ref/ref, we're at zero for the All Gas Plan,

9 correct?

10   MR. ED WOJCZYNSKI: Yes.

11   MR. ANTOINE HACAULT: And if we go ref

12 energy prices but change the discount rate to low and

13 do the ref capital costs again, we see a negative 1.039

14 billion, correct?

15   MR. ED WOJCZYNSKI: Yes.

16   MR. ANTOINE HACAULT: So the change in

17 methodology by excluding the cap -- common costs

18 changes the analysis by 3 billion in that particular

19 example?

20   MR. ED WOJCZYNSKI: Yes.

21   MR. ANTOINE HACAULT: So it narrows the

22 risk. And we looked at that graph, correct?

23   MR. ED WOJCZYNSKI: Yes.

24   MR. ANTOINE HACAULT: Okay. Now...

25

2549

 1   (BRIEF PAUSE)

 2

 3   MR. ED WOJCZYNSKI: We -- we agree that

 4 including the common factors had the unintended effect

 5 of amplifying the long-term risk of the gas

 6 alternative.

 7   And -- and we did acknowledge in the --

 8 on page 6 in that sentence just above the graph, which

 9 you can't see right now, that one (1) -- one (1)

10 important impact with the revised treatment of the

11 common cost when you reduce the downside risk of all

12 the plans, except for the Preferred Plan, which is

13 another way of saying what you said.

14   And you've -- you -- you bring up the

15 numbers and said it very well.

16   MR. ANTOINE HACAULT: Well, if we look

17 at the swing that now exists on discount rates and Plan

18 14, so on -- on the right-hand side, if we look at the

19 swing, and this is orig -- page 6 of 7 for -- of

20 Exhibit 104-2, we have ref/ref/ref at one point six-

21 nine-six (1.696), correct?

22   MR. ED WOJCZYNSKI: Yes.

23   MR. ANTOINE HACAULT: And then the

24 swing in low discount rates, I'm following my lines

25 correctly, I see the number, 5.265 billion?

2550

 1   MR. ED WOJCZYNSKI: Yes.

 2   MR. ANTOINE HACAULT: So there's an

 3 upside of about 3.6 billion, correct?

 4   MR. ED WOJCZYNSKI: Yes.

 5   MR. ANTOINE HACAULT: And that makes

 6 sense, because if you've got lower interest rates, you

 7 should see a lot more benefit.

 8   Now, if we look ref/ref/ref at one point

 9 six-nine-six (1.696) but we've got a higher discount

10 rate, at the higher discount rate we're down to $89

11 million?

12   MR. ED WOJCZYNSKI: Yes, correct.

13   MR. ANTOINE HACAULT: So when we had

14 the discussion with Dr. Grant on the sensitivity of the

15 capital-intensive project to interest, here we see a

16 swing of nearly $5 billion on interest rates, correct?

17   MR. ED WOJCZYNSKI: Yes.

18   MR. ANTOINE HACAULT: And under the

19 original quilt, you can do it subject to check, it was

20 only a swing of about 800 million?

21   MR. ED WOJCZYNSKI: Subject to check.

22   MR. ANTOINE HACAULT: I've just got one

23 (1) or two (2) short questions of Dr. Borison, looking

24 at the time, and it related to the -- oh, sorry, before

25 we move on, would it be possible for the revised quilt

2551

1 that's part of Exhibit 104-2 to give us the same type

2 of pages that we had in Appendix 9.3 that I referenced?

3   I assume that those numbers exist

4 because a quilt was produced. Could we have the same -

5 - if you look at page 10 of our book of documents. I'd

6 just like to have the same type of sheets that led to

7 the quilt that's in your revised exhibit that show the

8 revised construction costs and -- and the revised

9 approach to the common cost.

10   MS. JOANNE FLYNN: Yeah, we're -- we're

11 just preparing those. We intend to -- to file the

12 updated --

13   MR. ANTOINE HACAULT: Perfect.

14   MS. JOANNE FLYNN: -- Appendix 9.3 to

15 back it up.

16   MR. ANTOINE HACAULT: Thank you.

17

18   (BRIEF PAUSE)

19

20   MS. JOANNE FLYNN: No, it will be part

21 of Exhibit 104.

22

23   (BRIEF PAUSE)

24

25   MR. ANTOINE HACAULT: If document

2552

1 management person could go to Volume IV, page 62.

2 That's our book of documents, page 62.

3

4   (BRIEF PAUSE)

5

6   MR. ANTOINE HACAULT: First, Dr.

7 Borison, did Manitoba Hydro provide you with a copy of

8 our book of documents?

9   DR. ADAM BORISON: Yes, thank you.

10   MR. ANTOINE HACAULT: Okay. And at Tab

11 13, we believe this is a reproduction of one of the

12 papers that you co-authored with Dr. Gregory -- Gregory

13 Hamm, correct?

14   DR. ADAM BORISON: That is correct,

15 yes.

16   MR. ANTOINE HACAULT: Okay. And I just

17 have a couple questions with respect to some of the

18 things that were written in that document and -- and to

19 know whether or not your view is that -- that it's

20 still the case, in today's market, relevant to Manitoba

21 Hydro.

22   So -- because this was a paper written

23 some eight (8) years ago and it wasn't written with

24 Manitoba Hydro and this hearing in mind, I'm sure,

25 correct?

2553

1   DR. ADAM BORISON: Yes.

2   MR. ANTOINE HACAULT: So the third

3 paragraph down, the -- the -- we're looking at, says:

4   "The major problem with the financial

5   approach is that the markets are not

6   sufficiently extensive, mature, and

7   stable to rely on the available data.

8   Or said another way, there is just

9   not enough applicable data to produce

10   accurate long-run forecasts.

11   Regional electric -- electricity

12   markets may have only existed for a

13   few years and/or have been in the

14   state of transition during most or

15   all of their existence."

16   With respect to the statements that I've

17 read, sir, as applicable to this case and Manitoba

18 Hydro, do you think those statements still stand?

19

20   (BRIEF PAUSE)

21

22   DR. ADAM BORISON: I would say to some

23 extent. And let me just give you the background. I

24 certainly view myself as knowledgeable about tools used

25 in forecasting and -- and since wrote this paper as a

2554

1 part of that. But I am not, certainly to the extent

2 that, say, that Dr. Murphy is, or even my colleague Dr.

3 Tanner, who is sitting behind me, not as much of an

4 expert as they are on the current state of markets, the

5 availability of data, those factors.

6   My understanding is that in the

7 intervening eight (8) years or so, the amount of

8 available information from markets -- regional

9 electricity markets, commodity markets -- has

10 increased. But I would still agree that to produce

11 very long term forecasts there typically is not enough

12 available data.

13   MR. ANTOINE HACAULT: So that brings me

14 to the concluding sentence in that paragraph, and I'm

15 quoting:

16   "Accuracy when the data are projected

17   forward twenty (20) to thirty (30)

18   years is questionable at best."

19   Do you still agree with that analysis as

20 it regards to this case?

21   DR. ADAM BORISON: By and large, yes.

22   MR. ANTOINE HACAULT: And then in this

23 paper you discuss another approach, and it's two (2)

24 paragraphs down for the document management. And it

25 starts:

2555

 1   "The major problem with the

 2   engineering approach is a strong

 3   tendency to understate the

 4   uncertainty in technology, system

 5   configuration, fuel prices, and

 6   demands. This results in a forecast

 7   that anchors on a very narrow range

 8   that be -- can be inconsistent with

 9   market realities."

10   The same question: As it relates to our

11 exercise today, firstly, do you view that part of the

12 analysis that was undertaking (sic) looked at the

13 engineering approach which you ascribe in this paper?

14   DR. ADAM BORISON: Let me see if this -

15 - this -- if I understand the question. The issue that

16 I raised here was specifically with respect to the use

17 of tools in price forecasting.

18   MR. ANTOINE HACAULT: Correct.

19   DR. ADAM BORISON: And again, I -- I am

20 not a party to precisely what was done in the price

21 forecasts that were used by Manitoba Hydro, although --

22 and by Dr. Murphy, for example, in doing gas or

23 electricity price forecasts. But I do understand that

24 -- that those tools have -- have improved, and that

25 they -- they use a combination of both financial data

2556

1 and -- and engineering data.

2   But I would stand by the statement that

3 if one does a forecast based entirely, or largely, on

4 engineering these concerns occur. I don't know if that

5 answers your question or not.

6   MR. ANTOINE HACAULT: I had asked --

7 thank you. I had asked a second aspect. Are you aware

8 of whether Manitoba Hydro has taken the approach which

9 you espouse in this, is to rely both on the financial

10 approach and the engineering approach?

11   DR. ADAM BORISON: I can't -- yeah, it

12 -- it would be -- I would be hard pressed to answer

13 that question specifically with respect to Manitoba --

14 Manitoba Hydro. My understanding is that the available

15 market forecast that firms in this field use have a

16 mixture.

17   They are -- people are smart enough now

18 to combine both financially driven information,

19 forwards markets, and long-term technology information

20 to develop those forecasts. So -- so I would -- I

21 would think it would be highly likely that -- that the

22 -- the forecasts that were relied on here had a mixture

23 of both -- what this article calls for: a use of

24 financial data and a use of engineering data.

25   MR. ANTOINE HACAULT: Okay. And if Dr.

2557

1 Murphy could provide any insight on that, even though

2 he didn't write the paper, I'd most certainly invite

3 his comments or views.

4   DR. DEAN MURPHY: Yes, I certain have

5 some thoughts on this. I think -- I -- I agree with

6 Dr. Borison in that I think there are risks with the

7 engineering approach of understating the uncertainties

8 that may be involved. And that's not a problem of

9 necessarily the tools themselves as much as how they

10 are applied.

11   And -- and similarly on -- with the use

12 of financial data, yes, power price forwards these days

13 for the MISO region, you might get four (4), perhaps

14 five (5) years of forward data. And if you were to

15 rely solely on that forward data, you would have a

16 limited ability to project over the horizon that you --

17 that you're interested in.

18   I can't speak for Manitoba Hydro's

19 consensus forecast because I'm not aware of the details

20 of the other -- other consultants who provided

21 forecasts, but I was one of those consultants. And

22 obviously, I am quite familiar with the work that we

23 did. And -- and this was very much a focus of -- of

24 our work in providing the forecast for Manitoba Hydro,

25 is to not rely simply on an engineering approach or a

2558

1 financial approach, but to use both.

2   And we gave -- we put great effort into

3 understanding the input factors and the potential

4 uncertainty in those, and the ones that were most

5 important were gas prices and CO2 prices. And so I

6 used all the available data that I had at hand to try

7 to develop a range on those input prices, and then I

8 used an engineering model informed by those potential

9 ranges on input prices to project the implications for

10 power prices in the longer term.

11   And so for instance, for gas prices I

12 used forward market data, futures data, for natural

13 gas, which these days does go out farther than it did

14 five (5) or ten (10) years ago. You can get futures

15 prices for natural gas from NYMEX that go out to 2025,

16 so more than -- a little more than ten (10) years now.

17   But I also looked at historical gas

18 prices, the historical volatility in gas prices, and

19 historical forecast errors; how gas prices had been

20 forecasted periods in the past and how they ultimately

21 were realized when that time came to develop the range

22 that I put on the gas prices in -- in the forecast that

23 I used.

24   I also used options, financial options,

25 on gas which tell you something about what the market

2559

1 believes the uncertainty is in future gas prices. So I

2 used all that information to develop my -- the range of

3 gas prices that I then put into the engineering model

4 to -- to project the potential electricity prices in

5 the future under various combinations of gas prices and

6 also CO_2 prices, et cetera.

7   So I -- I didn't have any involvement

8 with Dr. Borison when he wrote this paper but I -- I

9 believe that the approach that -- that the Brattle

10 Group took with respect to its forecast that went into

11 Manitoba Hydro's consensus took into account these

12 concerns.

13   Is it perfect? Probably not. Is it the

14 best that we can do? Again, speaking only for the

15 Brattle Group's forecast, given the -- given the

16 resources and information available, I think it -- I

17 think it goes some way toward taking -- taking account

18 of the kinds of concerns that Dr. Borison raised in

19 this paper.

20   MR. ANTOINE HACAULT: Thank you. If we

21 could turn to page 63 of the document book. There's

22 the title, 'Anchoring on the Past and Present'. And

23 the second full -- the sentence starts:

24   "The second major problem identified

25   above was the lack of focus on the

2560

1   future, and underlying assumption of

2   little change. While often viewed as

3   extremely stable, the power industry

4   is actually a dynamic and changing

5   industry."

6   Again, with bringing that up to 2014,

7 sir, as it relates to Manitoba Hydro's projects, does

8 this statement continue to be true?

9   DR. ADAM BORISON: I thank you very

10 much for bringing this statement up, because I did -- I

11 do want to comment on that. I do think that statement

12 is still true.

13   And I -- I guess the point I would like

14 to emphasize is that this is an industry that has been,

15 for decades, quite dynamic, quite changing, and quite

16 uncertain. And that I was looking back in the

17 literature for the use of the term 'unprecedented

18 uncertainty', which I have used, and Dr. Murphy has

19 used. And I found that in every single year, at least

20 going back ten (10) years on the Internet, and then I

21 actually found an article from 1983 about -- that said

22 the -- the utility industry is facing unprecedented

23 uncertainty.

24   But I actually don't think that's

25 untrue. I think what 'unprecedented' means in that

2561

1 context is there are a set of things that appear very

2 uncertain right now that -- that haven't been there

3 before. And so in '83 it were -- was things like Three

4 Mile Island, or something of that nature,

5 electromagnetic fields. There were issues that were

6 there that people had never heard about before which

7 all of a sudden made things very uncertain.

8   I think the -- the fantasy though is

9 that -- that somehow those are going to go away and

10 what happens instead is those go away -- I mean, we now

11 don't worry so much about electromagnetic fields -- but

12 something else shows up. And so I -- again, to -- to

13 defend myself and Dr. Murphy, I think he'd say, Yes,

14 the uncertainty is different. Now it's structural

15 uncertainty. It may be uncertainty about the nature of

16 the market in MISO. It may about regulation in

17 California.

18   But it is not as if somehow we can wait

19 magically for a few years and the uncertainty will go

20 away, because most likely what's going to happen is

21 there'll be some other issue that comes up. And I

22 think the past thirty (30) or so years have been

23 evidence of that. Anyway, that's a long -- a very long

24 answer to that very brief question. I think things are

25 quite similar to when this was written, in that sense.

2562

1   MR. ANTOINE HACAULT: I might have a

2 question of -- I'm going to call him Dr., because he's

3 so knowledgeable, Cormie. What's your view as to what

4 the uncertainty does with respect to your negotiations?

5   Does it help you get better prices?

6   MR. DAVE CORMIE: Yes, clearly that's

7 an advantage that works in our favour, because it's --

8 it's not only Manitoba Hydro that uses a consensus

9 forecast and goes to multiple forecasters; our

10 customers also do exactly the same and they're making

11 their forward decisions based on the exact same

12 information that we have. Gas prices could be ten

13 dollars ($10) in the future, it could be eight dollars

14 ($8), it could be four dollars ($4), it could be three

15 dollars ($3).

16   And so it shouldn't be a surprise that

17 their view of the future is not much different than

18 ours and -- and they are risk averse just as we are.

19 And in -- in talking to them -- and their customers are

20 very similar to our customers. And the first thing

21 they want is a reliable supply of power. And the

22 second thing they want is stability in pricing. They

23 don't want to be exposed to volatile pricing. The

24 third thing they want is absolute price. But absolute

25 price is less important than stable pricing.

2563

1   And so when they look at the future and

2 they see this uncertainty, they -- they want to hedge

3 against that. And the price that we're able to achieve

4 -- achieve in -- in our forward selling reflects a

5 premium over what you would expect if you just did the

6 engineering analysis of what the future costs of

7 electricity might be.

8   So the uncertainty in -- in that regard

9 helps us to achieve premium pricing, because we -- we

10 can offer fixed price, long-term contracts that are

11 stable, and that eliminates a lot of utility risk, and

12 -- and they're paying for that.

13   MR. ANTOINE HACAULT: And to the extent

14 that you're able to negotiate firm con -- firm price

15 contracts for part of your dependable energy, you make

16 use of that uncertainty to reduce the uncertainty in

17 Manitoba Hydro.

18   Am I getting it right?

19   MR. DAVID CORMIE: Yes. So we then --

20 I have fixed price contracts for power off Conawapa

21 going out to 2036 for the Wisconsin Public Service

22 sale. That locks up, essentially, a third of the

23 production of that station at a -- at a price that's

24 well above our levelized cost, and -- and that helps us

25 make a better business case to build that project.

2564

1   MR. ANTOINE HACAULT: Now, I have

2 another question. Because some of the energy produced

3 by the facilities is not dependable, correct?

4   MR. DAVID CORMIE: Yes. Each facility

5 produce -- each hydro facility produces surplus energy.

6   MR. ANTOINE HACAULT: Okay. And that

7 varies according to the stations in the amount -- you

8 can't just do an automatically, Well, there's 3,000

9 gigawatts of dependable, and we'll multiply that times

10 a specific number, but is there a range?

11   MR. DAVID CORMIE: Usually about 40

12 percent of the average production is surplus. Sixty

13 percent of it is dependable. You know, some -- some

14 plants, that -- that number is a little bit different,

15 but for the system as a whole, and especially the large

16 northern plants, Kettle, Long Spruce, and Limestone,

17 they all are essentially the same capacity factor.

18 Forty percent is a good amount on average that is

19 surplus.

20   MR. ANTOINE HACAULT: Okay. And how

21 does Hydro deal with the uncertainty, I guess --

22 hopefully this is not CSI, but in its forecasts before

23 this Board with respect to that portion of the energy?

24 And then I'll have a question with respect to the

25 uncontracted dependable, firstly with respect to the

2565

1 power over and above the dependable.

2   MR. DAVID CORMIE: There -- there's two

3 (2) ways that we manage that. Firstly, customers are

4 willing to buy fixed-price surplus energy, and they're

5 willing to buy that and -- and give Manitoba Hydro the

6 option to have an adverse water clause so that under

7 adverse water conditions, when we need to keep that

8 energy for our own needs, we have the right to curtail,

9 and so we can -- we can -- although we're talking about

10 surplus energy, it's not dependable energy, we can fix

11 the price of that.

12   And -- and then secondly, we -- we have

13 the energy that's available on an annual basis as -- as

14 the -- as the water supply varies, and so that's the --

15 the opportunity energy, the energy that -- that, if it

16 rains today -- it rains today, in a couple of weeks,

17 we'll have some extra production.

18   We can manage that in two (2) ways. One

19 (1) is just to leave it for the spot market, wait till

20 the water arrives at the generating station. On a

21 daily basis we calculate what that is and we take it to

22 the spot -- the MISO spot market.

23   The other thing that we can do is we can

24 lock that in at forward prices in -- in the current

25 year, and generally we attract a significant premium by

 1 managing utility risk in the short term, by fixing the

 2 price for electricity six months out, and generally

 3 that trades significant premium over the spot market.

 4   Remembering the -- coming out of the

 5 winter of --

 6   MR. ANTOINE HACAULT: Could I -- can I

 7 just ask -- and I'll -- I'll let you continue, but what

 8 I'm trying to get a handle on with respect to the last

 9 statement that you made, you said you can fix some of

10 that energy at a premium, and my question is, Is that

11 premium reflected in the numbers of the forecast? You

12 -- you understand where I'm getting at?

13   Have we forecast a number lower than

14 what Hydro expects to get, because it -- you're able to

15 get premiums, but we aren't putting it in the forecast?

16   MR. DAVID CORMIE: No, the -- the -- in

17 -- in the -- in Manitoba Hydro's price forecast for

18 opportunity energy, there's a -- there is an adder that

19 reflects the -- our ability in the short term to get a

20 premium over the spot market prices.

21   MR. ANTOINE HACAULT: I don't know. I

22 saw Ed and Joanne's -- do you need to add anything

23 further? If not, I'll -- I'll move to the next

24 question that I had with respect to a similar concept

25 on the contracted dependable.

2567

1   MR. ED WOJCZYNSKI: There may be

2 something to supplement what Mr. Cormie said, is that

3 another way we take the unfirm hydro and -- and

4 maximize our revenues is to take our non-hydro energy

5 such as import or thermal generation and use that to

6 firm up some of the unfirm hydro, and sell a firm

7 product.

8   So we -- we also use that as another

9 tool, but it -- I'd like to add to an earl -- you had

10 an earl --

11   MR. ANTOINE HACAULT: Can I just ask

12 you, is that in Plan 14, because I know what you do in

13 reality, but I want to know whether it's in Plan 14?

14 So you've just explained the concept.

15   Is that concept included in Plan 14?

16   MR. ED WOJCZYNSKI: We -- we do that in

17 all our plans, including Plan 1.

18   MR. ANTOINE HACAULT: Okay, thank you.

19   MR. ED WOJCZYNSKI: But there's another

20 comment. You had quite a good steady stream of

21 discussion with Mr. Cormie I didn't want to interrupt

22 it, but before the thought leaves us all, there was

23 this discussion of -- of risk, and in the US, in -- in

24 the utility industry, and there's a lot of discussion

25 in various papers Mr. -- we had from the Consumers'

2568

1 Association. We had a number of papers, one (1) of

2 them was a series paper that I actually referenced in -

3 - in the discussion.

4   And if you go and look at most of those

5 papers, if not all of them, certainly the current ones

6 in the -- in the last number of years, I would suggest

7 the -- the single biggest, or at least one (1) of the

8 biggest risks that the industry is facing is

9 decarbonization, is moving away from -- from coal or --

10 or to -- to a lesser degree, natural gas.

11   There -- the papers written are in -- in

12 the focus of the majority of the utilities in -- in

13 North America, particularly the US, who are basically

14 heavily thermally based in the industry. I don't

15 remember the number, but it's something like -- now I'd

16 -- I wish I could remember, but, like, three-quarters

17 (3/4s) of the energy is thermal energy in -- in the

18 United States. Canada, it's 80 percent hydro. In the

19 US it's a flip picture.

20   And so the -- the threat that the util -

21 - many are talking about -- the utility industry in the

22 US actually has become and is, in effect, an

23 opportunity for Manitoba Hydro. And -- and through

24 some of the discussion that was just had, we take

25 advantage of some of that and use it to firm up our

1 prices on the firm product, like Mr. Cormie is talking

2 about, whatever.

3   But their threat, in effect, becomes our

4 opportunity.

5   MR. ANTOINE HACAULT: Thank you. So I

6 had one (1) other question that I had raised, which --

7 and I think maybe I'll -- after Mr. Cormie responds, if

8 Dr. Murphy has a response on this one (1) also.

9   With respect to the material that's put

10 before us in the forecasting, I understood that Plan 14

11 includes a forecast price, correct?

12   My question is: Is that fore --

13 forecast price include the pricing premium that we've

14 talked about or not, for the dependable part of our

15 energy?

16   MS. JOANNE FLYNN: The same price

17 forecast is used throughout the entire analysis. There

18 aren't -- there's separate prices for separate

19 products, but if the product exists in any one (1) of

20 the plans, the same price is applied.

21   MR. ANTOINE HACAULT: But -- but that

22 wasn't really the question. Let me try to put a number

23 to it. If the forecast is six (6) cents, just to pick

24 a number, and Mr. Cormie, through his valiant efforts

25 and the premium pricing is able to get one (1) cent

2570

1 over market, seven (7) cents, I want to understand

2 whether or not the forecast that's being put in front

3 of us, we aren't -- hopefully that's just an example,

4 it doesn't get into CSI, is the six (6) cent number,

5 which is the forecast number, or the premium, if there

6 is one, that Mr. Cormie's able to do, and in that

7 sense, are we valuing according to price forecasts, or

8 are we undervaluing what Manitoba Hydro's likely going

9 to achieve?

10   MS. JOANNE FLYNN: So for long-term

11 dependable sales, where there is enough progress in the

12 negotiations that we have, a -- a term sheet, or some -

13 - some sort of pricing arrangement, we will use in our

14 analysis that pricing arrangement. For the dependable

15 energy that has not yet been sold, so it's -- it's

16 uncommitted, then we -- we'll -- we will use the long-

17 term dependable forecast price from the long-term

18 forecast.

19   For the surplus energy, which has been

20 called the opportunity energy, there is a separate

21 price for that product.

22

23   (BRIEF PAUSE)

24

25   MR. DAVE CORMIE: Mr. Hacault, there's

2571

1 a difference between what people are willing to pay and

2 what something costs, and that's the difference between

3 the value and the cost. And we think that we are

4 reflecting the value of our products in the forecast,

5 and some of that value -- it depends on the product,

6 but it's a -- it's -- it's, I believe, a conservative

7 forecast of the value of the -- the specific Manitoba

8 Hydro product, which is -- would be different than if

9 you went out and you did an engineering cost estimate

10 of what that -- you thought that electricity might be

11 worth if you bought it in the spot market.

12   And so I think Ms. -- Ms. Flynn has --

13 has described, you know, the different products, but we

14 -- it -- it is a conservative value-based forecast and

15 not a -- not a cost-based estimate.

16   MR. ANTOINE HACAULT: And perhaps I

17 didn't ask the question in a detailed way enough. When

18 we see your graphs, we have the -- kind of a solid

19 block of the contracted power, and then you always keep

20 a margin between that solid block of export contracts,

21 or contracted, a dependable -- a -- a margin, which is

22 still considered dependable.

23   How is that block dealt with in the

24 forecasts?

25

2572

 1   (BRIEF PAUSE)

 2

 3   MS. JOANNE FLYNN: So the -- the

 4 products that the price forecasters give us are the --

 5 are what -- one (1) of them is called the long-term

 6 all-in price, and the other is the...

 7

 8   (BRIEF PAUSE)

 9

10   MR. ANTOINE HACAULT: Maybe we can have

11 a -- a lunch break, and if I have a short discussion

12 with counsel for Hydro, we can -- I can better phrase

13 the question, or whatever, so that when we come back

14 after lunch, we could deal with that quicker, because

15 it seems that I'm not communicating my questions

16 correctly.

17   THE CHAIRPERSON: I -- I do want to

18 clarify something though. In terms of the quilt,

19 though, the energy prices that are used for the

20 purposes of the quilt are not the same as the prices

21 that we're talking about here, the contract prices in

22 your negotiations?

23   MS. JOANNE FLYNN: Yes, they're this --

24 this -- it is the same.

25   THE CHAIRPERSON: It is, then?

2573

1   MS. JOANNE FLYNN: If we have contract

2   prices, they'll be included in --

3   THE CHAIRPERSON: As -- as far as the

4   energy price that we've -- you've used for the quilt

5   purposes?

6   MS. JOANNE FLYNN: As far as the

7   analysis of the net present values.

8   THE CHAIRPERSON: I see. Okay. Now,

9   in terms of just going back to Exhibit 104-2, a

10 question I have is the capital costs probabilities have

11 been changed as a result of the variation to the cost

12 of Keeyask. Now, what's happened there, I guess, is

13 you have removed the -- reduced the probability of a

14 high forecast -- a high cost, and -- and the reference

15 number has increased to 60 percent.

16   Now, it seems to me that, you know,

17 given that you know that capital costs are in the

18 increase, why would you not reduce the -- the low

19 scenario as opposed to decreasing the high scenario?

20   MR. ED WOJCZYNSKI: Sir, could -- could

21 you repeat the last part, the question?

22   THE CHAIRPERSON: Well, I'm just

23 looking at the capital cost probabilities here. You're

24 using a reference -- now using 60 percent reference,

25 with a high of 20 percent and a low of 20 percent.

2574

1   MR. ED WOJCZYNSKI: M-hm.

2   THE CHAIRPERSON: Now, I understand why

3   the reference case -- you know, you -- there's great --

4   greater certainty in -- in respect of the future, but

5   it seems to me that you now know that costs are in --

6   costs have increased.

7   Wouldn't you have a low -- wouldn't you

8   have reduced the low to 10 percent and increased the

9   high to -- to something higher than -- than 20 percent,

10   as opposed to what you've done, which is to reduce the

11   high?

12   MR. ED WOJCZYNSKI: I'll try and give a

13   short answer, and we can always give a long answer but

14   I -- I'll try -- hopefully the short answer will do.

15   First of all, through getting the GCC

16   and getting other information and having contracts

17   signed, we have greater confidence in the information

18   we have, and -- and that's the reason for increasing

19   the reference.

20   Secondly, we've used the information

21   we've obtained from the -- the bidding process for the

22   GCC and other information to -- to help us evaluate

23   what the high and the low should be and determine what

24   those costs are, and also assist in the probabilities.

25   One (1) of the things we did, and Mr.

1 Bowen was talking about that earlier, is when you do

2 the -- the labour -- the labour reserve -- the labour

3 productivity reserve component, and the -- the

4 uncertainty in the labour reserve risk, they took that,

5 and they used a probabilistic technique and applied it

6 to all three (3) scenarios of low, reference, and high.

7   So the risk on the labour productivity

8 side is already in the low estimate. So -- so based on

9 that, we felt that having a balanced high and low set

10 of probabilities was appropriate, because we've already

11 put the -- the risk of a labour productivity cost

12 increase into the low estimate. All three (3) already

13 have it, so we feel that that -- that's appropriate to

14 have that balanced.

15   Now just a -- a small detail is that

16 that's the case for -- for Keeyask, we're very

17 comfortable with that. With Conawapa, we -- we may --

18 the probabilities maybe should be a little bit more

19 along the line of what you're suggesting, but our

20 primary focus in the analysis is more on Keeyask than

21 on Conawapa right in -- in this analysis, so we were

22 focussing a bit more on Keeyask.

23   But -- but anyways, that -- that's why

24 we kept it balanced. I'll -- I'll give a shorter

25 answer. Because we've already increased the costs, the

 1 risk of it going higher has already been integrated it

 2 in, and we think we're in the middle point now.

 3   THE CHAIRPERSON: Okay. I think it's

 4 the appropriate time to break. Let's take -- let's

 5 resume the proceedings at one o'clock. Thank you very

 6 much.

 7

 8 --- Upon recessing at 12:14 p.m.

 9 --- Upon resuming at 1:05 p.m.

10

11   THE CHAIRPERSON: I believe that we're

12 ready to resume the proceedings for this afternoon.

13 Before I turn over the microphone to -- to M. Hacault,

14 is there anything that we need to address? M. Hacault,

15 s'il vous plait?

16

17 CONTINUED BY MR. ANTOINE HACAULT:

18   MR. ANTOINE HACAULT: Before we had

19 broken for lunch, we had a discussion with respect to

20 pricing of -- of power and how actual pricing and the

21 forecast pricing was interrelated. We had a short

22 discussion at the lunch break.   Could somebody

23 address that issue, please?

24   MR. ED WOJCZYNSKI: Yes. My colleagues

25 and I agreed that I -- I should provide that. Any of

2577

1 one of could have. I'll try. I've got two (2) sets of

2 summaries to provide to summarize the discussion we've

3 had with MIPUG over the last morning and yesterday

4 afternoon.

5   The first one is in this long-term

6 pricing for dependable energy, the firm energy that is

7 available in our system after the contracts are

8 finished. So it's the dependable energy that had -- we

9 don't have contracts for long-term firm contracts or

10 dependable contracts, that we could enter those

11 contracts, so what do we do with them?

12   So I have three (3) points to make, and

13 we -- hopefully this will be a very simple, basic thing

14 that pulls it all together.

15   1. We do have a forecast, our forecast

16 for the various export prices. There is a special

17 forecast for the long-term firm products that are not

18 contracted.

19   2. That forecast does include a premium

20 above what would be in -- in the -- in the opportunity

21 market forecast for the same products. There is a

22 premium, because it's a Manitoba Hydro long-term

23 product.

24   3. As Mr. Cormie said this morning,

25 that forecast is conservative, and anything more than

2578

1 that is CSI.

2   The second summary was more to do with a

3 -- a long discussion yesterday afternoon, or it seemed

4 long to me, on what is the Preferred Plan, and looking

5 back, it pro -- it would be good to have a summary, so

6 I have another three (3) point summary.

7   1. The Manitoba Hydro Preferred Plan is

8 to proceed with Keeyask, the 750 line and Conawapa, and

9 DSM will be expanded.

10   2. The in-service date for -- for

11 Conawapa is currently planned for 2026, but the

12 ultimate in-service date will depend on various

13 factors, including export sale negotiations, load

14 growth, DSM, energy prices, and regulatory schedule.

15   3. While the Preferred Plan is to

16 proceed with Conawapa, Manitoba Hydro will review that

17 plan, and under adverse conditions, Manitoba Hydro

18 would not proceed with Conawapa and instead proceed

19 with an alternate resource, such as, for example, gas.

20 Such adverse conditions would include failure of the

21 various sales negotiations you've been hearing about,

22 low gas and export prices, and high capital costs for

23 Conawapa.

24   That is the three (3) point summary.

25 Thank you.

2579

1   MR. ANTOINE HACAULT: Thank you, sir.

2   THE CHAIRPERSON: Would you mind

3 repeating the third bullet, please?

4   MR. ED WOJCZYNSKI: So this is the

5 prefer -- the -- the bullet as to defining the

6 Preferred Plan: While the Preferred Plan is to proceed

7 with Conawapa, Manitoba Hydro will review that plan and

8 under adverse conditions Manitoba Hydro would not

9 proceed with Conawapa and instead proceed with an

10 alternate resource; for example, such as gas

11 generation. Such adverse conditions would include

12 failure of the various sales negotiations that Mr.

13 Cormie has mentioned, whether it's Great River Energy,

14 or NSP down the road, or SaskPower; low gas and export

15 prices; and high capital costs for Conawapa.

16

17   (BRIEF PAUSE)

18

19 CONTINUED BY MR. ANTOINE HACAULT:

20   MR. ANTOINE HACAULT: Thank you.

21 That's very useful. And continuing on that line, I

22 just wanted to have one (1) clarification on one (1) of

23 the main slides, which they are found, if we look at

24 our book of documents, at page 26 in our book of

25 documents. And that was slide 20 of the presentation,

2580

 1 which is marked as Exhibit 95. At the bottom of that

 2 slide -- and your summary, Mr. Wojczynski, is very

 3 germane to this.

 4   In the last line under, "WPS 308

 5 megawatt system power sale," as I understand it through

 6 some of the responses by Mr. Cormie, that the WPS sale,

 7 as currently projected, it could be met with Keeyask

 8 and the new US interconnection, but that Conawapa is

 9 not a condition precedent to that sale proceeding in

10 the sense of resources?

11   MR. DAVE CORMIE: The 308 megawatt sale

12 is tied to Conawapa.

13   MR. ANTOINE HACAULT: I understand the

14 sale is tied to Conawapa, but did I also understand the

15 evidence correctly that even though Conawapa allows

16 Manitoba Hydro to say, If Conawapa doesn't proceed I

17 can choose not to do the 308, but the reverse isn't

18 necessarily true?

19   Conawapa might not proceed as of 2026

20 and you could still decide to keep that agreement with

21 Keeyask and the new US interconnection?

22   MR. DAVE CORMIE: No, Mr. Hacault,

23 that's not the correct. The sale is tied to Conawapa.

24 Now, if circumstances change, I'm sure we could have a

25 discussion with -- with the customer. But in that

2581

1 circumstances, lots of things would have changed and

2 there's no assurance that they would be satisfied with

3 an alternate product.

4   Both parties have the right to terminate

5 the sale if Manitoba Hydro does not commit to Conawapa

6 by 2029. So it -- not only do we have the right to

7 terminate the sale; they also have the right. If we're

8 not prepared to build, Conawapa they have the right.

9   So as I said in -- in -- the other day

10 when I was talking about the sale, it doesn't obligate

11 us to build it. But if we do build it, they're --

12 we're obligated to deliver and they're obligated to

13 take. But if we don't build it -- and this is -- this

14 is new. If -- if we don't build it they have the

15 option of cancelling the sale.

16

17   (BRIEF PAUSE)

18

19   MR. ANTOINE HACAULT: So when you say,

20 "this is new," it's just that it wasn't explained to

21 this Board before that Wisconsin Power has that option

22 in the agreement not to proceed with the sale if

23 Conawapa is not built.

24   That's the new part of the information

25 you're giving to the Board?

2582

 1   MR. DAVID CORMIE: Yes. And then --

 2 and it wasn't done intentionally. There is -- there

 3 are probably two (2) dozen condition precedents and I

 4 didn't go over them all, and -- and there's a lot of

 5 optionality in the agreement to protect both parties.

 6 But that -- this sale as negotiated is tied to

 7 Conawapa.

 8   MR. ANTOINE HACAULT: Thank you. That

 9 helps clarify the page 33 of our book of documents --

10   MR. ED WOJCZYNSKI: Can I comment on

11 that?

12   MR. ANTOINE HACAULT: Sure.

13   MR. ED WOJCZYNSKI: So there -- there

14 is no assurance that WPS would want to carry on with

15 the sale, but given that we could provide -- sell their

16 product as new hydro from Keeyask, our expectation is

17 that they -- that they would continue to want to do

18 that. But there isn't assurance of that.

19   MR. ANTOINE HACAULT: Okay. That's

20 helpful, thank you. That explanation that Mr.

21 Wojczynski provided is particularly helpful because

22 when I looked at the overall conclusions at page 14 --

23 slide 147, which is page 33 of our book of documents,

24 the last paragraph indicates:

25   "We'll confirm in future if proceed

2583

1   with Conawapwa, depending on

2   additional export contracts, gas

3   export price forecasts, load growth."

4   So there might be the scenario, and

5   you're hoping it would be the scenario, that WPS would

6   still keep its contract at three-o-eight (308). And if

7   it had indicated that, then it gives you the

8   flexibility of deciding to proceed with Conawapa right

9   away or not.

10   And that would depend, as it's indicated

11   here, on additional export contracts and a number of

12   other things, correct?

13   MR. ED WOJCZYNSKI: Yes. Down the road

14   we'll look at all the features that are happening,

15   including these ones, and evaluate what we're doing.

16   But -- and part of that is negotiations with others,

17   like the ones Mr. Cormie has mentioned.

18   MR. DAVID CORMIE: Mr. Hacault, yeah,

19   and -- and for -- for the same reasons we might not

20   choose to proceed with Conawapa, WPS may say, We're no

21   longer exposed to the risks that we're trying to

22   mitigate with Conawapa. So, you know, that's why you -

23   - we can't prejudge whether they would be happy with

24   carrying on with the hydro purchase from Manitoba

25   Hydro.

2584

 1   They -- you know, between now and the

 2 time we decide not to build Conawapa, for -- for

 3 changing reasons, they may have also changed their

 4 mind. So, you know, we have a contract now. But to

 5 assume that we could change the conditions of the

 6 contract and that they would just happily agree, I

 7 think, again, it's hypothetical.

 8   MR. ANTOINE HACAULT: Yeah. So if we

 9 go -- perhaps we can better explain this, and this is a

10 different document, slide 145 of Exhibit 95. So it's

11 Exhibit 95, slide 145.

12

13   (BRIEF PAUSE)

14

15   MR. ANTOINE HACAULT: If we look at the

16 bottom it says, "Keeyask 2019 with the bigger

17 interconnection," and it's got the 2 -- "308 megawatt

18 WPS sale," on the right-hand side. It says, "Pathway

19 would be," that's Pathway -- Plan number 5 or Pathway

20 5, you could go with Conawapa or gas generation and

21 still keep that 308 megawatt WPS sale.

22   Is that what Pathway 5 is telling us?

23   MR. ED WOJCZYNSKI: Yes, and as we just

24 indicated, that's not guaranteed that if we went with

25 gas that it would be -- WPS would carry on. But that's

2585

1 what we expect would happen.

2   MR. ANTOINE HACAULT: So is that part

3 of Plan 5 hypothetical, where we would say, Later with

4 gas generation, it's contingent on the goodwill or not

5 of WPS and...

6   MR. ED WOJCZYNSKI: I wouldn't -- I

7 wouldn't call it goodwill. But Mr. Cormie could

8 characterize it better. But my understanding was,

9 based on the business case that's there, including the

10 fact that Keeyask would still be new hydro, but I think

11 Mr. Cormie's in a better position to comment on that

12 characterization.

13   MR. DAVID CORMIE: The -- the later

14 Conawapa -- the contract provides for various in-

15 service dates, the issue of whether we install gas

16 generation and can still point to new hydro, for

17 example, Keeyask, and if there was surplus Keeyask

18 generation that met the requirements, we could discuss

19 that. I don't see why there would -- wouldn't be a

20 reason.

21   But it again assumes that their needs

22 don't change. They -- they made the decision today.

23 They had the reasons for making those. And just as we

24 might want to change our mind, this might be an

25 opportunity. And -- so it can only be seen as a

 1 hypothetical possibility.

 2   MR. ANTOINE HACAULT: Okay. And just

 3 to make it clear, in the bottom right-hand corner of

 4 slide 145, when we see, "Later Conawapa," that's a Plan

 5 14 if we want to make our own personal notes.

 6   Is that right?

 7   MR. ED WOJCZYNSKI: Sorry, could you

 8 repeat the last one?

 9   MR. ANTOINE HACAULT: At the bottom --

10 bottom right-hand it -- it says, "Keeyask 2019." So we

11 start on the left-hand side with the interconnect, and

12 it talks about the sales. And then on the right-hand

13 column it says, "Later Conawapa."

14   That's a variation of Plan 14, because

15 Plan 14 had the WPS investment also?

16   MR. ED WOJCZYNSKI: So throughout here

17 where -- where we use the word 'later', we mean it's a

18 later decision. So the intent when -- on -- on Path 5

19 way was that -- Path 5 way -- path 5 is that -- that

20 the -- the assumption in there is that -- well, again,

21 it's not guaranteed, but that WPS -- that we would do

22 Conawapa. And then we would -- WPS would be part of

23 that, assuming that Manitoba Hydro didn't change its

24 mind.

25   And then, secondly, if we did not want

2587

1 to proceed with Conawapa, then we'd go to gas

2 generation. And the assumption is that probably WPS

3 would want to carry on, being able to serve, say, from

4 Keeyask. But that's not guaranteed.

5   MR. ANTOINE HACAULT: Okay. And the

6 gas generation, that's Pathway 5, Plan 5.

7   Is that right?

8   MR. ED WOJCZYNSKI: I have to check the

9 numbers because I am -- I don't remember the numbers as

10 well as everybody else in the room seems to. Yes.

11   MR. ANTOINE HACAULT: Thank you.

12   THE CHAIRPERSON: Mr. Wojczynski, I

13 guess I'm going to go back to your statement and -- in

14 respect of the Preferred Plan. And I guess -- I don't

15 want to belabour the point, but it suggests to me that

16 what you're suggest -- what you're proposing here is

17 that you would continue to maintain the in-service date

18 for Conawapa of 2026.

19   In other words, you would continue

20 developing -- you would continue investing to maintain

21 the in-service date on Conawapa?

22   MR. ED WOJCZYNSKI: What -- as we've

23 said in the submission and as we depicted, there's a

24 big diagram showing the pathway. But I won't go to

25 that because it's -- it's too complicated for this

2588

1 discussion here. Is that our -- our plan would be

2 that, subject to what falls out of this process of the

3 NFAT and the government decisions, but let's assume for

4 the moment for discussion if we're in Pathway 5, that

5 Keeyask and the 750 megawatt line is -- is approved by

6 the government, because that -- that is Pathway 5, that

7 our plan would be for the upcoming year that we're

8 already entering into, that we would continue to

9 undertake the studies this summer, this fall, this

10 winter for Conawapa 2026. And now it may be that it

11 slips to '27, depending on -- on a lot of factors, but

12 still that would be planning for the early Conawapa in-

13 service date.

14   And then next year when we do our power

15 resource planning exercise, we would evaluate all the

16 conditions at the time. And if -- if conditions are

17 favourable, including the export negotiations and

18 there's no surprises on export prices and things, let's

19 just say they continue as they are now to keep it

20 simple, we -- we would -- we would -- the thinking is

21 we'd carry on planning on Conawapa.

22   On the other hand, if there were reasons

23 to want to defer Conawapa, we could make that decision

24 at that time and slow it down. But we would --

25 annually, as part of our power resource planning

2589

1 exercise, review the economics and -- and the schedule

2 and everything for Conawapa. Or -- and for --

3 presumably we're also going to revisit DSM every year,

4 as well. And we'd also revisit the economics of gas

5 and the new export contracts Mr. Cormie is bringing

6 forward, all -- all those parameters. And that's part

7 of our annual process.

8   THE CHAIRPERSON: So in terms of the --

9 the issue that the panel is called upon to address with

10 the government, we are expected to address the

11 Preferred Development Plan which you, I think, have now

12 redefined. I've heard you redefined the Preferred

13 Development Plan to be Keeyask/750 followed by

14 Conawapa, and increased DSM.

15   MR. ED WOJCZYNSKI: Yes. The -- the

16 increased DSM for us is implicit in all the plans, but,

17 yes.

18   THE CHAIRPERSON: And -- and the date

19 that we should be using for the Conawapa project is --

20 is 2026?

21   MR. ED WOJCZYNSKI: The -- the current

22 date is 2026, but I think the panel -- I would suggest

23 that this panel -- on behalf of Manitoba Hydro, I would

24 suggest to this panel that -- that in its deliberation,

25 it consider that -- that we may, for various reasons,

2590

 1 find that it's necessary or advantageous to defer

 2 Conawapa.

 3   So it's not necessarily '26. It -- it

 4 could slip to '27 or '28 for example. And that's

 5 entirely possible, so it's not that it's absolutely

 6 fixed at 2026. It won't be any earlier.

 7   MS. MARILYN KAPITANY: Mr. Cormie, can

 8 I just clarify. On this page 145 that we were just

 9 looking at, the last column where it says, "Later

10 Conawapa or gas."

11   MR. DAVID CORMIE: Yes.

12   MS. MARILYN KAPITANY: I think I heard

13 you say that for the three-o-eight (308) sale to WPS

14 that it would have to be committed by 2029, not that it

15 would have to be in service by 2029.

16   Is that correct?

17   MR. DAVID CORMIE: That -- that's

18 correct. If --

19   MS. MARILYN KAPITANY: Thank you.

20   MR. DAVID CORMIE: -- if Manitoba Hydro

21 hasn't committed by 2029 to build the station,

22 Wisconsin has the right to terminate the agreement.

23   MS. MARILYN KAPITANY: Thank you.

24   MR. DAVID CORMIE: And so does Manitoba

25 Hydro. And then there's another condition that says if

2591

1 we don't have units in service by 2031 -- so if for

2 some reason we've committed and we're -- we're going

3 down that path, and we decide this project is no longer

4 -- is too expensive and we -- and we stop building and

5 we haven't put in service a fourth unit at Conawapa, at

6 that point the contract can be terminated, as well.

7   So you can actually imagine a scenario

8 where we'd start construction, and for some reason, you

9 know, we aren't going to go through with this. I don't

10 know what that risk is, but it would have to be pretty

11 significant.

12

13   (BRIEF PAUSE)

14

15 CONTINUED BY MR. ANTOINE HACAULT:

16   MR. ANTOINE HACAULT: And is there any

17 other questions of the panel? Okay. And hopefully I'm

18 getting my numbers right. If we're still looking at

19 the slide before us from page -- slide 145, when we

20 were talking over the last ten (10) or fifteen (15)

21 minutes of a possible decision not to proceed with

22 Conawapa because of some adverse condition which we

23 don't know yet, that would actually put us back into

24 Pathway 4, which does not include the 308 WPS sale if

25 we...

2592

 1   MR. ED WOJCZYNSKI: It would only put

 2 into Pathway 4 if in -- well, that at some future date

 3 WPS decided that, no, they did not want to have the new

 4 hydro come from Keeyask instead of Conawapa.

 5   MR. ANTOINE HACAULT: And in Pathway 4,

 6 one of the plans that we were looking at was called

 7 Plan number 6, if we go to slide 88?

 8   MR. ED WOJCZYNSKI: Yes. Yes.

 9   MR. ANTOINE HACAULT: So Plan number 6

10 would have us do Keeyask right away. And instead of

11 Conawapa, I know there's been some changes because of

12 the DSM, et cetera, but it shows gas coming into play

13 at 2031 with a bigger intertie, correct?

14   MR. ED WOJCZYNSKI: Yes.

15   MR. ANTOINE HACAULT: I'm going to move

16 on to another subject area. It's going to be to better

17 understand the construction costs, how the current

18 estimates fit into the sensitivity analysis. And to do

19 that...

20

21   (BRIEF PAUSE)

22

23   MR. ANTOINE HACAULT: The first

24 reference that I have is Tab 2, which is the -- an

25 extract of the transcript that's page 15 of our book of

2593

1 documents. And at line 5, this is the transcript of

2 March 3 and Scott Thomson's address to this Board.

3 Line 5, he had this to say:

4   "What -- what I can say to you today

5   is that the general civil contract

6   price is higher than what we had

7   estimated."

8   And then, later on, he continues to say:

9   "We have found [this is at line 14]

10   the benefit of greater -- greater

11   confidence around the Keeyask cost

12   estimate."

13   So at that time, we hadn't had the

14 updated numbers, correct?

15   MR. ED WOJCZYNSKI: 'We' meaning this

16 hearing process?

17   MR. ANTOINE HACAULT: Yes.

18   MR. ED WOJCZYNSKI: No, this hearing

19 process didn't. Ms. -- President Thomson had the

20 benefit of the analysis we'd done with the proxy

21 capital costs, which are very close to the final ones.

22   MR. ANTOINE HACAULT: But the one (1)

23 thing -- and this is you. It would be at page 17 of

24 our book of documents. This is testimony by you, Mr.

25 Wojczynski. At line 15 you were explaining that the

 1 big shifts you felt had happened. And you've had many

 2 -- have done many things that caused Manitoba Hydro to

 3 have more confidence in these costs compared to

 4 Wuskwatim.

 5   Do you recall saying that?

 6   MR. ED WOJCZYNSKI: Yes.

 7   MR. ANTOINE HACAULT: Now, that process

 8 actually -- that learning process had actually been

 9 completed as far as Wuskwatim by the time you had

10 reached your $10.2 billion cost estimate, coright --

11 correct?

12   MR. ED WOJCZYNSKI: Ten -- you're

13 talking about Conawapa now?

14   MR. ANTOINE HACAULT: Cona --

15   MR. ED WOJCZYNSKI: You said, "10.2

16 billion."

17   MR. ANTOINE HACAULT: Ten point two

18 (10.2), that's right. And it also occurred prior to

19 you finalizing the six point two (6.2) cost estimate

20 for Keeyask, correct?

21   MR. ED WOJCZYNSKI: Our learnings for

22 Wuskwatim, I would say the majority of those had

23 happened from -- well, we -- when we prepared those

24 earlier estimates. I would suggest we're probably

25 still learning, but -- but the majority has, yes.

2595

1   MR. DAVE BOWEN: Just -- just to add to

2 that, so I think what you're referring to is that the -

3 - it's Mr. Bowen, Dave Bowen, in the back. The stress

4 test that occurred in 2012, which was the basis of the

5 NFAT submission, that stress test incorporated the

6 current -- the complete Wuskwatim project and our

7 lessons learned at that time, so it's correct.

8   MR. ANTOINE HACAULT: But I'm trying to

9 better understand by the time we had our 6.2 billion

10 for Wuskwatim -- sorry, Keeyask. I said, "Wuskwatim."

11 Keeyask; sorry for getting mixed up on that.

12   MR. ED WOJCZYNSKI: I get more mixed up

13 than you are, so you're doing very well.

14   MR. ANTOINE HACAULT: I'm trying to

15 understand if I've heard you say correctly, what things

16 do you think you hadn't learned with -- by the time you

17 hit the six point two (6.2) Keeyask estimate?

18   MR. ED WOJCZYNSKI: I think you're

19 asking what had we not learned with the 6.2 billion

20 estimate that we learned for the six point seven (6.7)

21 -- or 6.5 billion estimate?

22   MR. ANTOINE HACAULT: No.

23   MR. ED WOJCZYNSKI: Is that your

24 question?

25   MR. ANTOINE HACAULT: Sure, you can

2596

1 answer that.

2   MR. ED WOJCZYNSKI: Well, I'm not sure

3 if that was your question. Okay. Maybe you could

4 rephrase your quest -- could you ask your question

5 again?

6   MR. ANTOINE HACAULT: I -- I understood

7 your testimony in a very general way, sir, to be that

8 for Wuskwatim, there's a whole bunch of things that

9 happened that really, during the construction, caused

10 you to reconsider how to do the estimate for Keeyask.

11   Am I correct so far?

12   MR. ED WOJCZYNSKI: Yes.

13   MR. ANTOINE HACAULT: And my

14 understanding is that that lesson was -- and the

15 insight from that lesson was all incorporated in the

16 $6.2 billion estimate for Keeyask.

17   Am I correct so far?

18   MR. ED WOJCZYNSKI: Let's say -- yes.

19   MR. ANTOINE HACAULT: So what I was

20 trying to determine incrementally is what, after

21 Keeyask lesson, did we learn that helps us with respect

22 to both the Keeyask and Conawapa estimates?

23   MR. ED WOJCZYNSKI: So after we did the

24 $6.2 billion Wusk -- Keeyask estimate, what other

25 lessons learned were utilized in the next estimate? A

2597

1 major one, and I -- I think I'll make a brief

2 commentary, but I think I'll turn to Mr. Bowen to -- to

3 expand on it, is when we did the earlier estimate, we

4 had not yet fully progressed on the KIP infrastructure

5 and on the environmental processes, but I don't think

6 that's as major.

7   The major one is we have the general

8 civil contract in hand and we have a number of other

9 contracts, which Mr. Bowen can expand on if you like,

10 that we did not have earlier that we have now. The --

11 the biggest one being the general civil, but there are

12 others as well.

13   The other thing is in the estimate, we

14 enhanced the estimating process through dealing with

15 the labour productivity uncertainty, and there was some

16 research done in -- in the Canadian -- another large

17 Hydro construction area that told us that -- that we

18 should enhance what we're doing and -- and all the

19 other Canadian utilities are doing now as well using

20 what's called systemic risks as opposed to just project

21 risks, and Mr. Bowen talked about that in some length

22 the other day.

23   So those are -- plus we're a few years

24 further down the road since we did that estimate,

25 including work at Pointe du Bois, so we just have more

2598

1 general information over the last two (2) or three (3)

2 years. I -- I don't know if Mr. Bowen has anything to

3 add to that?

4   MR. DAVE BOWEN: Just to touch on a few

5 things and -- and highlight what Mr. Wojczynski stated.

6 So again, when we developed our 2012 stress test, which

7 formed the basis of the NFAT analysis, some of the key

8 learnings we had from the Wuskwatim project was --

9 number 1 was the -- how to deal with the labour risk.

10   So we developed a labour reserve to

11 basically -- the -- the basis of labour risk is that

12 there's a -- a decrease -- decrease in supply of craft

13 labour throughout -- throughout Canada. That's been --

14 that's been occurring for -- for a number of years now.

15 It gets -- it gets amplified at Northern project sites.

16   So -- so then what happened to us in

17 Wuskwatim, we had less product. We -- the -- the rate

18 of -- the rate of work that we expected was lower than

19 -- than what was anticipated, which -- which caused

20 increased costs for labour, but it also increased -- it

21 also meant we were there longer. We -- we did finish

22 the project one (1) month later than our original in-

23 service date, but -- but we had hoped to finish much

24 earlier than that in our original plans.

25   So -- so being there, you know, at site

2599

1 longer causes additional costs for Hydro for the

2 contractors to -- to be securing a count. So that's

3 been incorporated. We -- we incorporated the

4 escalation. Escalation in the 2000s is -- is now --

5 it's basically -- it doesn't -- it no longer follows

6 the Canadian price -- consumer price index, so we've

7 incorporated a -- a escalation reserve to -- to deal

8 with that risk.

9   Those are -- those are two (2) big

10 factors in our estimate, and -- and Mr. Wojczynski

11 touched on the systemic risk in our contingency

12 analysis. The -- the part that -- that we -- we never

13 know until we close a contract is what's -- how's the

14 market going to price our job?

15   So what happened December? Again,

16 December 6th of this past year, we closed our general

17 civil contract. The -- the price we anticipated in our

18 point estimate was -- was lower than what -- what the

19 contractors gave us. That the -- the main -- again,

20 the main difference is for our cost increase, where

21 we've increased our control budget from 6.2 to $6.5

22 billion, basically, about two hundred (200) and -- a

23 little over $200 million. That is base cost increase.

24   So -- so the main reasons for that is

25 that we had higher general and civil costs. We also

2600

1 added in post-construction adverse effects, which --

2 which caused an increase in our -- in our estimate. We

3 didn't have those in the original -- in the six point

4 two (6.2) number, and we changed our -- our -- we

5 realized that we're not going to be able to staff our

6 construction site team with Manitoba Hydro personnel,

7 and it -- it's much more costly to -- to augment that

8 staff with -- with non-Hydro staff.

9   So those are -- those are the drivers

10 for -- for why the cost changed.

11   MR. ANTOINE HACAULT: Thank you very

12 much for that explanation. I kind of need to move

13 along, but I'm trying to see whether there's a shortcut

14 to -- to have a -- a document or expla -- explanation

15 with respect to that.

16   In prior hearings, there were documents

17 called 'Capital Project Justifications', and we saw one

18 (1) for Bipole, and that document was fairly complete

19 in providing information with what the estimates and

20 the components of the estimates were and how they

21 changed, and they were signed off by various levels of

22 the Corporation.

23   Does that kind of document exist with

24 respect to the two (2) updated estimates for Keeyask

25 and Conawapa?

2601

1   MR. DAVE BOWEN: I could -- I could

2 speak to that. We haven't -- we haven't completed our

3 -- our capital project justifications, simply because

4 we've just finished our estimate updates. It does take

5 a -- a little bit of time to -- to complete that

6 process.

7   We have provided a complete, fairly

8 detailed variance analysis to the -- the independent

9 cost consultant part of the -- this hearing, but if

10 there -- if there is a requirement to provide a -- a

11 high-level variance explanation from outlining those

12 costs, I don't see why that's -- I -- I don't see why

13 we couldn't do that, so.

14   MR. ANTOINE HACAULT: Could you --

15   MR. ED WOJCZYNSKI: But that would not

16 be the CPJ itself, but it would provide the information

17 we think you're looking for.

18   MR. ANTOINE HACAULT: Thank you. Could

19 you undertake, and I'll repeat the undertaking, is to

20 provide an explanation with respect to both the

21 Conawapa and Keeyask increases containing information

22 similar to what would be in the CPJ, that being an

23 explanation of the differences and the reasons for

24 difference? Will that work?

25   MS. MARLA BOYD: I think just to be

2602

1 clear, I'd -- I'd prefer to use the words that Mr.

2 Bowen offered you, which was a high-level variance

3 explanation, but I think we're on the same page.

4

5 --- UNDERTAKING NO. 43:   Manitoba Hydro to provide a

6   high level variance

7   analysis of revised capital

8   costs relating to Keeyask

9   and Conawapa

10

11 CONTINUED BY MR. ANTOINE HACAULT:

12   MR. ANTOINE HACAULT: Okay. So my

13 formulation would be modified by taking out similar to

14 CPJ, and reference to a high level explanation. Is

15 that okay?

16   MR. DAVE BOWEN: Yes.

17   MR. ANTOINE HACAULT: If we could go

18 to...

19

20   (BRIEF PAUSE)

21

22   MR. ANTOINE HACAULT: I'd rather just

23 keep the transcript, and if we have an issue, we'll

24 discuss it with Manitoba Hydro. I really need to move

25 along. I've only got about three-quarters (3/4s) of an

 1 hour.

 2   If we could go to page 29 of our

 3 document book? The first issue I'd like to look at is

 4 the heading, 'B' as in 'Bob', base cost including sub-

 5 cost.

 6   Have you found that?

 7   MR. DAVE BOWEN: Yes, I'm there.

 8   MR. ANTOINE HACAULT: And the first

 9 thing is under the little 'I', it says, "2012." It's

10 my understanding that these are the values that were

11 inputted into the model, correct?

12   MR. DAVE BOWEN: Yes. Yes, item B base

13 cost is -- is meant to be a comparison of the increase

14 in base cost dollars using the economic analysis.

15   MR. ANTOINE HACAULT: So that for

16 Keeyask, which is the slide we're looking at, the

17 reference value for the base cost portion of it was

18 4.39 billion, correct?

19   MR. DAVE BOWEN: Yes, that's correct.

20 I should note that the base cost -- I'm just reading

21 this slide here, it -- it does include sunk, as well,

22 so the four point three-nine (4.39) would include the

23 sunk costs.

24   MR. ANTOINE HACAULT: Understood, yeah.

25 And the -- the analysis doesn't include the sunk costs.

2604

1 Thank you for that correction. Now, two (2) things.

2   The '14 -- or, 2014 update, if I look at

3 the numbers between low and ref, in 2012, we have a

4 difference between the 4.39 billion going to a low of

5 four point zero-seven (4.07) for a change of about 320

6 million, agreed?

7   MR. DAVE BOWEN: Yes.

8   MR. ANTOINE HACAULT: And this gets to

9 one (1) of the questions the chairperson was asking.

10 If I look for the 2014 update, we start at four point

11 nine-five (4.95) ref, agreed?

12   MR. DAVE BOWEN: Yes.

13   MR. ANTOINE HACAULT: And the variance

14 to the low is four point three-six (4.36), for a

15 difference of 59 -- or 590 million. So there's a wider

16 spread now, even though you have the civil contract

17 entered into.

18   MR. DAVE BOWEN: That's right. I -- I

19 did make -- when I did present this on -- on Monday, I

20 did make note that the -- the ranges between the low to

21 the reference, and the reference to the high are

22 greater than they were in the -- in our original

23 submission.

24   The -- the reason for that -- the reason

25 for the increase in range is due to the syst -- amount

2605

1 of systemic risk in the model, so the -- the amount of

2 systemic risk is -- is driving that increase of range.

3   MR. ANTOINE HACAULT: And have we moved

4 from the -- I want to say P10 parameter in the 2014

5 update?

6   MR. DAVE BOWEN: The -- the low,

7 reference, and high are equivalent to the -- the P10 as

8 low, the reference is P50, and the high is P90.

9   MR. ANTOINE HACAULT: Okay. Now, we

10 saw some of the impact of these changed numbers, so in

11 the 2012 analysis -- and I appreciate it includes sunk

12 costs, and -- we had shown $4.87 billion as a base cost

13 high scenario, correct?

14   MR. DAVE BOWEN: Correct.

15   MR. ANTOINE HACAULT: So it was

16 intended to show that that $4.87 billion number had a

17 P90 certainty, correct?

18   MR. DAVE BOWEN: The -- the 2012

19 derivation of the -- of the high was based on the P50,

20 plus the deterministics of the unfactored labour

21 reserve risk. That's -- that was the methodology used

22 in the analysis when we -- when we did the submission.

23   Since that time -- well, in the last

24 month we've basically looked at the -- we've

25 incorporated the labour risk into our contingency

2606

1 curve. And we've -- we've modelled it within our

2 curve, which we thinks a -- it's an important, so that

3 you'll -- basically, you'll see here is that the -- if

4 you look into line A under 'Key variables' for the

5 labour reserve, the -- the effect of adding the labour

6 reserve risk to the contingency curve is that it -- it

7 raises the low and the reference by approximately $190

8 million. And -- and so that's the -- that's the effect

9 there.

10   But I just wanted to point out that --

11 that one (1) change in methodology which we think is an

12 improvement.

13   MR. ANTOINE HACAULT: But the initial

14 thought was that the four point eight-seven (4.87) was

15 still equivalent to P90 certainty, correct? Well,

16 that's how you arrived at it.

17   But that's what the intent was, was to

18 communicate a certainty of P90, correct?

19   MR. DAVE BOWEN: We -- we never put a

20 value on it, but it -- it was equivalent -- it was our

21 high value, the equivalent to our P90 to date.

22   MR. ANTOINE HACAULT: Okay. And now

23 you've changed your reference to actually be higher, at

24 four point nine-five (4.95), in your update than was

25 projected in your filings in August?

2607

1   MR. DAVE BOWEN: Yes, both -- if you

2   compare the -- the base cost difference between

3   reference of 20 -- 2012 to the reference -- pardon me,

4   the -- the high of 2012, which is the four point eight-

5   seven (4.87), to the reference in -- in our current

6   update the reference is slightly higher. You could

7   compare that on both the base cost difference and the

8   in-service cost difference.

9   The in -- in-service cost difference,

10   the high from 2012 moves from six point three-three

11   (6.33) to six point three-five (6.35) to the reference.

12   MR. ANTOINE HACAULT: So is it fair to

13   say that if we look at the total in-service costs

14   modelled in the analysis at five point seven-one

15   (5.71), appreciating that includes sunk costs, which

16   those are certain.

17   You know they're not going to vary,

18   correct?

19   MR. DAVE BOWEN: I'm -- I'm not sure I

20   understand your point.

21   MR. ANTOINE HACAULT: Okay. The -- the

22   model doesn't include, I guess, or didn't -- that

23   you've presented with the 2012 values, because we've

24   seen updates, it didn't include the certainty of the

25   sunk costs.

2608

 1   The sunk costs are certain, correct?

 2   MR. DAVE BOWEN: Yes.

 3   MR. ANTOINE HACAULT: And with the

 4 certain sunk costs, we had a total number of 5.71

 5 million as a rough value in your model, correct?

 6   MR. DAVE BOWEN: Yes.

 7   MR. ANTOINE HACAULT: So there was a

 8 portion, the portion which was sunk costs, which was

 9 certain?

10   MR. DAVE BOWEN: Correct.

11   MR. ANTOINE HACAULT: That's not

12 varying? Just like in all your models that baseline of

13 sunk costs is excluded so that is a certain number?

14   MR. DAVE BOWEN: Yeah. I just want to

15 make sure we're -- we're on the same page. So we --

16 our sunk costs -- we have our spent to date. So our

17 spent to date -- so the -- the 2012 stress test was

18 based on spent to date as of March 31st, 2012. And --

19 and the current revised number includes our spent to

20 date as of December 31st, 2013. So -- so we are

21 certain of those numbers. Our -- our projections

22 thereon to sunk, they're still -- they're what we're

23 forecasting, we're fairly certain of.

24   MR. ANTOINE HACAULT: Okay. Thank you.

25 I'll move on. Sorry to be a bit rushed, and I don't

2609

1 mean to cut you off. If -- if you need to explain

2 things at a later time, I'll try and do my best, but

3 I'm supposed to finish at 2:30. If we flip onto page

4 30, that's the Conawapa details.

5   And you can see in the bottom right-hand

6 corner the total in-service costs at the high point was

7 estimated to be ten point seven-six (10.76), correct?

8   MR. DAVE BOWEN: Yes.

9   MR. ANTOINE HACAULT: And the revised

10 estimate, that was the number ten point seven-six

11 (10.76) in August of 2013.

12   And now the revised high has gone up by

13 about $1.72 billion?

14   MR. DAVE BOWEN: That's right. And

15 it's -- it's -- the same methodology and the same

16 rationale that was used for the Keeyask cost estimate

17 applies here.

18   MR. ANTOINE HACAULT: And then if we...

19

20   (BRIEF PAUSE)

21

22   MR. ANTOINE HACAULT: Just a quick

23 question. With respect to -- if we go back to Keeyask,

24 by the time you hit the estimate at 6.2 billion, would

25 you -- what level of tender or estimate security do you

2610

1 have at that point in time? I don't know if I've

2 explained that correctly. If you have a very

3 preliminary estimate you might have a range of 50

4 percent.

5   By the time you hit six point two (6.2),

6 what was the Company's expectation on -- on the

7 variation?

8   MR. DAVE BOWEN: The -- the expectation

9 on the variation was -- was defined in our -- in our

10 analysis. That was our -- that was our -- our best

11 estimate at the time as to what that variation would

12 be.

13   MR. ANTOINE HACAULT: If I could turn

14 to page 35 of the book of documents, that might help

15 explain what I was looking at, what kind of class of

16 estimate -- at the bottom of the page for the document

17 manager.

18   By the time you hit the six point two

19 (6.2) estimate, where would you have put that estimate

20 of $6.2 billion?

21   MR. DAVE BOWEN: In terms of the

22 estimate classification table here, when -- we -- we

23 estimated -- our -- our opinion was that we were

24 between a Class 2 and a Class 3. We have -- and that's

25 what we had in our submission.

 1   When we look at the class of estimate

 2 ranges here, we brought back -- recently brought back

 3 our -- in our contingency consultant to rerun our

 4 analysis. When you -- when you -- I would just

 5 caution. When you use this table, and we've been

 6 cautioned by our -- our consultant, who is one of the -

 7 - the main authors of the -- the AAEC cost report -- or

 8 the recommended practices, is that in order to reach a

 9 Class 3 it's -- it's basically if you don't reach all

10 the criteria, you don't make the grade, so you can't

11 call yourself less than a Class -- a Class -- true

12 Class 3 unless you meet all those requirements such as

13 level of project definition, level of your project

14 management team, et cetera, et cetera.

15   So -- so although it was our thoughts

16 were we're a two (2)/ three (3), really we're at a

17 Class 3.

18   MR. ANTOINE HACAULT: So at Class 3,

19 the low end would be -- should have been in your

20 analysis, am I correct, a range of minus 10 to minus 20

21 percent from your budget?

22   And on the high end as to how much

23 higher it might go, it should have been 10 percent to

24 30 percent, according to this table?

25   MR. DAVE BOWEN: I would just caution

2612

1 the use of the table. The purpose of the table was to

2 provide -- if -- if -- is to provide a proxy for where

3 you're at. The -- the recommended practice is to look

4 at your project, do your bottom-up costs, so -- so from

5 a first principle basis look at each of your costs,

6 build them up of things like rule of thumb, carry out a

7 contingency exercise representative of the risk on your

8 projects, and develop a contingency curve.

9   Once you do that exercise, it's

10 appropriate to look back in here to confirm that you're

11 within the range. But to use it for any -- a greater

12 purpose than that, I would -- I would caution anyone on

13 that.

14   MR. ANTOINE HACAULT: Thank you. If we

15 could go -- and I don't -- it's not in our book of

16 documents but Exhibit 95, slide 125. Slide 125 and

17 Exhibit 95.

18

19   (BRIEF PAUSE)

20

21   MR. ANTOINE HACAULT: I just want to

22 make it clear. That particular slide is still based on

23 the lower discount rate at 5.05 percent at a ref value

24 for a discount rate, correct?

25   MS. JOANNE FLYNN: Yes, that's correct.

2613

 1   MR. ANTOINE HACAULT: It also -- we

 2 have to be careful to use this slide because it does

 3 not take out the WPS investment, correct?

 4   MS. JOANNE FLYNN: That's correct.

 5   MR. ANTOINE HACAULT: Okay. And we

 6 also have to be careful because it doesn't include the

 7 enhanced DSM that the Corporation's intending to carry

 8 out, correct?

 9   MS. JOANNE FLYNN: That's right. The

10 purpose of redoing this was to show the impact on the

11 quilts of the increased cost to Keeyask and Conawapa.

12   MR. ANTOINE HACAULT: So if we go to

13 ref/ref/ref on this slide we see that Plan 14 comes out

14 at seven hundred and ninety-eight (798), correct?

15   MS. JOANNE FLYNN: Yes.

16   MR. ANTOINE HACAULT: And if we flip

17 back to slide 123 for the document manager. We see in

18 the second line the difference of changing the capital

19 cost. It brings an NPV from one point six-nine--six

20 (1.696) down to seven ninety-eight (798).

21   And we just saw that number on the

22 previous slide, correct?

23   MS. JOANNE FLYNN: Yes.

24   MR. ANTOINE HACAULT: And then if we

25 move to looking at what DSM does to the bottom number

2614

1 of three seventy-four (374) we have to flip to slide

2 130, please, document manager. So we had -- on the

3 previous slide we had gone down with no WPS investment

4 with the construction costs updated and the 2013

5 assumptions.

6   So then Plan 14 we start on the bottom

7 left-hand side, at three seventy-four (374). And this

8 used to be the one point six-nine-six (1.696) number in

9 the original filing, correct?

10   MS. JOANNE FLYNN: Yes. And that one

11 does not have a WPS investment in it, in the three

12 seventy-four (374).

13   MR. ANTOINE HACAULT: Correct. And

14 then if we move right to Level 2 DSM, which is what I

15 understand the Corporation to be shooting for, the Plan

16 14 goes down from the original one point six nine six

17 (1.696) NPV down to forty-five (45), correct?

18   MS. JOANNE FLYNN: That is correct,

19 without the pipeline load.

20   MR. ANTOINE HACAULT: And I won't go

21 through that. Mr. Williams identified some other --

22 the price of elastici -- elasticity number, which would

23 vary the numbers in brackets under the Level 2 DSM,

24 correct?

25   MS. JOANNE FLYNN: Yes, it would.

2615

1   MR. ANTOINE HACAULT: It would lower

2 those numbers directionally, correct?

3   MS. JOANNE FLYNN: Yes.

4   MR. ED WOJCZYNSKI: I might add to

5 that, that, as we said, on slide 5 of the same deck,

6 Exhibit 95, that the -- we also didn't think that we

7 were going to do all of option 2, and that's what Mr.

8 Kuczek had indicated last week.

9   So while there would be some adjustment

10 on the load forecast that you said that indicated that

11 would reduce that slightly, I think that's more than

12 offset by not doing all of Level 2 DSM. So, you would

13 actually see an increase rather than a decrease from

14 this number once you've took that all together.

15

16   (BRIEF PAUSE)

17

18   MR. ANTOINE HACAULT: Now, I hate to

19 use your dust word. How much dust are we talking

20 about?

21   MR. ED WOJCZYNSKI: I actually don't

22 remember using the word 'dust'. I talked about

23 rounding.

24

25   (BRIEF PAUSE)

2616
 1   MR. ANTOINE HACAULT: If we could flip

 2 back to slide 126, please.

 3

 4   (BRIEF PAUSE)

 5

 6   MR. ANTOINE HACAULT: Now, you recall,

 7 we started our discussion with the quilt at seven

 8 ninety-eight (798).

 9   We find that number in the bottom right-

10 hand side of that table, correct?

11   MS. JOANNE FLYNN: Yes, we do.

12   MR. ANTOINE HACAULT: And we saw how

13 that seven ninety-eight (798) number was reduced by a

14 number of factors, including DSM factors, correct?

15   MS. JOANNE FLYNN: Yes.

16   MR. ANTOINE HACAULT: And we had a

17 discussion -- or there was a discussion, I think,

18 between -- I don't know if it was Mr. Wojczynski and --

19 and Mr. Grant, or -- but about the -- one of the

20 important numbers being the expected value, correct?

21   MS. JOANNE FLYNN: Yes.

22   MR. ANTOINE HACAULT: And

23 directionally, are we to expect that the expected

24 value, similar to what's shown on this table, will be

25 lower than the ref/ref/ref NPV?

1   (BRIEF PAUSE)

2

3   MS. JOANNE FLYNN: You would expect so,

4 because we're not altering the -- the probabilities

5 associated with the other factors, the -- the energy

6 prices or the discount rates.

7   MR. ANTOINE HACAULT: Sorry, you

8 wouldn't expect?

9   MS. JOANNE FLYNN: We would expect that

10 it would -- that the expected value would be lower than

11 the ref/ref/ref, because we aren't altering the -- the

12 other probabilities and ranges.

13   MR. ANTOINE HACAULT: Okay. Now, am I

14 correct in understanding that the Corporation can't

15 give us -- or it would take a lot of work to give us an

16 expected value for all the numbers -- other numbers we

17 were looking for, because we had gone down to three

18 seventy-four (374), then we had gone down lower with

19 the DSM for the Preferred Plan.

20   Is it possible to give us the expected

21 values similar to what's on this table, but related to

22 -- we had looked at -- looked at slide 130, which gave

23 us base DSM at three seventy-four (374). That's lower

24 than our ref/ref/ref on this slide at seven ninety-

25 eight (798). And Level 1, which is kind of the minimum

2618

1 that we hope to achieve with DSM, is at one twenty-four

2 (124).

3   If we have a ref/ref/ref value of one

4 twenty-four (124), do we have any idea whether the

5 expected value is zero or significantly negative?

6   MS. JOANNE FLYNN: We have not

7 undertaken the probabilistic analysis on the 2013

8 assumptions, and that is a significant effort.

9   MR. ANTOINE HACAULT: Is there anything

10 you can offer as useful information -- is it -- I'll

11 ask the question, for example, on slide 126, if we go

12 back to it, in Plan 14 we have a ref/ref/ref value of

13 seven ninety-eight (798). There is nearly $500 million

14 of difference between the expected value and the

15 ref/ref/ref value.

16   Can I transpose that and say when I go

17 down to three seventy-four (374), my expected value

18 will roughly be $500 million less?

19

20   (BRIEF PAUSE)

21

22   MS. JOANNE FLYNN: I'm not sure of how

23 much assistance this will be, but if we consider the

24 two (2) categories for -- of energy prices and discount

25 rates, if -- between the 2012 assumptions and the 2013

2619

1 assumptions, the energy prices for the 2012 adjusted

2 price forecast were lower than the 2013 price forecast

3 came in.

4   So from that perspective, and depending

5 on how we would recalculate the probabilities

6 associated with that data set, you could expect that

7 that would reduce that difference between the expected

8 value and reference value.

9   The discount rate between 2012 and 2013,

10 the reference value of that increased from five point

11 zero-five (5.05) to five point four (5.4), so that

12 would have -- that effect also could shrink that

13 difference between the two (2), depending again on --

14 on how we would have to look at it from the perspective

15 of the underlying drivers to get the probabilities

16 associated with that particular data set, and that --

17 and that's where a lot of the time-consuming work is.

18   MR. ANTOINE HACAULT: But the one thing

19 that's sure, whether we use ref/ref/ref, expected -- or

20 ref/ref/ref value of three seventy-four (374) for Plan

21 14, or even the one twenty-four (124), there would be

22 some number we'd have to subtract to come to the

23 expected value. We just don't know whether it's three

24 hundred (300), four hundred (400), or five hundred

25 thousand dollars ($500,000), or what the number is,

2620

 1 correct?

 2   MR. ED WOJCZYNSKI: Million.

 3   MR. ANTOINE HACAULT: Oh.

 4

 5   (BRIEF PAUSE)

 6

 7   MS. JOANNE FLYNN: It does start to

 8 open up the door to -- to making like a -- to redoing

 9 the entire analysis, and, you know, taking into

10 consideration other aspects of it, like the ability to

11 reduce risk on the plans with hydro by treating some of

12 the uncommitted firm sale -- firm dependable energy

13 with some -- some fixed prices associated with -- so

14 there's a -- there's a multitude of things that could

15 effect this yet, but in terms of these largest impacts,

16 just as an indicative thing, yes, I think that there

17 would be a difference between the ref/ref/ref and the

18 expected value, and the expected value would be in some

19 way lower.

20   MR. ANTOINE HACAULT: But if I can

21 summarize, we don't expect the difference to be 500

22 million. I -- it wouldn't be smaller than that, so I

23 don't just do Level 1 DSM one twenty-four (124)

24 ref/ref/ref, and then subtract 500 million. It has to

25 be a number less than that, correct?

2621

1   That's what I take from your discussion.

2   MS. JOANNE FLYNN: That -- that's

3 basically what -- what'd -- yes.

4   MR. ANTOINE HACAULT: Okay. I'd like

5 to switch to another subject matter, drought, and page

6 48 in our book of documents.

7

8   (BRIEF PAUSE)

9

10   MR. ANTOINE HACAULT: First, has

11 Manitoba Hydro had a chance to look at the table to see

12 whether the numbers have been correctly transcribed on

13 the table? This data was taken from Mani --

14 MIPUG/Manitoba Hydro -- sorry, page 47. I said forty-

15 eight (48), but I should be at page 47.

16   MR. TERRY MILES: I have not

17 specifically gone through and identified whether every

18 number was --

19   MR. ANTOINE HACAULT: Okay.

20   MR. TERRY MILES: -- transcribed

21 correctly.

22   MR. ANTOINE HACAULT: So can we --

23 subject to check, can at -- I at least proceed with the

24 discussion? Is that fair?

25   MR. TERRY MILES: That's fair. Yeah.

2622

 1 Okay.

 2   MR. ANTOINE HACAULT: Because the

 3 numbers, I understand, are based from a response from

 4 Manitoba Hydro. The reference is at the bottom of the

 5 table. Do you see that?

 6   MR. TERRY MILES: Yeah, that's correct.

 7 I -- I know the reference. Thank you.

 8   MR. ANTOINE HACAULT: Okay. The one

 9 (1) thing that I wanted to look at, the table that this

10 was prepared from is a -- a whole bunch of data points

11 on drought, and that data is all -- is found later on

12 at this tab. I don't propose to go to it.

13   As I understand it, the data that was

14 provided would provide the effect on total net revenue

15 in each particular year. That was the table that was

16 provided. The details are on the next pages?

17   MR. TERRY MILES: Yeah, that's correct,

18 I believe, yeah.

19   MR. ANTOINE HACAULT: And the purpose

20 of this table was to look at All Gas and see what had

21 been expected ranges for droughts or the impacts of a

22 drought for All Gas as a reference point.

23   Do you see that, the first -- the first

24 table, left-hand side, top -- top left?

25   MR. TERRY MILES: Yeah.

2623

 1   MR. ANTOINE HACAULT: It says, "All

 2 Gas."

 3   MR. TERRY MILES: I see that, yes.

 4   MR. ANTOINE HACAULT: And then there's

 5 the years 1987 to 1992. Does that correspond with the

 6 five (5) year drought?

 7   MR. TERRY MILES: The years correspond

 8 with the five (5) year drought, yes.

 9   MR. ANTOINE HACAULT: Okay. And --

10   MR. TERRY MILES: I -- I believe this

11 is all taken for one (1) load year out in time though,

12 and there is some -- some approximation in there --

13   MR. ANTOINE HACAULT: Okay.

14   MR. TERRY MILES: -- that I am aware of

15 and I think you're aware of, as well.

16   MR. ANTOINE HACAULT: Yeah. So

17 generally, it would give us some direction in a -- in a

18 very general way as to how the plans fare on that five

19 (5) year drought?

20   MR. TERRY MILES: I'd say that's fair,

21 yes.

22   MR. ANTOINE HACAULT: Okay. So if we

23 look at Pathway 2, Plan 2, we see that there's a very

24 small variation set out in yellow of minus 1 -- 2

25 percent and 3 percent.

2624

1   Do you see that?

2   MR. TERRY MILES: I see that.

3   MR. ANTOINE HACAULT: Okay. And that's

4   the variance from the base case shown in the All Gas.

5   Does that seem right?

6   MR. TERRY MILES: Your -- just help me

7   understand what your base case is.

8   MR. ANTOINE HACAULT: All Gas.

9   MR. TERRY MILES: All Gas low. So, for

10 example, in Plan 2, where you have low under the

11 Keeyask -- and in Plan 2, where you have the low column

12 and you have several numbers that are there compared to

13 Plan 1, under the low column, is that -- and you've

14 done the difference there?

15   MR. ANTOINE HACAULT: Yes. Yes.

16   MR. TERRY MILES: That's what thas is.

17 And -- okay.

18   MR. ANTOINE HACAULT: So the Plan 4,

19 again, there's not much variance. If we compare the

20 numbers, there's not a huge variance in the variations.

21 Now, we've been talking about Plan 6. Again, the

22 variations vary from 2 percent to 8 percent.

23   Do you see that, compared to the All

24 Gas?

25   MR. TERRY MILES: I see that, yes.

2625

 1   MR. ANTOINE HACAULT: Okay. And

 2 Pathway 14 has the largest variations of the ones that

 3 we've been identifying in this hearing, correct, on a

 4 dollar basis?

 5   MR. TERRY MILES: Okay, I -- I see your

 6 numbers, and by that -- under Plan 14, you're showing

 7 higher percentages in yellow. Is that what you're

 8 indicating by higher variances?

 9   MR. ANTOINE HACAULT: Yes, the

10 variances from the base case of an All Gas. The Plan

11 14, under a low scenario, would indicate a 16 percent

12 difference, which is, in real numbers, not that big,

13 actually. It's about -- it's less than 200 million.

14 Because we reference All Gas at one point two-two-zero

15 (1.220) in the low instance, and your Plan 14 has a bit

16 bigger number, it exposes the variance to 1.414

17 billion.

18   Do you see that?

19   MR. TERRY MILES: I see that, yeah.

20 And that's a good -- I think that's a good point. If -

21 - if I can -- to understand this a little bit better,

22 if I could get a -- hopefully explain something, and

23 maybe that'll help me understand this a little better

24 as well.

25   When we talk about low, reference, and

1 high, we're talking about a low energy price world, a

2 reference energy price world, and a high energy price

3 world.

4   MR. ANTOINE HACAULT: Correct.

5   MR. TERRY MILES: So when we're

6 comparing back to the All Gas Plan in any of these

7 scenarios -- so if you want the low scenario, you're

8 comparing back to a -- a world, if you will, that has

9 low energy prices under an All Gas plan. That would be

10 a world then where low energy prices -- we'd establish

11 rates and all those things under that particular world.

12   Under the reference prices, we'd

13 establish under that world; and under the high prices,

14 we'd establish -- high-price world we'd establish

15 rates, et cetera, under those worlds that are there.

16   So we think of the different plans that

17 we have here and how those different plans would behave

18 under those particular worlds and what we're comparing

19 to, I guess, and -- and think about what -- what that

20 means.

21   So if think of Plan 14 under that world

22 that we have, under a low energy price world, Plan 14

23 has a lot of hydro. So we've looked at the impacts

24 under a low energy price world. And where you show

25 variability, you have to think about where the starting

 1 point is for those.

 2   And under, for example, the -- even a

 3 reference-price world, we have the -- the Plan 14

 4 actually compared to All Gas as performing at a higher

 5 NPV, if you will, or that. Under the high-price world,

 6 we have the All Gas -- or the Preferred Development

 7 Plan -- actually, that's one of the really strong

 8 upside potentials there.

 9   So when we talk about the revenue

10 differences, I think we have to think about what

11 baseline we're comparing to from that perspective as

12 well, when we talk about the differences.

13   MR. ANTOINE HACAULT: And to me reading

14 this, I don't know if you'd agree or have a comment on

15 it, intuitively I thought that if we built two (2) big

16 plants that were subject to hydrology, that we would

17 have even wider variations and wider impacts than

18 what's shown here under Plan -- between an All Gas,

19 which is not water sensitive really, and our hydraulic

20 generating stations, which can be fairly sensitive to

21 water flows.

22   Is that a fair statement? I -- I

23 thought there was going to be a lot more difference

24 than -- than this, quite frankly.

25   MR. TERRY MILES: Yeah. I'd -- I'd

2628

 1 suggest that part of it is because there's a -- a solid

 2 base, if you will, of the Hydro system in -- in behind

 3 this. I don't have any other explanation other than

 4 that.

 5   MR. ANTOINE HACAULT: Now, the other --

 6 the next slide, which I erroneously referenced

 7 initially page 48 of our book of documents, we've had

 8 some discussion of the variation in revenue. And let

 9 me just -- I don't know if you were here in the last

10 GRA when this slide was presented, Mr. Miles.

11   Do you remember it? Or somebody else

12 may remember it.

13   MR. TERRY MILES: I remember it. I

14 think --

15   MR. ANTOINE HACAULT: Yeah.

16   MR. TERRY MILES: -- I was here, yes.

17   MR. ANTOINE HACAULT: And can you

18 explain the difference between -- for example, if we

19 look around 1920 at the zero base, in that particular

20 year the Company would have earned a small net profit,

21 correct? There's a small green bar about -- above the

22 zero line?

23   Do you see that on the left-hand side?

24 A couple of years down the line, the green line goes

25 very close to the zero around 1920.

2629

1   MR. TERRY MILES: I see that, yes.

2   MR. ANTOINE HACAULT: In that year,

3 based on the calculations done by Manitoba Hydro, it's

4 my understanding in that year, even though it was a

5 drought year, there would have been a small profit

6 earned.

7   Is that correct?

8   MR. TERRY MILES: Can you just -- just

9 one (1) minute.

10

11   (BRIEF PAUSE)

12

13   MR. ANTOINE HACAULT: While you're

14 looking at this, my understanding was the dotted line

15 is the zero in your SPLASH runs, and the SPLASH runs is

16 the mean outcome. It's not necessarily what the actual

17 financial statements show.

18   MR. TERRY MILES: It's not -- it's not

19 net income. It's -- it's net revenue is what -- is

20 what this is, not net income. So net flow-related

21 revenue.

22   MR. ANTOINE HACAULT: Yes. Okay. And

23 the net flow related revenue in drought years we can

24 see some of them are actually below the zero line. We

25 would -- we actually lose money -- I'll back up a

2630

1 little bit.

2   We've been talking in this proceeding

3 about mean flows. Do you agree, based on a previous

4 review of this slide, that would be represented by the

5 dotted line on this graph?

6   MR. TERRY MILES: So when we in our

7 long-term forecasts -- so in our integrated financial

8 forecasts, when we capture extraprovincial revenues,

9 and we say that we -- our -- our forecast or projection

10 of extraprovincial revenues in load year, this would be

11 load year 2013/'14 out in time, and we say that we take

12 the average of all the revenues, or the net revenues of

13 all the flow conditions, this particular chart here

14 would reflect the range of flow, range of net revenues

15 that we would calculate out of SPLASH model for each of

16 those water years from 1912, the ninety-nine (99)

17 years, 1912; 2006 I'm assuming, or 2007. And we would

18 take the average of all of those.

19   The dash line on this chart, if I

20 understand, represents the average of those that would

21 be in the -- in the forecast. So that's what we would

22 base our forecast on. And that would be a -- and that

23 is how we assess what the average revenue would be in a

24 particular year going forward, recognizing that anyone

25 of those flow conditions is potentially possible, and

1 an average -- we would expect to get an average of

2 those.

3   These net revenues -- you know what,

4 I'll let you continue with your discussion.

5   MR. ANTOINE HACAULT: Okay. I don't

6 want to belabour the point, but if -- I just wanted to

7 make it clear when we were taking about a variation in

8 net income, that it was different than whether or not

9 the Corporation actually suffered a loss or had a small

10 net profit. Those two (2) concepts were different.

11   The actual losses and actual profits are

12 shown by the zero baseline and a variation from that,

13 and the calculations that are done on the averaging is

14 a difference of a line that's higher, which is shown by

15 the dotted line. Does that make sense?

16   MR. TERRY MILES: Yeah, it does. Yeah,

17 more or less. Yeah.

18   MR. ANTOINE HACAULT: So that in prior

19 GRAs, for the members that weren't part of it, in years

20 where the Corporation actually -- if you look at some

21 of the green lines are slightly higher than the zero

22 line, there would be a small profit, correct?

23   MR. TERRY MILES: So if -- if in

24 2013/'14, if that was the case and it was a number of

25 years back, and on average we were suggesting that the

2632

1 revenue -- net revenue might be whatever it is in this

2 chart, or about say $70 million, and we got to that

3 year, and in fact we had a flow year that was -- flow

4 year that resulted in -- in revenues higher -- a flow

5 year, I guess, that was better than that year, we might

6 make a profit in that year versus a -- we may have a

7 larger average revenue than -- than what was shown on

8 this chart.

9   MR. ANTOINE HACAULT: Thank you.

10   MR. TERRY MILES: Is that what you're

11 getting at, Mr. --

12   MR. ANTOINE HACAULT: Yeah.

13   MR. TERRY MILES: -- Hacault?

14   MR. ANTOINE HACAULT: Yeah. So when

15 we're talking variations and impact of a drought, the

16 line that we're using is the dotted line because we're

17 measuring from the average revenues.

18   We're not measuring actual losses,

19 correct?

20   MR. TERRY MILES: When we go forward,

21 so at -- if -- if you're getting at, Mr. -- Mr.

22 Hacault, is that when we do our drought analysis, so

23 the drought analysis that we find, when we say the

24 impact of a lost revenue in a -- in a drought is the

25 lost revenue that's demonstrated in this -- in the

2633

1 drought here, the -- you showed the 1988 to 1992 flow

2 year, if that year returns and that would represent a

3 year of below-average flow conditions, we would use

4 that as a representation of our five (5) year drought.

5 And if we took those revenues off of the revenues that

6 we would have projected, those then are the revenues

7 that we would have.

8   So it is a matter of where you start

9 from. So on a forecast going forward, if we forecast

10 based on the average unit revenues out in time that's

11 there, we then would subtract the revenues that we

12 would have been forecasting from the revenues that we

13 would have expected to lose in those particular years

14 under the drought.

15   That's how we carry our -- carry it out.

16 It is important as the -- as the baseline that you

17 measure from -- down from and it does depend on where

18 you start from.

19   MR. ANTOINE HACAULT: Thank you. And

20 I'll move on to the next point. The only point I

21 wanted to make is that we don't start -- some people

22 are thinking we're talking about a variance in -- in

23 income. It isn't net losses. We're talking a variance

24 from what we thought the average revenue was going to

25 be. And there's --

2634

 1   MR. TERRY MILES: And -- and that's --

 2   and that's important, Mr. Hacault, because --

 3   MR. ANTOINE HACAULT: Yeah.

 4   MR. TERRY MILES: -- we plan in the

 5   future. Those are the revenues -- or incremental

 6   revenues, or revenues that we plan on having in the

 7   Corporation to set things like rates, et cetera. So if

 8   we are setting our future projections based on those

 9   and we do not achieve those because of a -- a drought,

10   that is the baseline that we're measuring.

11   We're planning to have that revenue, if

12   you will. And the revenue that we do plan for going

13   forward, being the average of -- it's really the

14   average of the net production costs that are out there.

15   So it's the average of export revenues that we may get.

16   It's the average of production costs from running the

17   thermal units under a drought.

18   So in any given flow year that we have

19   going forward, if it is a lower flow year that's here,

20   the lowest of flow years on this chart will have a

21   considerable amount of import, so that's a cost to us.

22   It will have a significant amount of running of our

23   thermal generation, which is a cost. And there will be

24   some revenues associated with that as well -- or less

25   revenue in that year.

2635

 1   So when every given year you add up the

 2 costs that are there and the revenues that are there

 3 and you take the average of all of those years

 4 throughout, what we end up with is a value that

 5 accounts for revenues in higher flow years, it accounts

 6 for costs in lower flow years, and those get averaged

 7 out into the number that we are projecting.

 8   So when you go out one (1), or two (2),

 9 or three (3) years it's possible to have a high flow

10 year. It's possible to have a low flow year. So on

11 average you can expect some revenues and you can expect

12 some costs. And we account for those in our

13 forecasting going forward and that's what we plan for

14 in terms of the revenues that we have and in terms of

15 the way then that we set our rates, et cetera.

16   So any change from that needs to be a

17 reduction from that. And that's how we carry out our -

18 - our analysis.

19   MR. ANTOINE HACAULT: Thank you. Mr.

20 Chairman, I had some other areas that I wanted to

21 cover, but other counsel need to ask questions. There

22 is only, if I'm looking at the priority of what I want

23 to deal with, I -- I have something that I think would

24 take three (3) or four (4) -- maybe -- it depends if I

25 quick answers or not, on the curtailable program as

2636

1 part of -- of this consideration. And so that's -- it

2 involved two (2) pages in our book of documents, page

3 58 and 59.

4   THE CHAIRPERSON: Please proceed.

5

6 CONTINUED BY MR. ANTOINE HACAULT:

7   MR. ANTOINE HACAULT: If we could turn

8 to page 59. Maybe Mr. Cormie is the best to answer

9 this. We had talked about the role of curtailable in

10 the previous panel. And I just wanted to have you

11 explain with respect to Option E shown here, what's --

12 how can Manitoba Hydro use the Option E, which allows

13 it to curtail for up to ten (10) days for three (3)

14 separate times during the calendar years.

15   How can that be used by Hydro?

16   MR. DAVE CORMIE: The thinking behind

17 designing that option was to assist us during a period

18 of extreme weather, or during a period that the power

19 system is experiencing a -- an outage. Let's say we

20 were in a drought. The 500 kV line, and we were

21 importing on that, it went -- it went out of service

22 for -- for maintenance outage, or for -- for whatever

23 reason, that we could curtail load for up to ten (10)

24 days. And that's -- that's what it was used for --

25   MR. ANTOINE HACAULT: Okay.

2637

1   MR. DAVID CORMIE: -- was to get

2 through unanticipated system operating events.

3   MR. ANTOINE HACAULT: And this program

4 has been in place for, I think, a couple decades. Is

5 that fair?

6   MR. DAVID CORMIE: Has it been that

7 long? Yes. Mr. Wojczynski and I were on the -- in the

8 group that designed it, yes.

9   MR. ED WOJCZYNSKI: Yes, I -- and that

10 was a long time ago.

11   MR. ANTOINE HACAULT: And my

12 understanding, it's still part of the plan going

13 forward to -- to have this available?

14   MR. DAVID CORMIE: Yes.

15   MR. ANTOINE HACAULT: Now, with respect

16 to Options A and 'C', I don't know if you can provide a

17 quick explanation of why that's there. And there's one

18 that's just a five (5) minute notice and one's an hour

19 notice.

20   How do those fit into Manitoba Hydro's

21 needs?

22   MR. DAVID CORMIE: Option A is very

23 useful. It gives us a quick response resource.

24 Customers are able to curtail their load quickly. And

25 we can use that in an emergency.

2638

1   And Option C, less useful because to be

2 useful in an emergency, you actually have to anticipate

3 the emergency an hour in advance. And so it's really -

4 - it's really not very useful. And in all -- in -- in

5 all the years we've had that program, I don't believe

6 we've ever made an Option C curtailment.

7   We still have it in the program, but I -

8 - it -- it doesn't bring a lot of use and it doesn't

9 cost us really anything to have it in the program.

10   MR. ANTOINE HACAULT: And would I be

11 correct in categorizing the Option E as really an

12 energy option?

13   MR. DAVID CORMIE: Yes, it's a -- it's

14 -- it provides us an ability to reduce energy demand in

15 the system during emer -- emergency events.

16   MR. ANTOINE HACAULT: And if we flip

17 back to page 58. There -- the customers aren't --

18 aren't identified, but one (1) customer in particular

19 has the ability to do an Option E at over 192 megawatts

20 average on peak?

21   MR. DAVID CORMIE: Yes, that's correct.

22 And I notice on the table there is an Option C

23 curtailment here, so I stand corrected.

24   MR. ANTOINE HACAULT: Thank you. Now,

25 that energy, although you -- I think you agreed with me

2639

 1 that Customer 1 that provided the 'E' option, that was

 2 kind of an energy type of option.

 3   That 192 megawatts is not included in

 4 the energy tables, I believe, planning?

 5   MR. DAVID CORMIE: Are you asking: Do

 6 we include curtailable in our planning? No we don't.

 7   MR. ANTOINE HACAULT: And that's both

 8 for energy and capacity that you don't include these,

 9 correct?

10   MR. DAVID CORMIE: That's correct.

11   MR. ANTOINE HACAULT: Okay. Thank you.

12   MR. DAVID CORMIE: If we had many

13 customers and there was diversity in our customer base,

14 then I think we could start counting on an average

15 amount.

16   But because the number of customers is

17 very small, to assume that that customer will continue

18 ten (10), fifteen (15), twenty (20) years to take

19 service under the program, whereas if we add a hundred

20 customers you would say, Well, some are going to come

21 and some are going to go. But because the customer

22 base is so small, we just don't see it as -- as meeting

23 our firm requirements.

24   MR. ANTOINE HACAULT: So the

25 Corporation is taking a very conservative approach. If

2640

1 there's been a customer there for twenty (20) years, it

2 assumes the customer won't exist next year, for

3 planning purposes?

4   MR. DAVID CORMIE: Yes, we're saying

5 that. And -- and we're also saying that we're not in a

6 capacity-short situation. So, you know, is -- if we're

7 building for capacity and we're capacity long, then in

8 the short-term, it doesn't really provide value. In

9 the very, very long-run, we still see ourselves as

10 being energy dependent. So I don't know if it would

11 really change our plans whether we included it or not.

12   MR. ANTOINE HACAULT: Fair enough. I

13 won't continue, but is -- that's why I asked you the

14 question whether it was energy, and you said you're

15 energy dependent, and the Category E was energy.

16   But you've taken a conservative view of

17 the energy planning by not including companies that

18 have been there for a long time, correct?

19

20   (BRIEF PAUSE)

21

22   MR. TERRY MILES: My -- my

23 understanding, Mr. Hacault, is that, in the long term,

24 there's no obligation for those customers to remain in

25 the program, and not necessarily any commitment or

2641

1 guarantee that they'll be in the program ten (10) or

2 fifteen (15) years out in time, and I think, from a

3 planning perspective, when we look at what we can

4 reliably count on out -- out in time, that's -- that's

5 the perspective that we --

6   MR. ANTOINE HACAULT: Yeah. And I'll

7 just finish with this question. Do any of your DSM

8 programs have any guarantees that people will go in and

9 will continue to use and benefit from the programs,

10 sir?

11   MR. DAVID CORMIE: No, I don't -- I

12 don't think there is, but there's a large -- large

13 number of customers there, and so on -- as a cus -- as

14 a class, you could -- you could count on the -- the

15 only customer who actually has a take-or-pay obligation

16 is the long-term export customer.

17   They pay for it whether they take

18 delivery or not, and there's -- that's the only

19 customer we really have a revenue certainty under.

20   MR. ANTOINE HACAULT: I've exhausted

21 the grace of this Board and of other counsel. Thank

22 you.

23   THE CHAIRPERSON: Thank you. I believe

24 that, unless there's some administrative matters to

25 attend to, we will adjourn -- we'll -- pardon me, we

2642

1 will recess for ten (10) minutes. Thank you.

2

3 --- Upon recessing at 2:40 p.m.

4 --- Upon resuming at 2:57 p.m.

5

6   THE CHAIRPERSON: I would like to

7 resume. The -- the proceedings have resumed, so I

8 wonder if we could address the -- any administrative

9 matters that we need to address? Anything at all? If

10 not, then I'll turn the microphone over to you, Ms.

11 Saunders, please.

12   MS. JESSICA SAUNDERS: Thank you, Mr.

13 Chair.

14

15 CONTINUED CROSS-EXAMINATION BY MS. JESSICA SAUNDERS:

16   MS. JESSICA SAUNDERS: Much of the

17 cross-examination that has been completed by the PUB

18 and other Intervenors has dealt with a number of

19 matters that are of importance to the MMF, but I do

20 have a few remaining areas that I would like to cover

21 with the panel.

22   My first set of questions relates to the

23 Manitoba-Minnesota transmission project on firstly the

24 US portion of the line. Oh, nothing needs to be up for

25 this portion, but thank you. I'll get to that

2643

 1 eventually.

 2   So the US portion of the proposed new

 3 interconnection, being referred to as the Great

 4 Northern Transmission Line, you explained in your

 5 direct, Mr. Cormie, that Minnesota Power is going to

 6 build it, correct?

 7   MR. DAVID CORMIE: Yes, I did.

 8   MS. JESSICA SAUNDERS: Yes. And

 9 earlier in your testimony, you stated that the most

10 economic way to build the line is for Manitoba Hydro to

11 build and own the entire line. The benefits of

12 developing Conawapa are maximized under that scenario.

13   Is that correct?

14   MR. DAVID CORMIE: Yes, I said that.

15   MS. JESSICA SAUNDERS: You then said, A

16 better outcome is if somebody else comes along and

17 says, We will bear some of the costs of the line and

18 further, but it's a good deal even if we had to pay for

19 the whole cost of the line.

20   Is that correct?

21   MR. DAVID CORMIE: Yes. I agree with

22 that.

23   MS. JESSICA SAUNDERS: So from this, it

24 would be fair to say that, in your view, the line, no

25 matter which way, with Manitoba Hydro owning all or

2644

1 owning part or none of it, has an economic outcome, and

2 a good one at that.

3   Is that fair to say?

4   MR. DAVID CORMIE: I believe it's a

5 good project, yes.

6   MS. JESSICA SAUNDERS: And then a clear

7 way of putting it was in your answers to questions from

8 panel member Kapitany.

9   You provided the analogy of a house. To

10 that extent, you have decided to build a house and pay

11 for the whole cost of the house, and to the extent you

12 have somebody come along and rent the house from you,

13 you get an additional income, and it makes your

14 investment in the house even better.

15   You recall that?

16   MR. DAVID CORMIE: Yes. I -- I think

17 my analogy was a little bit weak, because in this case,

18 we actually have somebody who's willing to pay for the

19 porch and the garage.

20   MS. JESSICA SAUNDERS: Okay. Thank

21 you.

22   MR. DAVID CORMIE: Not -- not just

23 renting it, but -- but paying for it and -- and getting

24 to use it for fifteen (15) years.

25   MS. JESSICA SAUNDERS: Okay. And then

2645

 1 you further indicated that Minnesota Power customers

 2 aren't prepared to pay for more than what they need, so

 3 Manitoba Hydro will pay for 60 percent, and you

 4 indicate some of that will be recovered through the

 5 power purchase agree -- arrangement.

 6   You confirm that?

 7   MR. DAVID CORMIE: Yes, the -- the

 8 larger line allows us to enter into a power sale

 9 agreement with Wisconsin Public Service, and -- and the

10 price that Wisconsin Public Service is paying is -- is

11 for delivered service. So there's -- there's

12 consideration in the price that Manitoba Hydro is

13 bearing the costs of that transmission.

14   MS. JESSICA SAUNDERS: Okay. And

15 Wisconsin Public Service was the only other reference

16 you had mentioned, correct?

17   MR. DAVID CORMIE: Yes.

18   MS. JESSICA SAUNDERS: Okay. You

19 indicated that Manitoba Hydro is in ongoing discussions

20 with other US transmission owners at this time who are

21 interested in assuming Manitoba Hydro's 49 percent

22 investment and ownership position, correct?

23   MR. DAVID CORMIE: Yes.

24   MS. JESSICA SAUNDERS: I can appreciate

25 that those discussions and the names of the utilities

2646

1 may be confidential, but can you provide us with the

2 number of other utilities, specifically those utilities

3 other than Wisconsin Public Service, that Hydro has

4 been in discussions with, if any?

5   MR. DAVID CORMIE: We've discussed this

6 with several utilities, but we are in particular

7 discussions with one (1).

8   MS. JESSICA SAUNDERS: And you can't

9 speak to how long you've been in those discussions with

10 the several other utilities, or can you?

11   MR. DAVID CORMIE: Detailed -- detailed

12 discussions have been going on since about Christmas,

13 but in concept -- or in principle, the idea of Manitoba

14 Hydro being an owner of last resort has been around for

15 a -- a -- for -- for a long time, and probably several

16 years.

17   MS. JESSICA SAUNDERS: Okay, thank you.

18 So in this arrangement as it is currently being

19 proposed, and in light of your comments, you can agree

20 that based on what we've heard, the arrangement brings

21 more certainty, say, for Minnesota ratepayers, and

22 essentially places Manitoba ratepayers in a more

23 uncertain position with respect to the ownership

24 structure of the US portion of the line?

25   MR. DAVID CORMIE: You know, Manitoba

 1 Hydro sees this line providing significant benefits to

 2 its customers in -- in a whole broad range of areas for

 3 -- in perpetuity. And so, from our perspective, this

 4 line is a strategic asset, and -- and to the extent

 5 that someone is offered to build it, help pay for it in

 6 -- in spite of the fact that they will receive some

 7 benefit from it, it's a -- it's a good project, and I

 8 don't think it exposes Manitoba Hydro's customers to

 9 significant risk.

10   There's -- as my -- as my past boss, Mr.

11 Ken Adams who just retired would say, There's never

12 been a transmission line that Mr. Jacobson built for us

13 that hasn't paid for itself very quickly, and I would

14 think that that will be the case with the 750 kV line -

15 - 750 megawatt line.

16   MS. JESSICA SAUNDERS: Okay.

17   MR. DAVID CORMIE: So I don't see it as

18 a -- as a -- a burden to the Manitoba Hydro ratepayer.

19 I see it as an opportunity that will help -- will --

20 will bring value long past the time that the Power

21 Purchase Agreement with Minnesota Power expires.

22   MS. JESSICA SAUNDERS: And, now you've

23 -- you've used the words 'burden' and 'opportunity' in

24 referring to your views of the project with respect to

25 potential impacts on Manitoba ratepayers, but in light

2648

1 of our previous line of discussion where we went

2 through the -- the number of potential utilities that

3 Hydro's been in discussions with, and the fact that you

4 were only able to reference more certainly the Purchase

5 Agreement with the Wisconsin Public Service, does that

6 not create an uncertain position for Manitoba

7 ratepayers to be in?

8   MR. DAVID CORMIE: Yeah, there -- there

9 is uncertainty in how much benefit there will be. I

10 think the project would be beneficial to the ratepayer

11 if we had to bear all the costs to the extent that a --

12 a third party comes along and pays for it or a third

13 party comes along and helps -- unburdens Manitoba Hydro

14 of the ownership risk.

15   That improves the amount of benefits

16 that the project -- it doesn't add -- add risk, it

17 reduces the risk of the project and it just makes it a

18 better project. It -- it -- yeah, I -- I don't see it

19 as -- as -- these activities don't harm the customer,

20 they -- they make it better.

21

22   (BRIEF PAUSE)

23

24   MS. JESSICA SAUNDERS: Okay. And I do

25 not want to belabour the point, but in light of the

2649

1 fact that we do not have confirmed details other than

2 the Wisconsin Public Service potential arrangements, we

3 currently have no others, and we are paying for a

4 significant portion of this line and we own a

5 significant portion of this line.

6   And while you say it won't harm...

7 Should I have just stayed back in the second row? They

8 told me to come here, that it would be better, and I...

9 Okay. I apologize, everyone. And, of course, I --

10 I've lost that train of thought on that one, but I'll -

11 - I'll try to return.

12   I -- I'd -- I -- I've been hoping to

13 explore this -- this idea of uncertainty, and -- and in

14 that, we have very few others than Wisconsin Public

15 Service who, at the present time, indicated their

16 interest to come in and take over the portion of this

17 line.

18   And you say, you know, the -- the burden

19 on Hydro in terms of costs and the investment will be

20 one that, you know, Manitobans will benefit from, but

21 at the present time, the uncertainties at the present

22 time, do present a risk for Manitoba ratepayers that,

23 say, when you consider the certainties that are

24 provided to Minnesota ratepayers under this

25 arrangement, there's -- there's clearly a difference

 1 there.

 2   Is that fair to say?

 3   MR. DAVID CORMIE: Let me answer your

 4 question in -- in this way. If it was -- if the only

 5 benefit from the expo -- from the line were export

 6 sales, and we only had one (1) customer lined up, and -

 7 - and we were investing in this line, and -- and we've

 8 only contracted for a -- a third (1/3) of it, and

 9 there's two thirds (2/3s) left, that -- that would be

10 one (1) situation, but there's a -- a list of -- of

11 benefits that this line brings beyond just exports.

12   And we've talked about the -- the

13 increase in dependable energy that this line provides.

14 We've -- you'd talked -- Mr. Jacobson described the

15 increased reliability the line provides. There's less

16 contingency risk, reduced loss of load probability in

17 Manitoba. There's the -- the benefit of being able to

18 arbitrage more often on peak energy.

19   There's -- allows Manitoba Hydro to

20 enter into capacity back sales with Wisconsin

21 utilities, so now we have a market access benefit.

22 There's more competition. We will get higher average

23 market prices. There are strategic benefits.

24   We now have another major customer in

25 the United States who will advocate on behalf of

2651

1 Manitoba Hydro who is, from the United States's

2 perspective, a foreign entity who wants to sell into

3 the United States its surplus power and displace, you

4 know, local jobs and affect the local economy. So, you

5 know, there's -- there -- this is a strategic asset

6 that we're bringing to the table.

7   In addition to that, we are able to sell

8 some firm power and -- on the line. So the basket of

9 benefits that Manitoba Hydro receives as a result of

10 having a big line is quite broad, and to only look at

11 the firm power sale as the only benefit ignores the

12 other -- the other benefits that -- that are -- that

13 are there.

14   And -- and I -- and I think when I look

15 at this project and -- and think about all the broad

16 things -- the broad basket of benefits it brings, you

17 know, I -- I -- and knowing how valuable

18 interconnections are -- are and how difficult they are

19 to build, you know, it's my judgment and -- and

20 Manitoba Hydro's judgment that -- that this is

21 something that we have an opportunity to go for now,

22 and that we should -- we should do that, and that --

23 that's why it's kind of in our -- in our plans as this

24 is a must. This will provide long-lasting value to the

25 Company.

2652

1   And so it's not just on the economics of

2   a particular transaction, and -- and in that context,

3   that's why I -- I'd say this is a good deal for

4   Manitoba Hydro, and to the extent that other utilities

5   are willing to reduce the cost by investing, it -- it

6   only can make it a better project for us.

7   MS. JESSICA SAUNDERS: Okay. And you

8   referred -- and I will move on, but you did refer to

9   the broad basket benefits, but at the very least, you

10   can agree that there is some uncertainty for Manitoba

11   ratepayers in that we're relying on Manitoba Hydro to

12   arrange for other owners to come in, and so far only --

13   right now, we're aware that Wisconsin Public Services

14   is going to come in -- potentially going to come in?

15   MR. DAVE CORMIE: Yes, and as we've

16   looked at the ownership options, we are convinced that

17   even if Manitoba had to be -- even if Manitoba Hydro

18   had to be the last -- the owner of last resort, it

19   would still be a good project, and to the extent that

20   we can do better than that, again, by having another US

21   transmission owner take -- take the position, that

22   reduces risk that the Manitoba ratepayer may have to

23   face. So it -- it is -- it -- it -- again, it's a bit

24   -- it's a -- it's a -- a reduction of risk, so it -- it

25   would be beneficial to do.

2653

 1   But even if we weren't successful in

 2 getting a third party to come to the table, I judge

 3 that it's still the right thing to do, and -- and I

 4 think Manitoba Hydro has -- has indicated we were

 5 prepared to do that. Otherwise, it would have never

 6 been an option on the table. You know, we were -- we

 7 very carefully thought through this and -- and have --

 8 have come to that conclusion.

 9   MS. JESSICA SAUNDERS: Okay. So moving

10 on, I will refer you to -- well, moving on, I will now

11 go to the Manitoba portion of the line, and despite not

12 knowing the name for this facility until participating

13 in the review proceedings recently, the Riel converter

14 station and the Manitoba/Minnesota Transmission Project

15 is near and dear to my client's heart, and so I'm going

16 to ask some questions regarding the costs for this

17 project.

18   I'll first refer you to slide 80 of the

19 panel presentation. That's Manitoba Hydro's Exhibit

20 95. So this slide presents the costs of the

21 Manitoba/Minnesota Transmission Project. At the first

22 bullet, it is indicated the costs of the 235 kilometre

23 500 kV line to the US border as being 173.6 million in

24 2012 dollars, correct?

25   MR. DAVE CORMIE: I think Mr. Jacobson

2654

 1 is probably best to answer if he's still here.

 2   MS. JESSICA SAUNDERS: Oh, hello.

 3   DR. DAVID JACOBSON: Yeah, I'm still

 4 here. Yeah, you're correct.

 5   MS. JESSICA SAUNDERS: Okay. Then at

 6 the second bullet, the Dorsey line termination shunt

 7 reactor, Riel 230-500 kV, 1,200 MVA transformer, and

 8 the three (3) times the -- the 73.4 MVAR capacitors are

 9 indicated as costing 77.5 million in 2012 dollars,

10 correct?

11   DR. DAVID JACOBSON: That's correct.

12   MS. JESSICA SAUNDERS: And then, of

13 course, the third bullet you'll read there as amounting

14 to 16.5 million in 2012 dollars again, correct?

15   DR. DAVID JACOBSON: Correct.

16   MS. JESSICA SAUNDERS: For the total of

17 267.6 million in 2012 dollars, which today is indicated

18 as being 281.4 million, correct?

19   DR. DAVID JACOBSON: That's correct.

20 And the two eighty-one (281) includes an additional

21 fascia trend (phonetic) series. So that's why it's a -

22 - a little bit higher than the -- than the 2012

23 estimate.

24   MS. JESSICA SAUNDERS: Okay. We'll get

25 to that. So I just want to clarify, as the title

2655

1 suggests, these items as listed on page 80 present all

2 of the major project components for the

3 Manitoba/Minnesota Transmission Project, correct?

4   DR. DAVID JACOBSON: The major

5 component's within Manitoba.

6   MS. JESSICA SAUNDERS: Yes.

7   DR. DAVID JACOBSON: Obviously you need

8 the Great Northern to -- to connect the source of the

9 sync.

10   MS. JESSICA SAUNDERS: Yes. So the

11 total's for Manitoba?

12   DR. DAVID JACOBSON: Correct.

13   MS. JESSICA SAUNDERS: If we go back a

14 slide to 79, as you were just saying, so the -- the

15 line above, of course, we've got all of the facilities,

16 and I did read the transcript, so you -- I'll -- in the

17 interests of time, I -- I understand what -- what

18 you've depicted on the map there, and so I'm going to

19 focus, of course, on the above-border facilities.

20   But again, that -- all of these

21 facilities as indicated on slide 80 and the totals

22 presented on slide 80 at the present time are accurate

23 to your knowledge?

24   DR. DAVID JACOBSON: Yes.

25   MS. JESSICA SAUNDERS: Okay. I want to

2656

1 refer you to the chart at page 110 of PUB Exhibit 58-3,

2 and on this chart for 2012, the costs for Riel CS are

3 indicated as being 268 million in CEF 2012, correct?

4   DR. DAVID JACOBSON: That's what it

5 says there.

6   MS. JESSICA SAUNDERS: Yeah.

7   DR. DAVID JACOBSON: M-hm.

8   MS. JESSICA SAUNDERS: And CS, of

9 course, refers to the converter station, and in that

10 would be the costs associated with the facilities as

11 part of the converter station, correct?

12   DR. DAVID JACOBSON: I don't believe

13 that's correct.

14   MS. JESSICA SAUNDERS: Okay. Then as

15 part of the costs of the Riel CS, could you then

16 indicate what costs would be included in the line as

17 you see there on page 110 of PUB Exhibit 58-3?

18   DR. DAVID JACOBSON: The MTP line is

19 near the bottom of the page, Dorsey -- Dorsey to the US

20 border. It's only 205 million between CEF08 and -- and

21 '012, but the -- the scope of that project at -- at

22 that time was a -- a direct line between Dorsey and the

23 US border, and the scope has now changed to follow a --

24 a route between Dorsey and Riel along the -- what we

25 call our southern -- southern corridor, or southern

2657

1 loop, and then from Riel, it goes towards the US

2 border.

3   I mean, the route has not been

4 determined, but rough -- roughly that's -- that's what

5 happened. So it's a much longer route today than it

6 was back -- back in -- in those CEFs.

7   MS. JESSICA SAUNDERS: Okay. You've

8 referenced the 500 kV Dorsey/US border project on slide

9 110. So going back to slide 80, in the first bullet,

10 we have the description, "235 kilometre 500 kV line to

11 US border." Is that the same as -- as the line that

12 was indicated on Chart 110?

13   DR. DAVID JACOBSON: No. As I tried to

14 explain, the -- the route is much longer in this -- on

15 this slide. The -- we're currently going, as I

16 mentioned, from Dorsey towards Riel, so it's going

17 almost directly east, and then it -- it goes towards

18 the existing 500 kV line route, but not directly

19 parallelling it, but, I mean, it goes towards it, and

20 then it heads towards the US border.

21   So the -- the distance is estimated

22 currently at 235 kilometres. The original estimate was

23 a direct due south line from Dorsey to the US border,

24 which was much shorter. I think it was -- I hate to --

25 I hate to guess, but, I mean, it -- probably half --

2658

1 half the distance. Does that answer -- answer your

2 question?

3   MS. JESSICA SAUNDERS: If I could just

4 have one (1) minute, I'm -- I'm just trying to

5 understand where I need to go next here. The

6 description you just provided me -- can we actually go

7 back to slide 79, and can you just explain -- so we've

8 got -- you -- you mentioned from slide 80, we have the

9 500 kV line to the US border, and can you indicate

10 where that is on slide 79, please?

11   DR. DAVID JACOBSON: Well, if you see

12 Dorsey --

13   MS. JESSICA SAUNDERS: Yeah.

14   DR. DAVID JACOBSON: -- there's a --

15 there are -- there are two (2) lines that go due south

16 of -- or -- or straight down. I'm -- I shouldn't put

17 directions, but it goes straight down out of the Dorsey

18 substation. The line furthest to the right that

19 connects directly to Riel is the existing 500 kV line

20 that currently terminates at Forbes, and we're in the

21 process of constructing the Riel substation and

22 sectionalizing that line into Riel.

23   So the Dorsey to Forbes line will get

24 terminated into Riel later in 2014, so the line

25 immediately to the left of that, that has the 300 MVARs

2659

1 reactor noted is the new line, the new MTP line, so it

2 will be going towards Riel but not terminating in Riel,

3 and then -- and then going towards Blackberry on the

4 eastern side of Manitoba.

5   Is that -- is that clear? I can come

6 over there and point it out to you with my fingers.

7 It's probably quicker.

8   MS. JESSICA SAUNDERS: Okay. No, I --

9 I see. So the 235 kilometre line from Riel up there

10 down to Blackberry, those costs are indicated -- those

11 are the costs, then, that are indicated in page 110 of

12 the PUB exhibit?

13   DR. DAVID JACOBSON: I'll take your --

14   MS. JESSICA SAUNDERS: I just want to

15 be sure, and if you don't mind, so it's that -- the 500

16 kV Dorsey-US border, the 205 million?

17   DR. DAVID JACOBSON: Those costs, as I

18 mentioned, are not the same costs.

19   MS. JESSICA SAUNDERS: Not the same

20 costs --

21   DR. DAVID JACOBSON: No.

22   MS. JESSICA SAUNDERS: -- but that's --

23   DR. DAVID JACOBSON: The same project.

24   MS. JESSICA SAUNDERS: -- that line

25 there is the same --

2660

 1   DR. DAVID JACOBSON: The same project.

 2   MS. JESSICA SAUNDERS: -- is the

 3 project.

 4   DR. DAVID JACOBSON: Yeah, the same

 5 project. And that -- that project in CEF13 has

 6 increased to $350 million, give or take, in-service

 7 costs. So -- so the current CEF has the proper scope

 8 to reflect the MMT -- MMTP project.

 9   You know, giving a bit of history, we

10 were originally looking at dropping the Dorsey line

11 into Fargo area, and that scope has since changed to go

12 into -- towards Duluth in the Minnesota Power service

13 territory.

14   MS. JESSICA SAUNDERS: Thank you for

15 going through that. And so in my questions on slide

16 80, when I asked if all of these lines represented the

17 full costs associated with the Manitoba-Minnesota

18 transmission project, you indicated that they did.

19   And so the costs you just referred to

20 for the US border new 500 kV transmission line -- and

21 you were very good to provide me with the revised

22 forecast number of 350 million -- are those costs

23 indicated on slide 80 at all?

24   DR. DAVID JACOBSON: No. The -- the

25 costs I indicated on slide 80 are the overnight

2661

1 dollars, base dollars, excluding interest and

2 escalation, and three hundred and fifty (350) is the

3 in-service dollars to 2020. So they're -- they're the

4 same. It just depends which year you're talking about.

5   MS. JESSICA SAUNDERS: Okay. So -- but

6 we're seeing a different total in that we've got there

7 this -- the -- the three hundred and fifty (350)

8 revised amount for the 500 kV transmission line, and

9 then we've got total costs as indicated in slide 80 as

10 being today at two eighty-one (281).

11   Shouldn't the costs you just referred to

12 me for the new 500 kV line not be included on slide 80,

13 as they form part of the Manitoba-Minnesota

14 transmission project?

15   DR. DAVID JACOBSON: I'm sorry. Can

16 you repeat that question?

17   MS. JESSICA SAUNDERS: Okay. So you

18 just confirmed that the 350 million updated costs for

19 the new 500 kV transmission line -- and those were the

20 project -- that -- that's the project that we went

21 through on page 110 of the PUB exhibit.

22   And now what I'm asking you is should

23 those costs not also be added to slide 80 where you see

24 the total of 267 million -- and you confirmed that the

25 line on the screen we went through was the first

2662

 1 bullet.

 2   Should there not maybe be a -- a bullet

 3 after that that includes the costs that you just went

 4 through, the 350 million that represent the cost of the

 5 500 kV transmission line? Should they not also be

 6 included on slide 80?

 7   MS. JOANNE FLYNN: Ms. Saunders --

 8   MS. JESSICA SAUNDERS: Sorry, Ms.

 9 Flynn.

10   MS. JOANNE FLYNN: -- what might be

11 helpful is the response that Manitoba Hydro provided to

12 CAC/MH-Round 1-18B. You will see the 267 million on

13 there, and then interest and escalation and the

14 additional piece of equipment that Dr. Jacobson

15 referred to, to get you up to the $350 million.

16   And what I would note is that, for

17 purposes of the main submission, the 2012 analysis, the

18 -- the amount that was used for -- in the analysis for

19 the Manitoba-Minnesota transmission project is the

20 amount, I -- I guess, equivalent to the three thirty-

21 one (331) in in-service dollars that was used, because

22 the $19 million was an addition that came after we

23 completed that analysis.

24   The 2013 update includes the 19 million,

25 so that it's equivalent to the 350 million that's --

2663

 1 that is included in the analysis of -- of any of the

 2 2013 values.

 3   MS. JESSICA SAUNDERS: Okay. So if I -

 4 - just for my own clarification. And I'll go through

 5 this more for -- for, I said, my purposes than, I

 6 think, yours. I just have to understand this.

 7   So if we take what's up on the screen

 8 here -- it's the Manitoba-Minnesota Transmission

 9 Project. And we do have the -- the 277 million amount

10 indicated there, correct?

11   MS. JOANNE FLYNN: The -- the value that

12 Dr. Jacobson referred to was the two sixty-seven (267)

13 in 2012 dollars. The values that are provided in the

14 NFAT submission are in 2014 dollars. So you see two

15 seventy-seven (277) is the conversion from the two six

16 -- of the two sixty-seven (267) from the 2012 dollars

17 to the 2014 dollars.

18   MS. JESSICA SAUNDERS: Okay. And you

19 can confirm --

20   THE CHAIRPERSON: This estimate -- I'm

21 sorry. This estimate is Class 2, Class 3?

22   MR. DAVID JACOBSON: This estimate is

23 equivalent to -- to Class 3, I would say. We don't

24 have the same kind of class structures that -- in

25 transmission as they do in generation. But, in

2664

1 essence, it's -- it's being prepared to -- to go into a

2 facility construction agreement, so it's -- it's our

3 best -- our best estimate, so -- which is, from the

4 notes I read on the Class 1 through 5 structure, Class

5 3 seemed to fit the most close to what this estimate

6 is.

7

8 CONTINUED BY MS. JESSICA SAUNDERS:

9   MS. JESSICA SAUNDERS: And so thank

10 you, Ms. Flynn. You pointed out to the 267 million

11 estimate in 2012 dollars. So I'll refer you, if you

12 don't mind, to Manitoba Hydro Exhibit 98. That's the

13 CEF13, page 16.

14

15   (BRIEF PAUSE)

16

17   MR. TERRY MILES: Was that page 16 or

18 17?

19   MS. JESSICA SAUNDERS: Page 16 we'll

20 start.

21   MR. TERRY MILES: Okay.

22   MS. JESSICA SAUNDERS: And so here we

23 have the explanation of the Riel 500 kV station. And

24 you've got the description there. And you've got the

25 chart that indicates the previously approved amount of

2665

1 267.6 million.

2   And you can confirm that's the CEF2012

3 number?

4   DR. DAVID JACOBSON: I would like to

5 point out that this is a totally different project.

6 This is sectionalization of the existing 500 kV line.

7   MS. JESSICA SAUNDERS: M-hm.

8   DR. DAVID JACOBSON: So it's nothing to

9 do with the -- the new tie-line. But, I mean, I'll

10 confirm those -- those numbers are on the page, but --

11   MS. JESSICA SAUNDERS: Okay.

12   DR. DAVID JACOBSON: -- that's nothing

13 to do with the MMTP project.

14   MS. JESSICA SAUNDERS: Okay. Then if

15 we could -- right, because when you look at slide 80

16 though in your presentation -- and again, I apologize -

17 - I apologize if it's my own --

18   DR. DAVID JACOBSON: The 267 was -- was

19 a fluke that they matched up.

20   MS. JESSICA SAUNDERS: Okay. It was a

21 fluke that they matched up.

22   DR. DAVID JACOBSON: Yeah.

23   MS. JOANNE FLYNN: Ms. Saunders, if you

24 go to page 17 of that document --

25   MS. JESSICA SAUNDERS: Yeah.

2666

 1   MS. JOANNE FLYNN: -- the Dorsey to US

 2 border -- Dor -- Dorsey to US border new 500 kV

 3 transmission line, that's the correct project.

 4   MS. JESSICA SAUNDERS: This is the

 5 correct project.

 6   MS. JOANNE FLYNN: The Dorsey to US

 7 border.

 8   MS. JESSICA SAUNDERS: Okay.

 9   MS. JOANNE FLYNN: So you see -- you

10 see the revised forecast there of three hundred and

11 fifty point three (350.3).

12   MS. JESSICA SAUNDERS: Okay. And that

13 project, Ms. Flynn, though is a different one, you say.

14 It doesn't -- it's not part of the Manitoba-Minnesota

15 Transmission Line Project?

16   MS. JOANNE FLYNN: That is -- that is

17 the fact of the project.

18   MS. JESSICA SAUNDERS: Okay. And the

19 Riel Station though on page 16, which --

20   DR. DAVID JACOBSON: Is a separate

21 project.

22   MS. JESSICA SAUNDERS: Is a separate

23 project?

24   DR. DAVID JACOBSON: Yes. It's -- it's

25 -- we're -- we're sectionalizing the existing 500 kV

2667

1 line for reliability purposes. In the event that we

2 lose the Dorsey Station, we're able to import through

3 Riel. And it -- it also facilitates the addition of --

4 of Bipole III in the future, but it's a totally

5 separate project from the new 500 kV line to the US.

6   MS. JESSICA SAUNDERS: Okay. If I

7 might ask, how did you determine that this Riel Station

8 -- because in the -- in the project description, the --

9 the Riel Station is discussed at length.

10   And so how do you determine then that

11 this project is not part of the Manitoba-Min --

12 Minnesota Transmission Line Project being discussed

13 here?

14   DR. DAVID JACOBSON: I'm sorry, I don't

15 understand the question. I mean, they're -- they're

16 separate. How do I determine? I mean, these are

17 separate.

18   MS. JESSICA SAUNDERS: Okay. Okay.

19   DR. DAVID JACOBSON: Dor -- the -- the

20 Dorsey to Riel -- sorry, Dorsey to Forbes existing line

21 was planned to be sectionalized a number of years ago.

22 And so we're going to create a new station. It's under

23 construction. We're going to add transformation at

24 Riel. We're going to be tying it into the existing 230

25 kV grid. And the purpose of that sectionalization

1 project was to improve reliability in the even of a

2 Dorsey station loss. So that is a -- a known project

3 base -- base case facility.

4   So now -- now then comes along the

5 request to increase transmission service to the US.

6 And on top of this Riel sectionalization, we looked at

7 the addition of a new transmission line. So that new

8 transmission line goes from Dorsey to the border to

9 Blackberry. We have to add some additional facilities

10 into the Riel substation as part of that project. But

11 those two (2) projects are separate, different --

12 different drivers.

13   MS. JESSICA SAUNDERS: So the

14 transmission is separate from the Riel station?

15 They've -- the costs have been --

16   DR. DAVID JACOBSON: The -- the Dorsey

17 -- the Dorsey --

18   MS. JESSICA SAUNDERS: -- included

19 separately and --

20   DR. DAVID JACOBSON: No, the -- the --

21   MS. JESSICA SAUNDERS: -- or --

22   DR. DAVID JACOBSON: -- Dorsey to US

23 border project includes transmission as well as some

24 substation additions that are in addition to what's

25 included in the scope of the -- of the Riel Project

2669

1 that you'd noted before.

2

3   (BRIEF PAUSE)

4

5   MS. JESSICA SAUNDERS: Okay. If I

6 could just have a moment? Thanks.

7

8   (BRIEF PAUSE)

9

10   MS. JESSICA SAUNDERS: Okay. And

11 perhaps it might have served me some greater

12 clarification if the -- there was different titles and

13 such. You see names and 500 kVs and it does get

14 confusing for myself.

15   Then in the second bullet on slide 80

16 then, when you're referencing Riel 230-500 kV, what --

17 and it's the transformer, that's -- that's separate

18 from what we just went through, the Riel 230-500 kV

19 station? This is just a convertor that's included in

20 the Manitoba/Minnesota Transmission Project?

21   DR. DAVID JACOBSON: Yes. Hopefully I

22 can clarify this. As part of the Riel Sectionalization

23 Project we will be adding a new 500 to 230 kV

24 transformer. And -- and that picture that I had shown

25 earlier in this -- in this presentation was actually

2670

1 one (1) phase of that three (3) phase transformer.

2   So there will be in 2014 a transformer

3 preexisting. And then the proposal is to add a second

4 -- a second transformer in parallel in 2020 to

5 facilitate the additional transfers between Manitoba

6 and the US. So it's -- so the Riel transformer is a --

7 a needed additional facility to facilitate 750

8 megawatts between Manitoba and the US. I mean, it

9 sounds kind of counterintuitive, you know, why --

10 you're -- you're going from Dorsey and you're adding a

11 transformer at Riel, but the whole interface works

12 together.

13   So we actually have two (2) transformers

14 at Dorsey existing, and we will have two (2)

15 transformers at Riel, and we will have an export line

16 out of Dorsey and an export line out of Riel, so it's -

17 - it's symmetric. So you get -- you get a nice balance

18 between the two (2) stations.

19   I don't know if --

20   MS. JESSICA SAUNDERS: Okay.

21   DR. DAVID JACOBSON: -- the Board's

22 getting it?

23   MS. JESSICA SAUNDERS: Yeah. Yeah.

24 No, they are. And I apologize. So then if you can

25 just clarify for me then on slide 88, the 277 million

2671

1 of the capital costs represents which of the products -

2 - the projects you just discussed here?

3   DR. DAVID JACOBSON: That is the

4 Preferred Development Plan, the MMTP project, or the

5 Dorsey to US border project, all one and the same.

6   MS. JESSICA SAUNDERS: And it doesn't

7 include the Riel 500 kV station?

8   DR. DAVID JACOBSON: That is correct.

9 That's a preexisting project. That'll be in service in

10 2014.

11

12   (BRIEF PAUSE)

13

14   THE CHAIRPERSON: But that table shows

15 that the capital cost in 2014 is two seventy-seven

16 (277), and we just -- we just determined a few minutes

17 ago that it's well over two seventy-seven (277), isn't

18 it?

19   DR. DAVID JACOBSON: You got to be

20 careful about the -- the year. It's $350 million in

21 2020 dollars versus 2012 or 2014. I mean, it drives me

22 crazy, too.

23

24 CONTINUED BY MS. JESSICA SAUNDERS:

25   MS. JESSICA SAUNDERS: Okay.

2672

 1   MS. JOANNE FLYNN: Just -- just a point

 2 of clarification, Mr. Chair, is that the two seventy-

 3 seven (277) is equivalent -- it's easier to see on CAC-

 4 Round 1-18B, but it's actually equivalent to 331

 5 million in in-service dollars because there was a $19

 6 million capital addition that brings it up to 350

 7 million.

 8   That 350 million equivalent was used in

 9 the analysis for the 2013 because that 19 million was

10 identified after we had completed the analysis for

11 2012.

12   MS. JESSICA SAUNDERS: Okay. And so

13 the Board of course was asking for clarification on the

14 dollars in what year, and of course I was getting

15 clarification on which project we were talking about.

16 I do apologize. I'm moving on.

17   So I'll refer back to CEF13. That's

18 Manitoba Hydro Exhibit 98. And so for Riel on page 16,

19 the previously approved amount -- and -- and we went

20 through that.

21   And I want to note the reason for the

22 revision you indicated was resulting from a review of

23 the project and including incorporation of award values

24 of all of the major contracts, with the in-service date

25 being delayed by five (5) months from May 2014.

2673

1   So you can confirm that those are the

2 reasons for the revision?

3   MS. MARLA BOYD: I think we need to --

4 we need to look at the project on page 17, which is

5 actually what's related to the NFAT.

6   MS. JESSICA SAUNDERS: Okay.

7   MS. MARLA BOYD: The project on page 16

8 won't actually form part of the NFAT.

9   MS. JESSICA SAUNDERS: Doesn't form

10 part of the NFAT, and I was mistaken in that. Okay.

11   MS. MARLA BOYD: Thank you.

12

13 CONTINUED BY MS. JESSICA SAUNDERS:

14   MS. JESSICA SAUNDERS: Then I'll -- I

15 can refer you then to page 17 and the reasons for

16 revision there. You had indicated the costs were

17 increased for additional line length -- you said this

18 earlier -- the south loop to Riel Station.

19   Are you aware of any potential reasons

20 for further revision in the coming year?

21   DR. DAVID JACOBSON: Well, the only

22 potential reason would -- would be if -- if the

23 estimates get revised. I mean, obviously -- I mean,

24 we're always looking at estimates. I mean, we are

25 going through an exercise to try and fine tune the

2674

1 route.

2   So once -- once we, you know, figure out

3 how many corner towers there are, how many crossings of

4 this and that, I mean, there -- there could be a

5 revision. But I don't anticipate any changes in the

6 next year.

7   MS. JESSICA SAUNDERS: Okay. And so

8 Manitoba Hydro has indicated that it is seeking public

9 input to help identify the most suitable route for the

10 line in order to take into account impacts on people

11 and the environment.

12   Is that correct?

13   DR. DAVID JACOBSON: Yes. Round 1 has

14 been completed, and we're going to start Round 2

15 shortly. I mean, detailed questions on -- on

16 environment are best given to the fourth panel, but I

17 can do my best.

18   MS. JESSICA SAUNDERS: Okay.

19   DR. DAVID JACOBSON: All right.

20   MS. JESSICA SAUNDERS: Well, then, on

21 that note, I can save the questions that I would have

22 for the panel that will be appearing I believe a week

23 and a half, two (2) weeks from now. And so moving on.

24   Mr. Peters in his cross-examination

25 asked the panel if there was an update on the costs of

 1 Bipole III. And you had indicated there was no updated

 2 cost estimate, Mr. Wojczynski. I wanted to ask just a

 3 few questions to follow up to your answer to those

 4 questions.

 5   So if I might just -- and again, this

 6 might be for my own clarification -- but refer you to

 7 page 110 of PUB Exhibit 58-3. And in your response to

 8 questions asked by Board counsel, you stated that there

 9 was no updated capital cost estimates for Bipole III.

10   And as a follow-up to that, and in

11 clarification understanding that answer, with

12 construction starting, has Hydro performed a detailed

13 facility study or more detailed cost estimates for

14 Bipole III, or is it using the initial facility study?

15   MS. MARLA BOYD: Again, Mr. Chair, this

16 would be outside the scope of the NFAT submission.

17

18 CONTINUED BY MS. JESSICA SAUNDERS:

19   MS. JESSICA SAUNDERS: Okay. Well --

20 and I do apologize respectfully. My interpretation of

21 Order 22 regarding our -- our proposed evidence in this

22 regard allowed certain evidence to be discussed

23 relating to a comparison of the cost of Bipole III and

24 the net present value of the PDP and other

25 alternatives. So the questions that we're asking here

2676

1 today relate to, I guess, in follow up to the answer

2 provided by Mr. Wojczynski.

3   But I can move on it if -- if it would

4 be of any assistance to have the information that I'm

5 seeking here today.

6   THE CHAIRPERSON: Frankly, the -- the

7 terms of reference are pretty clear that the Bipole II

8 is not to be addressed by this panel, so we have to

9 accept the values as described by Manitoba Hydro.

10   MS. JESSICA SAUNDERS: Thank you very

11 much.

12

13 CONTINUED BY MS. JESSICA SAUNDERS:

14   MS. JESSICA SAUNDERS: I'll try one (1)

15 more area. In moving, as well, Mr. Wojczynski, to the

16 matters discussed in Mr. Williams's examination, he

17 asked you about the Canadian Environmental Assessment

18 Agency comprehensive study report process for Keeyask.

19 He mentioned that the process relates to public -- the

20 public comment section of it, as well as the Aboriginal

21 consultation section of it.

22   And I am mindful that the terms of

23 reference also exclude Aboriginal Consultation, but I

24 just wanted to explore with you I think the portions of

25 the CEAA report that would relate to potential impact -

2677

1 - impacts to in-service dates and costs related with

2 Keeyask, if that's okay.

3   So are you aware in the CEAA process

4 that they provide funding to Aboriginal peoples in

5 order that they can consider the EIS guidelines and the

6 comprehensive study report that's being conducted by

7 CEAA?

8   MR. ED WOJCZYNSKI: I understand

9 generally that that is done and is available. I don't

10 know the specifics that are being done for -- for the -

11 - the Keeyask project and the -- the -- panel 4 (sic)

12 would be the ones who have that information, or would

13 have a handle on that.

14   MS. JESSICA SAUNDERS: Okay. So I -- I

15 do realize that panel 4 (sic), and we do intend to --

16 to discuss these matters there, so I can leave my

17 questions for panel 4 (sic). Thank you. Those are all

18 my questions.

19   THE CHAIRPERSON: Thank you, Ms.

20 Saunders. I will now turn the microphone back to M.

21 Hacault -- sorry, just before we go, I just want to

22 confirm M. Monnin has no questions? So I will turn the

23 microphone over to M. Hacault.

24   MR. SVEN HOMBACH: Mr. Chairman, if I -

25 - sorry.

2678

1   MR. ANTOINE HACAULT: I'm standing

2 between everybody and a beer on Friday, and the Jets

3 game tonight, so I'm in a lot of pressure.

4   MR. SVEN HOMBACH: I do apologize, Mr.

5 Chairman, if I just may have thirty (30) seconds

6 administratively. I -- I'm not sure if everybody's

7 aware, I believe the panel is prepared to continue

8 until 4:30, and earlier Me. Hacault was cut off to make

9 sure that the remaining parties have sufficient time to

10 complete their examination.

11   I was advised by Mr. Monnin earlier that

12 he doesn't have any questions for this panel, and

13 perhaps I can just Mr. Monnin that that is still the

14 case, now having heard from Ms. Saunders?

15   MR. CHRISTIAN MONNIN: I only have

16 about two (2) hour -- no -- no, no further questions.

17   THE CHAIRPERSON: M. Hacault, s'il vous

18 plait.

19

20 CONTINUED CROSS-EXAMINATION BY MR. ANTOINE HACAULT:

21   MR. ANTOINE HACAULT: Thank you. I

22 think that was a poke at me, but hopefully we'll

23 canvass some areas which will be of use for this panel.

24   The first subject matter that I would

25 like to -- to cover to get a little bit more clarity on

2679

1 is reliability. And that was in slide 139 of Exhibit

2 95. It's not in our book of documents. So slide 139,

3 Exhibit 95. It's a reliability chart.

4

5   (BRIEF PAUSE)

6

7   MR. ANTOINE HACAULT: First, what would

8 be NERC? What's that acronym mean?

9   DR. DAVID JACOBSON: I'll take that

10 one. The -- the North American Electric Reliability

11 Corporation.

12   MR. ANTOINE HACAULT: Thank you. And

13 what's the NERC standard or requirement for reliability

14 as it applies to Manitoba Hydro?

15   DR. DAVID JACOBSON: We could be here

16 all day if I have to answer that question. There's

17 probably about fifty (50) or more standards that are in

18 our legislation. But if I had to pick one (1), a key

19 one (1) for planning new transmission, it would be NERC

20 TPL Transmission Planning standards. And there's four

21 (4) sets of them 001 through 004, so.

22   MR. ANTOINE HACAULT: Okay. But with

23 respect to --

24   DR. DAVID JACOBSON: With respect to --

25   MR. ANTOINE HACAULT: -- this

2680

1 particular slide, peak load carrying capacity, could

2 you explain whether or not the standard is reflected by

3 the load line and, if so, what that standard is?

4   DR. DAVID JACOBSON: I -- I can cover

5 that one too. Currently there's no NERC standard North

6 American-wide that covers loss of a load exportation.

7 There is one (1) -- one (1) region in the US where it's

8 a local standard, reliability first.

9   But what -- what NERC does on an annual

10 basis in their long-term resource assessment is that

11 they require planning authorities, like Manitoba Hydro,

12 to perform a study to demonstrate that they have enough

13 resource adequacy to meet the point -- point one (.1)

14 day per year metric. But there are no penalties for

15 not meeting the metric. However, there's a fair bit of

16 peer pressure to meet the metric because everything's

17 published by NERC.

18   MR. ANTOINE HACAULT: So could you

19 explain how many minutes or hours that point one (.1)

20 standard means in real terms for me, as a householder?

21   DR. DAVID JACOBSON: Well, point one

22 (.1) of a day -- that's -- two point four (2.4) hours.

23   MR. ANTOINE HACAULT: So that's the

24 standard that Manitoba Hydro tries to achieve across

25 its system?

2681

 1   DR. DAVID JACOBSON: We do try to

 2 achieve that, yes.

 3   MR. ANTOINE HACAULT: And does this

 4 black load line on slide 139 represent that standard

 5 which Manitoba Hydro seeks to achieve?

 6   DR. DAVID JACOBSON: That is correct.

 7   MR. ANTOINE HACAULT: So -- and it may

 8 be Mr. Wojczynski who's going to be answering this, I

 9 don't know.

10   DR. DAVID JACOBSON: Well, he's got the

11 Masters degree. I only have a PhD in this area.

12   MR. ANTOINE HACAULT: That's okay.

13

14   (BRIEF PAUSE)

15

16   MR. ED WOJCZYNSKI: I think I just

17 might let him answer everything from now on.

18   MR. ANTOINE HACAULT: Is there

19 something that we would refer to as -- and I don't know

20 if I've got the wording quite right -- a cost of

21 unserved energy metric?

22   MR. ED WOJCZYNSKI: Yes. That was one

23 (1) of my thesis topics, but, of course, it wasn't a

24 doctorate, so.

25   But, seriously, there have been many

2682

1 attempts to try and estimate what is the cost to

2 customers if there are unexpected short-term outages of

3 their supply, such as due to capacity shortages. And

4 it's those kind of outages that this metric of loss of

5 load expectations measures. There -- there are various

6 techniques that have been used over time.

7   The simple answer I can tell you right

8 now is there's consensus that the cost to customers of

9 unreliability is orders of magnitude greater than what

10 they pay for it. In other words, if a customer --

11 customer, whether you're residential, commercial, or

12 industrial, if you're interrupted and you -- you --

13 let's say there's a reduction in -- of 1 kilowatt hour

14 of your supply, which in a residential, let's just say

15 is seven (7) cents, the -- the impact to the customer

16 is a hundred times, or a thousand times, or -- it

17 depends on the kind of customer -- more than the actual

18 -- what they pay for it.

19   And -- and there are estimates available

20 and have been available for that, but you can't get

21 that number precisely. You can get ballpark estimates

22 of it.

23   MR. ANTOINE HACAULT: And when we look

24 at this graph -- I'm trying to get a sense of when does

25 increasing amounts on this graph continue to be

2683

1 relevant. Let me preface that question by looking at

2 the red line, the green line that's marked on there,

3 and finally the Plan 14, which is the purple line.

4   How far up from the load metric that's

5 shown there is still relevant?

6   MR. ED WOJCZYNSKI: I would suggest

7 that it's relevant all the way. But the further -- Mr.

8 Chair and panel, the further you move off of the load

9 line, or the more the -- the less it'll I'll be worth,

10 but it would still be significant all the way out

11 there.

12   MR. ANTOINE HACAULT: And in presenting

13 the information to this Board, has Hydro tried to

14 quantify, if we're weighing alternatives, the relative

15 value of reliability between the three (3) plans shown

16 on this graph?

17   MR. ED WOJCZYNSKI: We have done some

18 work on that. I'm going to have to turn to my

19 colleague, Mr. Jacobson, whether we have that with us

20 here.

21   DR. DAVID JACOBSON: Well, Chapter 13

22 of the NFAT submission did have the reliability worth

23 calculations for the Preferred Plan and Keeyask/Gas. I

24 -- and in the appendix, we -- we compared the relative

25 reliability of -- of the -- the top running con --

2684

1 contenders. But in terms of the value of unserved

2 energy, we have those two (2) values in Chapter 13.

3   MR. ANTOINE HACAULT: And, sorry if I

4 don't remember everything, is that actually measured in

5 terms of dollar values for Manitoba ratepayers?

6   MR. ED WOJCZYNSKI: It would be for

7 customers who are, for all intents and purpose the same

8 as ratepayers.

9   MR. ANTOINE HACAULT: Well, you do a

10 lot of exports.

11   MR. ED WOJCZYNSKI: No, it's strictly -

12 - strictly Manitoba domestic customers we're taking

13 about.

14   MR. ANTOINE HACAULT: Okay.

15   MR. ED WOJCZYNSKI: Yeah. No, when we

16 talk about this reliability enhancement, we are only

17 talking about Manitoba domestic customers.

18   MR. ANTOINE HACAULT: Okay. And sorry,

19 could you -- and I apologize if -- if I hadn't picked

20 that up in the material -- the relative incremental

21 value of reliability as evaluated by Manitoba Hydro

22 between the three (3) plans shown on this graph?

23

24   (BRIEF PAUSE)

25

2685

1   DR. DAVID JACOBSON: Page 27, I think,

2 of Chapter 13, has the number.

3

4   (BRIEF PAUSE)

5

6   MR. ANTOINE HACAULT: I see a number

7 being put there with respect to the Preferred

8 Development Plan, but my question was more specific as

9 -- as it related to -- and -- and we have the same

10 graph on that page, or similar graph. If we go in

11 line, what is it, about 10 or 12, I think I had seen

12 it, line 8 the -- the expected and served energy cost

13 for All Gas and Keeyask/Gas alternatives would be

14 greater than for the Preferred Development Plan by 101

15 million.

16   Is that the Gas Plan that we're

17 referring to?

18   MR. ED WOJCZYNSKI: Yes.

19   MR. ANTOINE HACAULT: And the second

20 number is 105 million, and that's the Keeyask22/Gas?

21   MR. ED WOJCZYNSKI: Yes.

22

23   (BRIEF PAUSE)

24

25   MR. ANTOINE HACAULT: And help me

2686

1 understand what that means to the decision making

2 process. Do we, when we're looking at all these

3 expected values, say, Well, the Preferred Development

4 Plan, compared to gas, we have to notionally add $101

5 million for the value of this expected unserved energy

6 cost?

7   MR. ED WOJCZYNSKI: Yes. And that is

8 what is done in Chapter 13 later on. The -- Manitoba

9 Hydro valuation of its -- of benefits, as we've been

10 talking about this whole week, that -- that is

11 recalculated in there. And -- and this is one (1) of

12 the things that's added to it.

13   So you could for the sake of the

14 discussion today say that compared to all the numbers

15 where we've talked about the Preferred Plan compared to

16 the All Gas Plan, add $100 million to that to bring in

17 this factor in a -- in a dollars sense.

18   So where Ms. Flynn talked about 377

19 million, now we would bringing this one (1) other

20 factor it'd be 477 million. It does not include the

21 benefits of energy security. That's a different

22 metric.

23

24   (BRIEF PAUSE)

25

2687

1   MR. ANTOINE HACAULT: And to follow

2 that logic, if I might, and that's why I wanted to

3 ensure the Keeyask/Gas, there is another -- there's a

4 $4 million -- do we also when we look at the

5 Keeyask/Gas number we have to notionally add 105

6 million if we want to compare it to the Conawapa

7 situation, or is it just the $4 million difference?

8   MR. ED WOJCZYNSKI: The Keeyask/Gas,

9 that is without the interconnection, without Conawapa,

10 would be $105 million -- would -- would be $105 million

11 -- yeah, we're comparing things to All Gas.

12   So if you're comparing the Preferred

13 Plan to the Keeyask/Gas Plan from Ms. Flynn's analysis,

14 whatever number you come up with you should add another

15 $100 million -- $105 million benefit to the Preferred

16 Plan compared to the Keeyask/Gas Plan.

17   MR. ANTOINE HACAULT: And the one (1)

18 thing we don't have though, and we have been

19 discussing, is Keeyask with the big interconnection,

20 the 750 megawatt inter -- interconnection.

21   Do we have a number that we should be

22 attributing to the level of reliability that comes with

23 this bigger line? Which is basically Plan 5, I think.

24   MR. ED WOJCZYNSKI: We -- we don't have

25 that one in here. We have done some other analysis,

2688

1 but if you're -- you're -- that was the Keeyask/Gas

2 750. If you look at the chart, there's perhaps a --

3 well, we can use the chart in -- if you can move up the

4 page slightly. You see where in the Keeyask/Conawapa

5 purple -- no, sorry, the preferred line. Sorry.

6   The Preferred Plan, which is the purple

7 line, the top line, you see where in 2020 it jumps up

8 to 6,000 megawatts. And then it sort of flattens out

9 for a few years and then it jumps up in 2025 to nearly

10 7,000. That is the addition of Conawapa.

11   If you, instead of putting in Conawapa,

12 had Keeyask/Gas, you would not have that almost 1,000

13 mega -- let's call it an 800 megawatt jump up. You

14 would probably have a hundred or so megawatt jump up.

15 And --

16   DR. DAVID JACOBSON: Well, Keeyask

17 cancels the red curve, Ed, and on that curve -- on that

18 chart.

19   MR. ED WOJCZYNSKI: Yeah, but that's

20 got -- that's two fifty (250).

21   DR. DAVID JACOBSON: That is -- both of

22 them. The red curve is Keeyask/Gas and the green curve

23 is Keeyask/Gas small time?

24   MR. ED WOJCZYNSKI: Yeah, I'm talking -

25 - I'm talking about the -- the 750 megawatt tie-line.

                                                    2689
 1   DR. DAVID JACOBSON: Which is the

 2 Preferred Plan, yeah. I'm sorry -- sorry to interrupt.

 3   MR. ED WOJCZYNSKI: Okay. Let's back

 4 up. As -- as I understood the question, it was if you

 5 do the 750 megawatt tie-line and Keeyask/Gas instead of

 6 Keeyask/Conawapa?

 7   MR. ANTOINE HACAULT: What I was trying

 8 to isolate was the reliability factor that we get with

 9 the 750 megawatt line and the reliability factor that

10 Conawapa might add in addition to getting --

11   MR. ED WOJCZYNSKI: Yeah.

12   MR. ANTOINE HACAULT: -- the 750

13 megawatt line in. When I had --

14   MR. ED WOJCZYNSKI: And that's what I'm

15 answering.

16   MR. ANTOINE HACAULT: Okay. So

17 continue then.

18   MR. ED WOJCZYNSKI: So the purple line

19 is the 750 megawatt interconnection and Keeyask. Up

20 till about 2024 it's just those two (2).

21   MR. ANTOINE HACAULT: So when --

22   MR. ED WOJCZYNSKI: Then when it jumps

23 up in 2026 to six thousand eight hundred (6,800) or

24 something, that is the addition of Conawapa. If you

25 did not have Conawapa and you only put in the gas

2690

1 plant, for example, it would have gone up only

2 slightly. So it would be like that line went straight

3 across, set it just over, let's say 6,100 megawatts.

4 So we don't have a numerical analysis we can present

5 here, but we -- we can tell you confidently that's what

6 would happen.

7   So in terms of the reliability benefit

8 as measured by $100 million, I ballpark it that instead

9 of $100 million liability benefit for this, you'd get a

10 $50 million -- $50 million reliability benefit.

11   MR. ANTOINE HACAULT: As a result of

12 the larger 750 megawatt line?

13   MR. ED WOJCZYNSKI: But without

14 Conawapa, yes.

15   MR. ANTOINE HACAULT: Without Conawapa.

16   MR. ED WOJCZYNSKI: Yeah. You get

17 about half -- simplistically, about half the benefit.

18   MR. ANTOINE HACAULT: Okay. So just to

19 make sure I've understood your point, sir, if we look

20 at the starting point of the red line and the starting

21 point of the preferred line. Both include Keeyask at

22 that starting point being constructed. And the first

23 jump in the purple line is related to the 750 megawatt

24 big line?

25   MR. ED WOJCZYNSKI: Yes.

2691

 1   MR. ANTOINE HACAULT: Okay. And that

 2 represents the jump in reliability in the system as a

 3 result of that larger line. And that is then compared

 4 to the jump in reliability that we would have had if we

 5 had been able to go to the smaller 250 line, which is

 6 the green jump that goes only to fifty-five hundred

 7 (5,500) instead of the six thousand (6,000)?

 8   MR. ED WOJCZYNSKI: Yes.

 9   MR. ANTOINE HACAULT: Okay.

10   MR. ED WOJCZYNSKI: That

11 Keeyask/Gas/250 would be that light green line, and

12 that's what you'd be getting there, yes.

13   MR. ANTOINE HACAULT: The --

14   MR. ED WOJCZYNSKI: And that's worth 56

15 million, apparently. It's in the text.

16

17   (BRIEF PAUSE)

18

19   MR. ANTOINE HACAULT: I guess I'm

20 thinking to myself is there some reason why we didn't

21 include this in the Chapter 9 analysis, because I see

22 you're actually putting real numbers to this, and it's

23 not external numbers; it's direct benefits to the

24 Manitoba consumers on reliability and -- and lessening

25 the impact on them?

2692

1   MR. ED WOJCZYNSKI: The -- the question

2   was: Why did we not include this in Chapter 9 when we

3   did the cost to Manitoba Hydro? The reason is that the

4   intent of Chapter 9 was the cost -- the cash cost --

5   the cashflow cost to Manitoba Hydro: cash into Manitoba

6   Hydro, cash out of Manitoba Hydro.

7   These are costs that the customer

8   experiences and we -- and Manitoba Hydro doesn't

9   experience. So those are what we'd call the societal

10   costs, and that's what Chapter 13 does. It says we

11   start with the cashflow analysis to Manitoba Hydro, and

12   then add in or subtract the impacts to Manitobans from

13   other things, reliability being one (1) that we just

14   talked about.

15   So Chapter 13 is where we take the

16   Manitoba Hydro cash analysis, if I can call it that,

17   and then say: What other things happened in Manitoba?

18   And these are things that happened to the customer.

19   So it's added in in Chapter 13 to give a

20   total provincial -- which is the truly provincial

21   social-economic view, because it brings in all the

22   economic and social parameters for all Manitobans. So

23   that is the -- Chapter 13 to give us the truest

24   socioeconomic analysis of the plans.

25   MR. ANTOINE HACAULT: Would it be fair

2693

1 to say, sir, that we can't necessarily assume that the

2 impact of an outage is the same on industrial customers

3 as residents? For example, I'm all -- all heat at

4 home. I run a little generator, and that's maybe the

5 only immediate impact on me when your -- your hydro

6 goes out. I would venture to think that there might be

7 different implications on an industry when it power --

8 its power goes out.

9   When you come to these numbers, have

10 you, in your view, adequately considered the impact on

11 industrials and -- and what the cost to them might be

12 of power outages?

13   MR. ED WOJCZYNSKI: You raise a good

14 point. Every industry would have its own unique cost.

15 If you're talking about something -- and I'll give you

16 a very extreme example. If you're talking about a

17 paper mill, which you don't have here anymore, but a

18 paper mill; if you have one (1) second outage, that can

19 cost them a million dollars, or maybe not a million,

20 but a huge amount of money, 'cause they lose a whole --

21 they're -- it interrupts their whole flow.

22   On the other hand, if you have something

23 which is just melting some material and it's a short-

24 term outage, it have may no effect. If it goes twelve

25 (12) hours or twenty-four (24) hours, the material can

2694

1 freeze in the melting vessel, and it is hugely

2 expensive to empty that. So for them, a two (2) hour

3 outage may not be significant, but an eight (8) hour

4 outage may skyrocket. So it's very specific to the

5 industry and to the characteristics.

6   The values that we're talking about here

7 that were used were average values for sort of Canadian

8 average industry, Canadian average residential,

9 Canadian average commercial, and -- and then

10 approximated by thinking about these -- the sectors in

11 the economy. But we could not, without doing a whole

12 bunch of additional research, come up with something

13 specific, say just to Manitoba industry. We'd have to

14 do work that is fairly extensive.

15   It can be done, but it's -- it's a major

16 piece of work.

17   MR. ANTOINE HACAULT: I think you

18 continue to educate me. I think you said something

19 like, Reliability is different than energy security.

20   Did I understand that right?

21   MR. ED WOJCZYNSKI: In -- in the

22 utility industry it's -- it has some specific meanings.

23 In the -- in the common parlance of my friends, who I

24 hope to see tonight sometime, they would take

25 reliability to mean it all lumped together, but in the

2695

1 context of what we're talking about they are very two

2 (2) different things.

3   Reliability is ability to meet the peak

4 load. And -- whereas the energy security is related to

5 having enough energy during droughts or low energy

6 periods. And the --the impact -- the causes are

7 different, and the impacts are different, and so we

8 measure them differently.

9   This is only measuring that ability to

10 meet that high peak load.

11   MR. ANTOINE HACAULT: And have you

12 measured, and where did you put the value of energy

13 security in this analysis?

14   MR. ED WOJCZYNSKI: We have not been

15 able to obtain a dollar value on that. We have

16 provided it in -- in our interrogatories. And in

17 Exhibit 95, slide 141, we have a evaluation of

18 thousands of -- of gigawatt hours. We have done a

19 comparison. We have a more detailed comparison in one

20 (1) of the interrogatories that has the other -- some

21 other plans, not just these two (2) plans. But we do

22 not have a dollar value of the importance of this, and

23 there isn't readily available information that I can --

24 that I'm aware of that we could us to calculate this.

25   I would be guessing to try and come up

1 with a value. I -- I -- and my guess would be in the

2 same order of magnitude as the other capacity value

3 information. But I really have very little -- that --

4 that's -- that would be just a guess there. I -- I

5 don't really have any substantial -- to put a dollar

6 value on. And -- yeah.

7   MR. ANTOINE HACAULT: I will try and

8 get you out to see your friends, don't worry. I have a

9 hockey game to go to tonight, too, and some people are

10 expecting to see me.

11   I think -- I'm not too sure if we'll

12 have a chance to look at some of the answers we got.

13 In Manitoba Hydro Exhibit 103, there was some

14 clarification with respect to the load sensitivity.

15 Mr. Cormie referred to that -- I don't know if it was

16 this morning or yesterday -- in saying Manitoba Hydro

17 was attempting to achieve, with respect to load, a ten

18 (10) year metric of plus or minus 10 percent, correct?

19   MR. DAVID CORMIE: No, I -- I don't

20 think I meant to say it that way. I think our -- our

21 historic accuracy in being able to predict the rate of

22 load growth is plus or minus 10 percent on ten (10)

23 years.

24   MR. ANTOINE HACAULT: So your actual

25 experience is plus or minus 10 percent. And what --

 1   MR. DAVID CORMIE: Yes, because it's --

 2 you can't -- you can't accurately predict everything

 3 that will happen in the future. It's just not

 4 possible.

 5   MR. ANTOINE HACAULT: So we had started

 6 with a metric of P10 and P90, and if we go ten (10)

 7 years out to the line 23-24, we've got gross firm base

 8 forecast of 29,000 megawatts, more or less, correct?

 9 And this new graph, if we look at the top, gives us the

10 P5 and P95 metric as opposed to the P10 and P90 metric,

11 as I understand this new information from Manitoba

12 Hydro.

13   Is that correct?

14

15   (BRIEF PAUSE)

16

17   MR. DAVID CORMIE: I believe that's

18 what it says, yes.

19   MR. ANTOINE HACAULT: So I'm trying to

20 see and understand when you're giving us metrics in

21 your analysis that would go as far as 5 percent and 95

22 percent, whether we hit your experience over twenty

23 (20) years of being able to forecast within 10 percent

24 what your load's going to be.

25   As of the ten (10) years with the nine

2698

1 (9) -- the 5 percent and the 95 percent probability,

2 have we yet reached what Manitoba Hydro experiences as

3 a 10 -- a 10 percent accuracy?

4   I tell you, according to my general look

5 at this, 10 percent would be in the order of close to

6 3,000 gigawatts. And it doesn't appear between the

7 close -- the 5 percent probability. If we added about

8 3,000 gigawatts, we aren't close to a 10 percent metric

9 yet -- or a 10 percent accuracy using a further

10 bandwidth.

11   MR. DAVID CORMIE: I think, Mr.

12 Hacault, you're measuring the uncertainty around the

13 total firm energy demand rather than the uncertainty

14 associated with the load growth percentage. I think

15 our forecast accuracy is -- we're trying to predict

16 what the load growth is in percentage. Let's say it's

17 2 percent, and that's going to be plus or minus 10

18 percent ten (10) years out.

19   So instead of -- so 2 percent, that

20 means it could be as low as 1.8 percent or as high as

21 2.2 percent. Is that not how that load forecast

22 accuracy is measured? I'm -- as -- rather than plus or

23 minus 10 percent on the total Manitoba load, it's only

24 related to the load growth.

25   MR. ANTOINE HACAULT: Okay. So if --

2699

1 I'd like to -- to bring it back. We had load

2 forecasts, and we were looking at that graph, and we

3 saw that, where there was lines, that there was a

4 number of years where we were at or varying based on

5 our actual forecasts.

6   So in -- at this time, for 2023/2024,

7 we're forecasting a load of approximately 29,000

8 gigawatts. Let's start with that.

9   Am I right there?

10   MR. DAVID CORMIE: Which year are you

11 referring to again?

12   MR. ANTOINE HACAULT: 2023 and 2024.

13   MR. DAVID CORMIE: Yes. I see the --

14 the base forecast is twenty-nine thousand four eighteen

15 (29,418). Twenty-nine thousand four eighteen (29,418).

16   MR. ANTOINE HACAULT: And I appreciate

17 you weren't there when I had taken the previous panel

18 through this. There was a graph showing numbers and

19 forecasts going ten (10) years ago.

20   If we're going to test the robustness of

21 the different plans based on the actual experience of

22 Manitoba Hydro, history has shown us that ten (10)

23 years out, Manitoba Hydro is happy if it reaches a 10

24 percent accuracy metric, correct?

25   MR. DAVID CORMIE: I don't -- I -- I --

2700

1 I'm not sure that we are happy or sad. All we're

2 saying is that, doing the best possible job, this is

3 the range within which the forecasts end up being. And

4 it's the nature of the uncertainty associated with load

5 growth -- not that we're trying to target any

6 particular accuracy.

7   I think our -- if we had a target, we

8 would want to be perfect, you know, but the nature of

9 predicting the energy demand, it's -- it's an uncertain

10 science and can't be done.

11   And -- and our history is that, for --

12 for being able to predict the Manitoba load, the

13 history is what it is, and it's -- there's a five (5)

14 year accuracy and a ten (10) year accuracy metric.

15   MR. ANTOINE HACAULT: And --

16   MR. DAVID CORMIE: From that, you can

17 imply what it might be in the future.

18   MR. ANTOINE HACAULT: Okay. And for

19 the information that's been presented to the Board, we

20 wanted to see how wide that probability band had to be

21 before we reached the 10 percent that has been achieved

22 as a matter of practice for Manitoba Hydro.

23   So we haven't reached it at the 5

24 percent to 95 percent, and if we turn to the next page,

25 which is page 2 of 2, if we go to the 2.5 percent and

2701

1 97 percent probability points, we still haven't reached

2 something that matches Manitoba Hydro's experience as

3 of 2023/2024, which is the ten (10) year metric. We're

4 not within that 10 percent accuracy that's been

5 experienced by Manitoba Hydro in its forecasting,

6 correct?

7   MR. DAVID CORMIE: Mr. Hacault, I -- I

8 think what I might do is, once the transcripts are

9 available, take your questions under advisement and --

10 and speak to the load forecasting people and -- and be

11 -- and come back with an answer to your -- to your

12 question. I -- I don't think I can speak to this

13 knowledge any --

14   MR. ANTOINE HACAULT: Thank you. Yeah,

15 mathematically, when I look at the numbers, and you can

16 perhaps check this, the only time where we're -- if we

17 look at the probability points, we have to go to the

18 table that says .1 percent and 99.9 percent before we

19 get to a range that meets or exceeds Manitoba Hydro's

20 experience of 10 percent accuracy.

21   Could you double check that when you

22 come back, sir?

23   MR. DAVID CORMIE: Yes, we'll -- we'll

24 look into that, and -- and we'll provide a -- an

25 undertaking to describe why there is that confusion.

2702

1   MR. IAN PAGE: Mr. Hacault, I -- I was

2 here last week, so I can just maybe speak to this

3 briefly because of the context it was presented in. If

4 you look at -- if you layer on top of this economic

5 cycles, you'll find -- if you look at that graph that

6 was presented on the five (5) and ten (10) forecast

7 accuracy, if you look -- and remember, there was a -- a

8 recession in '90, and one (1) in 2008.

9   So if you -- if you have that in mind,

10 if you look at all the forecasts done before a

11 recession tend to be too high, all the forecasts done

12 right after a recession tend to be too low. That's a -

13 - a very nice repeating cycle that we can see through

14 there, and the fact that we're just after a recession

15 now, you can think -- take that and -- and -- as you

16 will.

17   MR. DAVID CORMIE: Yes, we do.

18

19   (BRIEF PAUSE)

20

21   MR. DAVID CORMIE: Manitoba Hydro will

22 -- will attempt to explain why Manitoba Hydro's

23 historical accuracy doesn't align with the

24 probabilistic analysis presented on pages -- in Exhibit

25 103.

2703

1 --- UNDERTAKING NO. 44:   Manitoba Hydro to explain

2   why its historical accuracy

3   doesn't align with the

4   probabilistic analysis

5   presented in Exhibit 103

6

7 CONTINUED BY MR. ANTOINE HACAULT:

8   MR. ANTOINE HACAULT: I'm going to

9 suggest that the load forecast probabilities and

10 getting those right is important in the exercise that

11 we're doing in this hearing, and is that something

12 you'd be prepared to agree to, Mr. Wojczynski?

13   MR. ED WOJCZYNSKI: Yes, I'd be

14 prepared to agree to that, and I'd also be prepared to

15 agree with, I think, where you -- what you were

16 suggesting indirectly earlier, is that there is a

17 significant probability that our load can be

18 significantly higher or significantly lower than we're

19 forecasting, and that there are many parameters that --

20 that are involved with that, including the business

21 cycle, and of course, short-term things like weather,

22 and -- and that we need to plan for both possibilities.

23   MR. ANTOINE HACAULT: And if the P10

24 and P90 is not matching with Manitoba Hydro experience

25 over the last previous twenty (20) years, how are we to

2704

1 approach picking plans to deal with that issue?

2   MR. ED WOJCZYNSKI: I think we have two

3 (2) questions that get melded into one (1) there. One

4 (1) is the issue that Mr. Cormie took an undertaking

5 on. The other is, given that there is uncertainty in

6 the load growth and it -- it can be exemplified by the

7 2 1/2 percent and 97 1/2 percent or by -- by some other

8 metric, we -- we have to through quantitative means

9 look at what happens.

10   We also have to protect against the

11 possibility of higher load growth, so that if we do

12 have the higher load growth, we're in a position to

13 meet it, but also make sure that if the lower load

14 growth happens, that we -- we don't bankrupt ourselves.

15   So -- and that is fundamental to

16 resource planning is looking at those possibilities,

17 and that's what we've been trying to do in our

18 submission is to account for both of those

19 possibilities.

20   And generally, our -- our position is

21 that -- that having a preferred -- having a plan with a

22 750 megawatt interconnection gives us more flexibility

23 to do with lower or higher load growth and advancing

24 generation, and -- and selling at least a good portion

25 of that into the export market to help pay for it helps

2705

1 us with our reliability in case we have a higher load

2 growth, but it also gives us somebody who pays for the

3 generation if it turns out our load growth didn't need

4 it.

5   So we think there's -- from that point

6 of view, we think the Preferred Plan gives us a -- a

7 better overall plan to deal with those kinds of

8 uncertainties, just like we have for the last twenty-

9 five (25) years.

10   MR. DAVID CORMIE: Yeah. In that -- in

11 that regard, although we have -- it appears that we've

12 linked the new line with Minnesota Power to the power

13 sale, they're actually separate. Minnesota Power and

14 Manitoba Hydro have agreed that we will target a 2020

15 in-service date, even if Keeyask is delayed.

16   Because we have that risk of -- of delay

17 and the risk of load growth, the -- the 750 megawatt of

18 import capability gives us tremendous flexibility in a

19 situation where load growth all of a sudden becomes

20 higher than we had expected.

21   And -- and by separating them, we have a

22 hedge against high load growth or unexpected

23 circumstances, and -- and then we're proceeding on that

24 -- on that basis.

25   MR. ANTOINE HACAULT: Thank you very

1 much for being very helpful. I had one (1) or two (2)

2 other areas which I'm not going to enter into given the

3 time, and hopefully these areas that I was able to

4 cover presented useful information for the Board.

5 And I thank the Manitoba Hydro panel for

6 doing their best efforts to answer my questions, as

7 ineloquent as they may be, and I wish everybody a good

8 and happy weekend.

9 We still have the issue that I raised at

10 the very outset of my cross-examination, and there's

11 undertakings that we may have some questions on. I'm

12 not too sure whether we'll have to make a formal motion

13 to try and fit that somewhere in our schedule, but I

14 guess we'll take that under advisement and -- and take

15 some direction from the Board in due -- due course on

16 that.

17 MR. BYRON WILLIAMS: Mr. Chair, it's --

18 way in the back, Mr. Williams here.

19 THE CHAIRPERSON: Mr. Williams, please.

20 MR. BYRON WILLIAMS: Thank you. I was

21 just -- and I don't think I've missed it today, but we

22 were thinking that we might get additional evaluation

23 from Manitoba Hydro with regard to Plan 2 and an

24 evaluation, taking into account the new capital costs

25 at -- at DSM level, or the DSM reference level, and I

2707

1 was just hope -- wondering if we could get an update on

2 that.

3   MS. JOANNE FLYNN: We are working on

4 that, Mr. Williams. We'll provide it as soon as we

5 can.

6   MR. BYRON WILLIAMS: I -- I think that

7 was an earlier undertaking, so I'm not going to have a

8 -- a undertaking to -- to fulfill the undertaking.

9 That's fine.

10   MS. JOANNE FLYNN: It will be

11 considered part of Exhibit 104.

12   MR. SVEN HOMBACH: Ms. Boyd, any last

13 undertakings to speak to before we break for the

14 weekend?

15   MS. MARLA BOYD: No, thank you.

16   THE CHAIRPERSON: There being no

17 business, I would like to thank the panel for the work

18 up to now. Who knows what the future will bring, but -

19 - so thank you very much for your contribution to the

20 work of the panel this week, and I also want to thank

21 everyone else who contributed to the work.

22   It's been a long week, but a fruitful

23 one, and I would wish you all a good weekend, and we'll

24 see some of the Manitoba Hydro people on Monday morning

25 at nine o'clock sharp, as long -- as well as the

2708

1 Intervenors and advisors. So have a good weekend,

2 everyone. Thank you very much.

3

4   (PANEL RETIRES)

5

6 --- Upon adjourning at 4:26 p.m.

7

8

9

10 Certified correct,

11

12

13 _____

14 Cheryl Lavigne, Ms.

15

16

17

18

19

20

21

22

23

24

25

110 2446:10
2656:1,17
2657:9,12
2659:11
2661:21
2675:7

1-18B
2662:12
2672:4

12 2463:23
2685:11
2693:25

12:14 2576:8

123 2613:17

124 2618:2,4
2619:21
2620:23

125 2612:16

126 2616:2
2618:11

127 2525:10

13 2463:17
2464:10
2488:2
2552:11
2683:21
2684:2
2685:2
2686:8
2692:10,15
,19,23

130 2614:2
2617:22

139 2679:1,2
2681:4

14 2440:24
2450:2,3
2463:18
2464:10
2490:23
2549:18
2567:12,13
,15
2569:10
2582:22
2586:5,14,
15 2593:9
2604:2

2613:13
2614:6,16
2618:12
2619:21
2625:2,6,1
1,15
2626:21,22
2627:3
2683:3

140 2522:22

141 2695:17

1410 2522:22

145
2584:10,11
2586:4
2590:8
2591:19

147 2582:23

15 2449:20
2458:4
2538:18
2540:5,7
2591:20
2592:25
2593:25
2639:18
2641:2
2644:24

153 2469:23

16 2625:11
2664:13,17
,19
2666:19
2672:18
2673:7

16.5 2654:14

17 2477:4,10
2496:7
2593:23
2664:18
2665:24
2673:4,15

173.6
2653:23

176 2450:5

177
2492:15,24

179 2494:23

18 2458:3
2466:7,17

185 2496:5

19 2662:24
2672:9

1912
2630:16,17

192 2492:16
2638:19
2639:3

1920
2628:19,25

1983 2560:21

1987 2623:5

1988 2633:1

1992 2623:5
2633:1

─────────
2
─────────

2 2448:20
2449:1,8,1
5,18,21
2450:8,12
2451:8
2452:8,11
2464:4
2465:9
2468:22
2471:4,8,9
2472:10
2475:1
2483:1
2495:24
2516:12
2519:8,18
2520:5,12
2521:1
2522:15
2531:9,22
2540:19
2544:1
2547:16,23
2550:23
2554:23
2565:3,18
2577:1,19
2578:10
2582:3

2584:17
2592:24
2598:1
2599:9
2600:24
2604:1
2610:24
2611:16
2614:14,23
2615:7,12
2618:24
2619:13
2623:23,24
2624:10,11
,22
2627:15
2631:10
2635:8
2636:2
2658:15
2663:21
2668:11
2670:13,14
,18
2674:14,23
2678:16
2684:2
2689:20
2694:2
2695:2,21
2698:17,19
2700:25
2704:3,7
2706:1,23

2,855 2525:8

2.2 2698:21

2.4 2680:22

2.5 2700:25

2.8 2523:19

2.84 2544:2

2.857 2530:7
2532:13

2/3s 2650:9

2:30 2609:3

2:40 2642:3

2:57 2642:4

20 2469:19
2470:10

2477:3,4
2522:20
2554:17
2573:25
2574:9
2579:25
2607:3
2611:20
2639:18
2640:1
2697:23
2703:25

200 2599:22
2625:13

2000s 2599:4

2006 2630:17

2007 2630:17

2008 2702:8

2012 2595:4
2598:6
2603:9
2604:3
2605:11,18
2607:3,4,1
0,23
2608:17,18
2618:25
2619:1,9
2653:24
2654:9,14,
17,22
2656:2,3
2662:17
2663:13,16
2664:11
2671:21
2672:11

2013 2448:13
2608:20
2609:11
2614:4
2618:7,25
2619:2,9
2662:24
2663:2
2672:9

2013/'14
2630:11
2631:24

2014 2440:24

2511:1
2529:6
2534:4
2560:6
2604:2,10
2605:4
2658:24
2663:14,17
2670:2
2671:10,15,21
2672:25

2015 2538:23

2018 2483:23

2019 2584:16
2586:10

2019/'20
2534:7

2020 2661:3
2670:4
2671:21
2688:7
2705:14

2021 2529:7

2023 2699:12

2023/2024
2699:6
2701:3

2024 2689:20
2699:12

2025 2558:15
2688:9

2026 2578:11
2580:19
2587:18
2588:10
2589:20,22
2590:6
2689:23

2029 2581:6
2590:14,15,21

2031 2591:1
2592:13

2036 2563:21

2048 2511:2

205 2656:20

2659:16

2090 2532:24
2536:16,20

21 2451:16
2452:25
2491:12

22 2470:11
2675:21

230 2667:24
2669:23

230-500
2654:7
2669:16,18

23-24 2697:7

235 2653:22
2657:10,22
2659:9

24 2458:4
2493:2
2494:23
2496:7
2693:25

2440 2440:25

2444 2442:3

2445 2442:4

2446 2444:3

2451 2444:5

2453 2442:19

2456 2442:21

2457 2444:6

25 2482:20
2705:9

250 2688:20
2691:5

2503 2442:23

2514 2442:25

26 2474:15
2579:24
2590:3

2602 2445:6

2642 2443:4

267 2661:24
2662:12

2663:12,16
2664:10
2665:18

267.6
2654:17
2665:1

2678 2443:6

268 2521:19
2522:1
2656:3

2689 2522:25

27 2474:15
2588:11
2590:4
2685:1

2703 2445:10

2708 2440:25
2443:8

277
2663:9,15
2670:25
2671:16,17
2672:3

28 2590:4

281 2654:20
2661:10

281.4
2654:18

2841 2522:21

29 2603:2

29,000
2697:8
2699:7

29,418
2699:15

292 2522:24

─────────
3
─────────

3 2448:21
2449:8,15,16,19,22,24 2450:6,9
2464:12
2519:16
2520:5
2521:1

2522:15
2542:14
2543:17
2548:18
2575:6,12
2577:12,24
2578:6,15,24 2593:2
2598:1
2610:24
2611:9,12,16,17,18
2623:25
2635:9,24
2636:13
2654:8
2663:21,23
2664:5
2670:1
2683:15
2684:22

3,000 2564:8
2698:6,8

3.05 2530:12

3.35
2530:17,20,25

3.50 2483:25

3.6 2550:3

3.95
2491:12,15
2499:20,24

3/4 2485:9

3/4s 2568:17
2602:25

30 2503:23
2529:16
2535:7
2546:18
2554:17
2561:22
2609:4
2611:24
2678:5

30,000
2496:14

300 2619:24
2658:25

308
2580:4,11,17 2583:6
2584:17,21
2590:13
2591:24

31 2444:3
2446:9,16

31st
2608:18,20

320 2604:5

33 2582:9,23

330 2440:22

331 2662:21
2672:4

343 2449:22

35 2454:2,12
2455:4
2610:14

350 2660:22
2661:2,7,18
2662:4,25
2672:6,8

350.3
2666:11

374
2614:1,7,12
2617:18,23
2618:17
2619:20

375 2449:5

377 2686:18

393 2450:6

─────────
4
─────────

4 2442:6
2446:23
2466:9,17
2487:2,5
2519:6,8,10,14,15,25
2520:5,18
2522:14,15
2523:13,21
2525:5

2528:7
2543:14,15
2557:13
2591:24
2592:2,5
2624:18
2635:24
2677:11,15
,17
2679:21

4,326 2541:3

4.07 2604:5

4.36 2604:14

4.39
2603:18,22
2604:4

4.87 2606:14
2607:5

4.95 2604:11
2606:24

4:26 2708:6

4:30 2678:8

40 2510:6
2529:16
2546:18
2564:11

400 2440:22
2619:24

426 2448:25
2449:2

43 2445:3
2510:6
2602:5

44 2445:7
2454:20
2703:1

45 2614:17

47
2621:14,15

477 2686:20

48 2621:6,15
2628:7

49 2645:21

───────────
5

5 2450:2
2463:16
2490:23
2515:2
2525:22
2557:14
2558:14
2584:19,20
,22 2585:3
2586:18,19
2587:6
2588:4,6
2593:1,3
2615:5
2623:6,8,1
9 2633:4
2637:18
2664:4
2672:25
2687:23
2697:21
2698:1,7
2700:13,23
2702:6

5,000
2542:12

5,500 2691:7

5.05 2529:24
2612:23
2619:11

5.265
2549:25

5.4 2619:11

5.71 2607:15
2608:4

50 2543:2
2546:18
2610:3
2679:17

500
2620:21,24
2636:20
2653:23
2657:8,10,
18
2658:9,19
2659:15
2660:20
2661:8,12,
19 2662:5

2664:23
2665:6
2666:2,25
2667:5
2669:13,23
2671:7

56 2691:14

58 2636:3
2638:17

58-3
2656:1,17
2675:7

59 2604:15
2636:3,8

590 2604:15

───────────
6

6 2444:4
2450:25
2451:3
2493:3
2513:24
2519:8
2520:8,17
2523:10,11
,25
2525:10
2537:4
2547:19,20
2548:5
2549:8,19
2569:23
2570:4
2592:7,9
2624:21

6,000 2688:8
2691:7

6,100 2690:3

6,800
2689:23

6.2 2594:19
2595:9,17,
19 2599:21
2600:4
2609:24
2610:5,19

6.33 2607:11

6.35 2607:11

6.5
2532:5,23
2595:21

6.7 2595:20

60
2573:15,24
2645:3

62 2552:1,2

63 2559:21

67 2454:11

68 2521:2
2522:17

6th 2599:16

───────────
7

7 2456:19
2458:1
2477:4,10
2513:24
2519:6,11,
14,25
2520:8
2523:11,13
,21,25
2525:22,23
2537:4,20
2543:14,15
2549:19
2570:1
2682:15

7,000
2688:10

7-2 2456:25

723 2449:3,4

73.4 2654:8

734 2522:17

750 2578:8
2588:5
2647:14,15
2670:7
2687:20
2688:2,25
2689:5,9,1
2,19
2690:12,23
2704:22
2705:17

77.5 2654:9

78 2453:17

79 2655:14
2658:7,10

798 2541:2,5
2613:14,20
2616:8,13
2617:25
2618:13

───────────
8

8 2456:20
2458:1
2461:9
2466:17
2528:20
2537:20
2552:23
2554:7
2624:22
2685:12
2694:3

80 2531:11
2568:18
2653:18
2655:1,21,
22 2657:9
2658:8
2660:16,23
,25
2661:9,12,
23 2662:6
2665:15
2669:15

800 2550:20
2688:13

83 2561:3

85
2492:14,25
2503:24

88 2592:7
2670:25

───────────
9

9 2493:2
2691:21
2692:2,4
2698:1

9.3 2463:7

2464:1
2515:3
2551:2,14

9:03 2446:1

90 2479:18
2498:7
2702:8

90th 2496:20

95 2580:1
2584:10,11
2612:16,17
2615:6
2653:20
2679:2,3
2695:17
2697:21
2698:1
2700:24

97 2701:1
2704:7

98 2539:10
2664:12
2672:18

99 2630:16

99.9 2701:18

9A 2469:22

———————

A

a.m 2446:1
2513:11,12

AAEC 2611:7

ability
2557:16
2566:19
2620:10
2638:14,19
2695:3,9

able 2481:2
2483:18
2491:18
2563:3,14
2566:14
2569:25
2570:6
2587:3
2600:5
2637:24
2648:4

2650:17
2651:7
2667:2
2691:5
2695:15
2696:21
2697:23
2700:12
2706:3

Aboriginal
2487:12
2676:20,23
2677:4

above-border
2655:19

absolute
2562:24

absolutely
2470:1
2471:16
2590:5

abstract
2465:16

accept
2676:9

acceptable
2453:11

access
2650:21

accommodate
2512:25

accomplished
2453:8

according
2505:20
2564:7
2570:7
2611:24
2698:4

account
2478:3,4
2481:9
2496:2
2529:18
2559:11,17
2635:12
2674:10
2704:18

2706:24

accounted
2517:14

accounts
2479:24
2487:8
2510:24
2635:5

accuracy
2445:8
2554:16
2696:21
2698:3,9,15,22
2699:24
2700:6,14
2701:4,20
2702:7,23
2703:2

accurate
2544:8
2553:10
2655:22

accurately
2697:2

achieve
2563:3,4,9
2570:9
2618:1
2634:9
2680:24
2681:2,5
2696:17

achieved
2700:21

acknowledge
2446:5
2513:16
2549:7

acronym
2679:8

across
2448:16
2456:6
2469:2
2506:15
2529:1
2544:1
2680:24

2690:3

action
2508:13

activities
2648:19

activity
2462:25

actual
2457:21
2489:6
2535:11
2576:20
2629:16
2631:11
2632:18
2682:17
2696:24
2699:5,21

actually
2453:4
2458:24
2462:23
2465:1
2467:24
2478:8
2482:18
2487:23
2488:21
2490:11
2498:3,16
2500:5
2506:22
2523:2,13
2524:1
2540:3,7
2545:8
2560:4,21,24
2568:2,22
2591:7,23
2594:8
2606:23
2615:13,21
2625:13
2627:4,7
2629:24,25
2631:9,20
2638:2
2641:15
2644:18
2658:6
2669:25

2670:13
2672:4
2673:5,8
2684:4
2691:22
2705:13

ADAM 2442:7
2446:24
2457:9,12
2458:8
2460:6
2461:25
2466:15,22
2467:7,11
2470:4
2471:6
2472:21
2473:19
2474:21
2476:2
2477:13,18
2478:20
2479:2,19
2490:8
2496:16
2497:6
2511:19
2512:9
2514:21
2534:25
2552:9,14
2553:1,22
2554:21
2555:14,19
2556:11
2560:9

Adams
2647:11

add 2489:16
2490:9
2491:22
2511:6
2533:22
2566:22
2567:9
2595:1
2598:3
2615:4
2635:1
2639:19
2648:16
2667:23

2668:9
2670:3
2686:4,16
2687:5,14
2689:10
2692:12

added 2600:1
2661:23
2686:12
2692:19
2698:7

adder
2566:18

adding
2606:5
2669:23
2670:10

addition
2651:7
2662:22
2667:3
2668:7,24
2672:6
2688:10
2689:10,24

additional
2479:23
2583:2,11
2599:1
2644:13
2654:20
2662:14
2668:9
2670:5,7
2673:17
2694:12
2706:22

additions
2517:19
2668:24

address
2576:14,23
2589:9,10
2593:2
2642:8,9

addressed
2491:6
2676:8

addresses

2506:23

adequacy
2680:13

adequately
2693:10

adjourn
2641:25

adjourning
2708:6

adjusted
2487:24
2619:1

adjustment
2490:4
2615:9

adjustments
2487:10

**administrati
on**
2509:18,20

**administrati
ve** 2450:21
2641:24
2642:8

**administrati
vely**
2452:6
2678:6

adopted
2458:7

advance
2638:3

advancing
2704:23

advantage
2562:7
2568:25

advantageous
2590:1

adverse
2565:6,7
2578:17,20
2579:8,11
2591:22
2600:1

advice

2482:12

advised
2452:7
2678:11

advisement
2701:9
2706:14

advisors
2708:1

advocate
2650:25

affect
2651:4

afternoon
2452:9
2576:12
2577:4
2578:3

afterwards
2539:25

against
2563:3
2704:10
2705:22

Agency
2676:18

aggregation
2524:3

ago 2451:12
2497:23
2552:23
2558:14
2637:10
2667:21
2671:17
2699:19

agreed
2576:25
2604:6,11
2638:25
2705:14

agreement
2514:19
2543:6
2580:20
2581:22
2582:5
2590:22

2645:9
2647:21
2648:5
2664:2

ahead
2534:24

align 2445:8
2702:23
2703:3

all-in
2572:6

allocate
2454:23

allow
2452:16

allowable
2505:12

allowed
2675:22

allows
2580:15
2636:12
2645:8
2650:19

alone 2448:3

already
2455:12
2575:8,10,
12,25
2576:1
2588:8

altering
2617:4,11

alternate
2578:19
2579:10
2581:3

alternative
2458:13,16
,19
2461:18
2468:19
2469:1,2
2470:18
2471:22
2475:3
2476:7,15,
16 2549:6

alternatives
2440:8
2495:9
2509:24
2675:25
2683:14
2685:13

am
2459:10,20
,21 2477:9
2505:8
2508:20
2509:16
2529:10
2544:6
2554:1
2555:19
2557:22
2563:18
2587:9
2596:11,17
2611:20
2617:13
2623:14
2676:22
2699:9

America
2568:13

American
2679:10

**American-
wide**
2680:6

amongst
2517:13

amount
2487:11,22
2498:6,13,
15 2514:5
2539:5
2544:5
2546:17
2554:7
2564:7,18
2604:25
2605:1
2634:21,22
2639:15
2648:15
2661:8
2662:18,20

2663:9	2563:6	2510:9	5,18	2569:5,21
2664:25	2569:17	2533:3	2517:20,24	2571:16
2672:19	2570:14	2547:10	2519:1,24	2572:10
2693:20	2573:7	2556:12	2520:3,11,	2576:17,18
amounting	2575:20,21	2561:24	16,24	2579:1,19,
2654:13	2592:18	2574:13,14	2521:6,10,	20 2580:13
	2593:20	2575:25	24 2522:5	2581:19
amounts	2598:7	2596:1	2523:9,24	2582:8,12,
2682:25	2599:12	2636:8	2524:13	19
amplified	2601:8	2650:3	2525:17	2584:8,15
2598:15	2602:7	2654:1	2526:1,10,	2585:2
	2603:14,25	2658:1	14,19	2586:2,9
amplifying	2605:11,22	2675:3,11	2527:8,16	2587:5,11
2549:5	2607:14	2676:1	2528:1,5,1	2591:15,16
	2610:10	2679:16	0,15,25	2592:5,9,1
analogy	2611:4,20	2681:17	2529:5,9,1	5,23
2644:9,17	2618:7	2682:7	5,22	2593:17,22
	2620:9	2701:11	2530:4,10,	2594:7,14,
analyses	2632:22,23	2706:6	19,22	17
2484:21	2635:18		2531:3,7,1	2595:8,14,
	2662:17,18	**answered**	3,15,19	22,25
analysis	,23 2663:1	2451:9	2532:3,7,1	2596:6,13,
2445:4,9	2672:9,10	2452:2	1,15	19 2600:11
2447:13	2687:13,25	2453:18	2534:21	2601:14,18
2448:6,8	2690:4		2536:14,18	2602:11,12
2449:14	2691:21	**answering**	2537:1	,17,22
2455:14	2692:11,16	2681:8	2543:9,10,	2603:8,15,
2458:11	,24	2689:15	22 2544:21	24
2470:13,15	2695:13		2545:3,6,1	2604:8,13
,17,24	2697:21	**answers**	3	2605:3,9,1
2471:5	2702:24	2473:9	2546:2,7,1	5
2472:16	2703:4	2556:5	5,23	2606:13,22
2474:16		2635:25	2547:9,12,	2607:12,21
2475:2	**Anchoring**	2644:7	15,20,24	2608:3,7,1
2479:16,22	2559:22	2696:12	2548:1,4,7	1,24
2486:15,18			,11,16,21,	2609:9,18,
2487:2,3,2	**anchors**	**anticipate**	24	22 2610:13
4 2488:1	2555:7	2638:2	2549:16,23	2611:18
2489:21		2674:5	2550:2,5,1	2612:14,21
2494:16	**and/or**		3,18,22	2613:1,5,1
2495:4,24	2553:13	**anticipated**	2551:13,16	2,16,24
2496:2		2598:19	,25	2614:13,20
2510:10,25	**Anderson**	2599:17	2552:6,10,	2615:1,18
2512:15	2441:16		16 2553:2	2616:1,6,1
2514:5,17,		**Antoine**	2554:13,22	2,16,22
20 2515:9	**annual**	2441:13	2555:18	2617:7,13
2516:20	2565:13	2442:25	2556:6,25	2618:9
2517:5,17	2589:7	2443:6	2559:20	2619:18
2522:18	2680:9	2450:19	2562:1	2620:3,20
2523:4		2451:7,18,	2563:13	2621:4,10,
2533:6	**annually**	22 2453:10	2564:1,6,2	19,22
2534:9	2588:25	2502:8	0	2622:2,8,1
2537:3,6,8		2514:9,12,	2566:6,21	9
2548:18	**answer**	13,24	2567:11,18	2623:1,4,9
2554:19	2475:5	2515:6,11,		
2555:12	2487:1	18,24		
	2495:12,18	2516:4,9,1		
	2504:18			

,13,16,22
2624:3,8,1
5,18
2625:1,9
2626:4
2627:13
2628:5,15,
17
2629:2,13,
22
2631:5,18
2632:9,12,
14 2633:19
2634:3
2635:19
2636:6,7,2
5
2637:3,11,
15
2638:10,16
,24
2639:7,11,
24 2640:12
2641:6,20
2678:1,20,
21
2679:7,12,
22,25
2680:18,23
2681:3,7,1
2,18
2682:23
2683:12
2684:3,9,1
4,18
2685:6,19,
25
2687:1,17
2689:7,12,
16,21
2690:11,15
,18
2691:1,9,1
3,19
2692:25
2694:17
2695:11
2696:7,24
2697:5,19
2698:25
2699:12,16
2700:15,18
2701:14
2703:7,8,2

3 2705:25

anymore
2452:2
2693:17

anyone
2512:4
2612:12
2630:24

anything
2472:1
2566:22
2576:14
2577:25
2598:2
2618:9
2638:9
2642:9

Anyway
2561:23

anyways
2575:23

apologies
2546:1

apologize
2463:24
2649:9
2665:16,17
2670:24
2672:16
2675:20
2678:4
2684:19

apparently
2691:15

appear
2561:1
2698:6

APPEARANCES
2441:1

appearing
2674:22

appears
2528:11
2705:11

appendix
2463:7,25
2469:22
2515:3

2551:2,14
2683:24

applicable
2553:9,17

applications
2457:19
2496:9

applied
2447:20
2557:10
2569:20
2575:5

applies
2609:17
2679:14

apply
2460:9,13,
14,17
2471:24,25
2491:3
2510:15
2535:24

appreciate
2453:1,2
2466:10
2544:18
2605:11
2645:24
2699:16

appreciated
2502:25

appreciating
2466:25
2467:1
2607:15

approach
2456:17
2457:24
2458:7,12,
16,17
2459:1,14,
20,25
2460:2,5,7
,13,15
2461:11,19
2464:7,14,
17
2465:1,2,8
,11,18
2466:4

2468:7,10,
15,16
2469:12
2471:18
2472:3,17,
24
2473:4,5,7
,8,17,18,2
5
2474:3,6,7
2475:9,21
2476:1,18,
20
2477:6,15
2478:13
2480:20
2481:22,24
2482:4,11,
13 2489:12
2500:3,7,9
,10,12,16
2504:13,17
2506:1
2511:18
2537:12
2544:16
2551:9
2553:5
2554:23
2555:2,13
2556:8,10
2557:7,25
2558:1
2559:9
2639:25
2704:1

approaches
2472:10

approaching
2539:7

appropriate
2453:21
2469:13
2471:23
2496:3
2505:10
2509:3,12
2512:14
2536:24
2575:10,13
2576:4
2612:10

approved
2588:5
2664:25
2672:19

approximated
2694:10

**approximatel
y** 2510:5
2519:16
2606:7
2699:7

**approximatio
n** 2623:12

arbitrage
2650:18

arbitrary
2459:17
2477:19

area 2463:3
2512:22
2514:14
2519:12
2524:8,16
2528:16
2592:16
2597:17
2660:11
2676:15
2681:11

areas
2635:20
2642:20
2647:2
2678:23
2706:2,3

aren't
2517:3,17
2536:15
2538:22
2541:25
2566:15
2569:18
2570:3
2591:9
2617:11
2638:17,18
2645:2
2698:8

argue 2490:1

2503:22

argues
2486:10

argument
2482:8
2499:19
2500:24
2501:8
2505:9,14,
16,21
2506:12,16

arises
2502:18

arising
2502:22

arrange
2652:12

arrangement
2570:13,14
2645:5
2646:18,20
2649:25

arrangements
2649:2

arrived
2606:16

arrives
2565:20

article
2556:23
2560:21

articles
2462:2

ascribe
2555:13

aside
2500:21

aspect
2556:7

aspects
2620:10

assess
2491:2
2537:20
2630:23

assessing

2481:1,2

assessment
2481:25
2676:17
2680:10

asset
2454:15,16
,21
2455:1,4,8
,22 2647:4
2651:5

assign
2456:22
2499:5

assist
2574:24
2636:17

assistance
2618:23
2676:4

assists
2473:14

associated
2473:6,7
2505:24
2512:21
2517:9,10,
18
2518:13,17
2617:5
2619:6,16
2620:13
2634:24
2656:10
2660:17
2698:14
2700:4

Association
2568:1

assume
2479:9
2551:3
2584:5
2588:3
2639:17
2693:1

assumed
2487:18

assumes

2585:21
2640:2

assuming
2448:17
2586:23
2630:17
2645:21

assumption
2479:4
2510:25
2560:1
2586:20
2587:2

assumptions
2504:23
2506:3
2510:2
2614:5
2618:8,25
2619:1

assurance
2581:2
2582:14,18

attempt
2490:15
2509:16
2702:22

attempting
2535:21
2696:17

attempts
2682:1

attend
2513:18
2641:25

attention
2492:17
2493:7
2499:8

attitudes
2480:2

attract
2565:25

attractive
2486:19

attributable
2505:22

attributing

2687:22

augment
2600:7

August
2606:25
2609:11

author
2466:5

authorities
2680:11

authors
2611:7

**automaticall
y** 2564:8

availability
2554:5

available
2553:7
2554:8,12
2556:14
2558:6
2559:16
2565:13
2577:7
2637:13
2677:9
2682:19,20
2695:23
2701:9

Avenue
2440:22

average
2457:18
2483:2,8
2510:4
2537:5
2564:12,18
2630:12,18
,20,23
2631:1,25
2632:7,17
2633:10,24
2634:13,14
,15,16
2635:3,11
2638:20
2639:14
2650:22
2694:7,8,9

averaged
2635:6

averaging
2631:13

averse
2479:8,10
2490:22
2562:18

aversion
2490:10
2499:7,12

avoid
2482:14

award
2672:23

aware
2490:25
2509:16
2556:7
2557:19
2623:14,15
2652:13
2673:19
2677:3
2678:7
2695:24

away 2507:15
2533:16
2561:9,10,
20 2568:9
2583:9
2592:10

———————
B
———————
background
2470:7
2553:23

backgrounds
2472:22

bad 2456:5
2484:5
2520:19

balance
2484:23
2670:17

balanced
2575:9,14,
24

ballpark
  2682:21
  2690:8

band 2700:20

bandwidth
  2698:10

bank
  2478:3,4

bankrupt
  2704:14

bar 2628:21

base
  2448:12,13
  ,19,24
  2450:4
  2458:13
  2459:14
  2467:18
  2468:24
  2477:16,21
  ,24
  2478:4,5,6
  ,7,10
  2491:10,13
  2517:7
  2518:17
  2529:12
  2599:23
  2603:4,12,
  14,17,20
  2605:12
  2607:2,7
  2617:23
  2624:4,7
  2625:10
  2628:2,19
  2630:22
  2639:13,22
  2661:1
  2668:3
  2697:7
  2699:14

based
  2474:18
  2503:20
  2510:25
  2511:3
  2540:11
  2556:3
  2562:11
  2568:14

  2575:8
  2585:9
  2605:19
  2608:18
  2612:22
  2622:3
  2629:3
  2630:3
  2633:10
  2634:8
  2646:20
  2699:4,21

baseline
  2461:1
  2608:12
  2627:11
  2631:12
  2633:16
  2634:10

basic
  2466:23
  2472:11
  2577:13

basically
  2457:13
  2468:6
  2475:6
  2512:4
  2568:13
  2598:11
  2599:5,22
  2605:24
  2606:3
  2611:9
  2621:3
  2687:23

basis
  2447:13,14
  2461:22
  2466:23
  2467:23
  2533:7
  2565:13,21
  2595:4
  2598:7,11
  2612:5
  2625:4
  2680:10
  2705:24

basket
  2651:8,16

  2652:9

bear 2643:17
  2648:11

bearing
  2491:20
  2645:13

become
  2522:21,22
  ,24
  2568:22

becomes
  2525:10,14
  2541:4
  2569:3
  2705:19

beer 2678:2

beginning
  2538:13

behalf
  2589:23
  2650:25

behave
  2626:17

behind
  2458:12
  2505:6
  2554:3
  2628:2
  2636:16

Bel 2440:16
  2477:2,17
  2478:19,21

belabour
  2488:5
  2587:15
  2631:6
  2648:25

believe
  2446:4
  2451:7
  2456:25
  2460:1
  2463:18
  2467:12
  2473:24
  2478:13
  2480:13
  2490:17

  2513:14
  2535:4
  2552:11
  2559:9
  2571:6
  2576:11
  2622:18
  2623:10
  2638:5
  2639:4
  2641:23
  2644:4
  2656:12
  2674:22
  2678:7
  2697:17

believes
  2559:1

**below-
  average**
  2633:3

beneficial
  2648:10
  2652:25

benefit
  2455:3
  2485:14
  2486:12
  2487:3,8,2
  3
  2489:16,21
  2498:17,21
  ,23
  2526:24
  2527:13
  2550:7
  2593:10,20
  2641:9
  2647:7
  2648:9
  2649:20
  2650:5,17,
  21 2651:11
  2687:15
  2690:7,9,1
  0,17

benefits
  2483:11,13
  2485:11,18
  ,20
  2486:7,8,2

  0 2488:8
  2489:2,7
  2539:24
  2643:11
  2647:1
  2648:15
  2650:11,23
  2651:9,12,
  16 2652:9
  2686:9,21
  2691:23

best
  2479:7,18
  2481:6
  2497:10,11
  2513:25
  2536:24
  2554:18
  2559:14
  2609:2
  2610:10
  2636:8
  2654:1
  2664:3
  2674:16,17
  2700:2
  2706:6

better
  2455:6
  2459:10,11
  ,20,21
  2460:11
  2461:23
  2467:2
  2473:21
  2481:15,17
  2483:12
  2485:8
  2498:5,18
  2527:11
  2544:12
  2562:5
  2563:25
  2572:12
  2584:9
  2585:8,11
  2592:16
  2595:9
  2625:21,23
  2632:5
  2643:16
  2644:14
  2648:18,20

2649:8
2652:6,20
2705:7

beyond
2454:5,12
2455:3
2500:19
2512:22
2650:11

bidding
2574:21

bigger
2478:24
2483:13
2485:2
2496:23
2542:17
2544:12
2584:16
2592:13
2625:16
2687:23

biggest
2455:13
2568:7,8
2597:11

bil 2542:12

bill 2442:11
2447:3
2479:11
2502:14
2510:23

billion
2485:3,9
2519:15,16
,18
2520:5,18,
22
2521:1,3
2522:2,15,
16,23
2523:19
2525:8,13
2527:22
2528:3,7,1
9 2531:4
2532:9
2536:20
2542:12,13
2543:20
2544:1

2545:20
2547:4
2548:14,18
2549:25
2550:3,16
2594:10,16
2595:9,19,
21
2596:16,24
2599:22
2603:18
2604:4
2605:12,16
2609:13,24
2610:20
2625:17

billions
2485:8

bind 2494:11

Bipole
2600:18
2667:4
2675:1,9,1
4,23
2676:7

bit 2506:8
2519:17
2526:3,20
2531:10
2534:3
2564:14
2575:18,22
2601:5
2608:25
2625:15,21
2630:1
2644:17
2652:23
2654:22
2660:9
2678:25
2680:15

black 2681:4

Blackberry
2659:3,10
2668:9

block
2571:19,20
,23

blue 2526:21

2527:19

board
2440:3,14,
15,16,17,2
1 2441:2
2450:24
2452:15
2469:2
2479:6
2511:24
2543:12
2564:23
2581:21,25
2593:2
2641:21
2672:13
2675:8
2683:13
2700:19
2706:4,15

Board's
2670:21

Bob 2441:2
2603:4

Bois 2597:25

Bonjour
2450:19

book 2444:6
2456:18
2457:3
2463:16
2464:11
2466:7
2469:19
2492:13
2493:14
2515:1
2528:20
2531:25
2551:5
2552:2,8
2559:21
2579:24
2582:9,23
2592:25
2593:24
2603:3
2610:14
2612:15
2621:6
2628:7

2636:2
2679:2

Booth
2493:15

border
2653:23
2656:20,23
2657:2,8,1
1,20,23
2658:9
2659:16
2660:20
2666:2,7
2668:8,23
2671:5

borders
2506:15

Borison
2442:7
2446:24
2453:22
2456:15
2457:6,9,1
2 2458:8
2460:6
2461:8,10,
25 2464:22
2466:7,11,
15,17,22
2467:7,11
2469:22,23
2470:4
2471:6
2472:14,21
2473:19
2474:21
2476:2
2477:13,18
2478:20
2479:2,19
2490:8
2495:10
2496:16
2497:6
2500:6
2502:2,17
2511:16,19
2512:9
2514:18,21
2534:22,25
2550:23
2552:7,9,1

4
2553:1,22
2554:21
2555:14,19
2556:11
2557:6
2559:8,18
2560:9

borrow
2536:19

boss 2647:10

bottom
2493:2,6
2496:7
2526:15
2527:17
2529:23
2530:1,13,
22 2532:4
2580:1
2584:16
2586:3,9,1
0 2609:5
2610:16
2613:25
2614:6
2616:9
2622:4
2656:19

bottom-up
2612:4

bought
2571:11

Bowen 2442:8
2446:25
2513:18,22
,23 2575:1
2595:1,3
2597:2,9,2
1 2598:2,4
2601:1
2602:2,16
2603:7,12,
19
2604:7,12,
18
2605:6,14,
18 2606:19
2607:1,19
2608:2,6,1
0,14

2609:8,14
2610:8,21
2611:25

box 2521:8
2524:2,5

Boy 2462:18

Boyd 2441:6
2446:6,7,1
8 2451:10
2452:24
2513:17
2601:25
2673:3,7,1
1 2675:15
2707:12,15

brackets
2614:23

Brattle
2502:19
2559:9,15

break 2453:9
2513:7
2572:11
2576:4,22
2707:13

brief
2450:15
2451:14,20
2463:21
2464:19
2465:5
2466:20
2490:9
2492:19
2497:14
2503:5,12
2508:8
2516:24
2519:22
2520:1
2524:18
2525:25
2545:23
2547:7
2549:1
2551:18,23
2552:4
2553:20
2561:24
2570:23
2572:1,8

2579:17
2581:17
2584:13
2591:13
2592:21
2597:1
2602:20
2609:20
2612:19
2615:16,25
2616:4
2617:1
2618:20
2620:5
2621:8
2629:11
2640:20
2648:22
2664:15
2669:3,8
2671:12
2679:5
2681:14
2684:24
2685:4,23
2686:24
2691:17
2697:15
2702:19

briefly
2702:3

bring
2456:19
2521:11,12
2527:17
2536:16
2549:14
2638:8
2647:20
2686:16
2699:1
2707:18

bringing
2560:6,10
2589:5
2651:6
2686:19

brings
2554:13
2613:19
2646:20
2650:11

2651:16
2672:6
2692:21

British
2508:4

broad 2647:2
2651:10,15
,16 2652:9

broader
2495:3
2496:2

broken
2576:19

brought
2611:2

budget
2599:21
2611:21

build
2536:10
2563:25
2581:8,11,
13,14
2584:2
2590:21
2612:6
2643:6,10,
11 2644:10
2647:5
2651:19

building
2591:4
2640:7

built 2533:8
2534:1,13
2581:23
2627:15
2647:12

bullet
2579:3,5
2653:22
2654:6,13
2657:9
2662:1,2
2669:15

bunch
2455:9,15
2468:18
2471:25

2596:8
2622:10
2694:12

burden
2647:18,23
2649:18

burn 2517:9
2518:13

burning
2509:7,8

business
2458:13
2465:15
2495:13
2497:5
2563:25
2585:9
2703:20
2707:17

buy 2536:15
2565:4,5

Byron 2441:8
2450:21
2706:17,20
2707:6

—————————
C
—————————
CAC 2441:8
2444:5
2450:22
2451:4
2672:3

CAC/MH-Round
2662:12

calculate
2454:24
2455:3
2460:9
2464:16
2471:11
2473:3,12,
25 2474:1
2475:13
2481:8
2490:12
2537:13
2565:21
2630:15
2695:24

calculated
2454:14,16
2465:1,2
2472:12
2497:4,8
2510:1

calculates
2454:19

calculating
2488:17

calculation
2471:20
2472:3
2526:25
2527:2,3,2
0
2528:6,11,
17 2532:22

calculations
2510:20
2526:15
2528:2
2629:3
2631:13
2683:23

calendar
2636:14

California
2561:17

Canada
2511:4
2568:18
2598:13

Canadian
2597:16,19
2599:6
2676:17
2694:7,8,9

cancelling
2581:15

cancels
2688:17

canvass
2678:23

canvassed
2452:7

cap
2504:2,4,6

,25
2505:1,3,1
0,11,12,14
,19
2506:3,4,9
,10,13,20,
22
2507:3,9,1
0,16
2548:17

capability
2705:18

capacitors
2654:8

capacity
2564:17
2639:8
2640:7
2650:20
2680:1
2682:3
2696:2

capacity-
short
2640:6

capital
2445:5
2483:2
2484:2
2488:23
2490:4
2496:3
2500:20
2501:20
2508:23
2515:14,15
2517:25
2519:12,16
,17,18
2521:18,22
2522:13
2523:15
2524:11
2525:7
2528:19
2529:12
2534:19
2535:23
2536:10
2538:12,22
2540:2,6,2

1,23
2541:16
2543:25
2544:23
2545:18
2546:8,12,
19 2547:25
2548:13
2573:10,17
,23
2578:22
2579:15
2593:21
2600:17
2601:3
2602:7
2613:18
2671:1,15
2672:6
2675:9
2706:24

capital-
intensive
2550:15

Capra
2458:7,15,
17 2466:9
2486:9
2488:21
2489:25

Capra's
2477:6

capture
2493:22
2630:8

carbon
2507:17
2509:3,5,1
2,15,21,24
2510:1,7,8
,16,19
2511:5,8,1
0,13
2512:1

careful
2533:2
2613:2,6
2671:20

carefully
2653:7

carry
2582:14
2584:25
2587:3
2588:21
2612:6
2613:7
2633:15
2635:17

carrying
2583:24
2680:1

case
2449:16,20
2453:21
2459:15
2465:15
2477:21
2479:15
2483:12
2491:10,13
2495:14
2497:5
2517:7,8,9
,10,11
2518:5,16,
17 2521:17
2532:12
2539:22
2552:20
2553:17
2554:20
2563:25
2574:3
2575:16
2585:9
2624:4,7
2625:10
2631:24
2644:17
2647:14
2668:3
2678:14
2705:1

cases
2480:15
2534:20

cash 2504:14
2533:7,12
2534:3,8
2535:25
2536:11

2537:24
2538:25
2692:4,5,6
,16

cashflow
2537:15
2692:5,11

categories
2618:24

categorizing
2638:11

Category
2640:15

cause
2506:18
2547:22
2693:20

caused
2594:2
2596:9
2598:19
2600:2

causes
2449:16
2599:1
2695:6

caution
2611:5,25
2612:12

cautioned
2611:6

CEAA 2676:25
2677:3,7

CEF 2656:3
2660:7

CEF08
2656:20

CEF13 2660:5
2664:13
2672:17

CEF2012
2665:2

CEFs 2657:6

cent 2569:25
2570:4

cents

2569:23
2570:1
2682:15

certain
2467:25
2504:4
2532:18
2557:4
2607:16
2608:1,4,9
,13,21,23
2675:22

certainly
2453:1
2462:3
2472:23
2474:22
2490:25
2495:5
2553:24
2554:1
2557:2
2568:5
2648:4

certainties
2649:23

certainty
2499:17
2501:21
2574:4
2605:17
2606:15,18
2607:24
2641:19
2646:21

Certificate
2443:8

Certified
2708:10

cetera
2559:6
2592:12
2611:14
2626:15
2634:7
2635:15

chair
2453:15
2456:10,24
2466:10

2486:25
2502:14
2512:23
2642:13
2672:2
2675:15
2683:8
2706:17

Chairman
2452:25
2519:20
2635:20
2677:24
2678:5

chairperson
2440:13
2446:3
2450:17
2451:16
2452:23
2456:21
2491:4
2492:4
2502:6
2503:1
2513:6,14,
22 2514:7
2572:17,25
2573:3,8,2
2 2574:2
2576:3,11
2579:2
2587:12
2589:8,18
2604:9
2636:4
2641:23
2642:6
2663:20
2671:14
2676:6
2677:19
2678:17
2706:19
2707:16

chance
2463:9
2469:23
2621:11
2696:12

change
2456:4

2469:11
2478:8
2480:21
2500:17
2505:1,15
2508:9,15
2518:10,11
,12,13
2520:13
2521:3,4,1
8
2522:6,7,1
0 2523:25
2524:14
2532:21
2533:16
2535:22
2541:7,9
2544:24
2547:12,15
2548:4,12,
16 2560:2
2580:24
2584:5
2585:22,24
2586:23
2604:5
2606:11
2635:16
2640:11

changed
2467:4
2469:17
2518:15
2524:25
2529:17
2573:11
2581:1
2584:3
2600:4,10,
21 2605:10
2606:23
2656:23
2660:11

changes
2500:15
2518:6
2520:21
2521:7,8
2544:13
2548:18
2592:11

2674:5

changing
2522:8
2529:15
2532:17
2545:19
2546:4
2547:17
2560:4,15
2584:3
2613:18

Chapter
2464:10
2488:2
2683:21
2684:2
2685:2
2686:8
2691:21
2692:2,4,1
0,15,19,23

**characterist
ics** 2694:5

**characteriza
tion**
2585:12

characterize
2585:8

chart
2529:23,24
2530:13
2630:13,19
2632:2,8
2634:20
2656:1,2
2657:12
2664:25
2679:3
2688:2,3,1
8

check
2539:14
2550:19,21
2587:8
2621:23
2701:16,21

Cheryl
2708:14

choice
2484:10

2510:17

choose
2476:15
2580:17
2583:20

choosing
2515:19

chose
2477:20
2490:22

chosen
2477:23
2539:20

Christian
2441:21
2442:21
2456:1,11,
14,15,24
2457:5,6,1
1,25
2460:4
2461:7
2463:2,12,
23
2464:3,9,2
1 2465:3,7
2466:6,16,
24 2467:10
2469:18
2470:1,9
2472:13
2473:13
2474:12
2475:24
2476:25
2492:6,9,1
0,23
2494:17,21
2496:4
2497:2
2501:24,25
2678:15

Christmas
2646:12

circulated
2502:20

**circumstance
s**
2505:10,13
2580:24

2581:1
2705:23

civil 2593:5
2597:8,11
2599:17,25
2604:16

**clarificatio
n** 2579:22
2663:4
2669:12
2672:2,13,
15
2675:6,11
2696:14

clarify
2458:9
2513:19,24
2514:22
2517:2
2543:11
2572:18
2582:9
2590:8
2654:25
2669:22
2670:25

clarity
2678:25

class
2610:15,24
2611:1,9,1
1,12,17,18
2641:14
2663:21,23
,24 2664:4

**classificati
on** 2610:22

clause
2565:6

clear 2456:5
2586:3
2602:1
2612:22
2631:7
2644:6
2659:5
2676:7

clearly
2479:4
2512:11

2562:6
2649:25

Cleary
2493:15

client's
2653:15

climate
2507:14,25
2508:9,14

close
2457:23
2474:3
2593:21
2599:13
2628:25
2664:5
2698:5,7,8

closed
2599:16

closely
2473:23
2500:6

clothes
2467:25

cloudier
2494:7

Co 2456:25

CO2 2502:19
2503:24
2504:14,19
,24
2505:1,16
2506:9,18
2511:1
2558:5
2559:6

coal 2568:9

co-authored
2552:12

code 2470:7

coincide
2533:2

colleague
2554:2
2683:19

colleagues

2576:24

column
2448:10,15
,16
2469:15
2478:14
2515:7,25
2516:6
2521:14
2522:20
2529:11,18
2530:6
2535:17
2545:1
2586:13
2590:9
2624:11,13

columns
2533:18
2537:25

combination
2523:19
2524:10
2555:25

combinations
2559:5

combine
2481:20
2556:18

combined
2450:22

comes
2485:10
2543:3
2561:21
2613:13
2643:16
2648:12,13
2668:4
2687:22

comfortable
2575:17

coming
2472:4
2475:2
2538:17
2540:7
2566:4
2592:12

2673:20

commencing
2446:1

comment
2461:24
2488:11
2490:9
2504:9,12
2506:25
2524:22
2560:11
2567:20
2582:10
2585:11
2627:14
2676:20

commentary
2597:2

commented
2453:19

comments
2453:22
2557:3
2646:19

commercial
2682:11
2694:9

commit
2581:5

commitment
2640:25

committed
2501:1
2590:14,21
2591:2

commodity
2554:9

common
2461:4
2514:16,19
2515:21
2516:19
2517:13
2518:25
2520:9,14
2526:7,11,
16 2527:21
2528:6
2544:8,9

2548:17
2549:4,11
2551:9
2694:23

communicate
2452:2
2606:18

**communicatin
g** 2572:15

communities
2485:12

companies
2640:17

Company
2628:20
2651:25

Company's
2610:6

comparative
2470:17
2517:4
2541:19

**comparativel
y** 2469:7

compare
2448:15
2458:14,19
2459:18
2460:11
2462:4
2467:18
2468:12,20
2476:11
2521:1
2523:10
2546:24
2607:2,7
2624:19
2687:6

compared
2458:24
2461:20
2474:10
2523:2
2526:25
2527:1
2594:3
2624:12,23
2627:4

2683:24
2686:4,14,
15 2687:16
2691:3

compares
2461:2

comparing
2468:18
2520:11
2521:1
2626:6,8,1
8 2627:11
2687:11,12

comparison
2518:17
2603:13
2675:23
2695:19

competition
2650:22

competitive
2455:22

complete
2595:6
2600:18
2601:5,7
2678:10

completed
2594:9
2601:2
2642:17
2662:23
2672:10
2674:14

completely
2480:12

complicated
2466:3
2587:25

component
2546:21
2575:3

components
2498:8,19
2600:20
2655:2

component's
2655:5

comprehensive 2676:18
2677:6

con 2449:13
2563:14
2683:25

Cona 2594:14

Conawapa
2445:6
2482:5,8
2483:12
2484:5
2488:16
2491:24
2537:25
2538:7,17
2540:6
2563:20
2575:17,21
2578:8,11,
16,18,23
2579:7,9,1
5
2580:8,12,
14,15,16,1
9,23
2581:5,8,2
3 2582:7
2583:8,20,
22
2584:2,20
2585:14
2586:4,13,
22
2587:1,18,
21
2588:10,12
,21,23
2589:2,14,
19
2590:2,10
2591:5,22
2592:4,11
2594:13
2596:22
2600:25
2601:21
2602:9
2609:4
2613:11
2643:12
2687:6,9

2688:10,11
2689:10,24
,25
2690:14,15

Conawapwa
2583:1

concept
2566:24
2567:14,15
2646:13

concepts
2631:10

conceptual
2506:16

concern
2499:3

concerned
2476:21

concerns
2518:24
2556:4
2559:12,18

concluding
2541:9
2554:14

conclusion
2497:9
2653:8

conclusions
2582:22

condition
2580:9
2582:3
2590:25
2591:22

conditions
2503:22
2565:7
2578:17,20
2579:8,11
2584:5
2588:16
2630:13,25
2633:3

conduct
2518:1

conducted

2677:6

confidence
2574:17
2593:11
2594:3

confidential
2646:1

confidently
2690:5

configuratio
n 2555:5

confirm
2545:14
2546:24
2582:25
2612:10
2645:6
2663:19
2665:2,10
2673:1
2677:22

confirmed
2649:1
2661:18,24

confused
2477:3
2539:13

confusing
2669:14

confusion
2469:8
2477:14
2701:25

connect
2655:8

connects
2658:19

conscious
2466:4

consensus
2499:6
2557:19
2559:11
2562:8
2682:8

conservative
2489:24
2571:6,14

2577:25
2639:25
2640:16

consider
2504:14
2511:25
2589:25
2618:23
2649:23
2677:5

considerable
2634:21

consideratio
n 2620:10
2636:1
2645:12

considered
2461:17
2571:22
2693:10
2707:11

considering
2454:4
2504:25

consistent
2449:13
2450:10
2489:25

constructed
2690:22

constructing
2529:12
2658:21

construction
2514:2
2530:8
2531:5
2532:8
2551:8
2591:8
2592:17
2596:9
2597:17
2600:6
2614:4
2664:2
2667:23
2675:12

consultant

2601:9
2611:3,6

consultants
2557:20,21

consultation
2676:21,23

consumer
2599:6

consumers
2479:10
2567:25
2691:24

Con't 2443:1

contact
2503:9

containing
2601:21

contenders
2684:1

CONTENTS
2442:1
2443:1

context
2470:8
2497:11
2535:16
2561:1
2652:2
2695:1
2702:3

contexts
2493:22

contingency
2599:11
2605:25
2606:6
2611:3
2612:7,8
2650:16

contingent
2585:4

continue
2452:21
2529:6
2560:8
2566:7
2582:17
2587:17,19

,20
2588:8,19
2631:4
2639:17
2640:13
2641:9
2678:7
2682:25
2689:17
2694:18

Continued
2442:6,18,
20,22,24
2443:3,5
2446:23
2453:13
2456:14
2457:5
2492:9
2501:24
2503:3
2514:12
2543:9
2576:17
2579:19
2591:15
2602:11
2636:6
2642:15
2664:8
2671:24
2673:13
2675:18
2676:13
2678:20
2703:7

continues
2593:8

continuing
2531:23
2579:21

contract
2572:21
2573:1
2583:6
2584:4,6
2585:14
2591:6
2593:5
2597:8
2599:13,17
2604:16

contracted
2566:25
2571:19,21
2577:18
2650:8

contractors
2599:2,19

contracts
2484:1
2563:10,15
,20
2571:20
2574:16
2577:7,9,1
0,11
2583:2,11
2589:5
2597:9
2672:24

contributed
2707:21

contribution
2707:19

control
2599:21

conversation
2474:25
2514:2

conversion
2663:15

converter
2653:13
2656:9,11

convertor
2669:19

convinced
2652:16

co-op 2494:8

cooperation
2453:1

cope 2491:18

copies
2451:11

copy 2519:9
2552:7

Corey

2441:19

coright
2594:10

Cormie
2442:9
2447:1
2562:3,6
2563:19
2564:4,11
2565:2
2566:16
2567:2,21
2569:1,7,2
4 2570:25
2577:24
2579:13
2580:6,11,
22 2582:1
2583:17,18
2585:7,13
2589:5
2590:7,11,
17,20,24
2636:8,16
2637:1,6,1
4,22
2638:13,21
2639:5,10,
12 2640:4
2641:11
2643:5,7,1
4,21
2644:4,16,
22
2645:7,17,
23
2646:5,11,
25 2647:17
2648:8
2650:3
2652:15
2653:25
2696:15,19
2697:1,17
2698:11
2699:10,13
,25
2700:16
2701:7,23
2702:17,21
2704:4
2705:10

Cormie's
2570:6
2585:11

corner
2519:11
2520:4,6,1
7 2522:14
2523:14,21
2528:21
2530:1
2586:3
2609:6
2674:3

Corporate
2493:15

corporately
2491:5

Corporation
2483:17
2600:22
2614:15
2617:14
2631:9,20
2634:7
2639:25
2679:11

**Corporation'
s** 2613:7

correct
2471:16
2477:9
2496:6
2515:4,5,9
,10,16,17,
22,23
2516:2,3,7
,8,10,13
2517:23
2520:9,10,
14,15,22,2
3
2521:4,5,8
,9,20
2522:9
2523:18
2524:8,16
2526:7,11,
16
2527:14,15
,23
2528:3,8,2

3
2529:7,14,
20,21
2530:2,3,8
,9,15,16
2531:1,2,5
,6,10,24
2532:2,5,6
,9,10,13,1
4
2536:16,22
2543:20,21
2545:5,20
2547:5
2548:9,14,
22 2549:21
2550:3,12,
16
2552:13,14
,25
2555:18
2564:3
2569:11
2580:23
2583:12
2590:16,18
2592:13
2593:14
2594:11,20
2595:7
2596:11,17
2603:11,18
,19
2605:13,14
,17
2606:15,18
2607:18
2608:1,5,1
0 2609:7
2611:20
2612:24,25
2613:3,4,8
,14,22
2614:9,13,
17,18,24
2615:2
2616:10,14
,20
2617:14
2620:1,25
2622:6,17
2625:3
2626:4
2628:21

2629:7	2489:19,21	2681:20	2551:8	2635:21
2631:22	2496:3	2682:1,8	2563:6	2641:21
2632:19	2500:20,22	2685:12	2571:2	2675:8
2638:11,21	2501:1,5	2686:6	2573:10,17	
2639:9,10	2509:13,20	2692:3,4,5	2574:5,6,2	**count**
2640:18	,24	2693:11,14	4 2575:25	2510:11
2643:6,13,	2510:1,7,1	,19	2578:22	2599:2
20	6	**cost-based**	2579:15	2641:4,14
2645:16,22	2511:5,8,1	2571:15	2592:17	**counted**
2653:24	0 2512:1		2593:21	2510:13
2654:4,10,	2514:5	**costing**	2594:3	
11,14,15,1	2515:19	2654:9	2598:20	**counterintui**
8,19	2517:16	**costly**	2599:1,25	**tive**
2655:3,12	2522:13	2600:7	2601:12	2670:9
2656:3,11,	2523:16		2602:8	**counting**
13 2663:10	2525:7	**costs** 2445:5	2603:23,25	2639:14
2666:3,5	2528:18	2487:18	2605:12	
2671:8	2534:19	2488:7	2607:13,15	**couple**
2674:12	2537:5	2499:18	,25	2451:12
2681:6	2540:23	2500:23	2608:1,4,8	2502:9,22
2696:18	2541:16	2505:24	,13,16	2540:15
2697:8,13	2545:18	2509:23	2609:6	2552:17
2699:24	2546:17,19	2510:11	2612:4,5	2565:16
2701:6	,21	2511:17	2614:4	2628:24
2708:10	2547:25	2514:1,4,1	2634:14,16	2637:4
	2548:3	6,19	2635:2,6,1	
corrected	2549:11	2515:12,21	2 2643:17	**course**
2638:23	2551:9	2516:19	2645:13	2454:11
correction	2563:24	2517:2,4,5	2648:11	2473:19
2604:1	2571:3,9	,7,9,10,13	2649:19	2649:9
	2573:11,14	,25	2653:16,20	2654:13
correctly	,23	2518:10,13	,22	2655:15,19
2492:15	2575:11	,14,20,23,	2656:2,10,	2656:9
2549:25	2593:11	25	15,16	2672:13,14
2572:16	2594:10,19	2519:12,13	2659:10,11	2681:23
2580:15	2599:20,23	,16,17,18	,17,18,20	2703:21
2595:15	2600:10	2520:14	2660:7,17,	2706:15
2610:2	2601:9	2521:18,22	19,22,25	
2621:12,21	2603:4,5,1	2524:11	2661:9,11,	**cover**
	3,14,17,20	2526:7,11,	18,23	2635:21
correlation	2605:12	16 2527:21	2662:3	2642:20
2533:10	2607:2,7,8	2528:6	2668:15	2678:25
correspond	,9 2609:16	2529:6,10,	2671:1	2680:4
2623:5,7	2611:7	11,12	2673:16	2706:4
	2613:11,19	2530:8	2674:25	
corridor	2634:21,23	2531:5	2677:1	**covers**
2656:25	2638:9	2532:8	2692:7,10	2680:6
	2643:19	2537:7	2706:24	**CPJ**
cost 2446:13	2644:11	2539:3,4		2601:16,22
2447:14	2652:5	2540:21	**counsel**	2602:14
2483:2	2662:4	2543:25	2441:2	
2484:2	2671:15	2544:8,9	2452:7	**craft**
2485:14	2675:2,9,1	2546:13	2502:9,16	2598:12
2486:12,15	3,23	2548:13,17	2572:12	**crazy**
2487:3,19				2671:22
2488:24				

create
2648:6
2667:22

created
2480:7
2512:12

creating
2542:24

criteria
2611:10

criterion
2470:21,22
,23
2471:1,3,2
4,25
2473:1
2474:18,20

critical
2473:4

criticism
2477:6

cross
2452:15
2513:1

cross-examination
2442:18,20
,22,24
2443:3,5
2452:10,19
,21
2453:13
2456:14
2502:21
2503:3
2514:12
2642:15,17
2674:24
2678:20
2706:10

crossings
2674:3

CS
2656:2,8,1
5

CSI 2564:22
2570:4

2578:1

current
2467:19
2510:18
2554:4
2565:24
2568:5
2589:21
2592:17
2595:6
2607:5
2608:19
2660:7

currently
2456:10
2511:13
2578:11
2580:7
2646:18
2649:3
2657:15,22
2658:20
2680:5

curtail
2565:8
2636:13,23
2637:24

curtailable
2635:25
2636:9
2639:6

curtailment
2638:6,23

curve 2521:7
2606:1,2,6
2612:8
2688:17,22

curves
2522:7
2525:19

cus 2641:13

customer
2580:25
2638:18
2639:1,13,
17,21
2640:1,2
2641:15,16
,19
2648:19

2650:6,24
2682:10,11
,15,17
2692:7,18

customers
2447:15
2468:8
2476:17
2480:1
2562:10,19
,20 2565:3
2637:24
2638:17
2639:13,16
,20
2640:24
2641:13
2645:1
2647:2,8
2682:2,8
2684:7,12,
17 2693:2

cut 2609:1
2678:8

cycle
2702:13
2703:21

cycles
2702:5

D

---

daily
2565:21

dam 2536:11

damage
2508:16

dash 2630:19

data
2553:7,9
2554:5,12,
16 2555:25
2556:1,24
2557:12,14
,15
2558:6,12
2619:6,16
2621:13
2622:10,11
,13

date
2578:10,12
2587:17,21
2588:13
2589:18,22
2592:2
2598:23
2606:21
2608:16,17
,18,20
2672:24
2705:15

dates
2585:15
2677:1

Dave 2442:8
2446:25
2513:23
2562:6
2570:25
2580:11,22
2595:1,3
2598:4
2601:1
2602:16
2603:7,12,
19
2604:7,12,
18
2605:6,14,
18 2606:19
2607:1,19
2608:2,6,1
0,14
2609:8,14
2610:8,21
2611:25
2636:16
2652:15
2653:25

DAVID
2442:9,13
2447:1,5
2563:19
2564:4,11
2565:2
2566:16
2582:1
2583:18
2585:13
2590:11,17
,20,24

2637:1,6,1
4,22
2638:13,21
2639:5,10,
12 2640:4
2641:11
2643:7,14,
21
2644:4,16,
22
2645:7,17,
23
2646:5,11,
25 2647:17
2648:8
2650:3
2654:3,11,
15,19
2655:4,7,1
2,24
2656:4,7,1
2,18
2657:13
2658:11,14
2659:13,17
,21,23
2660:1,4,2
4 2661:15
2663:22
2665:4,8,1
2,18,22
2666:20,24
2667:14,19
2668:16,20
,22
2669:21
2670:21
2671:3,8,1
9 2673:21
2674:13,19
2679:9,15,
24
2680:4,21
2681:1,6,1
0 2683:21
2685:1
2688:16,21
2689:1
2696:19
2697:1,17
2698:11
2699:10,13
,25
2700:16

2701:7,23 2702:17,21 2705:10	2489:17 **debt** 2489:18,22	2615:5 **decrease** 2598:12	2698:13 2700:9 **demands**	**derivation** 2605:19 **describe**
day 2447:25 2456:6 2544:17 2581:9 2597:22 2679:16 2680:14,22	2490:5 2493:12 2532:24 **decades** 2560:15 2637:4	2615:13 **decreasing** 2573:19 **defend** 2561:13	2555:6 **demonstrate** 2680:12 **demonstrated** 2632:25	2701:25 **described** 2507:6 2526:16 2571:13 2650:14 2676:9
days 2557:12 2558:13 2636:13,24	**decarbonizat ion** 2568:9 **December**	**defer** 2480:16 2497:12	**depend** 2506:2 2578:12	**describes** 2459:7
deal 2466:3 2482:23 2513:21 2514:25 2564:21 2572:14 2598:9 2599:7 2635:23 2643:18 2652:3 2704:1 2705:7	2599:15,16 2608:20 **decide** 2580:20 2584:2 2591:3 **decided** 2455:9 2536:2 2592:3 2644:10	2588:23 2590:1 **deferring** 2491:24 **defined** 2610:9 **defining** 2579:5 **definitely** 2528:13 2542:8	2583:10 2633:17 **dependable** 2563:15 2564:3,9,1 3,25 2565:1,10 2566:25 2569:14 2570:11,14 ,17 2571:21,22	**description** 2444:2 2445:2 2657:10 2658:6 2664:24 2667:8 **descriptive** 2459:1,7 2461:4 2463:10
dealing 2542:7 2597:14	**deciding** 2460:15 2484:15 2583:8	**definition** 2611:13 **degree**	2577:6,8,1 0 2620:12 2650:13	2468:10 **designed** 2506:14 2637:8
deals 2515:8 **dealt** 2452:18 2454:13 2455:13 2571:23 2642:18	**decision** 2462:24 2465:24 2466:5 2467:17 2468:2 2470:16,20 ,22 2471:1	2568:10 2681:11 **delay** 2705:16 **delayed** 2508:13 2672:25 2705:15	**dependent** 2501:10 2640:10,15 **depending** 2458:2 2583:1 2588:11 2619:4,13	**designing** 2636:17 **despite** 2653:11 **detail** 2575:15
DEAN 2442:14 2447:6 2500:5 2503:17 2504:10,15 ,21 2505:7 2507:2,7 2508:5,20 2509:2,14 2510:22 2511:6 2557:4	2472:17 2474:18 2537:18 2585:22 2586:18 2588:23 2591:21 2686:1 **decisions** 2461:6 2478:2 2562:11 2588:3	**deliberately** 2490:3 **deliberation** 2589:24 **deliver** 2581:12 **delivered** 2486:12 2645:11 **delivery**	**depends** 2506:8 2510:10 2571:5 2635:24 2661:4 2682:17 **depicted** 2527:20 2587:23 2655:18	**detailed** 2455:21 2571:17 2601:8 2646:11 2674:15 2675:12,13 2695:19 **details** 2557:19 2609:4 2622:16
dear 2653:15 **debate**	**deck** 2503:17	2641:18 **demand** 2638:14	**depreciated** 2454:21 **depreciation** 2454:24	2649:1 **determine** 2454:20

2509:23
2511:24
2574:23
2596:20
2667:7,10,
16

determined
2657:4
2671:16

**deterministi
cs** 2605:20

develop
2556:20
2558:7,21
2559:2
2612:8

developed
2598:6,10

developing
2587:20
2643:12

development
2440:10
2470:18
2497:5
2521:20
2523:13
2528:23
2529:1
2531:24
2538:8
2539:19
2541:13,14
,22
2543:16
2589:11,13
2627:6
2671:4
2685:8,14
2686:3

deviation
2496:24

deviations
2496:13

diagram
2587:24

dice 2482:8

difference
2460:17

2461:12
2468:17,23
2478:13
2498:2
2531:8
2532:12,19
,21
2533:5,17,
20 2534:18
2538:1
2547:2
2571:1,2
2599:20
2601:24
2604:4,15
2607:2,7,8
,9 2613:18
2618:14
2619:7,13
2620:17,21
2624:14
2625:12
2627:23
2628:18
2631:14
2649:25
2687:7

differences
2481:1
2490:13
2518:21
2533:18
2601:23
2627:10,12

different
2447:22
2448:5
2458:25
2459:12,23
2460:21
2462:5,19
2465:20
2471:5,10
2472:11,22
2479:3,14
2480:2,22
2482:6
2488:18
2495:6,8,1
7,22
2498:6
2505:24
2510:2

2518:2,6
2524:2,15
2534:23
2537:8
2538:2,3
2561:14
2562:17
2564:14
2571:8,13
2584:10
2626:16,17
2631:8,10
2661:6
2665:5
2666:13
2668:11,12
2669:12
2686:21
2693:7
2694:19
2695:2,7
2699:21

**differentiat
e** 2489:20
2490:6

differently
2455:11
2695:8

difficult
2510:12
2651:18

digest
2466:14

direct
2643:5
2656:22
2657:23
2691:23

direction
2506:6
2623:17
2706:15

**directionall
y** 2542:8
2615:2
2616:23

directions
2658:17

directly
2473:10

2474:25
2509:14
2657:17,18
2658:19

**disappointme
nt** 2458:23
2460:9,16
2462:13

disaster
2482:9

discount
2493:8,10,
18,21
2494:25
2495:3,6
2510:15,17
2517:25
2520:25
2521:13,15
,21
2522:8,13
2523:15
2524:5,6,1
1 2525:6
2528:17
2533:1,7
2535:5,13,
14,20
2537:2
2538:2,10,
13,14,20
2539:1,6,8
,11,20
2540:12,25
2541:2,4,7
,10,12,20
2542:4,9,2
3,25
2543:1,23,
25 2544:13
2545:18,19
2546:17
2547:4
2548:12
2549:17,24
2550:9,10
2612:23,24
2617:6
2618:24
2619:9

discounted
2538:19

2539:9,10
2540:8

discounting
2535:3,9
2544:9

discuss
2489:14
2554:23
2585:18
2602:24
2677:16

discussed
2488:2
2497:9
2646:5
2667:9,12
2671:2
2675:22
2676:16

discussing
2687:19

discussion
2479:22
2483:22
2490:7,23
2500:6
2543:12
2550:14
2567:21,23
,24
2568:3,24
2572:11
2576:19,22
2577:2
2578:3
2580:25
2588:1,4
2616:7,17
2621:1,24
2628:8
2631:4
2648:1
2686:14

discussions
2497:8
2645:19,25
2646:4,7,9
,12 2648:3

dispatch
2503:21
2508:23

2511:9

displace
2504:8,19
2651:3

displacement
2502:19
2504:1

display
2462:10
2504:7

distance
2538:24
2657:21
2658:1

distinct
2462:25
2475:2
2493:20
2495:2

distinction
2472:7

distribution
2482:6
2486:20
2489:1
2496:19,22
2523:8

diversity
2639:13

doctorate
2681:24

doctor's
2473:17

document
2496:6
2515:14
2519:2,5,7
2523:6,12
2526:2
2527:17
2529:2
2531:25
2535:8
2551:25
2552:18
2554:24
2559:21
2584:10
2600:14,18

,23 2603:3
2610:16
2613:17
2614:2
2665:24

documents
2444:6
2446:5
2456:19
2457:3
2463:17
2464:11
2466:8
2469:19
2492:13
2513:15,17
2515:1,4
2521:12
2528:20
2547:1
2551:5
2552:2,8
2579:24,25
2582:9,23
2593:1,24
2600:16
2610:14
2612:16
2621:6
2628:7
2636:2
2679:2

dollar
2479:11
2483:24
2499:24
2533:14,15
2625:4
2684:5
2695:15,22
2696:5

dollars
2479:12
2485:9
2491:8
2510:7,20,
21
2511:1,2
2562:13,14
,15
2603:14
2619:25

2653:24
2654:9,14,
17
2661:1,3
2662:21
2663:13,14
,16,17
2664:11
2671:21
2672:5,14
2686:17
2693:19

domestic
2448:4
2485:5,6
2684:12,17

done 2455:16
2458:20,24
,25
2459:4,11
2461:3
2462:5,19
2467:13,15
2474:10
2476:24
2479:24
2485:13,25
2486:6
2489:16
2490:11
2492:14
2495:13
2509:7,10
2513:4
2515:11
2518:22
2529:24
2532:4
2555:20
2574:10
2582:2
2593:20
2594:2
2597:16
2624:14
2629:3
2631:13
2677:9,10
2683:17
2686:8
2687:25
2694:15
2695:18

2700:10
2702:10,11

door 2620:8

Dor 2666:2
2667:19

Dorsey
2654:6
2656:19,22
,24
2657:16,23
2658:12,17
,23
2660:10
2666:1,2,6
2667:2,20
2668:2,8,1
6,17,22
2670:10,14
,16 2671:5

Dorsey/US
2657:8

Dorsey-US
2659:16

dotted
2629:14
2630:5
2631:15
2632:16

double
2701:21

doubt 2508:3

downside
2483:11,14
,16
2490:20
2491:6
2498:19
2499:5
2521:7
2523:4
2528:3,11
2549:11

dozen 2582:3

Dr 2442:23
2456:15
2457:6,9,1
2 2458:8
2460:6
2461:7,10,

25 2464:22
2466:6,11,
15,17,22
2467:7,11
2469:21,23
2470:4
2471:6
2472:14,21
2473:19
2474:21
2476:2
2477:13,18
2478:20,22
2479:2,3,1
9 2482:3
2485:21
2487:6
2488:4,17,
20
2489:1,4,2
2 2490:8
2495:10
2496:16
2497:6
2499:2,10
2500:5,6
2502:2,16,
17,21,22
2503:3,4,5
,7,10,14,1
7,19
2504:10,12
,15,16,21,
22 2505:7
2506:24
2507:2,5,7
2508:2,5,7
,20,22
2509:2,10,
14 2510:22
2511:6,15,
16,19
2512:6,9,1
0 2513:4
2514:18,21
2527:10
2534:21,25
2535:2
2538:5
2539:13,16
2541:11
2542:21
2543:13
2550:14,23

2552:6,9,1
2,14
2553:1,22
2554:2,21
2555:14,19
,22
2556:11,25
2557:4,6
2559:8,18
2560:9,18
2561:13
2562:2
2569:8
2654:3,11,
15,19
2655:4,7,1
2,24
2656:4,7,1
2,18
2657:13
2658:11,14
2659:13,17
,21,23
2660:1,4,2
4 2661:15
2662:14
2663:12
2665:4,8,1
2,18,22
2666:20,24
2667:14,19
2668:16,20
,22
2669:21
2670:21
2671:3,8,1
9 2673:21
2674:13,19
2679:9,15,
24
2680:4,21
2681:1,6,1
0 2683:21
2685:1
2688:16,21
2689:1

draw 2493:7

drive
2492:16

driven
2556:18

drivers

2600:9
2619:15
2668:12

drives
2671:21

driving
2481:13
2605:2

drop 2449:3
2483:24

dropping
2660:10

drops 2450:7

drought
2621:5
2622:11,22
2623:6,8,1
9
2629:5,23
2632:15,22
,23,24
2633:1,4,1
4
2634:9,17
2636:20

droughts
2622:21
2695:5

Drs 2453:22

DSM 2446:12
2447:13,18
,19,22
2448:5,12,
13,18,19,2
0,24
2449:18,19
,21,22,24
2450:4,8,1
1
2578:9,14
2589:3,14,
16 2592:12
2613:7,25
2614:14,23
2615:12
2616:14
2617:19,23
2618:1
2620:23
2641:7

2706:25

du 2597:25

due 2498:23
2546:13
2604:25
2657:23
2658:15
2682:3
2706:15

Duluth
2660:12

during
2495:21
2553:14
2596:9
2636:14,17
,18
2638:15
2695:5

dust 2531:17
2615:19,22

dynamic
2560:4,15

———————
E
———————

earl
2567:9,10

earlier
2447:24
2453:18
2456:2
2467:6
2483:4
2504:1
2511:7
2575:1
2590:6
2594:24
2597:3,10
2598:24
2643:9
2669:25
2673:18
2678:8,11
2703:16
2707:7

early
2541:16
2588:12

earned
2628:20
2629:6

easier
2446:20
2465:19
2466:2
2672:3

easily
2465:22

east 2657:17

eastern
2659:4

economic
2447:19
2449:14
2457:19
2479:23
2480:7
2486:1
2488:6
2489:6
2495:1,5
2503:21
2504:24
2507:21
2508:23
2512:10
2514:17
2533:5,6
2534:9
2537:3,9
2603:14
2643:10
2644:1
2692:22
2702:4

economics
2465:21
2480:11
2481:11
2484:10,16
2494:6
2508:24
2512:18
2537:12
2589:1,4
2652:1

economist
2507:18
2508:4

2512:11

economy
2486:4
2651:4
2694:11

economy-wide
2506:10
2507:10

Ed 2442:16
2447:8,10
2454:1,8
2464:8,15,
24 2465:13
2480:16,17
2482:17
2486:23
2488:10,19
,25
2489:3,15
2491:21
2492:21
2494:20
2497:16
2524:21
2531:18
2539:12
2540:13
2541:24
2543:21
2544:14
2545:2,4,7
,25
2546:6,11,
16
2547:11,14
,18,22,25
2548:2,6,1
0,15,20,23
2549:3,22
2550:1,4,1
2,17,21
2566:22
2567:1,16,
19 2573:20
2574:1,12
2576:24
2579:4
2582:10,13
2583:13
2584:23
2585:6
2586:7,16

2587:8,22
2589:15,21
2592:1,8,1
4
2593:15,18
2594:6,12,
15,21
2595:12,18
,23
2596:2,12,
18,23
2601:15
2615:4,21
2620:2
2637:9
2677:8
2681:16,22
2683:6,17
2684:6,11,
15
2685:18,21
2686:7
2687:8,24
2688:17,19
,24
2689:3,11,
14,18,22
2690:13,16
,25
2691:8,10,
14 2692:1
2693:13
2694:21
2695:14
2703:13
2704:2

educate
2694:18

effect
2447:17
2510:18
2533:9
2535:22
2536:8,9,1
0,12
2549:4
2568:22
2569:3
2606:5,8
2619:12
2620:15
2622:14

2693:24

effective
2507:19

effectively
2454:21,24
2460:20
2468:19
2497:1

effects
2512:16
2533:23
2600:1

efficiency
2507:22

efficient
2490:19
2507:20

effort
2453:2
2490:12
2558:2
2618:8

efforts
2569:24
2706:6

eight
2503:23
2525:7
2537:20
2541:1,5
2544:1
2552:23
2554:7
2562:13
2607:4
2617:25
2621:15
2689:23
2694:3

eighteen
2699:14,15

eight-five
2530:6

**eight-five-
seven**
2532:13

eight-seven
2606:14

eighty
2511:2
2531:13

eighty-nine
2522:25
2525:12

eighty-one
2654:20
2661:10

EIS 2677:5

either
2458:3
2506:5
2507:20
2510:4

elastici
2614:22

elasticity
2614:22

electric
2457:14
2506:9
2553:11
2679:10

electricity
2499:18
2553:11
2554:9
2555:23
2559:4
2563:7
2566:2
2571:10

**electromagne
tic**
2561:5,11

element
2468:5

elements
2468:16

eliminates
2563:11

else 2474:10
2477:23
2502:5
2506:19
2524:1
2561:12

2587:10
2628:11
2643:16
2707:21

elsewhere
2480:4

email
2451:11

emer 2638:15

emergency
2637:25
2638:2,3,1
5

emission
2502:19

emissions
2504:5,8,1
9
2505:2,16,
17,18,22,2
3
2506:9,10,
18,22
2507:21,22
2509:25
2510:16

emitting
2508:17
2510:18

emotion
2462:14

emphasize
2560:14

employment
2487:11

empty
2456:10
2694:2

end-all
2480:14

energy
2484:11,19
2499:15,23
2500:2,4,2
3
2501:2,9,1
5 2517:24
2520:25

2521:12,15
,21
2522:12
2523:14
2524:4,10
2525:6
2540:20
2543:23
2545:17
2547:4
2548:12
2563:15
2564:2,5,2
3
2565:4,8,1
0,13,15
2566:10,18
2567:4
2568:17
2569:15
2570:15,19
,20
2572:19
2573:4
2577:6,8
2578:14
2579:13
2617:5
2618:24
2619:1
2620:12
2626:1,2,9
,10,22,24
2638:12,14
,25
2639:2,4,8
2640:10,14
,15,17
2650:13,18
2681:21
2684:2
2685:12
2686:5,21
2694:19
2695:4,5,1
2 2698:13
2700:9

engineering
2555:2,13
2556:1,4,1
0,24
2557:7,25
2558:8

2559:3
2563:6
2571:9

enhance
2597:18

enhanced
2597:14
2613:7

enhancement
2684:16

enlighten
2464:22

ensure
2510:12
2687:3

enter
2577:10
2645:8
2650:20
2706:2

entered
2604:17

entering
2588:8

entire
2478:14
2515:21
2535:24,25
2536:2,9,1
2 2537:24
2569:17
2620:9
2643:11

entirely
2556:3
2590:5

entitled
2529:19

entity
2651:2

environment
2511:4
2674:11,16

**environmenta
l** 2485:11
2597:5
2676:17

equal 2483:4

equipment
2514:1,2
2662:14

equity
2483:7
2493:12

equivalent
2457:23
2605:7
2606:15,20
,21
2662:20,25
2663:23
2672:3,4,8

erroneously
2628:6

errors
2558:19

escalation
2599:4,7
2661:2
2662:13

especially
2564:15

espouse
2556:9

essence
2458:22
2474:11
2475:1,20
2517:14,16
2518:18,24
2664:1

essentially
2473:11
2474:8
2475:16,20
2496:21
2517:11
2536:11
2539:5,6
2563:22
2564:17
2646:22

establish
2626:10,13
,14

established
2505:2

estimate
2455:5,6,7
2481:6
2493:18
2571:9,15
2575:8,12
2593:12
2594:10,19
2595:17,20
,21
2596:10,16
,24,25
2597:3,13,
24
2599:10,18
2600:2
2601:4
2609:10,16
,24,25
2610:3,11,
16,19,22
2611:1
2654:23
2657:22
2663:20,21
,22
2664:3,5,1
1 2675:2
2682:1

estimated
2593:7
2609:7
2610:23
2657:21

estimates
2511:3
2592:18
2594:24
2596:22
2600:19,20
,24
2673:23,24
2675:9,13
2682:19,21

estimating
2455:19
2597:14

estimation
2455:21

et 2559:6
2592:12
2611:14
2626:15
2634:7
2635:15

evaluate
2447:19
2574:22
2583:15
2588:15

evaluated
2684:21

evaluation
2448:1,2
2455:11
2479:23,25
2486:1,6
2488:6
2489:6
2495:2,5,2
1 2695:17
2706:22,24

evaluations
2446:12

event
2502:11
2538:19
2543:5
2667:1

events
2637:2
2638:15

eventually
2643:1

everybody
2587:10
2678:2
2706:7

everybody's
2678:6

everyone
2493:4
2502:4
2649:9
2707:21
2708:2

everyone's

2492:16

everything
2460:11
2461:2
2477:19
2589:2
2681:17
2684:4
2697:2

everything's
2680:16

everywhere
2469:2

evidence
2460:22
2462:1
2508:11
2561:23
2580:15
2675:21,22

exact
2534:19
2562:11

exactly
2480:1
2485:16
2490:18
2562:10

examination
2452:16
2676:16
2678:10

example
2487:10,25
2509:19
2515:19,24
2521:11
2528:19
2548:19
2555:22
2570:3
2578:19
2579:10
2585:17
2590:4
2618:11
2624:10
2627:2
2628:18
2690:1

2693:3,16

exceed
2505:12
2506:5

exceeded
2506:5

exceeds
2701:19

except
2461:19
2520:8
2523:6
2549:12

exclude
2676:23

excluded
2514:19
2516:19
2608:13

excluding
2526:15
2548:17
2661:1

exclusion
2517:3

excuse
2484:3
2502:13

executive
2463:11
2464:5,12
2465:13,17
,25 2466:5

exemplified
2704:6

exercise
2518:1
2555:11
2588:15
2589:1
2612:7,9
2673:25
2703:10

exhausted
2641:20

exhibit
2444:2
2445:10

2446:10,16
2451:1,3,1
6 2452:25
2453:5
2456:22
2457:1,3
2458:2
2492:14
2514:15
2516:11,20
,21
2519:2,3
2540:16
2549:20
2551:1,7,2
1 2573:9
2580:1
2584:10,11
2612:16,17
2615:6
2653:19
2656:1,17
2659:12
2661:21
2664:12
2672:18
2675:7
2679:1,3
2695:17
2696:13
2702:24
2703:5
2707:11

Exhibits
2442:3
2444:1

exist 2551:3
2600:23
2640:2

existed
2553:12

existence
2553:15

existing
2657:18
2658:19
2665:6
2666:25
2667:20,24
2670:14

exists

2549:17
2569:19

expand
2514:22
2597:3,9

expanded
2454:4,6
2578:9

expect
2449:10
2532:24
2538:21
2542:6,20
2563:5
2585:1
2616:23
2617:3,8,9
2619:6
2620:21
2631:1
2635:11

expectation
2457:17,21
2475:16,17
2582:16
2610:6,8

expectations
2682:5

expected
2453:3
2457:8,10,
22,24
2459:13,19
2460:21
2470:20
2471:15
2473:6
2474:2
2475:14
2477:14
2478:25
2479:1
2480:9,19,
21,23
2481:7
2482:5,10
2483:1
2485:16
2490:13,20
2491:1,7
2497:25

2498:12,14
2511:18
2523:6
2589:10
2598:18
2616:20,23
2617:10,16
,20
2618:5,14,
17
2619:7,19,
23 2620:18
2622:21
2633:13
2685:12
2686:3,5
2705:20

expecting
2521:19
2542:17
2696:10

expects
2566:14

expedited
2514:25

expenditure
2539:23

expenditures
2538:17
2540:3

expense
2534:6

expenses
2534:13,15

expensive
2544:23
2591:4
2694:2

experience
2473:3
2475:13
2692:9
2696:25
2697:22
2699:21
2701:2,20
2703:24

experienced
2701:5

experiences
2692:8
2698:2

experiencing
2636:19

expert
2481:22
2554:4

experts
2452:8
2462:12
2481:24

expiration
2524:23

expires
2647:21

expla
2600:14

explain
2445:7
2457:13
2467:8
2532:20
2534:22,24
2584:9
2609:1
2610:15
2625:22
2628:18
2636:11
2657:14
2658:7
2680:2,19
2702:22
2703:1

explained
2483:4
2567:14
2581:20
2610:2
2643:4

explaining
2448:22
2593:25

explanation
2447:11
2465:14
2582:20
2600:12,14

2601:11,20,23
2602:3,14
2628:3
2637:17
2664:23

explore
2528:16
2649:13
2676:24

expo 2650:5

export
2481:15
2484:1
2517:5
2539:3
2571:20
2577:16
2578:13,22
2579:14
2583:2,3,11
2588:17,18
2589:5
2634:15
2641:16
2650:5
2670:15,16
2704:25

exportation
2680:6

exported
2504:6

exports
2485:4,10
2504:19
2506:17
2650:11
2684:10

exposed
2562:23
2583:21

exposes
2625:16
2647:8

expressing
2541:18

extend
2512:15

extended
2482:15

extensive
2553:6
2694:14

extent
2458:15
2512:19
2553:23
2554:1
2563:13
2644:10,11
2647:4
2648:11
2652:4,19

external
2691:23

externalities
2509:1,4,6
2511:8
2512:17

externality
2511:17

extra
2565:17

extract
2477:4
2515:3,7
2592:25

extraprovincial
2630:8,10

extreme
2521:14,16
2522:20
2525:6
2527:20
2528:2
2543:19
2636:18
2693:16

extremely
2520:19
2560:3

extremes
2522:7

eye 2503:8

———
F
———
face 2652:23

facilitate
2670:5,7

facilitates
2667:3

facilities
2564:3
2655:15,19,21
2656:10
2668:9

facility
2529:13
2564:4,5
2653:12
2664:2
2668:3
2670:7
2675:13,14

facing
2560:22
2568:8

fact 2462:11
2472:10
2473:25
2476:6
2479:15
2490:17
2527:7
2535:3,8,10 2536:3,6
2543:4
2585:10
2632:3
2647:6
2648:3
2649:1
2666:17
2702:14

factor
2564:17
2686:17,20
2689:8,9

factors
2481:20
2511:25
2512:2,5
2520:9

2549:4
2554:5
2558:3
2578:13
2588:11
2599:10
2616:14
2617:5

failure
2508:10,15
2578:20
2579:12

fair 2485:25
2544:5
2607:12
2621:24,25
2623:20
2627:22
2637:5
2640:12
2643:24
2644:3
2650:2
2680:15
2692:25

fairly
2472:6
2514:14,25
2538:19
2540:8
2600:18
2601:7
2608:23
2627:20
2694:14

fairness
2466:13

fall 2588:9

falls 2588:2

false
2542:24

familiar
2500:11
2505:9
2508:3,19,20 2557:22

fancy
2460:14

fantasy

2561:8

fare 2623:18

fared
2500:14

Fargo
2660:11

farther
2558:13

fascia
2654:21

favour
2562:7

favourable
2449:11
2588:17

favourably
2459:9

features
2583:14

federal
2509:21,22
2511:4

Federation
2453:24

fee
2489:18,22
2490:5
2507:17

feel 2460:12
2462:20
2490:21
2575:13

feeling
2462:20

felt 2458:20
2461:3
2498:25
2507:8
2575:9
2594:1

field
2462:12
2556:15

fields
2561:5,11

fifteen

2538:18
2540:5,7
2591:20
2639:18
2641:2
2644:24

fifty
2483:25
2543:2
2546:18
2661:2,7
2666:11
2679:17
2688:20

fifty-five
2691:6

figure
2674:2

file 2446:8
2551:11

filed
2514:15

filing
2463:11
2614:9

filings
2463:4
2606:25

final
2593:21

finalizing
2594:19

finally
2683:3

finance
2493:15
2534:6

financial
2447:22
2448:6,7
2457:19,21
2479:25
2493:11
2494:16
2495:21,25
2533:5,21
2534:10,16
2537:13

2553:4
2555:25
2556:9,24
2557:12
2558:1,24
2629:17
2630:7

financially
2556:18

financials
2534:5

financing
2533:23

fine 2456:3
2514:23
2673:25
2707:9

fingers
2659:6

finish
2598:21,23
2609:3
2641:7

finished
2577:8
2601:4

firm
2505:11,14
2509:11
2563:14
2567:6
2568:25
2569:1
2577:6,9,1
7 2620:12
2639:23
2651:8,11
2697:7
2698:13

firms
2556:15

first
2450:20
2465:19
2466:10
2467:1
2471:20
2480:19
2483:3,15

2490:4
2514:13
2535:1
2536:14
2539:17
2540:4
2552:6
2562:20
2574:15
2577:5
2592:23
2603:3,8
2612:5
2621:10
2622:23
2642:22
2653:18,21
2657:9
2661:25
2678:24
2679:7
2680:8
2690:22

firstly
2522:19
2527:18
2528:21
2555:11
2564:25
2565:3
2642:23

fit 2592:18
2637:20
2664:5
2706:13

five 2455:4
2503:24
2522:23
2525:7,8
2542:11,12
2557:14
2558:14
2607:14
2619:10,11
,24
2623:6,8,1
8 2633:4
2637:18
2672:25
2700:13
2702:6
2705:9

fix 2501:20
2536:20
2565:10
2566:9

fixed
2459:16,18
2467:18
2468:24
2477:15
2515:25
2516:1
2529:19
2563:10,20
2590:6
2620:13

fixed-based
2461:14

fixed-price
2565:4

fixing
2566:1

flattens
2688:8

fleshed
2495:15

flexibility
2583:8
2704:22
2705:18

flip 2530:11
2568:19
2609:3
2613:16
2614:1
2616:1
2638:16

flips 2541:4

floor
2477:25

flow 2533:13
2537:24
2629:23
2630:13,14
,25
2632:3,4
2633:1,3
2634:18,19
,20
2635:5,6,9

,10
2693:21

flow-related
2629:20

flows
2534:3,8
2535:25
2536:11
2538:25
2627:21
2630:3

fluke
2665:19,21

Flynn
2442:10
2447:2
2463:6,24
2464:2
2522:10
2523:23
2524:9,20
2526:8,12,
17
2527:5,15,
24
2528:4,9,1
3,24
2529:4,8
2544:16
2551:10,14
,20
2569:16
2570:10
2571:12
2572:3,23
2573:1,6
2612:25
2613:4,9,1
5,23
2614:10,18
,25 2615:3
2616:11,15
,21
2617:3,9
2618:6,22
2620:7
2621:2
2662:7,9,1
0 2663:11
2664:10
2665:23
2666:1,6,9

,13,16
2672:1
2686:18
2707:3,10

Flynn's
2687:13

focus
2471:21
2482:24
2495:23
2498:2
2557:23
2559:25
2568:12
2575:20
2655:19

focussed
2480:8
2497:19

focussing
2471:14
2472:9
2527:18
2575:22

follow-up
2675:10

foot 2496:14

footnote
2503:25
2504:11

Forbes
2658:20,23
2667:20

fore 2569:12

forecast
2538:3
2555:6
2556:3,15
2557:19,24
2558:19,22
2559:10,15
2562:9
2566:11,13
,15,17
2569:11,13
,17,23
2570:2,5,1
7,18
2571:4,7,1

4 2573:14
2576:21
2577:15,17
,19,21,25
2615:10
2619:2
2630:9,21,
22 2633:9
2660:22
2666:10
2697:8,23
2698:15,21
2699:14
2702:6
2703:9

forecasted
2558:20

forecasters
2562:9
2572:4

forecasting
2553:25
2555:17
2569:10
2608:23
2633:12
2635:13
2699:7
2701:5,10
2703:19

forecasts
2553:10
2554:11
2555:21,23
2556:20,22
2557:21
2564:22
2570:7
2571:24
2583:3
2630:7,8
2699:2,5,1
9 2700:3
2702:10,11

foreign
2651:2

form 2458:11
2507:14
2661:13
2673:8,9

formal

2706:12

format
2503:15

formed
2598:7

former
2527:19

forms
2516:20

formulation
2602:13

forty 2510:5
2511:1
2522:22
2529:16
2546:18
2564:18
2621:14

forty-five
2614:17

forty-four
2454:19

forty-one
2522:21

forty-seven
2510:6

forty-three
2449:22
2510:6

forward
2554:17
2557:14,15
2558:12
2562:11
2563:4
2565:24
2589:6
2630:24
2632:20
2633:9
2634:13,19
2635:13
2637:13

forwards
2556:19
2557:12

fossil

2509:7,9

fourteen
2522:22

fourth
2485:13
2488:3
2490:7
2591:5
2674:16

frame
2535:25
2536:12

frankly
2469:6
2497:9
2627:24
2676:6

freeze
2694:1

Friday
2678:2

Friend
2456:6
2492:11

friends
2694:23
2696:8

front 2456:9
2458:2
2474:15
2503:8
2537:16
2570:2

frontier
2490:19

fruitful
2490:7
2707:22

fuel 2501:11
2555:5

fuels
2509:8,9

fulfill
2707:8

full 2461:10
2481:9
2559:23

2660:17

full-scale
2455:21

fully
2544:14
2597:4

function
2491:2

fundamental
2458:12
2467:11,14
,22
2468:17,22
2469:12
2472:2,3
2473:8,24
2508:15
2512:17
2704:15

**fundamentall
y** 2476:3

funding
2677:4

furthest
2658:18

future
2481:7
2482:19
2484:11
2499:15,18
,25
2501:10
2507:14
2510:17
2537:13
2538:24
2546:13
2559:1,5
2560:1
2562:13,17
2563:1,6
2574:4
2582:25
2592:2
2634:5,8
2667:4
2697:3
2700:17
2707:18

futures

2500:2
2558:12,14

G

GAC 2441:10

gamble
2479:11
2499:22

game 2678:3
2696:9

Gange
2441:10
2502:13,14

garage
2644:19

gas
2448:10,17
2458:16,18
,21
2459:15
2460:23
2461:1
2468:25
2476:16
2477:7,21
2478:11,15
2481:16
2482:4,11,
14
2483:14,23
2501:4,6
2504:8
2515:8,16
2516:2,5
2517:6,8,9
,10,11,17,
18,19
2518:7,10
2520:18
2522:6,14
2525:3
2526:20,21
2527:6,8,1
8,20
2528:2,11
2541:14
2542:3,10,
13
2544:22,25
2546:4,8,1
4,17,19,21

2547:3
2548:3,8
2549:5
2555:22
2558:5,11,
13,15,17,1
8,19,22,25
2559:1,3,5
2562:12
2568:10
2578:19,22
2579:10,14
2583:2
2584:20,25
2585:4,15
2587:1,6
2589:4
2590:10
2592:12
2622:20,22
2623:2
2624:4,8,9
,24
2625:10,14
2626:6,9
2627:4,6,1
8
2685:13,16
2686:4,16
2687:11
2689:25

gases
2508:17

GCC
2574:15,22

general
2459:9
2477:18
2499:6
2504:17
2512:7
2524:2
2593:5
2596:7
2597:7,11
2598:1
2599:16,25
2623:18
2698:4

generally
2460:2
2461:5

2496:10
2508:18
2565:25
2566:2
2623:17
2677:9
2704:20

generated
2486:7
2489:7

generating
2565:20
2627:20

generation
2503:21
2508:23,24
2567:5
2579:11
2584:20
2585:4,16,
18
2587:2,6
2634:23
2663:25
2704:24
2705:3

generations
2484:11

generator
2693:4

gentlemen
2452:11,17

George
2441:15

germane
2580:3

gets 2450:9
2598:15
2604:8

getting
2472:3
2474:21
2477:3
2480:25
2526:2
2563:18
2566:12
2574:15,16
2591:18

2595:11
2632:11,21
2644:23
2653:2
2670:22
2672:14
2689:10
2691:12
2703:10

gigawatt
2695:18

gigawatts
2564:9
2698:6,8
2699:8

given
2447:23
2452:7
2469:9
2500:3
2507:22
2542:22
2559:15
2573:17
2582:15
2634:18
2635:1
2674:16
2704:5
2706:2

gives 2448:6
2481:25
2498:5
2531:4
2583:7
2637:23
2697:9
2704:22
2705:2,6,1
8

giving
2477:6
2487:22
2544:7
2581:25
2660:9
2697:20

glad 2459:4

God 2494:18

gone 2458:5

2465:9
2609:12
2614:3
2617:17,18
2621:17
2690:1

goodwill
2585:4,7

Gosselin
2440:13

government
2486:3
2509:21,22
2588:3,6
2589:10

government's
2511:4

GRA 2628:10

grace
2641:21

grade
2611:10

Grant
2440:17
2478:22
2479:3
2482:3
2485:21
2486:24
2488:4,17,
20
2489:1,4
2499:2
2527:10
2535:2
2538:5
2539:13,16
2541:11
2542:21
2543:13
2550:14
2616:19

Grant's
2487:6

graph
2527:18
2548:22
2549:8
2630:5

2682:24,25
2683:16
2684:22
2685:10
2697:9
2699:2,18
2702:5

graphics
2459:15

graphs
2571:18

GRAs 2631:19

great 2558:2
2574:3
2579:13
2643:3
2655:8

greater
2501:15
2507:20,21
2523:2
2541:12
2574:4,17
2593:10
2604:22
2612:11
2669:11
2682:9
2685:14

greatest
2499:14
2508:10

green 2526:4
2527:1
2628:21,24
2631:21
2683:2
2688:22
2691:6,11

greenhouse
2504:8
2508:17

Gregory
2552:12

grid 2667:25

gross 2697:7

group
2502:19

2559:10
2637:8

Group's
2559:15

growth
2578:14
2583:3
2696:22
2698:14,16
,24 2700:5
2704:6,11,
12,14,23
2705:2,3,1
7,19,22

GS 2529:2

guarantee
2489:18,22
2490:5
2499:20
2641:1

guaranteed
2584:24
2586:21
2587:4

guarantees
2499:17
2641:8

guess
2447:12
2487:17
2488:9,18
2511:22
2512:9
2538:20
2539:16
2541:18
2542:7,16
2548:2
2560:13
2564:21
2573:12
2587:13,14
2607:22
2626:19
2632:5
2657:25
2662:20
2676:1
2691:19
2696:1,4

2706:14

guessing
2695:25

guideline
2468:12

guidelines
2677:5

guy 2525:18

guys 2477:11

——————
H
——————
ha 2454:11

Hacault
2441:13
2442:25
2443:6
2450:18,19
2451:7,18,
22 2453:10
2502:7,8,1
4,25
2512:25
2513:7,8
2514:8,9,1
2,13,24
2515:6,11,
18,24
2516:4,9,1
5,18
2517:20,24
2519:1,24
2520:3,11,
16,24
2521:6,10,
24 2522:5
2523:9,24
2524:13
2525:17
2526:1,10,
14,19
2527:8,16
2528:1,5,1
0,15,25
2529:5,9,1
5,22
2530:4,10,
19,22
2531:3,7,1
3,15,19
2532:3,7,1
1,15

2533:4
2534:21
2536:14,18
2537:1
2543:9,10,
22 2544:21
2545:3,5,6
,13
2546:2,7,1
5,23
2547:9,12,
15,20,24
2548:1,4,7
,11,16,21,
24
2549:16,23
2550:2,5,1
3,18,22
2551:13,16
,25
2552:6,10,
16 2553:2
2554:13,22
2555:18
2556:6,25
2559:20
2562:1
2563:13
2564:1,6,2
0
2566:6,21
2567:11,18
2569:5,21
2570:25
2571:16
2572:10
2576:13,14
,17,18
2579:1,19,
20
2580:13,22
2581:19
2582:8,12,
19 2583:18
2584:8,15
2585:2
2586:2,9
2587:5,11
2591:15,16
2592:5,9,1
5,23
2593:17,22
2594:7,14,
17

2595:8,14,
22,25
2596:6,13,
19 2600:11
2601:14,18
2602:11,12
,17,22
2603:8,15,
24
2604:8,13
2605:3,9,1
5
2606:13,22
2607:12,21
2608:3,7,1
1,24
2609:9,18,
22 2610:13
2611:18
2612:14,21
2613:1,5,1
2,16,24
2614:13,20
2615:1,18
2616:1,6,1
2,16,22
2617:7,13
2618:9
2619:18
2620:3,20
2621:4,10,
19,22
2622:2,8,1
9
2623:1,4,9
,13,16,22
2624:3,8,1
5,18
2625:1,9
2626:4
2627:13
2628:5,15,
17
2629:2,13,
22
2631:5,18
2632:9,12,
13,14,22
2633:19
2634:2,3
2635:19
2636:6,7,2
5
2637:3,11,

15
2638:10,16
,24
2639:7,11,
24
2640:12,23
2641:6,20
2677:21,23
2678:1,8,1
7,20,21
2679:7,12,
22,25
2680:18,23
2681:3,7,1
2,18
2682:23
2683:12
2684:3,9,1
4,18
2685:6,19,
25
2687:1,17
2689:7,12,
16,21
2690:11,15
,18
2691:1,9,1
3,19
2692:25
2694:17
2695:11
2696:7,24
2697:5,19
2698:12,25
2699:12,16
2700:15,18
2701:7,14
2702:1
2703:7,8,2
3 2705:25

half 2502:11
2657:25
2658:1
2674:23
2690:17

Hamlin
2442:11
2447:3
2510:23

Hamm 2552:13

hand 2532:1
2558:6

2588:22
2597:8
2616:10
2693:22

handle
2566:8
2677:13

happen
2518:7
2539:2
2540:17
2561:20
2585:1
2690:6
2697:3

happened
2462:4
2468:13,20
2518:19
2573:12
2594:1,23
2596:9
2598:16
2599:15
2657:5
2692:17,18

happens
2447:21
2483:16
2525:5
2530:24
2561:10
2704:9,14

happily
2584:6

happy
2474:24
2476:17,18
2583:23
2699:23
2700:1
2706:8

hard 2451:11
2556:12

harm 2509:7
2648:19
2649:6

hate 2615:18
2657:24,25

haven't
2561:2
2591:5
2601:2
2700:23
2701:1

having
2458:5
2465:17
2467:4
2468:18
2471:22
2478:5
2479:22
2482:19,25
2518:25
2524:2
2574:16
2575:9
2634:6
2651:10
2652:20
2678:14
2695:5
2704:21

head 2499:12

heading
2529:2
2603:4

heads
2657:20

heard
2448:14
2455:12
2527:6
2561:6
2589:12
2590:12
2595:15
2646:20
2678:14

hearing
2552:24
2578:21
2593:16,18
2601:9
2625:3
2703:11

hearings
2600:16

heart
2653:15

heat 2693:3

heavily
2538:19
2539:9
2568:14

heck 2543:1

he'd 2561:13

hedge 2563:2
2705:22

HELD 2440:20

hello
2494:19
2503:14
2654:2

help 2478:18
2485:1
2488:11
2535:1
2562:5
2574:22
2610:14
2624:6
2625:23
2647:5,19
2674:9
2685:25
2704:25

helpful
2463:13
2468:11
2480:18
2537:17
2582:20,21
2662:11
2706:1

helps 2471:7
2482:2
2494:22
2563:9,24
2582:9
2596:21
2648:13
2704:25

he's 2562:2
2654:1
2681:10

hesitate
2472:22
2473:1
2512:4

high 2445:3
2480:3
2481:15
2487:13
2498:15
2501:7
2519:12,16
2521:15,18
,21
2522:13
2524:5,6,1
0,11
2525:7
2538:13
2541:4
2573:14,19
,25
2574:9,11,
23
2575:6,9
2578:22
2579:15
2602:6,14
2604:21
2605:7,8,1
3,19
2606:21
2607:4,10
2609:6,12
2611:22
2626:1,2,1
3 2635:9
2695:10
2698:20
2702:11
2705:22

higher
2483:6
2484:23
2487:22
2521:13
2526:3
2536:4
2539:6,7
2550:9,10
2574:9
2576:1
2593:6
2599:25

2606:23
2607:6
2611:23
2625:7,8
2627:4
2631:14,21
2632:4
2635:5
2650:22
2654:22
2703:18
2704:11,12
,23
2705:1,20

highest
2524:16
2525:11

high-level
2601:11
2602:2

highlight
2598:5

highly
2540:8
2556:21

high-price
2626:14
2627:5

Hill 2456:25

HILL-7-2
2444:6
2457:3

historic
2696:21

historical
2445:8
2558:17,18
,19
2702:23
2703:2

history
2660:9
2699:22
2700:11,13

hit 2595:17
2609:24
2610:5,18
2697:22

hockey
2696:9

Hombach
2441:3
2456:6,8
2677:24
2678:4
2707:12

home 2693:4

hope 2460:2
2482:2
2514:14
2618:1
2694:24
2707:1

hoped
2598:23

hopefully
2564:22
2570:3
2574:14
2577:13
2591:17
2625:22
2669:21
2678:22
2706:3

hoping
2583:5
2649:12

horizon
2540:5
2557:16

hour 2456:4
2502:10,11
2603:1
2637:18
2638:3
2678:16
2682:13
2694:2,3

hourly
2487:16,17

hours
2680:19,22
2693:25
2695:18

house 2478:5
2644:9,10,

11,12,14

householder
2680:20

how's
2599:13

huge 2482:23
2539:23
2542:22
2544:24
2546:12,13
2624:20
2693:20

hugely
2694:1

Hugh 2440:17
2478:22
2479:3
2482:3
2485:21
2488:4,17,
20
2489:1,4
2499:2
2538:5
2539:16
2541:11
2542:21

hundred
2479:11,12
2510:19
2531:8,17,
18,20
2599:22
2613:14
2619:24
2639:19
2661:2,7
2666:10
2682:16
2688:14
2689:23
2691:6

Hyd 2451:23

hydraulic
2627:19

hydro 2440:7
2441:5
2442:6
2444:5
2445:3,7

2446:10,11
,13,23
2447:12,15
2448:3
2449:6
2450:24
2451:5,23
2452:3,12
2453:5
2454:4,10
2461:17
2462:7
2463:4
2468:3
2469:13
2477:12
2479:9
2484:10
2485:1,25
2486:10
2487:16,20
2488:22
2491:5,18
2492:14,24
2494:4,8
2495:13,20
2497:16
2499:13,16
2500:19
2503:25
2504:5,7,1
9 2505:3
2514:16
2518:11
2519:3
2523:3
2552:7,21,
24 2553:18
2555:21
2556:8,14
2557:24
2562:8
2563:17
2564:5,21
2565:5
2566:14
2567:3,6
2568:18,23
2571:8
2572:12
2577:22
2578:7,16,
17
2579:7,8

2580:16
2581:5
2582:16
2583:24,25
2585:10,16
2586:23
2589:23
2590:20,25
2592:4
2594:2
2597:17
2599:1
2600:6
2602:5,24
2620:11
2621:11,14
2622:4
2626:23
2628:2
2629:3
2636:12,15
2643:10,25
2645:3,12,
19
2646:3,14
2647:1,18
2648:13
2649:19
2650:19
2651:1,9
2652:4,11,
17 2653:4
2662:11
2664:12
2672:18
2674:8
2675:12
2676:9
2679:14
2680:11,24
2681:5
2683:13
2684:21
2686:9
2692:3,5,6
,8,11,16
2693:5
2696:13,16
2697:12
2698:2
2699:22,23
2700:22
2701:5
2702:21

2703:1,24	2702:1	**IEC** 2441:21	2526:24	2595:8,14
2705:14				2596:2
2706:5,23	**I'd** 2458:25	**ignored**	**I'm** 2453:24	2600:13
2707:24	2459:22	2447:16	2454:6	2603:7,20
	2461:3		2456:5	2607:19
Hydro-104	2467:20,21	**ignores**	2458:19	2609:3
2540:18	2473:22	2651:11	2459:4	2618:22
	2474:24		2461:1	2630:17
hydrology	2480:13	**II** 2676:7	2463:18	2635:22
2627:16	2492:10		2466:12	2653:15
	2493:6	**III** 2667:4	2467:25	2654:3
Hydro's	2511:22	2675:1,9,1	2468:19	2655:18
2440:9	2513:23	4,23	2474:14	2658:4,16
2448:19	2528:16		2475:21	2661:15,22
2470:13	2531:19	**I'll** 2447:11	2476:21	2663:20
2477:6	2543:11	2464:7	2477:3	2667:14
2486:2	2551:5	2480:15,18	2480:8,17	2672:16
2489:12	2557:2	2488:8	2481:22,23	2676:4
2492:1	2567:9	2495:11	,24 2487:1	2678:1,3,6
2494:11	2568:15	2497:6,12	2492:15	2682:24
2506:17	2602:1,22	2503:4,7	2495:11	2683:18
2515:3	2603:3	2505:17	2496:6	2688:24,25
2557:18	2621:4	2514:22,23	2499:9,14	2689:2,14
2559:11	2623:20	2519:19	2500:1,10,	2691:19
2560:7	2627:25	2543:7	11 2503:24	2693:3
2566:17	2649:12	2546:25	2504:10,16	2695:24
2570:8	2652:3	2564:24	,22 2505:5	2696:11
2637:20	2699:1	2566:7,23	2506:23	2697:19
2645:21	2703:13,14	2569:7	2511:20	2698:22
2647:8		2574:12,14	2513:4	2700:1
2648:3	**idea** 2466:23	2575:24	2514:24	2703:8
2651:20	2469:14	2577:1	2519:4	2706:2,11
2653:19	2512:16	2597:1,2	2524:21,22	2707:7
2701:2,19	2535:12	2601:19	2525:18	
2702:22	2544:12	2608:25	2527:24	**imagine**
	2618:4	2609:2	2531:16,20	2591:7
hyperbolic	2646:13	2618:10	2538:20	
2535:3,9	2649:13	2629:25	2541:8	**immediate**
2543:3		2631:4	2542:23	2693:5
	identical	2633:20	2543:5,16	
hypothetical	2482:5	2641:6	2545:2,4,7	**immediately**
2584:7	2483:1	2642:10,25	2546:2	2658:25
2585:3		2649:10,11	2549:24	
2586:1	**identified**	2653:18	2552:24	**immensely**
	2559:24	2655:16	2554:14	2486:16
	2614:21	2659:13	2557:19	
___I___	2621:17	2663:4	2562:2	**impact**
i.e 2505:11	2638:18	2664:11	2566:8,12	2446:13
	2672:10	2665:9	2572:15	2448:2
Ian 2442:15		2672:17	2573:22	2468:7
2447:7	**identify**	2673:14	2580:24	2486:3
2494:3	2451:25	2676:14	2587:13	2491:24
2495:18,19	2674:9	2679:9	2591:17	2512:12
2533:3		2683:9	2592:15	2535:18
2536:17,23	**identifying**	2693:15		2537:4
2537:10	2625:3			2541:20,21
2538:25		**illustrated**		2546:4

2547:17
2549:10
2605:10
2613:10
2632:15,24
2676:25
2682:15
2691:25
2693:2,5,1
0 2695:6

impacts
2447:16
2448:3
2620:15
2622:21
2626:23
2627:17
2647:25
2674:10
2677:1
2692:12
2695:7

implications
2462:11
2558:9
2693:7

implicit
2589:16

imply 2449:9
2700:17

import
2517:7
2567:5
2634:21
2667:2
2705:18

importance
2481:6
2642:19
2695:22

important
2452:2
2481:9
2510:14
2524:23
2533:4
2538:15
2540:14
2549:10
2558:5
2562:25

2606:2
2616:20
2633:16
2634:2
2703:10

importing
2636:21

improve
2455:18
2668:1

improved
2544:15
2555:24

improvement
2606:12

improves
2648:15

impute
2509:24

inaction
2508:13

**inappropriat
e** 2480:11

incentive
2446:13

include
2489:22,24
2508:25
2512:15
2569:13
2577:19
2578:20
2579:11
2591:24
2603:21,22
,25
2607:22,24
2613:6
2639:6,8
2671:7
2686:20
2690:21
2691:21
2692:2

included
2446:14
2511:9,17
2512:3,5,2
1 2514:4

2526:7,10,
12 2527:21
2567:15
2573:2
2639:3
2640:11
2656:16
2661:12
2662:6
2663:1
2668:18,25
2669:19

includes
2569:11
2605:11
2607:15
2608:19
2654:20
2662:3,24
2668:23

including
2448:3
2455:16
2514:16
2515:21
2549:4
2567:17
2578:13
2583:15
2585:9
2588:17
2597:25
2603:4
2616:14
2640:17
2672:23
2703:20

inclusion
2524:24

income
2486:11
2629:19,20
2631:8
2633:23
2644:13

inconsistent
2555:8

incorporate
2544:19

incorporated
2595:5

2596:15
2599:3,7
2605:25

**incorporatio
n** 2672:23

incorrect
2472:20

increase
2449:9
2499:21
2506:19
2525:15
2573:18
2575:12
2599:20,23
2600:2
2603:13
2604:25
2605:2
2615:13
2650:13
2668:5

increased
2554:10
2573:15
2574:6,8
2575:25
2589:14,16
2598:20
2599:21
2613:11
2619:10
2650:15
2660:6
2673:17

increases
2448:25
2449:17
2450:1
2525:1
2601:21

increasing
2450:11
2574:18
2682:25

incremental
2517:18
2518:14
2634:5
2684:20

**incrementall
y** 2596:20

independent
2472:4
2601:8

index 2599:6

indicate
2625:11
2645:4
2656:16
2658:9

indicated
2447:25
2450:22
2452:13
2513:25
2583:7,10
2584:24
2615:8,10
2645:1,19
2649:15
2653:4,22
2654:9,17
2655:21
2656:3
2657:12
2659:10,11
2660:18,23
,25 2661:9
2663:10
2672:22
2673:16
2674:8
2675:1

indicates
2582:24
2664:25

indicating
2625:8

indication
2448:7
2498:5

indicative
2620:16

indirectly
2544:6
2703:16

individual
2481:12

2488:15
2498:8,19,
25

industrial
2682:12
2693:2

industrials
2693:11

industry
2560:3,5,1
4,22
2567:24
2568:8,14,
21
2693:7,14
2694:5,8,1
3,22

ineloquent
2706:7

information
2453:6
2470:24
2474:16
2481:19
2497:18
2544:18
2554:8
2556:18,19
2559:2,16
2562:12
2574:16,17
,20,22
2581:24
2598:1
2600:19
2601:16,21
2618:10
2676:4
2677:12
2683:13
2695:23
2696:3
2697:11
2700:19
2706:4

informed
2481:24
2545:7
2558:8

infrastructu

re 2597:4

inherent
2533:7

inherently
2533:8

initial
2501:20
2539:17,23
2540:3
2606:13
2675:14

initially
2538:11
2541:15
2628:7

input
2558:3,7,9
2674:9

inputted
2603:11

insensitive
2538:9

in-service
2578:10,12
2587:17,21
2607:8,9,1
3 2609:6
2660:6
2661:3
2662:21
2672:5,24
2677:1
2705:15

insight
2469:15
2557:1
2596:15

install
2585:15

instance
2491:23
2558:11
2625:15

instead
2459:4,9
2502:11
2561:10
2578:18

2579:9
2592:4,10
2688:11
2689:5
2690:8
2691:7
2698:19

integrated
2576:1
2630:7

intend
2551:11
2677:15

intended
2465:14
2605:16

intending
2613:7

intensive
2546:8,12

intent
2465:24
2586:18
2606:17
2692:4

**intentionall
y** 2582:2

intents
2684:7

inter
2687:20

interconnect
2586:11

**interconnect
ion**
2580:8,21
2584:17
2643:3
2687:9,19,
20 2689:19
2704:22

**interconnect
ions**
2651:18

interdecile
2496:18

interest

2462:22
2479:7
2528:18
2532:25
2533:1,8
2534:1,15
2537:4,7,2
2 2538:2,4
2542:10
2550:6,15,
16 2649:16
2661:1
2662:13

interested
2462:10
2557:17
2645:21

interests
2655:17

interface
2670:11

interject
2538:6

**internalizin
g**
2509:4,13
2512:16

**internationa
l** 2506:15

Internet
2560:20

**interpretati
on** 2497:20
2675:20

interrelated
2576:21

**interrogator
ies**
2695:16,20

interrupt
2545:5
2567:21
2689:2

interrupted
2682:12

interrupts
2693:21

intertie
2592:13

intervening
2554:7

Intervenors
2642:18
2708:1

Introduction
2493:14

introductory
2465:14
2466:1

intuition
2540:10

intuitively
2465:22
2539:21
2544:22
2545:14
2546:7
2627:15

invested
2491:8

investing
2587:20
2650:7
2652:5

investment
2483:6
2484:15
2493:13
2501:20
2522:1
2530:25
2535:18
2536:3,15
2537:18
2586:15
2613:3
2614:3,11
2644:14
2645:22
2649:19

investments
2478:7
2508:24
2535:6
2536:7

investor

2484:14	**issues**	2510:12	,16	2589:12
invite	2479:24	2512:14,24	2635:9,10	2595:15
2557:2	2480:1	2514:14	2637:12	2602:25
involved	2493:22	2515:20	2638:3,4,1	2610:1
2452:20	2536:8	2519:13	3 2643:18	2641:20
2511:23	2561:5	2520:8	2644:4	2649:10,12
2557:8	**it'd** 2686:20	2523:7,20	2647:7	2681:20
2636:2		2524:1,4	2651:19,23	2690:19
2703:20	**item** 2603:12	2527:12	2652:1,23,	2706:21
involvement	**items** 2453:4	2531:10,24	24 2653:3	
2559:7	2516:10,14	2533:4	2654:21	
	2655:1	2537:8,17	2656:20	J
involves		2538:20	2657:5,16	**Jacobson**
2508:15	**it'll** 2683:9	2539:23	2659:7,15	2442:13
IR	**it's** 2446:8	2540:2,14,	2662:25	2447:5
2466:8,14,	2447:14	16,19	2663:8	2647:12
18 2490:18	2448:5	2541:25	2664:1,2	2650:14
IRs 2451:25	2449:23	2542:4,14	2665:8,17	2653:25
	2450:3,10	2545:1	2666:14,24	2654:3,11,
Island	2457:9	2546:11	2667:4,22	15,19
2561:4	2458:3,10,	2552:19	2669:17	2655:4,7,1
isn't 2478:7	23 2459:6	2554:23	2670:6,16,	2,24
2484:9,14	2460:4	2561:14	17	2656:4,7,1
2498:7	2464:12	2562:7,8	2671:17,20	2,18
2527:13	2465:18,19	2565:10	2672:3,4	2657:13
2541:9	,22,23	2567:13	2679:2,3	2658:11,14
2580:17	2466:8,9,1	2568:15,18	2680:7	2659:13,17
2582:18	7 2469:4	,19	2682:4	,21,23
2633:23	2473:15,16	2570:15	2683:7	2660:1,4,2
2671:17	2474:22	2571:6	2684:11	4 2661:15
2695:23	2476:1,2,5	2576:3	2689:20	2662:14
	2477:5,11	2577:8,22	2691:15,22	2663:12,22
isolate	2478:8	2579:13	,23	2665:4,8,1
2689:8	2480:24	2581:20	2692:19	2,18,22
issue 2476:5	2481:6	2583:10	2693:23	2666:20,24
2478:8,24	2483:3	2584:7,10,	2694:4,15,	2667:14,19
2481:23	2485:17	17 2585:4	22	2668:16,20
2490:9	2486:21	2586:17,21	2697:1,3	,22
2495:3	2488:1	2587:25	2698:16,23	2669:21
2513:21	2489:19,23	2590:1,3,5	2700:4,9,1	2670:21
2514:16	2490:25	2592:16	3 2706:17	2671:3,8,1
2538:16	2491:14	2595:3,7	2707:22	9 2673:21
2543:3	2493:3	2599:5		2674:13,19
2555:15	2494:6,8	2600:7	**IV** 2552:1	2679:9,15,
2561:21	2496:17	2603:9	**I've**	24
2576:23	2497:10	2606:2	2471:9,14	2680:4,21
2585:15	2498:16,18	2609:15	2482:20	2681:1,6,1
2589:9	2500:8	2611:9	2492:14	0
2602:23	2501:13,18	2612:9,15	2499:11	2683:19,21
2603:3	2502:14	2619:23	2510:19,20	2685:1
2704:1,4	2504:13,16	2625:13	2511:9	2688:16,21
2706:9	2505:12	2629:3,16,	2550:22	2689:1
	2509:6	18,19	2553:16	**Jennifer**
		2634:13,15	2577:1	2442:19

2443:4

Jessica
2441:18
2453:13,14
,15,23
2454:3
2455:24
2642:12,15
,16
2643:8,15,
23
2644:6,20,
25
2645:14,18
,24
2646:8,17
2647:16,22
2648:24
2652:7
2653:9
2654:2,5,1
2,16,24
2655:6,10,
13,25
2656:6,8,1
4 2657:7
2658:3,13
2659:8,14,
19,22,24
2660:2,14
2661:5,17
2662:8
2663:3,18
2664:8,9,1
9,22
2665:7,11,
14,20,25
2666:4,8,1
2,18,22
2667:6,18
2668:13,18
,21
2669:5,10
2670:20,23
2671:6,24,
25 2672:12
2673:6,9,1
3,14
2674:7,18,
20
2675:18,19
2676:10,13
,14

2677:14

Jets 2678:2

Joanne
2442:10
2447:2
2463:6
2464:2
2479:20
2480:16
2522:10
2523:23
2524:9,20
2526:8,12,
17
2527:5,15,
24
2528:4,9,1
3,24
2529:4,8
2551:10,14
,20
2569:16
2570:10
2572:3,23
2573:1,6
2612:25
2613:4,9,1
5,23
2614
2614:10,18
,25 2615:3
2616:11,15
,21
2617:3,9
2618:6,22
2620:7
2621:2
2662:7,10
2663:11
2665:23
2666:1,6,9
,16 2672:1
2707:3,10

Joanne's
2566:22

job 2451:24
2599:14
2700:2

jobs 2651:4

judge 2495:9
2653:2

judgment

2651:19,20

jump 2502:24
2688:13,14
2690:23
2691:2,4,6

jumps
2688:7,9
2689:22

**justificatio
ns** 2600:17
2601:3

───────
K
───────

Kapitany
2440:14
2590:7,12,
19,23
2644:8

Keeyask
2445:5
2488:15
2528:19
2529:2
2530:7
2531:5
2532:9
2534:4
2535:17
2537:25
2573:12
2575:16,20
,22 2578:8
2580:7,21
2582:16
2584:16
2585:10,17
2586:10
2587:4
2588:5
2592:4,10
2593:11
2594:20
2595:10,11
,17
2596:10,16
,21,22,24
2600:24
2601:21
2602:8
2603:16
2609:16,23

2613:11
2624:11
2676:18
2677:2,11
2687:19
2688:16
2689:19
2690:21
2705:15

Keeyask/750
2589:13

**Keeyask/
Conawapa**
2688:4
2689:6

Keeyask/Gas
2525:11
2683:23
2685:13
2687:3,5,8
,13,16
2688:1,12,
22,23
2689:5

**Keeyask/
Gas/250**
2691:11

**Keeyask/
Gas/750**
2525:4,14

**Keeyask19/
C25**
2528:22

**Keeyask22/
Gas**
2685:20

Ken 2647:11

Kettle
2564:16

key 2598:7
2606:4
2679:18

kilometre
2653:22
2657:10
2659:9

kilometres
2657:22

kilowatt
2682:13

kinds
2559:18
2705:7

KIP 2597:4

knock 2452:4

knowledge
2514:1
2536:25
2655:23
2701:13

**knowledgeabl
e** 2553:24
2562:3

known 2668:2

Kuczek
2615:8

Kurt 2512:23
2513:5

kV 2636:20
2647:14
2653:23
2654:7
2657:8,10,
18
2658:9,19
2659:16
2660:20
2661:8,12,
19 2662:5
2664:23
2665:6
2666:2,25
2667:5,25
2669:16,18
,23 2671:7

kVs 2669:13

───────
L
───────

La
2458:6,15,
17 2466:9
2477:6
2486:9
2488:21
2489:25

labour

2487:19
2575:2,4,7
,11
2597:15
2598:9,10,
11,13,20
2605:20,25
2606:5

lack 2559:25

large
2469:13
2484:25
2498:13
2499:13,16
2501:20
2533:18
2538:12
2539:5
2541:6
2546:17
2554:21
2564:15
2597:16
2641:12

largely
2480:6
2556:3

larger
2511:17
2632:7
2645:8
2690:12
2691:3

largest
2487:18
2620:15
2625:2

Larry
2440:15

last 2452:7
2464:10
2474:13
2493:7
2496:8
2524:24
2527:25
2542:21
2566:8
2568:6
2573:21
2577:3

2580:4
2582:24
2586:8
2590:9
2591:20
2598:1
2605:23
2615:8
2628:9
2646:14
2652:18
2702:2
2703:25
2705:8
2707:12

lasted
2502:10

later
2585:3,13
2586:4,13,
17,18
2590:9
2593:8
2598:22
2609:2
2622:11
2658:24
2686:8

latest
2540:22,23

Lavigne
2708:14

layer 2702:4

LCA 2469:22
2470:14
2471:13
2474:1
2478:13
2500:11

LCA079
2466:9

LCA's
2470:24
2474:16

lead 2501:21
2507:20

leads
2524:14
2532:7

leakage
2506:15

learn
2596:21

learned
2455:10
2595:7,16,
19,20
2596:25

learning
2483:22
2594:8,25

learnings
2594:21
2598:8

least
2463:18
2465:8
2510:21
2541:15
2560:19
2568:7
2621:23
2652:9
2704:24

leave
2452:8,14,
18 2543:7
2565:19
2677:16

leaves
2567:22

led 2551:6

left-hand
2519:11
2520:6
2528:21
2530:1,23
2586:11
2614:7
2622:24
2628:23

legislation
2679:18

length
2597:21
2667:9
2673:17

lengthy
2466:14

less 2500:19
2525:13,14
2528:12,13
2540:2
2544:23
2546:8,9,1
2 2562:25
2598:17
2611:11
2618:18
2620:25
2625:13
2631:17
2634:24
2638:1
2650:15
2683:9
2697:8

lessening
2691:24

lesser
2568:10

lesson
2596:14,15
,21

lessons
2455:10
2595:7
2596:25

let's 2450:3
2467:19
2482:7
2484:2
2486:20
2488:15
2499:19
2531:22
2535:18
2540:21
2541:25
2545:1
2576:4
2588:3,18
2596:18
2636:19
2682:13,14
2688:13
2689:3
2690:3

2698:16
2699:8

level 2445:4
2448:19,20
,24
2449:1,15,
16,18,19,2
1,22,24
2450:4,6,8
,9,12
2507:12,22
2602:6,14
2609:25
2611:13
2614:14,23
2615:12
2617:25
2620:23
2687:22
2706:25

levelized
2563:24

levels
2447:13,22
2448:5,18
2449:10,15
2518:3,6
2523:15
2600:21

liability
2690:9

life
2454:12,20
2458:14
2459:3

light
2646:19
2647:25
2648:25
2691:11

likelihood
2506:25

likely
2466:10
2473:15
2507:9
2556:21
2561:20
2570:8

Limestone

2564:16

limit 2504:4

limited
2557:16

line 2470:11
2474:14
2477:10
2492:11
2513:24
2520:19
2521:25
2526:4,21
2527:19
2544:1
2575:19
2578:8
2579:21
2580:4
2588:5
2593:1,3,9
,25 2606:4
2613:18
2628:22,24
2629:14,24
2630:5,19
2631:14,15
,22
2632:16
2636:20
2642:24
2643:4,10,
11,17,19,2
4 2645:8
2646:24
2647:1,4,1
2,14,15
2648:1
2649:4,5,1
7
2650:5,7,1
1,13,15
2651:8,10
2653:11,23
2654:6
2655:15
2656:16,18
,22
2657:10,11
,18,23
2658:9,18,
19,22,23,2
4

2659:1,9,2
4
2660:10,20
2661:8,12,
19,25
2662:5
2665:6
2666:3,15
2667:1,5,1
2,20
2668:7,8
2670:15,16
2673:17
2674:10
2680:3
2681:4
2683:2,3,9
2685:11,12
2687:23
2688:5,7
2689:9,13,
18
2690:2,12,
20,21,23,2
4
2691:3,5,1
1 2697:7
2705:12

lined 2650:6

lines
2460:22
2477:4
2549:24
2631:21
2658:15
2660:16
2699:3

linked
2705:12

list
2442:3,4
2444:1,4
2445:1
2450:24
2451:1,3
2457:1
2516:19
2650:10

listed
2655:1

literature

2460:1
2473:22
2560:17

little
2446:20
2456:5
2471:7
2494:7
2502:17
2506:8
2519:17
2524:24
2526:3,20
2534:2
2558:16
2560:2
2564:14
2575:18
2599:23
2601:5
2603:9
2625:21,23
2630:1
2644:17
2654:22
2678:25
2693:4
2696:3

load
2449:19,23
2491:20
2578:13
2583:3
2614:19
2615:10
2623:11
2630:10,11
2636:23
2637:24
2650:16
2680:1,3,6
2681:4
2682:5
2683:4,8
2695:4,10
2696:14,17
,22
2698:14,16
,21,23,24
2699:1,7
2700:4,12
2701:10
2703:9,17

2704:6,11,
12,13,23
2705:1,3,1
7,19,22

load's
2697:24

loan 2536:15

local 2651:4
2680:8

lock 2479:13
2499:23
2565:24

locking
2501:9

locks
2563:22

logic 2687:2

long 2449:10
2450:1
2484:21
2485:3,8,1
6 2487:9
2534:15
2535:21
2536:7
2554:11
2561:23
2564:16
2570:16
2574:13
2578:3,4
2637:7,10
2640:7,18,
23
2646:9,15
2647:20
2707:22,25

longer
2558:10
2583:21
2591:3
2598:21
2599:1,5
2657:5,14

long-lasting
2651:24

long-run
2553:10
2640:9

long-term
2484:16
2535:6
2536:7
2549:5
2556:19
2563:10
2570:10,17
2572:5
2577:5,9,1
7,22
2630:7
2641:16
2680:10

loop 2657:1
2673:18

lose 2629:25
2633:13
2667:2
2693:20

loss 2446:14
2631:9
2650:16
2668:2
2680:6
2682:4

losses
2631:11
2632:18
2633:23

lost
2632:24,25
2649:10

lot 2467:2
2469:14
2473:14
2482:18
2498:11,23
2501:4
2532:19,25
2538:17
2539:19
2550:7
2563:11
2567:24
2582:4
2588:11
2617:15
2619:17
2626:23
2627:23

2638:8
2678:3
2684:10

lots 2581:1

low 2481:16
2501:7
2519:12,13
,18
2520:25
2522:12
2523:14
2524:4,5,1
0 2525:6
2527:20
2541:2
2543:23,24
2545:17
2547:4
2548:12
2549:24
2573:18,25
2574:7,8,2
3
2575:6,8,9
,12
2578:22
2579:14
2604:3,4,1
4,20
2605:6,8
2606:7
2611:19
2624:9,10,
11,13
2625:11,15
,25
2626:1,7,9
,10,22,24
2635:10
2695:5
2698:20
2702:12

lower
2484:22
2501:3,11,
22 2523:4
2531:10
2536:4
2539:8
2550:6
2566:13
2598:18

2599:18
2612:23
2615:1
2616:25
2617:10,18
,23 2619:2
2620:19
2634:19
2635:6
2703:18
2704:13,23

lowest
2524:12
2634:20

lumped
2694:25

lunch
2572:11,14
2576:19,22

———————
M
———————
mad 2462:18

magically
2561:19

magnitude
2682:9
2696:2

main 2579:23
2599:19,20
,24 2611:7
2662:17

maintain
2587:17,20

maintenance
2636:22

major
2495:24
2553:4
2555:1
2559:24
2597:1,6,7
2650:24
2655:2,4
2672:24
2694:15

majority
2568:12
2594:22,25

manage
2483:18
2485:17
2565:3,18

management
2515:14
2519:2,8
2552:1
2554:24
2611:14

manager
2523:12
2526:3
2527:17
2610:17
2613:17
2614:2

managing
2484:6
2566:1

Mani 2621:13

Manitoba
2440:3,7,9
,23 2441:5
2442:6
2444:5
2445:3,7
2446:10,11
,13,23
2447:11,14
,15
2448:3,18
2449:6
2450:23
2451:5,23
2452:3
2453:5,24
2454:4
2461:17
2462:7
2468:3
2469:13
2470:12
2477:5,12
2484:10,11
2485:1,2,2
5 2486:10
2487:13,16
,20,23
2491:5,18
2492:1,14,

24
2494:4,7,1
1 2495:20
2497:16
2506:17
2514:15
2515:3
2519:3
2540:18
2552:7,20,
24 2553:17
2555:21
2556:8,13,
14
2557:18,24
2559:11
2560:7
2562:8
2563:17
2565:5
2566:17
2568:23
2570:8
2571:7
2577:22
2578:7,16,
17
2579:7,8
2580:16
2581:5
2583:24
2586:23
2589:23
2590:20,24
2594:2
2600:6
2602:5,24
2621:11
2622:4
2629:3
2636:12
2637:20
2643:10,25
2645:3,12,
19,21
2646:13,22
,25
2647:8,18,
25
2648:6,13
2649:22
2650:17,19
2651:1,9,2
0

2652:4,10,
11,17,22
2653:4,11,
19
2655:5,11
2659:4
2662:11
2664:12
2670:5,8
2672:18
2674:8
2676:9
2679:14
2680:11,24
2681:5
2684:5,12,
17,21
2686:8
2691:24
2692:3,5,6
,8,11,16,1
7 2694:13
2696:13,16
2697:11
2698:2,23
2699:22,23
2700:12,22
2701:2,5,1
9
2702:21,22
2703:1,24
2705:14
2706:5,23
2707:24

Manitoba/
Minnesota
2653:14,21
2655:3
2669:20

Manitoba-Min
2667:11

Manitoba-
Minnesota
2642:23
2660:17
2661:13
2662:19
2663:8
2666:14

Manitobans
2487:9,23
2649:20

2692:12,22

map 2655:18

March
  2440:24
  2593:2
  2608:18

margin
  2571:20,21

Marilyn
  2440:14
  2590:7,12,
  19,23

mark 2489:11
  2528:3,8

marked
  2451:1
  2580:1
  2683:2

market
  2455:7,22
  2486:2
  2487:15
  2500:2
  2508:10
  2511:14
  2512:13
  2536:19,21
  2552:20
  2555:9
  2556:15
  2558:12,25
  2561:16
  2565:19,22
  2566:3,20
  2570:1
  2571:11
  2577:21
  2599:14
  2650:21,23
  2704:25

marketplace
  2508:25

markets
  2493:11
  2499:23
  2508:16
  2553:5,12
  2554:4,8,9
  2556:19

Marla 2441:6
  2446:7,18
  2451:10
  2452:24
  2513:17
  2601:25
  2673:3,7,1
  1 2675:15
  2707:15

master's
  2482:22

Masters
  2681:11

match
  2476:23

matched
  2665:19,21

matches
  2701:2

matching
  2703:24

material
  2569:9
  2684:20
  2693:23,25

mathematical
  ly 2701:15

matrix
  2477:22

matter
  2450:21
  2452:6
  2487:17
  2513:18,19
  2515:1
  2621:5
  2633:8
  2643:25
  2678:24
  2700:22

matters
  2641:24
  2642:9,19
  2676:16
  2677:16

mature
  2553:6

maxi/min

2460:14,18
2472:25
2475:8

maximize
  2567:4

maximized
  2643:12

maximum
  2471:16
  2523:20

maximum/
  minimum
  2471:17

may
  2452:5,20
  2453:22
  2468:4,5
  2469:8
  2477:14
  2479:20
  2480:2
  2488:11
  2491:18
  2499:10
  2505:5
  2507:14
  2511:16,19
  2514:21
  2518:6,11,
  12,13
  2553:12
  2557:8
  2561:15,16
  2567:1
  2575:17
  2583:20
  2584:3
  2588:10
  2589:25
  2628:12
  2632:6
  2634:15
  2646:1
  2652:22
  2672:25
  2678:5
  2681:7
  2693:24
  2694:3,4
  2706:7,11

maybe

2467:12
2468:15
2485:22
2488:10
2503:5
2519:9,19
2542:16
2569:7
2572:10
2575:18
2596:3
2625:23
2635:24
2636:8
2662:2
2693:4,19
2702:2

mean 2461:24
  2462:25
  2476:9,12
  2496:5
  2500:3
  2507:3
  2536:1
  2561:10
  2586:17
  2609:1
  2629:16
  2630:3
  2657:3,19,
  25 2665:9
  2667:15,16
  2670:8
  2671:21
  2673:23,24
  2674:4,15
  2679:8
  2694:25

meaning
  2447:14
  2540:24
  2593:15

meaningful
  2482:1
  2497:20,21
  2499:1

meanings
  2694:22

means 2504:7
  2505:4,17,
  18 2560:25
  2626:20

2680:20
2686:1
2698:20
2704:8

meant
  2461:25
  2530:17
  2547:19
  2598:21
  2603:13
  2696:20

measure
  2457:15,16
  2633:17
  2695:8

measured
  2684:4
  2690:8
  2695:12
  2698:22

measures
  2496:11
  2497:4,11
  2504:13
  2682:5

measuring
  2632:17,18
  2634:10
  2695:9
  2698:12

mechanism
  2505:23

mechanisms
  2512:13

median
  2510:4

meet 2504:6
  2611:12
  2680:13,16
  2695:3,10
  2704:13

meeting
  2639:22
  2680:15

meets
  2701:19

mega 2688:13

megawatt

2580:5,11
2584:17,21
2588:5
2647:15
2687:20
2688:13,14
,25
2689:5,9,1
3,19
2690:12,23
2704:22
2705:17

megawatts
2638:19
2639:3
2670:8
2688:8
2690:3
2697:8

melded
2704:3

melting
2693:23
2694:1

member
2440:14,15
,16,17
2486:24
2644:8

members
2450:20
2453:19,20
2631:19

mention
2535:12

mentioned
2471:9
2495:19
2520:17
2579:13
2583:17
2645:16
2657:16
2658:8
2659:18
2676:19

Merci 2456:1
2492:6
2501:25
2514:10

merit 2506:2

Messr 2456:1
2492:6
2501:25
2514:10

met 2494:1
2506:4
2580:7
2585:18

method
2455:19
2520:13

methodol
2520:12

methodology
2521:4,25
2523:25
2524:7,14
2525:1,9
2526:6,22
2546:3
2547:17
2548:17
2605:21
2606:11
2609:15

Metis
2453:24

metric
2449:25
2474:2
2680:14,15
,16
2681:21
2682:4
2683:4
2686:22
2696:18
2697:6,10
2698:8
2699:24
2700:14
2701:3
2704:8

metrics
2497:17,21
2697:20

MH-110
2444:3

2446:16

M-hm 2488:25
2574:1
2656:7
2665:7

mic 2513:20

Michael
2441:16,22

microphone
2576:13
2642:10
2677:20,23

middle
2576:2

Mile 2561:4

Miles
2442:12
2447:4
2456:2
2469:20
2470:6
2503:7
2515:5,10,
17,23
2516:3,8,1
3,16,22
2517:1,23
2518:4
2520:10,15
,23
2521:5,9,2
3 2522:4
2526:16
2529:14,21
2530:3,9,1
6,21
2531:2,6,1
1,14
2532:2,6,1
0,14
2621:16,20
,25
2622:6,17,
25
2623:3,7,1
0,14,20
2624:2,6,9
,16,25
2625:5,19
2626:5
2627:25

2628:10,13
,16
2629:1,8,1
8 2630:6
2631:16,23
2632:10,13
,20
2634:1,4
2640:22
2664:17,21

mill
2693:17,18

Miller
2441:11
2442:23
2502:22
2503:3,4,1
0,14,19
2504:12,16
,22
2506:24
2507:5
2508:2,7,2
2 2509:10
2511:15
2512:6
2513:2,4

million
2449:20
2514:6
2521:2,19
2522:1
2531:8,11,
13,18
2532:12
2544:3
2550:11,20
2599:23
2604:6,15
2606:8
2608:5
2618:13,18
2620:2,22,
24 2625:13
2632:2
2653:23
2654:9,14,
17,18
2656:3,20
2659:16
2660:6,22
2661:18,24

2662:4,12,
15,22,24,2
5 2663:9
2664:10
2665:1
2670:25
2671:20
2672:5,6,7
,8,9
2685:15,20
2686:5,16,
19,20
2687:4,6,7
,10,15
2690:8,9,1
0 2691:15
2693:19

millions
2531:20

mind 2476:23
2483:9
2531:22
2539:23
2540:1
2541:15
2552:24
2579:2
2584:4
2585:24
2586:24
2659:15
2664:12
2702:9

mindful
2676:22

mini/max
2460:14,17
2472:25
2475:8

minimum
2471:16
2617:25

Minnesota
2643:5
2645:1
2646:21
2647:21
2649:24
2660:12
2667:12
2705:12,13

minus
  2449:21
  2519:15
  2522:15,16
  ,19,21,22,
  24
  2525:7,12
  2541:5
  2611:20
  2623:24
  2696:18,22
  ,25
  2698:17,23

minute
  2469:21
  2629:9
  2637:18
  2658:4

minutes
  2451:12
  2466:13
  2497:23
  2513:8
  2540:15
  2591:21
  2642:1
  2671:16
  2680:19

MIPUG
  2441:13
  2444:5
  2450:22
  2451:4,17
  2452:25
  2453:1
  2540:17
  2577:3

MIPUG/
  Manitoba
  2621:14

MIPUG-1-4
  2540:18

MIPUG-21
  2444:4
  2451:1,3

misleading
  2469:7

MISO 2557:13
  2561:16
  2565:22

missed
  2472:10
  2706:21

misses
  2476:20

missing
  2471:19
  2499:10

mistaken
  2673:10

misunderstan
  ding
  2467:13

mitigate
  2483:19
  2583:22

mitigated
  2492:1,3

mitigating
  2491:23

mixed
  2448:22
  2595:11,12

mixture
  2556:16,22

MKO 2441:15

MMF 2441:18
  2642:19

MMT 2660:8

MMTP 2660:8
  2665:13
  2671:4

model 2494:9
  2558:8
  2559:3
  2603:11
  2605:1
  2607:22
  2608:5
  2630:15

modelled
  2606:1
  2607:14

modelling
  2503:20

models

2608:12

modified
  2464:13
  2602:13

moment
  2446:19
  2448:21
  2494:18
  2500:21
  2588:4
  2669:6

Monday
  2447:12
  2514:3
  2604:19
  2707:24

money
  2495:16
  2629:25
  2693:20

Monnin
  2441:21
  2442:21
  2456:1,11,
  14,15,21,2
  4
  2457:5,6,1
  1,25
  2460:4
  2461:7
  2463:2,12,
  23
  2464:3,9,2
  1 2465:3,7
  2466:6,16,
  24 2467:10
  2469:18
  2470:1,9
  2472:13
  2473:13
  2474:12
  2475:24
  2476:25
  2492:4,6,9
  ,10,23
  2494:17,21
  2496:4
  2497:2
  2501:24,25
  2677:22
  2678:11,13

,15

month
  2598:22
  2605:24

months
  2566:2
  2672:25

morning
  2446:3,8
  2450:20
  2452:10
  2453:14
  2492:15
  2502:4
  2577:3,24
  2696:16
  2707:24

motion
  2706:12

move 2452:24
  2456:9
  2527:9
  2546:25
  2550:25
  2566:23
  2592:15
  2600:12
  2602:24
  2608:25
  2613:25
  2614:14
  2633:20
  2652:8
  2676:3
  2683:8
  2688:3

moved
  2477:20
  2478:12
  2605:3

moves 2522:1
  2526:20
  2527:6,7
  2528:7
  2607:10

moving
  2568:9
  2653:9,10
  2672:16
  2674:23

2676:15

MTP 2656:18
  2659:1

multiple
  2479:24
  2496:2
  2510:24
  2562:9

multiply
  2564:9

multitude
  2620:14

Murphy
  2442:14
  2447:6
  2453:22
  2499:10
  2500:5
  2502:17,21
  2503:5,8,1
  7
  2504:10,15
  ,21 2505:7
  2507:2,7
  2508:5,20
  2509:2,14
  2510:22
  2511:6
  2512:10
  2554:2
  2555:22
  2557:1,4
  2560:18
  2561:13
  2569:8

MVA 2654:7

MVAR 2654:8

MVARs
  2658:25

myself
  2458:20
  2467:3
  2505:19
  2509:15
  2540:10
  2553:24
  2561:13
  2669:14
  2691:20

2474:19	2582:19	2689:3,16	2466:12	2682:9
2563:10	2586:2	2690:18		
2618:10	2587:5	2691:1,9	**opportunity**	**orig** 2549:19
	2591:17	2698:25	2466:11	
offered	2596:3	2700:18	2467:1	**original**
2602:2	2602:12,15		2484:4	2523:4
2647:5	2605:9	**old** 2526:5	2498:18	2526:8
	2606:22	2527:2	2565:15	2528:2,14
offset	2607:21		2566:18	2543:15,18
2506:19	2608:24	**ones**	2568:23	2544:7,23
2615:12	2613:5	2452:4,20	2569:4	2545:14
	2617:13	2455:13	2570:20	2546:3
oh 2459:10	2621:4,19	2485:11	2577:20	2550:19
2488:19	2622:1,8	2505:25	2585:25	2598:22,24
2494:19	2623:9,13,	2512:20	2647:19,23	2600:3
2512:6	22	2518:17	2651:21	2604:22
2515:13	2624:3,17	2539:2		2614:9,16
2523:11	2625:1,5	2558:4	**opposed**	2657:22
2550:24	2629:22	2568:5	2465:11	
2620:3	2631:5	2583:15,17	2573:19	**originally**
2642:24	2636:25	2593:21	2574:10	2660:10
2654:2	2639:11	2625:2	2597:20	
	2644:20,25	2677:12	2697:10	**Orle** 2441:15
okay 2454:3	2645:14,18			
2457:11	2646:17	**one's**	**opposite**	**others**
2464:3	2647:16	2512:15	2502:9	2480:2
2465:3	2648:24	2637:18	2525:5	2487:12
2469:25	2649:9			2497:12
2470:9	2652:7	**ongoing**	**option**	2507:8
2476:25	2653:9	2537:6	2515:20	2508:16
2478:20,21	2654:5,24	2645:19	2565:6	2509:7
2488:4	2655:25		2581:15,21	2511:24
2497:2	2656:14	**onto** 2609:3	2615:7	2513:1
2503:20	2657:7		2636:11,12	2545:11
2504:16,17	2659:8	**open** 2620:8	,17	2583:16
2506:24	2661:5,17		2637:22	2597:12
2515:13	2663:3,18	**operate**	2638:1,6,1	2649:3,14
2516:15,22	2664:21	2518:11,14	1,12,19,22	
2517:1,20	2665:11,14		2639:1,2	**Otherwise**
2519:1	,20	**operates**	2653:6	2653:5
2526:2,14,	2666:8,12,	2494:8		
19 2527:8	18		**optionality**	**ought**
2528:1	2667:6,18	**operating**	2582:5	2463:17
2530:21	2669:5,10	2637:2		2496:6
2531:15	2670:20		**options**	
2546:2,6,1	2671:25	**operational**	2479:18	**ours** 2562:18
5,23	2672:12	2518:6	2558:24	
2547:20,24	2673:6,10		2637:16	**ourselves**
2548:1,3,2	2674:7,18	**opinion**	2652:16	2640:9
4	2675:19	2458:6		2704:14
2552:10,16	2677:2,14	2460:20	**order** 2611:8	
2556:25	2679:22	2467:5	2674:10	**outage**
2564:6,20	2681:12	2469:17	2675:21	2636:19,22
2567:18	2684:14,18	2472:14,19	2677:5	2693:2,18,
2573:8		2474:6	2696:2	24
2576:3		2495:12	2698:5	2694:3,4
		2511:20		
		2610:23	**orders**	**outages**
				2682:2,4
		oppor		2693:12

outcome
2461:12
2482:15
2538:15
2541:20
2629:16
2643:16
2644:1

outcomes
2461:20
2501:10

outlay
2538:12

outlays
2538:22
2540:6
2541:16

outlining
2601:11

outlook
2523:12

output
2462:21

outputs
2496:10

outset
2706:10

outside
2495:4
2675:16

outstanding
2451:24

overall
2449:7,10
2482:10
2484:13
2504:13
2506:20
2536:9
2582:22
2705:7

overlap
2452:12

overnight
2660:25

overview
2465:15

overwhelming
2508:14

owner
2646:14
2652:18,21

owners
2645:20
2652:12

ownership
2645:22
2646:23
2648:14
2652:16

owning
2643:25
2644:1

P
---

p.m 2576:8,9
2642:3,4
2708:6

P10
2498:1,3,7
,20 2499:8
2605:4,7
2697:6,10
2703:23

P10s 2480:25
2499:1,3

P5 2697:10

P50
2605:8,19

P90
2498:1,3,4
,21
2605:8,17
2606:15,18
,21
2697:6,10
2703:24

P90s 2480:25
2499:1,4

P95 2697:10

page
2442:2,15
2443:2
2444:2
2445:2

2447:7
2456:19
2458:1,3,4
2461:8,9
2463:17,18
,23
2464:4,10
2466:7,17,
18
2469:19,22
2470:10
2474:15
2477:3,4,1
0
2492:15,22
2493:2,3,6
,17
2494:3,20,
22,23
2495:18,19
2496:5,7,8
2513:19,24
2515:2
2519:6,8,1
0,14,24
2520:8,17
2523:10,11
,13,21,25
2525:5,10,
22 2528:20
2530:18
2531:24
2533:3
2536:17,23
2537:10
2538:25
2540:19
2543:14,15
2547:16,19
,20,22
2548:5
2549:8,19
2551:5
2552:1,2
2559:21
2579:24
2582:9,22,
23 2590:8
2591:19
2592:25
2593:23
2602:3
2603:2
2608:15

2609:3
2610:14,16
2621:5,14,
15 2628:7
2636:2,8
2638:17
2655:1
2656:1,17,
19 2659:11
2661:21
2664:13,17
,19
2665:10,24
2666:19
2672:18
2673:4,7,1
5 2675:7
2685:1,10
2688:4
2700:24,25
2702:1

pages
2440:25
2466:9
2492:13
2515:2
2523:11
2527:18
2551:2
2622:16
2636:2
2702:24

paid 2485:4
2501:1
2509:8
2512:13
2532:25
2647:13

panel 2442:6
2446:23
2450:20
2451:12
2452:12
2453:16,19
,20
2485:13
2486:24,25
2487:2,5
2488:3
2513:2
2534:22,24
2536:24

2545:15
2589:9,22,
23,24
2591:17
2636:10
2642:21
2644:8
2653:19
2674:16,22
,25 2676:8
2677:11,15
,17
2678:7,12,
23 2683:8
2699:17
2706:5
2707:17,20
2708:4

paper 2460:8
2519:9
2552:22
2553:25
2554:23
2555:13
2557:2
2559:8,19
2568:2
2693:17,18

papers
2552:12
2567:25
2568:1,5,1
1

paragraph
2461:10
2494:24
2553:3
2554:14
2582:24

paragraphs
2554:24

parallel
2522:11
2670:4

parallelling
2657:19

parameter
2605:4

parameters
2589:6

2692:22	**parties**	2524:18	2645:10	2677:4
2703:19	2509:8	2525:25	2649:3	
	2512:24	2545:23		**per** 2447:15
pardon	2581:4	2547:7	**payment**	2486:1
2492:21	2582:5	2549:1	2486:13	2491:12,15
2497:21	2678:9	2551:18,23		2510:7
2498:20		2552:4	**payments**	2538:23
2502:21	**party**	2553:20	2485:24	2680:14
2525:4	2555:20	2570:23		
2542:12	2648:12,13	2572:1,8	**pays** 2648:12	**perce**
2607:3	2653:2	2579:17	2705:2	2494:15
2641:25		2581:17		
	pass 2507:11	2584:13	**PDP** 2454:5	**percent**
parlance		2591:13	2476:10	2479:17,18
2694:23	**passed**	2592:21	2675:24	2491:21
	2507:25	2602:20		2499:20,24
participatin		2609:20	**peak** 2638:20	2529:25
g 2653:12	**past** 2527:22	2612:19	2650:18	2531:1
	2528:3	2615:16,25	2680:1	2532:23
particular	2558:20	2616:4	2695:3,10	2537:5
2459:1	2559:22	2617:1		2539:10
2460:18	2561:22	2618:20	**peer** 2680:16	2564:12,13
2463:3	2599:16	2620:5		,18
2468:13	2647:10,20	2621:8	**penalties**	2568:18
2476:23		2629:11	2680:14	2573:15,24
2493:24	**path** 2474:24	2640:20		,25
2496:6	2522:11	2648:22	**penultimate**	2574:8,9
2500:13,14	2586:18,19	2664:15	2493:9	2610:4
2504:11	2591:3	2669:3,8		2611:21,23
2505:8,23		2671:12	**people**	,24
2512:22	**pathway**	2679:5	2447:22	2612:23
2515:2,19,	2516:2	2681:14	2459:1	2623:25
20 2517:21	2584:18,19	2684:24	2462:10,13	2624:22
2519:4	,22	2685:4,23	,22 2463:9	2625:11
2521:8	2587:6,24	2686:24	2466:2	2645:3,21
2523:18	2588:4,6	2691:17	2472:22	2696:18,22
2529:11,24	2591:24	2697:15	2473:23	,25
2535:17	2592:2,5	2702:19	2480:10	2697:21,22
2546:25	2623:23		2481:23	,23
2548:18	2625:2	**pay** 2489:13	2487:12,21	2698:1,3,5
2612:22		2508:18	2496:24	,7,8,9,17,
2619:16	**patience**	2571:1	2519:9	18,19,20,2
2622:15	2502:3	2641:17	2528:22	1,23
2626:11,18		2643:18	2535:23	2699:24
2628:19	**Patti** 2441:5	2644:10,18	2536:6	2700:21,24
2630:13,24		2645:2,3	2544:19	,25
2633:13	**PAUSE**	2647:5	2545:8	2701:1,4,1
2638:18	2450:15	2682:10,18	2556:17	8,20
2646:6	2451:14,20	2704:25	2561:6	2704:7
2652:2	2463:21		2571:1	
2680:1	2464:19	**paying**	2633:21	**percentage**
2700:6	2465:5	2485:7	2641:8	2532:5,18,
	2466:20	2532:23	2674:10	21
particularly	2492:19	2563:12	2696:9	2698:14,16
2568:13	2497:14	2644:23	2701:10	
2582:21	2503:12		2707:24	**percentages**
	2516:24			
	2519:22		**peoples**	
	2520:1		2479:5	

2625:7

percentile
2479:17
2496:18,20

percep
2494:14

perfect
2551:13
2559:13
2700:8

perfectly
2469:9

perform
2680:12

performed
2675:12

performing
2627:4

perhaps
2455:13
2467:12
2468:16
2495:18
2504:1
2507:16
2510:6
2540:13
2547:19
2557:13
2571:16
2584:9
2669:11
2678:13
2688:2
2701:16

period
2453:17,25
2454:4,6,1
3,15
2455:8,20,
21 2532:24
2535:19
2538:22
2541:17
2636:17,18

periods
2558:20
2695:6

perpetuity

2647:3

person
2515:14
2519:2,8
2547:9
2552:1

personal
2478:2
2507:15
2511:20
2586:5

personnel
2600:6

perspect
2501:13

perspective
2446:12
2463:10
2478:2
2484:14
2486:2,3
2491:11
2494:5,11,
12,14,16
2495:20
2501:14,15
2533:21,24
2534:10,12
,16
2537:8,9
2619:4,14
2627:11
2641:3,5
2647:3
2651:2

perspectives
2481:21
2484:8,18
2495:16,22

Peter
2441:11
2442:23
2503:3,4,1
0,14,19
2504:12,16
,22
2506:24
2507:5
2508:2,7,2
2 2509:10
2511:15

2512:6
2513:2,4

Peters
2441:2
2674:24

phase 2670:1

PhD 2681:11

philosophy
2460:18

phonetic
2476:6
2654:21

phrase
2473:11
2572:12

pick 2569:23
2679:18

picked
2684:19

picking
2704:1

picture
2505:1
2544:8
2568:19
2669:24

piece
2457:20
2473:4
2501:16,20
2540:17
2662:14
2694:16

pieces
2471:9

pile 2478:22

pipeline
2449:19,21
,23 2450:9
2614:19

places
2503:6
2646:22

plait 2492:5
2514:8
2576:15

2678:18

plan 2440:10
2446:12
2448:17
2450:1,2,3
,11
2461:13
2462:16
2477:7
2482:4
2483:5,21
2488:14
2490:23
2491:6
2500:13,14
2515:8
2517:17,18
,19
2518:7,9,1
1 2520:18
2521:20
2522:1,6,8
,19
2523:3,6,1
3
2524:12,25
2525:1,3,4
,14,16
2527:3,21
2528:23
2529:1
2530:14,23
2531:24
2536:2,9
2538:8
2539:19
2541:1,13,
14,15,22
2542:9,10,
13,14
2543:16
2546:5,8
2547:3
2548:8
2549:12,17
2567:12,13
,15,17
2569:10
2578:4,7,1
5,17
2579:6,7
2584:19
2585:3

2586:4,14,
15
2587:6,14
2588:1,7
2589:11,13
2592:7,9
2613:13
2614:6,15
2617:19
2618:12
2619:20
2623:23
2624:10,11
,13,18,21
2625:6,10,
15
2626:6,9,2
1,22
2627:3,7,1
8
2634:4,6,1
2 2635:13
2637:12
2671:4
2683:3,23
2685:8,14,
16
2686:4,15,
16
2687:13,16
,23 2688:6
2689:2
2703:22
2704:21
2705:6,7
2706:23

planned
2461:20
2578:11
2667:21

planning
2482:20,21
,22
2509:22,23
2588:12,15
,21,25
2634:11
2639:4,6
2640:3,17
2641:3
2679:19,20
2680:11

2704:16

plans
2465:21
2470:18
2480:22
2481:15
2483:1
2488:18
2497:5
2517:12,14
2518:8,21
2522:11
2523:5,8
2526:5
2549:12
2567:17
2569:20
2589:16
2592:6
2598:24
2620:11
2623:18
2626:16,17
2640:11
2651:23
2683:15
2684:22
2692:24
2695:21
2699:21
2704:1

plant 2690:1

plants
2501:4
2564:14,16
2627:16

play 2499:22
2500:2
2592:12

played
2479:22

plays
2508:25

please
2456:20
2461:8
2464:11
2467:10
2469:19
2470:10
2492:22

2493:6
2503:1
2546:1
2576:23
2579:3
2614:2
2616:2
2636:4
2642:11
2658:10
2706:19

pleased
2456:5

plus
2522:17,21
,23,24
2541:3
2597:23
2605:20
2696:18,22
,25
2698:17,22

point
2448:12,13
2449:6,14
2454:19
2456:12
2459:16,17
,18 2463:3
2484:9
2488:20
2491:11,14
2500:8,12,
17,18
2503:23
2511:7
2523:10
2525:15
2530:6,12,
17,19
2532:13
2533:24
2535:15
2542:15,19
,22
2543:11
2544:1
2549:20
2550:8
2560:13
2576:2
2578:6,24

2585:16
2587:15
2591:6
2594:17,19
2595:17,20
2599:18
2600:3
2603:22
2604:5,10,
14
2606:10,14
,24
2607:4,10,
11,14,20
2609:6,7,1
0
2610:1,5,1
8 2613:19
2614:8,16
2619:10,11
2622:22
2625:14,20
2627:1
2631:6
2633:20
2648:25
2659:6
2665:5
2666:11
2672:1
2680:13,19
,21,22
2690:19,20
,21,22
2693:14
2705:5

Pointe
2597:25

pointed
2471:8
2664:10

points
2481:12
2577:12
2622:10
2701:1,17

poke 2678:22

policy
2507:14,25

political
2507:13

pontificate
2456:12

poor 2455:5

popped
2451:11

porch
2644:19

Portage
2440:22

portion
2564:23
2603:17
2608:8
2642:24,25
2643:2
2646:24
2649:4,5,1
6 2653:11
2704:24

portions
2676:24

pose 2482:3

posed
2453:20

posi 2540:25

position
2453:6,7
2585:11
2645:22
2646:23
2648:6
2652:21
2704:12,20

positive
2448:20,21
2449:1,2,2
1 2450:12
2522:1
2525:10
2541:1

possibilitie
s 2703:22
2704:16,19

possibility
2460:24
2586:1
2704:11

possible
2452:13
2471:4
2472:23
2495:6
2550:25
2590:5
2591:21
2617:20
2630:25
2635:9,10
2697:4
2700:2

post-
constructi
on 2600:1

potential
2523:3
2558:3,8
2559:4
2647:25
2648:2
2649:2
2673:19,22
2676:25

potentially
2495:15
2630:25
2652:14

potentials
2627:8

power
2557:12
2558:10
2560:3
2562:21
2563:20
2565:1
2571:19
2576:20
2580:5
2581:21
2588:14,25
2636:18
2643:5
2645:1,5,8
2647:20,21
2651:3,8,1
1 2660:12
2693:7,8,1
2

2705:12,13

PowerPoint
2503:15,17

practice
2459:8
2494:6
2612:3
2700:22

practices
2611:8

pre-ask
2451:8

pre-asks
2444:4
2450:23,25
2451:3

precedent
2580:9

precedents
2582:3

precise
2510:3

precisely
2512:5
2555:20
2682:21

precision
2542:24

predict
2696:21
2697:2
2698:15
2700:12

predicting
2700:9

preexisting
2670:3
2671:9

preface
2683:1

prefer
2456:11
2579:5
2602:1

preference
2491:2
2493:23

2496:1

preferences
2479:5
2495:8

preferred
2440:10
2483:21
2521:19,25
2522:8,19
2523:6,12
2524:12,25
2525:1,16
2527:3
2528:23
2529:1
2530:14
2531:24
2538:8
2539:18
2541:1,13,
14,21
2542:9,13
2543:16
2549:12
2578:4,7,1
5 2579:6
2587:14
2589:11,12
2617:19
2627:6
2671:4
2683:23
2685:7,14
2686:3,15
2687:12,15
2688:5,6
2689:2
2690:21
2704:21
2705:6

prejudge
2583:23

preliminary
2448:6
2466:1
2610:3

premium
2563:5,9
2565:25
2566:3,10,
11,20
2569:13,25

2570:5
2577:19,22

premiums
2566:15

prepared
2452:9
2581:8
2594:23
2622:10
2645:2
2653:5
2664:1
2678:7
2703:12,14

preparing
2551:11

present
2486:15,19
2488:18
2489:9
2491:9
2524:12
2529:24
2530:7,12,
25 2531:4
2532:4,8
2533:12,19
2537:14,23
2538:9
2539:19
2540:11
2559:22
2573:7
2604:19
2649:15,21
,22
2655:1,22
2675:24
2690:4

presentation
2490:2
2579:25
2653:19
2665:16
2669:25

**presentation
s** 2490:18

presented
2445:10
2487:5
2497:5,18,

19 2498:3
2503:15
2607:23
2628:10
2655:22
2700:19
2702:3,6,2
4 2703:5
2706:4

presenting
2498:25
2683:12

presents
2500:20
2653:20

President
2450:20
2456:2
2492:7
2502:1
2514:10
2593:19

pressed
2556:12

pressure
2678:3
2680:16

presumably
2589:3

pretty
2474:3
2525:18
2532:15
2538:10
2539:9
2591:10
2676:7

prevent
2506:14

previous
2526:6
2613:22
2614:3
2630:3
2636:10
2648:1
2699:17
2703:25

previously

2442:7,8,9
,10,11,12,
13,14,15,1
6
2446:24,25
2447:1,2,3
,4,5,6,7,8
2518:19
2664:25
2672:19

price
2504:14,24
2507:17
2509:3,6,1
2 2511:13
2517:25
2521:15
2555:17,20
,23
2557:12
2562:24,25
2563:3,10,
14,20,23
2565:11
2566:2,17
2569:11,13
,16,20
2570:7,17,
21
2572:4,6
2573:4
2583:3
2593:6
2599:6,14,
17 2614:22
2619:2
2626:1,2,2
2,24
2645:10,12

prices
2476:16
2481:15,16
2483:23
2499:15
2500:4
2501:2,6,9
,11
2512:21
2520:25
2521:13,21
2522:12
2523:14
2524:4,10

2525:6	**priority**	2559:24	2564:5	**programs**
2540:20	2452:5	**problems**	**produced**	2641:8,9
2543:23	2635:22	2545:11	2551:4	
2545:17			2564:2	**progress**
2547:4	**private**	**proceed**		2570:11
2548:12	2484:14	2484:4	**produces**	
2555:5		2578:8,16,	2564:5	**progressed**
2558:5,7,9	**pro** 2578:5	18		2597:4
,10,11,15,	**probabilisti**	2579:6,9	**product**	
18,19,22	**c** 2445:9	2580:16,19	2567:7	**project**
2559:1,3,4	2455:17	2581:22	2569:1,19	2454:22
,5,6	2575:5	2582:25	2570:21	2455:3
2562:5,12	2618:7	2583:8,20	2571:5,8	2486:18
2565:24	2702:24	2587:1	2577:23	2488:13,15
2566:20	2703:4	2591:21	2581:3	2493:20
2569:1,18		2621:23	2582:16	2499:13,16
2572:19,20	**probabilitie**	2636:4	2598:17	2500:19,22
,21 2573:2	**s**			2528:19
2577:16	2573:10,23	**proceeding**	**production**	2534:1,13
2578:14,22	2574:24	2483:5	2502:18	2537:7
2579:15	2575:10,18	2580:9	2539:3	2538:12
2588:18	2617:4,12	2630:2	2546:12,20	2550:15
2617:6	2619:5,15	2705:23	2563:23	2557:16
2618:24	2703:9		2564:12	2558:9
2619:1		**proceedings**	2565:17	2559:4
2620:13	**probability**	2446:4	2634:14,16	2563:25
2626:9,10,	2573:13	2513:15		2589:19
12,13	2650:16	2576:5,12	**productivity**	2591:3
2650:23	2698:1,7	2642:7	2575:3,7,1	2595:6
	2700:20	2653:13	1 2597:15	2597:20
pricing	2701:1,17			2598:8,15,
2562:22,23	2703:17	**process**	**products**	22 2600:17
,25 2563:9		2455:11	2569:19	2601:3
2569:13,25	**probably**	2471:11	2571:4,13	2611:13
2570:13,14	2452:1	2472:5,9	2572:4	2612:4
2576:20,21	2456:22	2475:5	2577:17,21	2642:23
2577:6	2499:8	2574:21	2671:1	2644:5
	2512:3	2588:2		2647:7,24
primary	2536:23	2589:7	**profit**	2648:10,16
2447:18	2559:13	2593:16,19	2628:20	,17,18
2575:20	2582:3	2594:7,8	2629:5	2651:15
	2587:2	2597:14	2631:10,22	2652:6,19
principle	2594:24	2601:6	2632:6	2653:14,17
2458:12	2646:15	2658:21		,21
2511:22	2654:1	2676:18,19	**profits**	2655:2,3
2512:17	2657:25	2677:3	2631:11	2656:21
2612:5	2659:7	2686:2		2657:8
2646:13	2679:17		**prognosticat**	2659:23
	2688:14	**processes**	**ion**	2660:1,3,5
principles		2597:5	2507:13	,8,18
2512:10	**problem**			2661:14,20
	2508:14	**processing**	**program**	2662:19
prior	2545:9	2475:7	2635:25	2663:9
2594:18	2553:4		2637:3	2665:5,13
2600:16	2555:1	**produce**	2638:5,7,9	2666:3,5,1
2631:18	2557:8	2553:9	2639:19	
		2554:10	2640:25	
			2641:1	

3,15,17,21,23
2667:5,8,11,12
2668:1,2,10,23,25
2669:20,23
2671:4,5,9
2672:15,23
2673:4,7
2677:11

projected
2554:16
2580:7
2606:25
2633:6

projecting
2635:7

projection
2630:9

projections
2608:21
2634:8

projects
2454:10
2486:16
2487:11
2489:2,10
2560:7
2612:8
2668:11
2671:2

project's
2454:23
2488:6

prominently
2526:4

pronounced
2527:13

proper
2470:17
2486:12
2488:6
2530:6
2660:7

properly
2481:3
2487:7

properties

2507:4,11

property
2532:16

proposal
2670:3

propose
2446:9
2450:25
2622:12

proposed
2643:2
2646:19
2675:21

proposing
2587:16

prospect
2504:9,25

protect
2582:5
2704:10

provide
2445:3
2446:11
2448:1
2456:18
2466:13
2469:15
2487:7
2495:12
2552:7
2557:1
2576:25
2577:2
2582:15
2601:10,16,20 2602:5
2612:2
2622:14
2637:16
2640:8
2646:1
2651:24
2660:21
2677:4
2701:24
2707:4

provided
2447:12
2450:24
2470:14

2487:4
2497:24,25
2498:1
2516:11
2519:5
2544:4,11
2557:20
2582:21
2601:7
2622:14,16
2639:1
2644:9
2649:24
2658:6
2662:11
2663:13
2676:2
2695:16

provides
2470:24
2474:16
2585:14
2638:14
2650:13,15

providing
2447:23
2557:24
2600:19
2647:1

province
2484:24
2486:22

province's
2504:3

provincial
2484:9
2692:20

provision
2446:11

proxy
2593:20
2612:2

PUB 2462:17
2499:4
2642:17
2656:1,17
2659:12
2661:21
2675:7

public

2440:3,21
2479:7
2563:21
2645:9,10,15 2646:3
2648:5
2649:2,14
2652:13
2674:8
2676:19,20

published
2680:17

pulls
2577:14

purchase
2583:24
2645:5
2647:21
2648:4

purchases
2517:8

pure 2485:25
2486:11,18
2489:5
2496:1
2533:7

purple
2683:3
2688:5,6
2689:18
2690:23

purpose
2464:22
2465:10,17
2514:20
2612:1,12
2613:10
2622:19
2667:25
2684:7

purposes
2572:20
2573:5
2640:3
2662:17
2663:5
2667:1

pursue
2488:8,12

push 2484:4
2506:10

puts 2458:18
2476:20

putting
2453:7
2507:17
2511:13
2544:8
2566:15
2644:7
2688:11
2691:22

PV 2529:24
2532:22
2541:6

———————
Q
———————

qualify
2516:16

qualitatively 2505:13

quality
2457:16
2463:24

quantify
2683:14

quantitative
2704:8

quarter
2502:11

quest 2596:4

question
2453:17
2462:3,16
2467:12
2470:2
2473:10
2482:16
2483:14
2484:25
2486:24
2487:6
2493:13
2495:11
2496:5
2499:10
2500:8,18
2504:17,18

2505:8
2506:23
2508:3
2511:7
2539:13
2555:10,15
2556:5,13
2561:24
2562:2
2564:2,24
2566:10,24
2569:6,12,
22 2571:17
2572:13
2573:10,21
2595:24
2596:3,4
2609:23
2618:11
2640:14
2641:7
2650:4
2658:2
2661:16
2667:15
2679:16
2683:1
2685:8
2689:4
2692:1
2701:12

questionable
2554:18

questioning
2513:9

questions
2452:12,16
,17
2453:16,19
,21
2455:25
2456:16
2457:7
2492:12
2502:3,10,
15,16,22
2550:23
2552:17
2572:15
2591:17
2604:9
2635:21

2642:22
2644:7
2653:16
2660:15
2674:15,21
2675:3,4,8
,25
2677:17,18
,22
2678:12,16
2701:9
2704:3
2706:6,11

quick
2447:11
2514:14
2609:22
2635:25
2637:17,23

quicker
2572:14
2659:7

quickly
2545:12
2637:24
2647:13

quilt
2471:22
2475:4
2516:11
2520:8
2523:17,25
2524:7,14
2540:19,22
,23
2543:15,18
2544:7,11,
23 2545:14
2546:24
2550:19,25
2551:4,7
2572:18,20
2573:4
2616:7

quilts
2519:9
2520:12
2543:14
2613:11

quite
2466:10

2473:15
2474:22
2476:23
2479:3
2489:9
2531:8
2534:17
2537:25
2539:2
2541:6
2542:2
2546:21
2557:22
2560:15
2561:25
2567:20
2627:24
2651:10
2681:20

quote
2469:24
2470:3
2477:8
2508:8

quoting
2554:15

———————
R
———————

rains
2565:16

raise
2693:13

raised
2555:16
2559:18
2569:6
2706:9

raises
2606:7

Ramage
2441:5

range
2481:10
2490:15
2496:17,18
,21
2497:17
2498:10,11
,22,23
2511:11

2527:22
2542:1,3,5
,11 2555:7
2558:7,21
2559:2
2564:10
2604:25
2605:2
2610:3
2611:20
2612:11
2630:14
2647:2
2700:3
2701:19

ranges
2496:12,15
2538:3
2558:9
2604:20
2611:2
2617:12
2622:21

rate 2447:16
2449:16
2450:1
2479:14
2487:14,16
,17
2493:8,10,
18,19
2494:25
2495:3
2496:1
2510:15,17
2517:25
2520:25
2521:13,15
,21
2522:8,13
2525:7
2528:18
2532:5
2533:7
2535:5,14,
20 2536:20
2537:22
2538:10,13
,14,20
2539:11,20
2540:12,25
2541:2,4,7
,10,12,20

2542:5,9
2543:1,24,
25 2544:13
2545:18,19
2546:4
2547:4
2548:12
2550:10
2598:17,18
2612:23,24
2619:9
2696:21

ratepayer
2491:11,17
,19,25
2492:2
2534:12
2647:18
2648:10
2652:22

ratepayers
2485:5,7
2486:22
2494:15
2646:21,22
2647:25
2648:7
2649:22,24
2652:11
2684:5,8

ratepayer's
2494:12,13

rates
2447:21
2448:4
2449:9,12
2480:3
2484:20,22
2493:21
2495:7
2499:21
2523:15
2524:5,6,1
1 2532:18
2533:8
2535:14
2537:3
2538:3,4
2539:1,6,8
2542:10,23
2549:17,24
2550:6,16

2617:6
2618:25
2626:11,15
2634:7
2635:15

rate's
2543:2

rather
2456:17
2466:14
2479:13
2498:21
2499:22
2534:14
2537:13,15
2602:22
2615:13
2698:13,22

ratio
2503:24
2542:17

rationale
2609:16

Re 2440:7

reach 2505:3
2611:8,9

reached
2594:10
2698:2
2700:21,23
2701:1

reaches
2699:23

reactor
2654:7
2659:1

readily
2695:23

reading
2458:1
2463:19
2603:20
2627:13

reads 2493:8
2496:8

ready 2446:4
2513:14
2576:12

real 2468:7
2625:12
2680:20
2691:22

realities
2555:9

reality
2491:10
2567:13

realize
2489:11
2677:15

realized
2558:21
2600:5

really
2455:2
2459:10,17
,21
2462:17,18
2468:11
2472:24
2478:7
2479:16
2480:5
2489:5
2496:25
2520:19
2523:7
2528:18
2533:22
2535:13,14
2537:6,11
2539:7
2542:25
2569:22
2596:9
2602:24
2611:16
2627:7,19
2634:13
2638:3,4,9
,11
2640:8,11
2641:19
2696:3,5

reason
2448:22
2462:9
2463:8
2465:8

2540:1
2574:18
2585:20
2591:2,8
2604:24
2636:23
2672:21
2673:22
2691:20
2692:3

reasonable
2462:14,21
2469:9
2500:24
2501:8,13

reasons
2498:4
2583:19
2584:3
2585:23
2588:22
2589:25
2599:24
2601:23
2673:2,15,
19

recalculate
2619:5

recalculated
2686:11

**recalculatio
n** 2526:18

recall
2470:5
2510:3
2594:5
2616:6
2644:15

receive
2544:20
2647:6

receives
2486:8
2651:9

recently
2509:18,20
2611:2
2653:13

recess

2642:1

recessing
2513:11
2576:8
2642:3

recession
2702:8,11,
12,14

recognizes
2487:9

recognizing
2630:24

recollection
2454:1

recommend
2459:8
2462:24
2472:6
2475:7,8
2536:6

**recommendati
on**
2471:2,12
2474:20
2478:16

recommended
2611:8
2612:3

recommending
2461:6
2474:4,6,1
4
2475:10,20
2478:14

recommends
2474:1

reconsider
2596:10

record
2451:23
2453:7
2513:24

recovered
2645:4

red 2519:13
2520:5
2683:2
2688:17,22

2690:20

redefined
2526:22
2589:12

redoing
2613:10
2620:8

reduce
2453:3
2491:24
2505:17,18
2506:22
2549:11
2563:16
2573:18
2574:10
2615:11
2619:7
2620:11
2638:14
2652:5

reduced
2503:24
2522:16
2573:13
2574:8
2616:13
2650:16

reduces
2648:17
2652:22

reducing
2452:3
2505:23

reduction
2448:4
2449:7,12
2506:17
2635:17
2652:24
2682:13

reductions
2505:22
2507:21,22

redundant
2511:16

ref 2497:24
2520:25
2521:11

2532:12	2539:11	2595:2	**Regis**	2461:18
2540:25	2540:20,21	2647:24	2440:13	
2543:23,25	2545:17,18	2685:17		**relate**
2547:3	2573:14,24	2699:11	**regret**	2676:1,25
2548:11,13	2574:3,19		2456:17	
2604:3,11	2575:6	**refers**	2458:7,9,1	**related**
2612:23	2592:24	2656:9	2,16,22	2453:16
	2602:14		2460:1,2,4	2500:6
ref/ref/ref	2603:17	**reflect**	,5,6,13,15	2517:5
2459:16	2604:21	2534:19	,20	2543:17
2477:21	2605:7,8	2536:7	2461:18	2546:21
2478:11	2606:7,23	2630:14	2463:7	2550:24
2481:5	2607:3,5,6	2660:8	2465:18	2617:21
2517:21	,11		2468:4,5,6	2629:23
2518:5,16	2619:8,10	**reflected**	,15,16	2673:5
2540:24	2622:4,7,2	2566:11	2469:3,14	2677:1
2543:18	2	2680:2	2471:17	2685:9
2545:1,16	2625:14,25		2472:24	2690:23
2547:3	2626:2,12	**reflecting**	2473:8,17,	2695:4
2548:8	2645:15	2571:4	18,25	2698:24
2549:20	2648:4		2474:1,2,3	
2550:8	2676:7,23	**reflects**	,8,9,11	**relates**
2613:13	2706:25	2476:19	2475:10,14	2525:19
2616:25		2493:8,10	,17,20	2555:10
2617:11,24	**referenced**	2563:4	2476:12,22	2560:7
2618:3,12,	2462:2	2566:19	2478:23	2642:22
15	2463:10		2500:7,9,1	2676:19
2619:19,20	2467:6	**regard**	2	
2620:17,24	2551:2	2563:8		**relating**
	2568:2	2675:22	**Regretfully**	2445:5
refer	2628:6	2705:11	2492:12	2602:8
2468:14	2657:8	2706:23		2675:23
2470:3			**regret-like**	
2497:24	**reference-**	**regarded**	2474:7	**relative**
2535:7	**price**	2468:11		2490:24
2652:8	2627:3		**regrets**	2683:14,24
2653:10,18		**regarding**	2464:7,14,	2684:20
2656:1	**referencing**	2653:16	16 2465:8	
2664:11	2669:16	2675:21	2472:16	**relatively**
2672:17			2474:17	2501:16
2673:15	**referred**	**regardless**	2476:1	2510:16
2675:6	2643:3	2450:10	2480:20	
2681:19	2652:8	2475:25		**relevant**
	2660:19	2481:7	**regrets-**	2472:6
reference	2661:11	2486:8	**approach**	2552:20
2448:12	2662:15		2470:16	2683:1,5,7
2459:17	2663:12	**regards**		
2469:21	2696:15	2554:20	**regrets-**	**reliability**
2491:10			**based**	2484:19
2497:24,25	**referring**	**regime**	2470:21,25	2650:15
2500:8,12,	2463:25	2507:1,2		2667:1
15,17,18	2472:25		**regulation**	2668:1
2517:7	2488:1	**region**	2561:16	2679:1,3,1
2521:12,15	2494:2,4	2504:5		0,13
,21 2535:2	2504:11	2557:13	**regulatory**	2680:8
	2544:17	2680:7	2535:11	2683:15,22
			2578:14	,25
		regional		2684:16,21
		2505:1	**rejected**	
		2553:11		
		2554:8		

2687:22
2689:8,9
2690:7,10
2691:2,4,2
4 2692:13
2694:19,25
2695:3
2705:1

reliable
2562:21

reliably
2641:4

reliance
2546:13

relied
2556:22

relief
2458:23
2460:10,16
2462:14

rely 2553:7
2556:9
2557:15,25

relying
2652:11

remain
2523:7
2640:24

remaining
2451:25
2454:16
2455:1
2642:20
2678:9

remains
2508:1

remember
2501:12
2568:15,16
2587:9
2615:22
2628:11,12
,13 2684:4
2702:7

Remembering
2566:4

remind
2512:24

remove
2518:2

removed
2517:12
2518:2,25
2573:13

removes
2517:16

rent 2644:12

rental
2490:4
2516:6
2517:10,16

rentals
2518:12

renting
2644:23

repeat
2472:8
2527:25
2536:9,17
2545:25
2573:21
2586:8
2601:19
2661:16

repeating
2579:3
2702:13

rephrase
2596:4

replacement
2503:21

report
2456:18
2458:3
2465:12
2467:5
2471:1
2474:19
2486:9
2492:25
2495:10
2502:19
2503:15,16
,18,20
2504:11
2505:6
2508:6

2611:7
2676:18,25
2677:6

represent
2453:23
2490:15
2538:3
2633:2
2662:4
2681:4

**representati
on** 2633:4

**representati
ve** 2612:7

represented
2497:10
2517:6,8
2630:4
2660:16

representing
2496:25

represents
2461:12
2630:20
2671:1
2691:2

reproduction
2552:11

request
2453:6
2668:5

require
2535:23
2536:3
2680:11

required
2493:12,19
2536:10

requirement
2493:25
2601:10
2679:13

requirements
2585:18
2611:12
2639:23

requires
2535:4

rerun 2611:3

research
2509:11
2597:16
2694:12

reserve
2575:2,3,4
2598:10
2599:7
2605:21
2606:5,6

residential
2682:11,14
2694:8

residents
2693:3

residual
2454:14,17
2455:6,19

resort
2646:14
2652:18

resource
2482:21
2578:19
2579:10
2588:15,25
2637:23
2680:10,13
2704:16

resources
2486:6
2489:6
2518:8,14
2559:16
2580:10

respect
2452:3,25
2456:16
2458:1
2468:25
2500:9
2501:12,19
2513:1,19
2522:6,19
2528:17
2543:4,11
2544:22
2552:17
2553:16

2555:16
2556:13
2559:10
2562:4
2564:23,24
,25
2566:8,24
2569:9
2574:4
2576:19
2587:14
2596:21
2600:15,24
2601:20
2609:23
2636:11
2637:15
2646:23
2647:24
2679:23,24
2685:7
2696:14,17

respectfully
2675:20

respond
2451:24
2453:6

responding
2453:4

responds
2569:7

response
2444:3
2446:9,16
2466:8
2569:8
2622:3
2637:23
2662:11
2675:7

responses
2580:6

responsible
2499:4

rest 2486:25

result
2508:9
2514:15
2520:13
2573:11

2651:9
2690:11
2691:3

resulted
2632:4

resulting
2672:22

results
2510:3
2511:11
2524:3
2530:5
2539:17
2555:6

resume
2446:4
2513:8,15
2576:5,12
2642:7

resumed
2642:7

resuming
2513:12
2576:9
2642:4

retired
2647:11

RETIRES
2708:4

return
2483:4,7,8
2490:19
2493:11,19
2535:23
2536:3
2649:11

returns
2633:2

revenue
2446:14
2448:4
2622:14
2627:9
2628:8
2629:19,21
,23
2630:23
2632:1,7,2
4,25

2633:24
2634:11,12
,25
2641:19

revenues
2448:19
2449:8
2517:6
2518:21
2539:4
2567:4
2630:8,10,
12,14
2631:3
2632:4,17
2633:5,6,1
0,11,12
2634:5,6,1
5,24
2635:2,5,1
1,14

reverse
2580:17

review
2440:9
2473:22
2578:16
2579:7
2589:1
2630:4
2653:13
2672:22

revised
2445:4
2524:7
2526:15,25
2527:3
2528:6,11
2544:5,11
2547:16
2549:10
2550:25
2551:7,8
2602:7
2608:19
2609:9,12
2660:21
2661:8
2666:10
2673:23

revision
2520:9

2672:22
2673:2,16,
20 2674:5

revisit
2589:3,4

Richard
2440:16
2477:2,17
2478:19,21

Riel 2653:13
2654:7
2656:2,15,
24
2657:1,16
2658:19,21
,22,24
2659:2,9
2664:23
2666:19
2667:3,7,9
,20,24
2668:6,10,
14,25
2669:16,18
,22
2670:6,11,
15,16
2671:7
2672:18
2673:18

right-hand
2493:1,3
2517:22
2520:4
2523:14
2549:18
2584:18
2586:3,10,
12 2609:5

rightly
2486:10

rights
2485:24
2486:11,21
2488:23

rise 2483:23
2489:10

rising
2511:1

risk 2460:24

2468:1,25
2469:3
2476:15
2479:5,8,1
0,17
2480:2
2481:1,13,
25
2483:13,16
2484:6
2485:17,18
2490:9,10,
19,21
2491:2,6,1
7,23
2492:1,2
2496:11
2497:4
2498:5,16,
17,19,20,2
4
2499:6,7,1
2
2500:9,20
2501:3,11,
12,22
2523:4,8
2524:16
2525:1,6,1
1 2548:22
2549:5,11
2562:18
2563:11
2566:1
2567:23
2575:4,7,1
1 2576:1
2591:10
2598:9,11
2599:8,11
2605:1,2,2
1,25
2606:6
2612:7
2620:11
2647:9
2648:14,16
,17
2649:22
2650:16
2652:22,24
2705:16,17

risk-averse

2482:13
2500:3

riskier
2524:8

risk-return
2497:11

risks
2455:15,16
2480:24
2481:13
2483:11
2484:17
2490:24
2508:12
2557:6
2568:8
2583:21
2597:20,21

risky 2472:1
2496:24
2500:19
2525:14
2528:12,14

River
2579:13

road 2546:19
2579:14
2583:13
2597:24

robustness
2699:20

role 2479:21
2636:9

roll 2482:8

room 2587:10

rose
2475:24,25

rough
2519:12,17
2608:5
2657:4

roughly
2503:23
2618:18
2657:4

round 2452:1
2672:4

2674:13,14

rounding
2531:16
2615:23

route 2501:4
2656:24
2657:3,5,14,18
2674:1,9

row 2649:7

rows 2448:16

rule 2612:6

ruled 2477:7

run
2485:3,6,8
2487:9
2535:21
2693:4

running
2634:16,22
2683:25

runs 2629:15

rushed
2608:25

───────
S
───────

sad 2700:1

sake 2482:7
2499:19
2686:13

salary
2487:22

sale 2563:22
2578:13
2580:5,6,9,11,14,23
2581:5,7,10,15,22
2582:6,15
2584:18,21
2590:13
2591:24
2620:12
2645:8
2651:11
2705:13

sales

2570:11
2578:21
2579:12
2586:12
2650:6,20

salvage
2454:17

SaskPower
2579:14

satisfied
2581:2

satisfying
2540:10

Saunders
2441:18
2442:19
2443:4
2453:13,14,15,23
2454:3
2455:24
2642:11,12,15,16
2643:8,15,23
2644:6,20,25
2645:14,18,24
2646:8,17
2647:16,22
2648:24
2652:7
2653:9
2654:2,5,12,16,24
2655:6,10,13,25
2656:6,8,14 2657:7
2658:3,13
2659:8,14,19,22,24
2660:2,14
2661:5,17
2662:7,8
2663:3,18
2664:8,9,19,22
2665:7,11,14,20,23,25

2666:4,8,12,18,22
2667:6,18
2668:13,18,21
2669:5,10
2670:20,23
2671:6,24,25 2672:12
2673:6,9,13,14
2674:7,18,20
2675:18,19
2676:10,13,14
2677:14,20
2678:14

save 2674:21

saw 2497:23
2522:13
2544:24
2547:2
2566:22
2600:17
2605:10
2613:21
2616:12
2699:3

scenario
2458:18,21
2461:14,21
2468:14,21
2475:3
2479:17
2481:5
2483:15
2491:9
2497:25
2500:14,15
2506:21
2573:19
2583:4,5
2591:7
2605:13
2625:11
2626:7
2643:12

scenario-by-scenario
2461:22

scenarios
2455:15,17
2468:19
2471:23
2478:23
2481:10,12,16 2510:5
2575:6
2626:7

schedule
2447:23
2520:7
2547:16
2578:14
2589:1
2706:13

science
2700:10

scope
2656:21,23
2660:7,11
2668:25
2675:16

Scott 2593:2

screen
2519:5,7,10 2526:4
2661:25
2663:7

scroll
2493:5
2534:2

scrolling
2496:7

S-curve
2482:15
2483:11
2520:20,21
2522:6
2525:20
2526:5,23
2527:13

S-curves
2480:10
2523:1

se 2447:15
2486:1

second
2447:20

2452:1
2455:20
2469:5
2470:10
2471:14
2483:10
2494:24
2521:14
2556:7
2559:23,24
2562:22
2578:2
2613:18
2649:7
2654:6
2669:15
2670:3,4
2685:19
2693:18

secondary
2478:24

secondly
2565:12
2574:20
2586:25

seconds
2678:5

secretary
2450:24

section
2463:4
2676:20,21

sectionalization
2665:6
2667:25
2668:6
2669:22

sectionalized 2667:21

sectionalizing 2658:22
2666:25

sector
2506:9

sectors
2694:10

securing

2599:2

security
2484:20
2609:25
2686:21
2694:19
2695:4,13

seeing
2515:19
2535:16
2661:6

seeking
2674:8
2676:5

seeks 2681:5

seem 2472:9
2624:5

seemed
2578:3
2664:5

seemingly
2538:9

seems
2471:13
2572:15
2573:16
2574:5
2587:10

seen 2490:11
2508:11
2510:19,20
2511:9,12
2585:25
2607:24
2685:11

sees 2647:1

selected
2512:8

sell 2567:6
2582:15
2651:2,7

selling
2563:4
2704:24

send 2450:23

sense
2452:22

2460:3,24
2476:13
2488:22
2489:2
2496:23
2501:11,22
2538:7
2541:19,23
2550:6
2561:25
2570:7
2580:10
2631:15
2682:24
2686:17

sensible
2476:7

sensical
2476:6

sensitive
2539:1,20
2540:2
2542:4,9,14
2546:20,22
2627:19,20

sensitivity
2495:4
2537:23
2541:12
2550:14
2592:18
2696:14

sentence
2461:16
2493:7,9
2494:3
2496:8
2524:24
2549:8
2554:14
2559:23

sentiment
2507:15

separate
2462:23,25
2569:18
2570:20
2636:14
2666:20,22
2667:5,16,

17
2668:11,14
2669:17
2705:13

separately
2668:19

separating
2705:21

series
2568:2
2654:21

seriously
2681:25

seriousness
2508:12

serve 2587:3

served
2669:11
2685:12

service
2534:6
2563:21
2585:15
2588:13
2590:15
2591:1,5
2598:23
2636:21
2639:19
2645:9,10,
11,15
2646:3
2648:5
2649:2,15
2660:12
2668:5
2671:9

Services
2652:13

session
2502:10

sets 2510:2
2577:1
2679:21

setting
2634:8

seven
2449:3,4

2522:17
2530:7
2537:19
2541:1,5
2570:1
2595:20
2607:5
2613:14,20
2616:7,13
2617:24
2618:13
2672:3
2682:15

seven-one
2607:14

seven-six
2609:7,10

seventy
2672:2

**seventy-
eight**
2453:16

seventy-five
2449:4

seventy-four
2614:1,7,1
2
2617:18,23
2618:17
2619:20

seventy-one
2522:23

**seventy-
seven**
2492:24
2663:15
2671:15,17

seventy-six
2450:5

several
2497:7
2510:2
2516:14
2624:12
2646:6,10,
15

Shaffer
2489:22

shale
2483:23

sharp
2707:25

sheet
2570:12

sheets
2551:6

Shefman
2441:19

she's 2526:1

shifts
2594:1

shooting
2614:15

short
2484:22
2485:6
2492:12
2550:23
2566:1,19
2572:11
2574:13,14
2576:21
2693:23

shortages
2682:3

shortcut
2600:13

shorter
2575:24
2657:24

shortly
2674:15

short-term
2640:8
2682:2
2703:21

showed
2633:1

showing
2462:21
2480:10
2521:18
2523:18
2587:24
2625:6

2699:18

shown 2453:2
2528:14
2605:12
2616:24
2624:4
2627:18
2631:12,14
2632:7
2636:11
2669:24
2683:5,15
2684:22
2699:22

shows 2515:8
2519:10
2520:12
2521:22
2561:12
2592:12
2671:14

shrink
2619:12

shunt 2654:6

sic 2485:13
2487:2,5
2488:3
2515:1
2524:23
2555:12
2677:11,15
,17

signed
2574:17
2600:21

significant
2484:25
2487:10
2491:8
2526:24
2536:13
2541:9
2542:2
2565:25
2566:3
2591:11
2618:8
2634:22
2647:1,9
2649:4,5
2683:10

2694:3
2703:17

**significantl
y** 2489:10
2520:21
2521:7,8
2618:5
2703:18

s'il 2492:4
2514:8
2576:15
2678:17

similar
2457:10
2477:15
2537:12
2561:25
2562:20
2566:24
2601:22
2602:13
2616:24
2617:21
2685:10

similarly
2557:11

Simonsen
2512:23,24
2513:5

simple
2485:15
2487:1
2494:6
2577:13
2588:20
2682:7

simpleton
2457:7

**simplistical
ly** 2690:17

simply
2493:16
2536:10
2557:25
2601:3

single
2459:16
2467:8
2468:23

2477:24
2478:10
2481:5,6
2560:19
2568:7

single-digit
2510:21

sir 2534:24
2553:17
2560:7
2573:20
2579:1
2596:7
2641:10
2690:19
2693:1
2701:22

site 2598:25
2600:6

sites
2598:15

sitting
2554:3

situation
2459:18
2482:12,25
2484:5
2509:5
2640:6
2650:10
2687:7
2705:19

situations
2498:11

six 2444:4
2450:25
2451:3
2522:25
2541:3
2549:20
2566:2
2569:23
2570:4
2594:19
2595:17,20
2600:3
2607:10,11
2610:5,18
2614:16
2663:15

2689:23
2691:7

six-nine-six
2550:9
2614:8

**six-nine--
six**
2613:19

Sixty
2564:12

sixty-eight
2522:17

sixty-seven
2454:11
2663:12,16

sixty-two
2522:16

skyrocket
2694:4

slide
2517:21
2530:11
2531:23
2579:25
2580:2
2582:23
2584:10,11
2586:4
2591:19
2592:7
2603:16,21
2612:16,22
2613:2,13,
17,22
2614:1,3
2615:5
2616:2
2617:22,24
2618:11
2628:6,10
2630:4
2653:18,20
2655:14,21
,22
2657:8,9,1
5
2658:7,8,1
0
2660:15,23
,25

2661:9,12,
23 2662:6
2665:15
2669:15
2670:25
2679:1,2
2680:1
2681:4
2695:17

slides
2579:23

slightly
2466:3
2514:22
2607:6
2615:11
2631:21
2688:4
2690:2

slip 2590:4

slips
2588:11

slow 2588:24

small 2470:8
2501:16
2513:21
2575:15
2623:24
2628:20,21
2629:5
2631:9,22
2639:17,22
2688:23

smaller
2542:5
2620:22
2691:5

smart
2459:22
2556:17

social
2485:11,14
2487:3
2489:16,21
2501:15
2509:15,20
2510:7
2511:5,10
2512:1

2692:22

social-
  economic
  2692:21

societal
  2447:17,18
  2496:3
  2503:22
  2692:9

society
  2485:2
  2501:17,19

socioeconomi
  c 2692:24

sold 2570:15

Soldier
  2440:15

solely
  2557:15

solid
  2571:18,20
  2628:1

somebody
  2576:22
  2628:11
  2643:16
  2644:12,18
  2705:2

somehow
  2483:19
  2561:9,18

someone
  2462:15,17
  2465:19
  2475:14
  2647:5

sometime
  2694:24

somewhat
  2507:16

somewhere
  2477:23
  2489:23
  2506:19
  2528:7
  2706:13

sooner

2534:9

sorry
  2448:23
  2463:23
  2477:2
  2493:9
  2494:17
  2496:16
  2504:10
  2514:22
  2517:1
  2523:11
  2527:24
  2540:19
  2545:2,4
  2550:24
  2586:7
  2595:10,11
  2608:25
  2617:7
  2621:14
  2661:15
  2662:8
  2663:21
  2667:14,20
  2677:21,25
  2684:3,18
  2688:5
  2689:2

sort 2446:19
  2478:23,24
  2479:4,13
  2482:5,10
  2538:6
  2540:9
  2570:13
  2688:8
  2694:7

sounds
  2670:9

source
  2655:8

south
  2491:13
  2657:23
  2658:15
  2673:18

southern
  2656:25

speak
  2479:19,21

2512:10
2557:18
2601:2
2646:9
2701:10,12
2702:2
2707:13

speaking
  2469:7
  2494:18
  2559:14

special
  2577:16

specific
  2461:13,14
  ,21
  2488:7,8,1
  2
  2515:12,15
  2516:2
  2564:10
  2571:7
  2685:8
  2694:4,13,
  22

specifically
  2487:13
  2494:13,15
  2535:16
  2555:16
  2556:13
  2621:17
  2646:2

specifics
  2512:20
  2677:10

spend 2544:5

spending
  2540:15

spent
  2608:16,17
  ,18,19

spite 2647:6

SPLASH
  2629:15
  2630:15

split 2519:7

spoke

2545:12

spot 2499:22
  2565:19,22
  2566:3,20
  2571:11

spread
  2540:4
  2544:3,12
  2604:16

Spruce
  2564:16

square
  2474:14

stability
  2562:22

stable
  2490:14
  2553:7
  2560:3
  2562:25
  2563:11

staff 2545:9
  2600:5,8

stage 2486:5
  2504:2

stakeholder
  2493:23

stakeholders
  2462:3
  2468:8
  2469:16
  2480:15
  2495:7,17,
  22 2511:23

stand
  2452:15
  2553:18
  2556:2
  2638:23

standard
  2496:11,12
  ,24
  2679:13
  2680:2,3,5
  ,8,20,24
  2681:4

standards
  2497:3

2679:17,20

standing
  2678:1

start
  2448:23
  2452:10,19
  2456:23
  2480:24,25
  2486:18
  2513:16
  2519:10,15
  2529:6
  2534:4
  2543:17
  2545:1
  2586:11
  2591:8
  2604:10
  2614:6
  2620:7
  2633:8,18,
  21 2639:14
  2664:20
  2674:14
  2692:11
  2699:8

started
  2543:20
  2616:7
  2697:5

starting
  2448:12
  2466:17
  2470:10
  2515:2
  2626:25
  2675:12
  2690:20,22

starts
  2448:11
  2461:10
  2554:25
  2559:23

state
  2493:16
  2511:21
  2553:14
  2554:4

stated
  2523:5
  2598:5

2643:9
2675:8

statement
2493:25
2556:2
2560:8,10,
11 2566:9
2587:13
2627:22

statements
2553:16,18
2629:17

States
2504:20
2568:18
2650:25
2651:3

States's
2651:1

station
2563:23
2565:20
2590:21
2653:14
2656:9,11
2664:23
2666:19
2667:2,7,9
,22
2668:2,14
2669:19
2671:7
2673:18

stations
2564:7
2627:20
2670:18

stay
2483:23,25
2484:2
2506:20

stayed
2649:7

steady
2567:20

step 2485:22

Stern
2508:4,5

stop 2474:23
2484:7
2526:2
2591:4

story
2449:23
2450:3,10
2485:15
2524:15

straight
2658:16,17
2690:2

strategic
2647:4
2650:23
2651:5

strategies
2502:15

strategy
2501:3,10
2502:8

stream
2537:15
2539:24
2567:20

streams
2537:24

stress
2595:3,5
2598:6
2608:17

strict
2506:4,13

strictly
2684:11,12

strong
2473:2
2506:3
2555:2
2627:7

strongly
2474:6,13

structural
2561:14

structure
2646:24
2664:4

structures
2663:24

studied
2482:21

studies
2509:16,19
2511:10
2588:9

stuff 2467:2
2485:24
2532:17
2539:4
2545:8

sub 2603:4

subject
2456:4
2550:19,21
2588:2
2592:16
2621:5,23
2627:16
2678:24

submission
2487:4
2488:2
2587:23
2595:5
2604:23
2605:22
2610:25
2662:17
2663:14
2675:16
2683:22
2704:18

subsequent
2533:25

subset
2512:8

substantial
2489:9
2696:5

**substantiall
y** 2451:8

substation
2658:18,21
2668:10,24

subtract

2619:22
2620:24
2633:11
2692:12

subtracted
2517:11
2518:18,23

successful
2653:1

sudden
2561:7
2705:19

suddenly
2489:8,9

suffered
2631:9

sufficient
2479:16
2678:9

sufficiently
2506:14
2553:6

suggest
2449:25
2453:5
2513:7
2568:6
2587:16
2589:22,24
2594:24
2628:1
2683:6
2703:9

suggested
2542:22

suggesting
2490:1
2505:5
2575:19
2631:25
2703:16

suggestion
2452:14
2488:5
2544:15

suggestions
2544:18

suggests

2491:19
2587:15
2655:1

suitable
2674:9

summaries
2577:2

summarize
2577:2
2620:21

summary
2463:11
2464:5,12
2465:14,17
,25 2466:5
2496:11
2497:23
2578:2,5,6
,24 2580:2

summer
2588:9

sunk
2514:1,5
2603:21,23
,25
2605:11
2607:15,25
2608:1,4,8
,13,16,22

supplement
2461:19
2463:1,5
2469:15
2510:24
2567:2

supply
2463:6
2484:11
2562:21
2565:14
2598:12
2682:3,14

support
2535:8,11

supportive
2488:22

suppose
2482:4,7,1
5 2499:12

2506:1,12

supposed
2609:3

sure 2452:17
2479:2
2480:8,17
2495:11
2506:23
2511:20
2513:23
2519:4
2541:8
2552:24
2580:24
2582:12
2595:25
2596:2
2607:19
2608:15
2618:22
2619:19
2659:15
2678:6,9
2690:19
2696:11
2700:1
2704:13
2706:12

surplus
2564:5,12,
19
2565:4,10
2570:19
2585:17
2651:3

surprise
2541:19
2542:18
2562:16

surprised
2473:20
2538:8
2539:18
2541:25

surprises
2588:18

surprising
2462:15

surprisingly
2535:10

survive
2483:17

suspect
2507:12

Sven 2441:3
2456:8
2677:24
2678:4
2707:12

swing 2541:6
2545:19
2546:9
2547:5
2549:17,19
,24
2550:16,20

switch
2503:5
2525:20
2621:5

switched
2524:5

switches
2525:21

Sworn
2442:7,8,9
,10,11,12,
13,14,15,1
6
2446:24,25
2447:1,2,3
,4,5,6,7,8

swung
2507:15

symmetric
2670:17

sync 2655:9

syst 2604:25

system
2482:22
2505:11
2506:13,14
2507:3,9,1
0 2515:21
2518:11
2555:4
2564:15
2577:7

2580:5
2628:2
2636:19
2637:2
2638:15
2680:25
2691:2

systemic
2597:20
2599:11
2605:1,2

T

tab 2456:20
2461:9
2463:16
2466:15,16
2552:10
2592:24
2622:12

table 2442:1
2443:1
2463:7,25
2464:4,12,
16 2515:7
2517:22
2544:5
2610:22
2611:5,24
2612:1
2616:10,24
2617:21
2621:11,13
2622:5,9,1
5,20,24
2638:22
2651:6
2653:2,6
2671:14
2701:18

tables
2465:9
2468:24
2497:23
2639:4

tail 2539:10

takeaway
2472:13

take-or-pay
2641:15

takers
2479:8

taking
2460:20
2475:14,15
2487:20
2498:22
2520:13
2559:17
2602:13
2620:9
2631:7
2639:25
2684:12
2706:24

talk 2486:20
2490:13
2508:22
2625:25
2627:9,12
2684:16

talked
2481:20
2484:19
2491:23
2505:6
2525:2
2569:14
2597:21
2615:22
2636:9
2650:12,14
2686:15,18
2692:14

talking
2477:5
2488:13,14
2500:10
2506:8
2512:7
2535:13
2562:19
2565:9
2568:21
2569:1
2572:21
2575:1
2581:10
2591:20
2594:13
2615:19
2624:21

2626:1
2630:2
2632:15
2633:22,23
2661:4
2672:15
2684:17
2686:10
2688:24,25
2693:15,16
2694:6
2695:1

talks
2586:12

tangent
2485:22

Tanner
2554:3

target
2700:5,7
2705:14

tax 2488:23
2507:17

taxes 2490:4
2515:14,15

team 2600:6
2611:14

technical
2458:10
2469:22
2474:22
2490:11

Technically
2457:9

technique
2454:17
2481:8
2575:5

techniques
2682:6

technology
2555:4
2556:19

ten 2496:15
2513:8
2522:16,22
2540:4
2546:17

2558:14,16
2560:20
2562:12
2591:20
2594:12,17
2609:7,10
2636:13,23
2639:18
2641:1
2642:1
2696:17,22
2697:6,25
2698:18
2699:19,22
2700:14
2701:3
2702:6

tend
2702:11,12

tendency
2499:7
2555:3

tender
2609:25

term 2449:10
2450:1
2457:22
2458:9,10
2464:7
2468:14
2484:21,22
2510:21
2535:5,8
2536:8
2554:11
2558:10
2560:17
2566:1,19
2570:12,17
2640:23
2693:24

terminate
2581:4,7
2590:22

terminated
2591:6
2658:24

terminates
2658:20

terminating

2659:2

termination
2654:6

terminology
2460:14
2469:8

terms
2453:3,7
2469:16
2472:11
2479:7
2480:19
2486:19
2499:12,24
2505:22
2536:15
2537:18,22
2540:10
2572:18
2573:9
2589:8
2610:21
2620:15
2635:14
2649:19
2676:7,22
2680:20
2684:1,5
2690:7

territory
2660:13

TERRY
2442:12
2447:4
2469:20
2470:6
2503:7
2515:5,10,
17,23
2516:3,8,1
3,16,22
2517:1,23
2518:4
2520:10,15
,23
2521:5,9,2
3 2522:4
2529:14,21
2530:3,9,1
6,21
2531:2,6,1
1,14

2532:2,6,1
0,14
2621:16,20
,25
2622:6,17,
25
2623:3,7,1
0,14,20
2624:2,6,9
,16,25
2625:5,19
2626:5
2627:25
2628:13,16
2629:1,8,1
8 2630:6
2631:16,23
2632:10,13
,20
2634:1,4
2640:22
2664:17,21

test
2447:17,18
,20
2595:4,5
2598:6
2608:17
2699:20

testimony
2593:24
2596:7
2643:9

text 2691:15

texts 2468:6

thank 2446:7
2450:13,17
2453:11
2455:24
2456:12
2461:7
2463:12
2466:6
2470:3,5,9
2473:14
2476:25
2486:23
2494:19,21
,22 2496:4
2502:2,4,1
2 2503:20
2508:2

2511:15
2513:5,9
2514:7,9
2519:1
2525:17
2528:15
2545:13
2551:16
2552:9
2556:7
2559:20
2560:9
2567:18
2569:5
2576:5
2578:25
2579:1,20
2582:8,20
2587:11
2590:19,23
2600:11
2601:18
2604:1
2608:24
2612:14
2622:7
2632:9
2633:19
2635:19
2638:24
2639:11
2641:21,23
2642:1,12,
25 2644:20
2646:17
2660:14
2664:9
2673:11
2676:10
2677:17,19
2678:21
2679:12
2701:14
2705:25
2706:5,20
2707:15,17
,19,20
2708:2

thanks
2478:21
2502:4
2510:22
2513:4

2669:6

thas 2624:16

that'll
2625:23
2671:9

that's
2447:17,18
2448:9
2449:1,2,5
2453:3,10
2455:5,23
2456:17
2459:3,6,9
,24
2460:25
2462:11,23
,25
2463:13,25
2464:4,6,9
2468:2,3
2469:24,25
2470:4
2471:21
2472:1,7,2
0
2473:10,11
2474:5,11
2475:18,21
,22
2476:6,11
2478:15
2479:15
2480:11
2483:9,14
2487:2,3,2
5 2488:21
2489:11,25
2490:3
2491:13
2494:22
2495:23
2497:12
2498:9,16
2502:4
2503:19
2506:24
2507:18
2510:14
2511:12
2514:23
2515:5,10,
17,18,23

2516:3,8,10,13	2603:19	2687:2	2482:22	2679:16,20
2517:21,23	2604:18	2688:19,20	2484:5,23,25 2486:12	2680:5,15
2519:11	2605:21	2689:14	2487:13	2682:8,13
2520:10,15,23	2606:8,16,17 2608:11	2690:5	2488:5	2687:3
2521:5,9	2609:4,14	2691:12,14	2495:25	2688:2
2523:9	2610:24	2692:10	2500:24	2700:13
2524:8	2612:25	2693:4	2501:8	2705:5
2526:20,21,24	2613:4,9	2696:4	2505:21	2706:10
2528:22	2615:7,11	2697:17	2514:1	
2529:14,18,21	2617:23	2698:17	2515:13	**thermal**
2530:1,3,6,9,16	2619:17,19	2700:19	2516:6,14	2517:9
2532:2,6,10,11,14	2621:1,2,25	2701:4	2526:24	2539:4
2533:13,14	2622:6,17	2702:12	2527:2	2567:5
2535:4	2623:20	2704:17	2531:7	2568:17
2536:5,23	2624:3,16	2707:9	2533:15	2634:17,23
2542:5	2625:20		2534:1,3	
2543:3,12	2627:7	**themselves**	2543:10	**thermally**
2551:1,7	2630:21	2472:4	2544:2	2568:14
2552:2	2631:14	2486:19	2550:2	
2557:8	2632:25	2557:9	2559:21	**thesis**
2560:24	2633:10,15		2564:8	2681:23
2561:23	2634:1,2,19,21	**theoretical**	2565:2	
2562:6	2635:13,17	2467:22	2566:18	**they'd**
2563:23	2636:1,24	2506:2	2567:19,24	2479:13
2565:13,14	2637:17,18		2569:18	2485:8
2569:9	2638:21	**theory**	2570:25	2505:3
2570:2,3	2639:7,10	2457:13,14	2574:3	
2571:2	2640:13	2467:16,23	2581:2	**they'll**
2574:18	2641:4,18	2468:9	2582:4	2534:14
2575:13,16,23	2651:23	2473:6	2587:23	2539:9
2579:21	2652:3	2480:8	2588:18	2573:2
2580:23	2653:19		2590:25	2641:1
2581:24	2654:11,19,21	**thereby**	2592:11	
2582:19	2656:4,13	2458:19	2596:8	**they're**
2583:22	2657:4		2598:12	2457:16
2584:19,24,25 2585:9	2659:22	**there'd**	2600:13	2472:8
2586:4,14	2661:20	2534:5	2604:15	2474:4
2587:4,6	2662:25		2620:14	2475:6,9
2589:6	2664:12	**therefore**	2623:4,23	2484:22,25
2590:4,17	2665:2,12	2504:7	2624:19,20	2486:11
2592:25	2666:3	2505:20	2628:1,21	2489:1,8
2594:18	2669:17,19		2633:25	2529:12
2597:6	2671:9	**there'll**	2637:17	2534:9,11
2598:13,14	2672:17	2561:21	2640:1,24	2538:18,23
2599:2	2677:2,6		2641:12,18,24	2540:4,7
2601:12	2680:22,23	**thereon**	2645:11	2562:10
	2681:12	2608:22	2647:10,11	2563:12
	2683:2,4		2649:25	2565:4
	2685:20	**there's**	2650:9,10,15,17,19,22 2651:5	2572:23
	2686:12,21	2448:22	2658:14	2581:11,12
		2449:7		2607:17
		2451:25		2608:22
		2456:9		2661:3
		2460:9		2667:15
		2462:1		2693:21
		2467:13,14		2705:13
		2468:15,23		
		2469:1		**They've**
		2471:24		

2511:11
2668:15

third 2461:9
2553:2
2562:24
2563:22
2579:3
2648:12
2650:8
2653:2
2654:13

thirdly
2481:11

thirds
2650:9

thirty
2455:3
2503:23
2529:16
2535:7
2546:18
2554:17
2561:22
2662:20
2678:5

thirty-five
2454:2,12

thirty-four
2522:17

Thomson
2593:19

Thomson's
2593:2

thoroughly
2455:14

thoughts
2557:5
2611:15

thousand
2525:12
2531:17,20
2542:11
2619:25
2682:16
2689:23
2691:7
2699:14,15

thousands

2695:18

threat
2568:20
2569:3

three-five
2530:17,20
2607:11

three-nine
2603:22

**three-o-
eight**
2583:6
2590:13

**three-
quarters**
2568:16
2602:25

three-six
2604:14

three-three
2607:10

throughout
2569:17
2586:16
2598:13
2635:4

thrown
2469:10

thumb 2612:6

tied
2580:12,14
,23 2582:6

tie-line
2665:9
2688:25
2689:5

tight
2532:22

till 2565:19
2689:20

**time-
consuming**
2619:17

title
2559:22
2654:25

titles
2515:13
2669:12

today
2533:14,20
2536:16
2537:18
2555:11
2565:16
2585:22
2593:4
2654:17
2657:5
2661:10
2676:1,5
2686:14
2706:21

today's
2533:24
2534:10
2552:20

tomorrow
2533:15

tomorrows
2533:15

tonight
2678:3
2694:24
2696:9

tonne
2510:7,19
2511:1,2

tonnes
2503:24

tool 2567:9

tools
2553:24
2555:17,24
2557:9

top 2493:1
2515:7,12,
13,25
2520:4,6,1
7 2522:14
2523:13,20
2526:5,23
2528:21
2529:1
2531:25

2622:24
2668:6
2683:25
2688:7
2697:9
2702:4

topic
2540:14

topics
2681:23

total 2486:6
2487:19
2505:16
2607:13
2608:4
2609:6
2622:14
2654:16
2661:6,9,2
4 2692:20
2698:13,23

totally
2665:5
2667:4

totals
2655:21

total's
2655:11

touch 2598:4

touched
2480:4
2599:11

toward
2507:16
2559:17

towards
2499:7
2657:1,16,
17,19,20
2659:2,3
2660:12

towers
2674:3

TPL 2679:20

trade
2504:2,4,2
5
2505:10,11

,15
2506:13
2507:3,9,1
0,16

tradeoff
2490:19

trades
2566:3

trailing
2534:17

train
2649:10

training
2485:12

transaction
2652:2

transcribed
2621:12,20

transcript
2443:8
2513:20
2592:25
2593:1
2602:23
2655:16

transcripts
2701:8

transfer
2486:11
2488:23
2489:18,19

transfers
2484:24
2485:1,3,2
3 2487:8
2670:5

**transformati
on** 2667:23

transformer
2654:7
2669:17,24
2670:1,2,4
,6,11

transformers
2670:13,15

transition
2553:14

translate
2479:6

translates
2504:24

transmission
2642:23
2643:4
2645:13,20
2647:12
2652:21
2653:14,21
2655:3
2660:18,20
2661:8,14,
19
2662:5,19
2663:8,25
2666:3,15
2667:12
2668:5,7,8
,14,23
2669:20
2679:19,20

transpose
2618:16

TRC 2447:13
2449:14

trea 2489:5

treasury
2535:4

treated
2534:8

treating
2620:11

treatment
2494:25
2535:5
2549:10

tremendous
2705:18

tremendously
2482:9

trend
2654:21

tried
2509:15
2657:13
2683:13

tries
2680:24

true 2488:24
2509:6
2512:11
2535:3
2560:8,12
2580:18
2611:11

truest
2692:23

truly
2692:20

try 2451:25
2459:8
2473:25
2480:18
2494:12,14
2503:4
2509:15
2534:24
2537:12
2544:19
2558:6
2569:22
2574:12,14
2577:1
2609:2
2649:11
2673:25
2676:14
2681:1
2682:1
2695:25
2696:7
2706:13

trying
2451:24
2452:4
2465:19
2474:14
2480:5
2499:11
2504:18
2514:24
2539:21
2566:8
2583:21
2595:8,14
2596:20
2600:13

2658:4
2682:24
2689:7
2697:19
2698:15
2700:5
2704:17

tune 2673:25

turbines
2529:16
2546:20

turn 2466:7
2513:20
2515:1
2559:21
2576:13
2597:2
2610:13
2636:7
2642:10
2677:20,22
2683:18
2700:24

turns
2457:15
2705:3

tweaked
2474:12

twelve
2693:24

twenty
2522:20,24
2554:17
2639:18
2640:1
2697:22
2703:25
2705:8

twenty-eight
2522:21

twenty-five
2482:20

twenty-four
2618:1,4
2619:21
2620:23
2693:25

twenty-nine
2699:14,15

twenty-one
2491:12

twenty-seven
2525:10

twenty-six
2448:25
2449:2

twenty-three
2449:3,4

two-two-zero
2625:14

tying
2667:24

type 2493:13
2494:8
2551:1,6
2639:2

typically
2457:20
2478:15
2496:17
2554:11

———————
U
———————

UK 2535:4

ultimate
2578:12

ultimately
2558:20

unacceptable
2485:18

**unanticipate
d** 2637:2

unburdens
2648:13

uncertain
2560:16
2561:2,7
2646:23
2648:6
2700:9

uncertainties
s 2557:7
2649:21
2705:8

uncertainty

2455:14
2467:17
2468:1
2470:14,19
2471:5
2481:25
2482:23
2490:16
2495:1
2496:19,22
2498:16
2499:15
2500:4,20
2508:1
2517:5
2535:6,14,
20 2555:4
2558:4
2559:1
2560:18,23
2561:14,15
,19 2562:4
2563:2,8,1
6 2564:21
2575:4
2597:15
2648:9
2649:13
2652:10
2698:12,13
2700:4
2704:5

uncommitted
2570:16
2620:12

uncontracted
2564:25

**unconvention
al** 2469:6

**underemploye
d** 2487:21

underlying
2503:16
2512:17
2560:1
2619:15

understan
2500:1

understand
2446:21
2458:6,17

2461:23	2675:11	2605:20	2674:25	**Usually**
2465:20	**understate**	**unfavourable**	2707:1	2564:11
2466:22	2555:3	2449:24	**updated**	**util** 2568:20
2472:19	**understating**	**unfirm**	2509:20	**utiles**
2473:15,16	2557:7	2567:3,6	2551:12	2457:16
2475:10	**understood**	**Unfortunatel**	2593:14	2512:7
2479:25	2487:6	**y** 2513:6	2600:24	**utilitarian**
2480:6	2569:10	**unintended**	2614:4	2456:17
2481:13,14	2596:6	2549:4	2661:18	2457:8
,17 2516:1	2603:24	**unique**	2675:1,9	2459:13,19
2533:4	2689:4	2693:14	**updates**	2461:11
2536:6	2690:19	**unit** 2591:5	2601:4	2465:11
2539:21	**undertake**	2633:10	2607:24	2466:4
2555:15,23	2499:16	**United**	**upon** 2446:1	2467:23
2566:12	2588:9	2568:18	2480:4	2478:23
2570:1	2601:19	2650:25	2513:11,12	2480:20
2574:2	**undertaken**	2651:1,3	2576:8,9	2481:22,24
2580:5,13,	2489:4	**units**	2589:9	2500:7,16
14 2592:17	2618:7	2515:16	2642:3,4	**utilities**
2595:9,15	**undertaking**	2591:1	2708:6	2440:3,21
2607:20	2444:3	2634:17	**upper**	2568:12
2614:15	2446:8,9,1	**unless**	2519:11	2597:19
2622:3,13	1,16	2509:2	**upset**	2645:25
2624:7	2448:1	2611:12	2462:17	2646:2,6,1
2625:21,23	2555:12	2641:24	**upside**	0 2648:2
2630:20	2601:19	**unprecedente**	2481:2	2650:21
2655:17	2602:5	**d**	2483:11,12	2652:4
2658:5	2701:25	2560:17,22	2498:13,15	**utility**
2663:6	2703:1	,25	,17,20,21	2446:13
2667:15	2704:4	**unrelated**	2499:5	2457:10,13
2677:8	2707:7,8	2516:5	2523:3	,14,22
2686:1	**undertakings**	**unreliabilit**	2527:2	2459:13,19
2694:20	2442:4	**y** 2682:9	2550:3	2460:21
2697:11,20	2445:1	**unserved**	2627:8	2464:17
understandab	2706:11	2681:21	**upsides**	2465:1,2
le 2465:23	2707:13	2684:1	2481:14	2467:23
understandin	**undervaluing**	2686:5	**useful**	2468:8
g 2458:11	2570:8	**untrue**	2462:13	2473:6,7
2466:1	**uneconomic**	2560:25	2470:19	2477:14
2480:14	2449:16	**upcoming**	2496:10	2479:1,6
2497:7	**unemployed**	2588:7	2498:7	2480:9
2529:10	2487:21	**update**	2544:18	2490:10
2539:15	**unemployment**	2604:2,10	2579:21	2499:16
2554:6	2487:14	2605:5	2618:10	2511:18
2556:14	**unexpected**	2606:24	2637:23	2560:22
2558:3	2682:2	2607:6	2638:1,2,4	2563:11
2585:8	2705:22	2662:24	2706:4	2566:1
2596:14	**unfactored**		**usual**	2567:24
2603:10			2458:13	2568:21
2617:14				2694:22
2629:4,14				**utilized**
2637:12				
2640:23				

2596:25

V

---

valiant
2569:24

valid
2489:17

valuable
2651:17

valuation
2486:2
2487:15
2686:9

valuations
2532:16

value
2454:14,15
,17
2455:5,6,7
,19,22
2457:8,17,
24 2459:19
2461:15
2470:21
2471:15
2475:15
2480:9,19,
21,23
2481:7
2482:10
2483:1
2485:16
2486:19
2488:18
2489:9
2490:13,20
2491:1,9
2495:16
2497:25
2498:12,15
2504:1
2505:21,22
2509:15
2510:18
2524:12
2530:7,12,
25 2531:4
2532:4,8
2533:20
2537:14
2538:9

2539:6,19
2540:11
2571:3,4,5
,7 2603:17
2606:20,21
2608:5
2612:23
2616:20,24
2617:10,16
2618:3,5,1
2,14,15,17
2619:8,10,
20,23
2620:18
2635:4
2640:8
2647:20
2651:24
2663:11
2675:24
2683:15
2684:1,21
2686:5
2695:12,15
,22
2696:1,2,6

value-based
2571:14

values
2457:22
2478:25
2482:5
2486:15
2490:24
2498:1,4
2510:19
2523:7,20
2537:13,23
2573:7
2603:10
2607:23
2617:21
2663:2,13
2672:23
2676:9
2684:2,5
2686:3
2694:6,7

valuing
2533:12
2570:7

vantage

2456:12

variability
2626:25

variables
2606:4

variance
2445:4
2543:24
2601:8,11
2602:2,6
2604:13
2624:4,19,
20 2625:16
2633:22,23

variances
2625:8,10

variation
2465:21
2498:23,24
2540:11
2542:19,22
2573:11
2586:14
2610:7,9,1
1 2623:24
2628:8
2631:7,12

variations
2538:10
2624:20,22
2625:2
2627:17
2632:15

varied
2448:17

varies
2564:7
2565:14

various
2480:15
2497:4
2503:22
2509:23
2559:5
2567:25
2577:16
2578:12,21
2579:12
2585:14
2589:25

2600:21
2682:5

vary 2539:4
2607:17
2614:23
2624:22

varying
2495:16
2509:17
2523:15
2608:12
2699:4

venture
2693:6

ver 2472:5

version
2464:13

versus
2478:23
2490:23
2500:7
2632:6
2671:21

vertical
2460:22

vessel
2694:1

view
2449:7,14
2460:20,21
2462:6,8,2
4 2467:14
2469:12
2471:21
2472:2
2473:20
2474:2,9
2475:23
2478:10
2481:12
2484:9
2485:2
2495:20
2496:3,14
2498:5,18
2507:15
2525:15
2533:25
2535:22
2542:15,19

2544:7
2552:19
2553:24
2555:11
2562:3,17
2640:16
2643:24
2692:21
2693:10
2705:6

viewed
2459:9
2460:2
2461:5
2534:10
2560:2

views 2557:3
2647:24

virtually
2467:16

vision
2476:23

visual
2525:18

voice
2494:18

volatile
2562:23

volatility
2558:18

Volume
2552:1

vous 2492:4
2514:8
2576:15
2678:17

W

---

wait 2519:19
2537:19
2561:18
2565:19

walks
2446:20

wasn't
2491:25
2539:19
2544:7

2545:11	2694:13	2706:12,14	2626:1,5,1	2591:2
2552:23	**Wednesday**	2707:4,23	8 2627:11	2599:6,21
2569:22	2450:23	**we're** 2446:4	2632:15,16	2601:4
2581:20	2502:20	2448:11,22	,18	2605:24
2582:2		2463:14	2633:22,23	2606:1
2681:23	**week** 2456:2	2474:21,23	2634:10,11	2607:23
	2479:11	2475:9	2640:4,5,6	2611:5
water	2490:2,7	2476:11,17	,7 2651:6	2624:21
2485:24	2615:8	2479:22	2652:11,13	2625:3
2486:10,21	2674:22	2483:18	2657:15	2626:23
2488:23	2686:10	2484:1,16,	2658:20	2628:7
2490:3	2702:2	17	2661:6	2630:2
2516:6	2707:20,22	2491:8,13	2666:25	2638:5,6
2517:10,16		2494:3,10,	2667:2,22,	2646:5,20
2518:12	**weekend**	11,16	23,24	2650:7,12,
2565:6,7,1	2706:8	2501:3	2673:24	14 2652:15
4,20	2707:14,23	2513:14	2674:14	2655:15
2627:19,21	2708:1	2519:4,24	2675:25	2658:7
2630:16		2520:20	2683:14	2661:6,9
	weeks	2521:1,18,	2684:12	2686:9,15
wavelength	2565:16	19 2522:8	2685:16	2697:7
2463:14	2674:23	2524:2	2686:2	2704:17
		2530:14,23	2687:11	2705:11
ways	**week's**	,24	2694:6	
2471:5,6	2536:24	2535:13	2695:1	**what'd**
2499:13,17		2539:15	2698:15	2621:3
2539:2	**weighing**	2540:25	2699:7,20	
2542:23	2683:14	2542:7	2700:1,5	**whatever**
2565:3,18		2543:6,24	2701:3,16	2469:5
	weighted	2548:8	2702:14	2471:23
weak 2644:17	2483:2,8	2550:10	2703:11,18	2476:13
	2537:5	2551:10	2704:12	2478:16,17
wealth		2553:3	2705:23	2487:17
2467:19	**weights**	2563:3		2569:2
2480:7	2499:5	2565:9	**we've**	2572:13
		2572:21	2447:23	2632:1
wealthier	**Weinstein**	2575:16	2462:2	2636:22
2467:20,21	2441:22	2576:2,11	2465:9	2687:14
		2581:7,12	2482:17	
wearing	**we'll**	2583:15,20	2484:19	**whenever**
2467:25	2451:25	,21	2487:18	2529:17
	2452:2	2588:4,7	2490:14	2538:11
weather	2489:13	2589:3	2493:3	
2636:18	2490:6	2591:2,18	2497:25	**whereas**
2703:21	2516:20	2594:24	2515:25	2487:15
	2528:21	2597:18,23	2518:22	2525:5
we'd 2462:5	2564:9	2600:5	2519:8	2534:4
2476:18	2565:17	2602:3	2550:9	2639:19
2483:10	2570:16	2603:16	2569:13	2695:4
2484:7	2582:25	2608:15,22	2573:4	
2499:7	2583:14	,23	2574:20,21	**whether**
2587:1	2602:23	2611:16	2575:10,25	2452:9
2588:21	2641:25	2617:4	2577:2	2453:8
2589:4	2654:24		2587:22	2459:25
2591:8	2664:19			2464:16
2593:20	2678:22			2470:19
2619:22	2696:11			2476:13
2626:10,12	2701:23,24			
,14 2692:9				

2480:19
2486:21
2489:18,19
2501:6
2504:19
2506:8
2511:8,23
2514:25
2526:23
2528:17
2537:20
2546:3
2552:19
2556:8
2567:13
2570:2
2579:13
2583:23
2585:15
2600:13
2618:4
2619:19,23
2621:12,17
2631:8
2640:11,14
2641:17
2680:2
2682:11
2683:19
2697:22
2706:12

white
2521:22

whoever
2512:8

whole
2455:9,15
2465:15
2564:15
2596:8
2622:10
2643:19
2644:11
2647:2
2670:11
2686:10
2693:20,21
2694:11

who's
2477:3,10
2644:18
2681:8

whose
2493:25

wide 2497:17
2511:11
2700:20

widely
2482:6
2509:17

wider
2542:11
2604:15
2627:17

width
2496:22,23
,25

William
2441:10
2502:13

Williams
2441:8
2450:21
2492:11
2614:21
2706:17,18
,19,20
2707:4,6

Williams's
2676:16

willing
2565:4,5
2571:1
2644:18
2652:5

Winnipeg
2440:23

winter
2566:5
2588:10

Wisconsin
2563:21
2581:21
2590:22
2645:9,10,
15 2646:3
2648:5
2649:2,14
2650:20
2652:13

wish 2462:18
2568:16
2706:7
2707:23

Wojczynski
2442:16
2446:19
2447:8,10
2450:18
2453:18
2454:1,8
2464:8,15,
24 2465:13
2480:17
2482:17
2486:23
2488:10,19
,25
2489:3,15
2491:21
2492:21
2494:20
2497:16
2524:21
2531:17,18
2539:12
2540:13
2541:24
2543:13,21
2544:11,14
2545:2,4,7
,25
2546:6,11,
16
2547:11,14
,18,22,25
2548:2,6,1
0,15,20,23
2549:3,22
2550:1,4,1
2,17,21
2567:1,16,
19 2573:20
2574:1,12
2576:24
2579:4
2580:2
2582:10,13
,21
2583:13
2584:23
2585:6
2586:7,16

2587:8,12,
22
2589:15,21
2592:1,8,1
4
2593:15,18
,25
2594:6,12,
15,21
2595:12,18
,23
2596:2,12,
18,23
2598:5
2599:10
2601:15
2615:4,21
2616:18
2620:2
2637:7,9
2675:2
2676:2,15
2677:8
2681:8,16,
22
2683:6,17
2684:6,11,
15
2685:18,21
2686:7
2687:8,24
2688:19,24
2689:3,11,
14,18,22
2690:13,16
,25
2691:8,10,
14 2692:1
2693:13
2694:21
2695:14
2703:12,13
2704:2

wonder
2446:5
2451:10
2642:8

wondering
2453:24
2454:6
2466:12
2499:9

2707:1

wording
2476:4
2681:20

work 2455:15
2460:23
2477:20
2479:23
2480:5,11,
13 2482:9
2484:1
2491:7
2557:22,24
2597:25
2598:18
2601:24
2617:15
2619:17
2683:18
2694:14,16
2707:17,20
,21

working
2447:23
2707:3

workload
2452:4
2453:3

works 2562:7
2670:11

world
2478:11
2499:14
2500:25
2508:10
2512:12
2626:1,2,3
,8,10,11,1
3,14,21,22
,24
2627:3,5

worlds
2472:23
2626:15,18

worried
2542:24

worry
2561:11
2696:8

worse
  2459:20,21

worst
  2523:12,17

worth 2485:3
  2533:14
  2540:14
  2571:11
  2683:9,22
  2691:14

WPS 2580:4,6
  2582:14
  2583:5,20
  2584:18,21
  ,25 2585:5
  2586:15,21
  ,22 2587:2
  2590:13
  2591:24
  2592:3
  2613:3
  2614:3,11

write
  2472:15
  2557:2

written
  2552:18,22
  ,23
  2561:25
  2568:11

wrote
  2553:25
  2559:8

Wusk 2596:24

Wuskwatim
  2453:25
  2454:8,10,
  13
  2455:10,16
  2594:4,9,2
  2
  2595:6,10
  2596:8
  2598:8,17

Y

Yea 2547:22

yellow
  2623:24

2625:7

yesterday
  2450:22
  2483:22
  2577:3
  2578:3
  2696:16

yet 2501:6
  2519:20
  2531:21
  2570:15
  2591:23
  2597:4
  2620:15
  2698:2,9

yielding
  2524:11

you'll
  2448:11
  2495:11
  2530:5
  2533:18
  2534:3,17
  2542:3
  2606:3
  2654:13
  2702:5

yours 2663:6

yourself
  2499:20
  2611:11

you've
  2448:14
  2454:19
  2455:11
  2466:25
  2467:24
  2491:7
  2498:11,12
  ,13 2501:1
  2505:14
  2509:2
  2510:12
  2534:23
  2549:14
  2550:6
  2567:14
  2573:4
  2574:10
  2578:21
  2594:1

2606:23
2607:23
2615:14
2624:13
2640:16
2646:9
2647:22,23
2655:18
2657:7
2664:24

Z
---
zero
  2448:11,25
  2468:23
  2469:1
  2477:22,24
  2478:6,11
  2511:12
  2538:22
  2539:7,24
  2540:4
  2545:1,16
  2547:3
  2548:8
  2618:5
  2628:19,22
  ,25
  2629:15,24
  2631:12,21

zero-five
  2530:12
  2619:11

zeros
  2458:18
  2460:10
  2468:18
  2469:1,4,1
  4
  2471:22,25
  2476:8,11,
  20 2477:11
  2478:15

zero-seven
  2604:5

zone 2491:14