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NATURAL RESOURCES CONSERVATION BOARD

Application No. 1701

SPRINGBANK OFF-STREAM RESERVOIR PROJECT

P R O C E E D I N G S

Volume 7
March 30, 2021
(Via videoconferencing)

1 Natural Resources Conservation Board Proceedings taken
2 virtually in Calgary and Edmonton, Alberta.

3

4 Volume 7

5 March 30, 2021

6

7

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9

10

11 (PROCEEDINGS COMMENCED AT 8:30 A.M.)

12 THE CHAIR: Good morning, everyone. I think
13 we're ready to begin today. It looks like we have
14 everyone on.

15 I'd like to welcome Ms. DiPaolo this morning,
16 she's court reporting, and Ms. Kaminski? Ms. Kaminski,
17 are you online?

18 MS. KAMINSKI: I am.

19 THE CHAIR: That's our document manager out of
20 Lethbridge, so welcome this morning.

21 Just to start, I believe we do have at least one
22 preliminary matter, and I've got -- I have a couple,
23 but Mr. Secord indicated you have a prelim?

24 MR. SECORD: Could we go with yours first, sir?
25 Because that's going to affect my submissions.

THE CHAIR: Oh, I see. Is it? Okay.

Well, good -- well, one may and one may not. I

1 did want to apologize, Mr. Secord, I did have the time
2 wrong. Because we had agreed that we were moving some
3 of Mr. Secord's cross from Topic 3 over to Topic 4, so
4 my apologies.

5 So we had 45 minutes that we were bringing over
6 from Topic 3, we have an hour and 15, according to my
7 calculations remaining in Topic 4.

8 So I think you had indicated you thought you had
9 about two hours, and you were correct. So you've got
10 two hours this morning for completing Topic 3 and the
11 remainder of Topic 4.

12 So that does sound correct, Mr. Secord?

13 MR. SECORD: Yes, and that will be --
14 hopefully, I won't need all of that time, sir, so thank
15 you for that.

16 And maybe -- I don't know whether you want to do
17 your second one or whether you want me to...

18 THE CHAIR: Well, you've got me guessing a
19 little bit because I might be changing some of your
20 answers. I'm not sure you know what I'm coming with,
21 but --

22 MR. SECORD: So -- so I phoned Mr. Kruhlak this
23 morning to discuss the schedule, and I've done sort of
24 a minute-by-minute schedule, and by my calculations, we
25 will be done tomorrow afternoon -- my guess is we'll

1 actually be done prior to the 5:00 break, 5:00 stop
2 point on Wednesday.

3 That, of course, is subject to obviously the
4 cross-exam from AT, questions from the Board, but based
5 on what we've seen so far, I believe that we will be
6 completed by the end of the day tomorrow.

7 So Mr. Kruhlak and I discussed argument. We --
8 you know, the record here is fairly immense, in terms
9 of pre-filed record, the exhibits, and we would both be
10 reluctant to start argument on Thursday. We think that
11 that would be inefficient, likely result in a longer
12 argument than needed.

13 So Friday is Easter, is Good Friday. Monday is
14 Easter Monday and a holiday for many people, and I know
15 you were expecting us to sit on Easter Monday, but
16 Mr. Kruhlak and I would like to float the idea of
17 having argument on the Tuesday, which would be the 6th.

18 And we put that out to you for your consideration
19 and perhaps you could get back to us on that.

20 THE CHAIR: Yeah, we did have -- we have been
21 doing the same, the Panel has had some informal
22 discussions. This does look to us that it would be no
23 problem finishing by Thursday. You were maybe a little
24 bit more ambitious than we were, but if it turns out
25 tomorrow we're done, then we're done.

1 I don't see any reason to sort of push final
2 argument quicker than that. I will confer with the
3 Panel based on what we discussed this morning; but, you
4 know, based on our informal discussions, I don't think
5 this will be a problem. We'll confirm that, get back
6 to parties today, and that will be for final -- the
7 request is for final argument on Tuesday, and I think
8 there's some merit in that, so...

9 MR. SECORD: And I should mention that I think
10 Mr. Kruhlak is needing to get instructions on that from
11 his client, so I expect Mr. Kruhlak will get back to us
12 perhaps on that question --

13 THE CHAIR: Mr. Kruhlak, do you have something
14 this morning or do you need some time to respond?

15 MR. KRUHLAK: Yes, Mr. Chairman, I've had a
16 discussion. I think that would -- that would be --
17 certainly make sense from our perspective.

18 THE CHAIR: And Mr. Rae?

19 MS. LOUDEN: Good morning, Mr. Chair. This is
20 Sara Louden. We take no issue with that. Final
21 arguments on Tuesday would work for us, as well.

22 THE CHAIR: Okay. Any other objections, just
23 to note?

24 Hearing none. Okay. Panel will get back to
25 parties. Thank you.

1 Was that it for this morning, Mr. Secord?

2 MR. SECORD: Yes. Thank you.

3 THE CHAIR: Any other prelim matters by other
4 parties?

5 MR. KRUHLAK: Mr. Chairman, it's Ron Kruhlak. I
6 just have two minor matters that I'd like to speak to.

7 THE CHAIR: Please.

8 MR. KRUHLAK: Firstly, sir, in the questioning
9 of Mr. Yoshisaka, he referred to a map and was asked to
10 locate it, and for reference, this is at transcript
11 page 1539, but he referred to the CEAA conformity
12 information request and -- in referring to the map, and
13 then it was later determined to mark that document as
14 an exhibit.

15 And, Mr. Chairman, I thought it might be useful as
16 I know all parties have been referring to documents on
17 the registry, as well as exhibits during the course of
18 these proceedings that the Board, and perhaps Board
19 counsel can just confirm, that the record actually
20 comprises those documents on the registry, whether they
21 be marked as exhibits in addition to the documents
22 we've been introducing during the hearing.

23 I thought that would just allay any concerns with
24 respect to that issue.

25 THE CHAIR: Mr. Kennedy?

1 MR. KENNEDY: I think it's -- certainly the
2 comment is a fair comment.

3 As we built the record coming into this hearing,
4 we've compiled a registry, I don't know whether we
5 named it that, but certainly we have -- have a long
6 list of documents going back several years now. And,
7 in fact, I think it's also fair to state that the Board
8 has been considering that record as all -- all part of
9 consideration of this application, and, as such, you
10 know, the fact that a document has been marked as an
11 exhibit or is in the registry, I think it's all part of
12 the Board's record on this proceeding.

13 I think that addresses your question, Mr. Kruhlak?

14 MR. KRUHLAK: Yes, Mr. Kennedy, I appreciate
15 that. We were certainly operating on that premise, as
16 I think have others, so I appreciate that confirmation.

17 THE CHAIR: Thank you. Thank you,
18 Mr. Kennedy.

19 And I think the marking of the exhibit, as we did
20 yesterday, as an example, as having -- for transcript
21 reasons because they're just easier to locate, so that
22 works. Thank you.

23 MR. KRUHLAK: I have one other matter, sir.

24 Just yesterday, Mr. Secord asked Mr. Wood about a
25 question that he was going to get back, and I can

1 address that.

2 So the question was what station the snow water
3 equivalent data came from. And on behalf of Alberta
4 Transportation, I can confirm that it was the
5 Little Bow -- I'm sorry, the Little Elbow Summit
6 station was the source of that data.

7 THE CHAIR: Mr. Kennedy, I think that was
8 essentially an undertaking?

9 MR. KENNEDY: I don't recall it is.

10 THE CHAIR: Yeah, I guess my question was, do
11 we want to mark that as an exhibit so, once again, we
12 can find it again, but I don't recall it being an
13 undertaking.

14 Mr. Kruhlak or...

15 MR. KRUHLAK: My recollection, sir, was he was
16 asked to confirm it and it was that he would be
17 checking on it and getting back. I didn't have an
18 opportunity to see whether it was formalized as an
19 undertaking, but since it seemed to be relatively
20 straightforward, we just thought we'd put it on the
21 record orally.

22 THE CHAIR: I think that works for me and the
23 Panel and other parties. Thank you.

24 MR. KRUHLAK: Thank you, sir. Those are my
25 matters.

1 THE CHAIR: Okay. I do have one request based
2 on the request that was made by Mr. Rae yesterday.

3 So in consideration of Mr. Rae's request on behalf
4 of Stoney Nakoda for the Panel to direct that
5 TransAlta/government of Alberta agreement be produced,
6 the Panel does have a couple follow-up questions before
7 we decide on the matter, and for Alberta
8 Transportation, and/or perhaps the City of Calgary,
9 could you confirm that benefits measured through damage
10 avoidance for SR1 are completely attributable to the
11 operation of SR1.

12 So when you did the calculations for the cost and
13 benefits, our question is, can you confirm that the
14 benefits measured through damage avoidance for SR1 are
15 completely attributable to the operation of SR1.

16 Furthermore, is the Panel correct in its
17 understanding, when Alberta Transportation indicates it
18 has no knowledge and has not considered the
19 TransAlta/government of Alberta operating agreement in
20 preparation of the EIA, including the cost-benefit
21 analysis.

22 So, as a follow-up to that, regardless of
23 operating parameters for the Ghost Reservoir, is it
24 AT's position, Alberta Transportation's position, that
25 cost and benefits of SR1, as calculated, are completely

1 independent of those operating parameters.

2 And secondly, if there could be impacts on the EIA
3 from the Ghost Reservoir operation, are these impacts
4 expected to be significant. And when we say "from the
5 Ghost Reservoir operation," as related to the operating
6 arrangement in the TransAlta/government of Alberta
7 agreement.

8 I think those would be -- there'd be some merit to
9 having answers to those questions for the Panel in its
10 determination as to whether or not we believe that that
11 document should be produced.

12 If agreeable, if Alberta Transportation -- and I
13 can forward this document if required, but we wouldn't
14 have the transcripts that quickly, but we can forward
15 this document to Mr. Kennedy, to parties, but if we
16 could have the answer to these questions by 1:00, we
17 could also entertain any further discussion we might
18 have on the motion itself, if any, and then we would
19 anticipate having the Panel ruling on the matter on the
20 motion by tomorrow morning.

21 So, Mr. Kennedy, I'll forward this to you so if
22 parties would like a copy so that -- because that is
23 maybe a lot to write down -- you want to make sure we
24 get that right, so I'll forward it to Mr. Kennedy, if
25 you could offer it to parties. Does that work? You're

1 on mute, I think.

2 MR. KENNEDY: I'm sorry. Yeah, indeed. I'll
3 forward it to Mr. Kruhlak and Ms. Louden. I don't see
4 Mr. Rae on this morning, but I'll copy it to him, as
5 well.

6 THE CHAIR: Ms. Senek -- I mentioned that
7 maybe the City of Calgary may need to confirm some of
8 this because they had done some of this work between
9 the two, so Ms. Senek, as well.

10 MR. KENNEDY: Yeah, I will indeed, and I don't
11 know that Mr. Secord has an interest in the document,
12 but would you like me to forward it to you as well?

13 MR. SECORD: Certainly, sir, that would be
14 fine. Thank you. It may feature in final argument.

15 MR. KENNEDY: And if others -- other parties
16 have an interest in getting it, please reach out to
17 Laura Friend or to me and just let me know you'd like a
18 copy, and I'll make sure it gets into your hands.

19 THE CHAIR: And Mr. Kennedy has identified --
20 thank you, Mr. Kennedy -- your request by Stoney Nakoda
21 was made yesterday, and it's at transcript -- starts at
22 Transcript page 1451. So if you just wanted to refer
23 to that at some page. 1451 of transcripts from
24 yesterday.

25 Okay. So I think that takes us through prelim.

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 Is there anything else from any parties with prelim
2 this morning?

3 Hearing none. Mr. Secord, we've agreed that two
4 hours, and it sounds like you may not need the complete
5 two hours, but please proceed.

6 MR. SECORD: Thank you.

7

8 M. HEBERT, M. SVENSON, W. SPELLER, D. BRESCIA, M. WOOD,
9 J. MENNINGER, D. BACK, D. LUZI, D. YOSHISAKA, D. JOBSON,
10 L. AUCOIN, T. NOBLE (For Alberta Transportation),
11 previously affirmed/affirmed

12 MR. SECORD CROSS-EXAMINES THE PANEL:

13 Q. Mr. Wood, picking up on Mr. Kruhlak's statement on the
14 record that the Little Bow Summit snow data was used.
15 My understanding is that Dr. Fennell used the
16 Little Bow Summit snow data and got very different
17 percentile values.

18 Could we ask you to provide us with those
19 calculations and the actual data that AT used, and
20 could you undertake to provide that to us.

21 A. MR. HEBERT: Mr. Chairman, we'll take that as
22 an undertaking.

23 Q. Thank you, Mr. Hebert.

24 **UNDERTAKING - TO PROVIDE ALBERTA**
25 **TRANSPORTATION'S LITTLE BOW SUMMIT SNOW**

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 **DATA CALCULATIONS AND ACTUAL DATA THAT**
2 **WAS USED**

3 Q. So, Mr. Yoshisaka, good morning.

4 A. **MR. YOSHISAKA:** **Good morning, Mr. Secord,**
5 **Mr. Chairman, members of the Panel.**

6 Q. I don't see you up quite yet on my screen. There he
7 is, there he is.

8 How are you this morning?

9 A. **MR. YOSHISAKA:** **We'll, thank you.**

10 Q. Good. So I just want to recap from yesterday, based on
11 the record of our discussions -- somebody is talking,
12 so you might want to mute yourself.

13 THE CHAIR: I think we have someone not muted.
14 Could everybody just check their mute, please?

15 And, Ms. Beckmann, it does not look like
16 Ms. Beckmann is muted. There we go. Thank you.

17 Q. **MR. SECORD:** So, just to recap from our lengthy
18 discussion yesterday, Mr. Yoshisaka, Exhibit 110,
19 Figure 3-10, on PDF page 47 shows that the base of the
20 SR1 reservoir is underlain by at least 5 metres of
21 lacustrine clay. So that's point Number 1.

22 Point Number 2, Figures 4-5 to 4-8, on PDF pages
23 113 to 115 of Exhibit 110 show the top three layers of
24 the model with a low permeability soil beneath the base
25 of SR1 reservoir footprint.

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 Point Number 3, the lacustrine clay should be at
2 least three layers because it is in the uppermost
3 formation.

4 Point Number 4, the K value for the top three
5 layers is indicated on those figures, 4-5 to 4-8, in
6 the legend, as being 7.2 times 10 to the minus 8 metres
7 per second.

8 Point Number 5, Exhibit 110, Table 4-3, on PDF
9 page 128 indicates that clay should have a value of
10 5.1 times 10 to the minus 6 metres per second, but it
11 is nevertheless given a value of 7.2 times 10 to the
12 minus 8 metres per second, which is more consistent
13 with "Till North." That's "T-I-L-L," capital N,
14 "North."

15 Point Number 6, missing from the top three layers
16 of the model is the documented sand and gravel in the
17 Unnamed Creek valley which was indicated by AT to be
18 anywhere from 1 to 7 metres thick overlain by a layer
19 of glacial material.

20 Point Number 7, the sand and gravel in the
21 Unnamed Creek valley should have at least been in
22 layer 1 or 2 of the model, given its proximity to the
23 surface.

24 And, finally, point Number 8, sand and gravel is
25 given a K value of up to 2.8 times 10 to the minus

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 3 metres per second in the previously cited Table 4-3
2 on PDF page 128 of Exhibit 110.

3 How -- so I have just five questions for you: How
4 is this configuration of soils, and associated K
5 values, in the model in any way reflective of the
6 actual geological conditions documented beneath the SR1
7 reservoir from the exploratory drilling programs?

8 **A. MR. YOSHISAKA:** Mr. Chairman, as I mentioned in
9 evidence yesterday, the process through which we
10 established the distribution, thickness, and relative
11 order of these materials was -- was based upon our
12 examination of numerous borehole records across the
13 project development area.

14 That information was then fed into our
15 three-dimensional conceptual site model, which was the
16 geologic model, describing the geology of the entire --
17 our A-A and honours the observations, the lithological
18 observations which were collected during drilling.

19 I believe, yesterday, we put up a cross-section
20 oriented in general down the main axis of the reservoir
21 area, again, the sands in question are shown on that
22 cross-section, they are rather isolated in their
23 extent, and thin, relative to the overlying layers.
24 The presence of that sand is also overlain by tilled
25 materials, so that sand does not extent all the way to

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 ground surface, which is why it does not appear in the
2 upper layers of the model.

3 So, again, I will submit that we do understand the
4 location of those sands, and, again, they are below the
5 till units, and that's why they are isolated from the
6 surface and thus do not appear in the upper layers of
7 the numerical model.

8 Q. Did you use geotechnical drilling information in the
9 model development?

10 A. MR. YOSHISAKA: Mr. Chairman, yes -- yes, we did.
11 We used various sources of information. As I indicated
12 yesterday, ranging from data sourced from regional
13 scale reports, the Alberta Water Well Information
14 Database information, in addition to the more than
15 150 boreholes that were drilled as part of the
16 hydrogeology and geotechnical field programs.

17 Q. How will the presence of this much lower K value layer
18 of 2.8 times 10 to the minus 3 metres per second
19 influence the leakage from the base of the SR1
20 reservoir, and will it not reduce it by up to two
21 orders of magnitude or so, all things being equal?

22 A. MR. YOSHISAKA: Mr. -- Mr. Chairman, subject to --
23 to check, I believe the figure just described there by
24 way of a K value of 10 to the minus 3 was related to
25 the alluvial deposits within the Elbow River valley, so

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 these are again different deposits. These are -- yes,
2 the coarse, the gravelly deposits within the alluvium
3 of the Elbow River valley. These are not the same
4 deposits that we're speaking about under the till under
5 the reservoir area.

6 Now, continuing on that thought, again, the small
7 sandy unit of limited extent that we're speaking of,
8 resides below the till. We are not relying on it to
9 form, you know, any of the containment associated with
10 downward flows. So we recognize that it is a more
11 permeable unit, it does sit directly on top of bedrock,
12 and, again, because it's below the till, we don't
13 consider it to have a low permeability that contributes
14 to the retardation of downward flows.

15 So, again, it's a -- we do recognize it's a more
16 permeable unit, and we don't consider it to be part of
17 that barrier.

18 Q. Did the geotechnical drilling identify the sand in the
19 Unnamed Creek valley?

20 A. MR. YOSHISAKA: Mr. Chairman, yes, it did.

21 Q. And did you actually test the sand and gravel in the
22 Unnamed Creek valley?

23 A. MR. YOSHISAKA: The --

24 A. MR. BACK: This is -- sorry, this is Dan
25 Back, the geotechnical engineer.

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 Can you clarify what you mean by "test"?

2 Q. Did you analyze the shallow sand and gravel that is in
3 the Unnamed Creek valley?

4 A. **MR. BACK:** The fluvial formation that was in
5 the Unnamed Creek valley under the footprint of the
6 storage dam embankment environment was evaluated. It
7 was logged by the engineers and geologists that were in
8 the field. Furthermore, there was a test pit program
9 that excavated through to expose that, and I was there
10 for much of that program.

11 So we have a very clear understanding of that
12 formation there under the dam at that location.
13 Laboratory tests were performed to understand the
14 gradation of the material.

15 Q. And did you K test the sand and gravel? And where is
16 that information?

17 A. **MR. BACK:** I don't believe that any
18 permeability tests were performed. It's extremely
19 difficult to perform laboratory tests, meaningful
20 laboratory tests on granular material of that type
21 because the disturbance and remolding has such a big
22 impact on the permeability. I don't believe that there
23 were any field permeability tests performed in that
24 formation. I would have to check to verify.

25 Q. Given that only three field measures of K values were

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 obtained by Stantec, with only one for the lacustrine
2 clay, how can my Springbank clients and the NRCB have
3 any confidence that the full range of values has been
4 obtained, including any influence from fractures or
5 other features that would result in higher K value like
6 silt layers?

7 **A. MR. BACK: I apologize, Mr. Secord. Could**
8 **you repeat that question?**

9 **Q.** Given the fact that only three field measurements of
10 K values were obtained by Stantec, with only one for
11 lacustrine clay, how can my Springbank clients and the
12 Natural Resources Conservation Board have any
13 confidence that the full range of values has been
14 obtained, including any influence from fractures or any
15 other features that would result in a higher K value
16 like silt layers?

17 **A. MR. BACK: I believe we did many more than**
18 **one test on the lacustrine clay. As I indicated**
19 **yesterday, field permeability tests of very low**
20 **permeability soil is extremely difficulty, and a number**
21 **of tests were attempted, but due to the extent and time**
22 **to reach equilibrium, only a few of those reached a**
23 **result with a permeability value.**

24 In the laboratory -- just let me look here -- it
25 looks like we did 15 or so laboratory tests on

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 undisturbed samples of the glacial lacustrine.

2 Then in conjunction with the classification data
3 for the soil, and the field test results that we had,
4 and some available literature information, we feel very
5 confident that we have characterized the permeability
6 of the lacustrine within a reasonable range of the
7 actual field values.

8 Q. Now, Mr. Yoshisaka, picking up, I think, on what
9 Mr. Back just said, you indicated in your evidence
10 yesterday that a number of K tests were performed, but
11 were not documented because of slow recovery or lack of
12 water; however, we see in Exhibit 110, Table 3-4, PDF
13 page 93, that samples were collected through water
14 quality analysis from up to 16-monitoring wells in the
15 unconsolidated deposits.

16 If you were able to sample these wells that were
17 obviously full of water, then why were you not able to
18 K test them, as well?

19 A. **MR. YOSHISAKA:** Mr. Chairman, basically, you know,
20 when we are preparing to sample a well, there's a
21 certain procedure that is followed, and the procedure
22 involves purging of a well, so removing any water that
23 has accumulated in the well prior to collecting the
24 sample. And this is done in order to ensure that the
25 sample that you've collected is "fresh," if we could

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 say so, in terms of just having entered the well. So
2 we don't want to be in a situation where we're
3 collecting a water sample from a well that's basically
4 reflective of stagnant water sitting in the well. We
5 want to collect a sample that is representative of the
6 conditions and the formation itself.

7 So, after having purged out the contents of the
8 well, we wait for it to recover such that we can
9 collect a sufficient volume of water for -- for a
10 sample.

11 Now, in the extremely low permeability wells
12 where, you know, we had difficulty performing a
13 complete field test, I mean, we were barely able to
14 connect -- collect enough sample to submit for -- for
15 water -- water analysis. You know, pretty much, we
16 were getting the final last drops out of the well to
17 even collect enough volume for -- for a sample.

18 So, you know, I guess we prioritized collecting a
19 sample, and then submitting that over perhaps waiting
20 longer and completing a test; however, given that we
21 did have some successful tests, we felt that, you know,
22 we understood that relative to the wells where we had a
23 successful test, the recoveries at those particular
24 wells were even slower than that.

25 And thus, you know, while we don't yield a numeric

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 result from that well in terms of a hydraulic
2 conductivity test, qualitatively, we know what that
3 meanings, and if the recovery out of a well is slower
4 than the recovery at a well where a test was
5 successfully completed, that would then infer that the
6 permeability at that well is in fact lower.

7 Q. When you purged a well, the water has to recover. Why
8 did you not measure it to get a K value?

9 A. MR. YOSHISAKA: Again, because the recovery was so
10 slow, and the level of standing water in the bottom of
11 the well was -- was just minuscule. It wouldn't really
12 be deep enough to insert the instrumentation required
13 to collect that information. It was barely enough to
14 be able to bail it out with a bailer, but was not of
15 sufficient depth necessarily to insert the
16 instrumentation required to collect that information.

17 Q. When water wells are drilled in till, you can get
18 smearing of the borehole that reduces the K value. Did
19 you take that into consideration in your K estimates
20 because they could be higher than you think?

21 A. MR. YOSHISAKA: My apologies, Mr. Chairman. They
22 may be higher than you think; is that correct,
23 Mr. Secord?

24 Q. Yeah, did you take that into consideration in your
25 K estimates?

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 A. MR. YOSHISAKA: As...

2 Q. That the smearing of the borehole reduces the K value?

3 A. MR. YOSHISAKA: There is possibility for the
4 influences of -- of drilling a borehole. The act of
5 drilling a borehole can lead to some of the smearing
6 that you had mentioned; however, we do do our best to
7 develop that well as much as possible.

8 And by "develop," that means trying to remove some
9 of the fines that may have smeared in the well screen
10 region.

11 Further, you know, the effects of smearing are
12 much more notable in more permeable deposits. So if
13 you can imagine, if you're drilling through something
14 that's relatively sandy and some clay-type materials
15 get smeared on the surface of your borehole, then yes,
16 there could be an apparent reduction in K values.

17 However, when drilling through a material that is
18 already low in K, and you're simply smearing it with
19 the same materials in which you have completed the
20 well, then that potential for it to have skewed your
21 numbers is greatly reduced.

22 Q. Where is the information to confirm that you took that
23 into account?

24 A. MR. YOSHISAKA: It -- Mr. Chairman, it was taken
25 into account by nature of the way in which we completed

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1 the wells. So the manner in which we construct a
2 monitoring well is done so in, you know, in accordance
3 with best practices, and those best practices include
4 provisions for minimizing the influence of that type of
5 mechanism.

6 Q. And my last question arising from the recap of
7 yesterday, you brought up some evidence yesterday in
8 new Exhibit 375, Table 17-1 on PDF page 47 showing very
9 different K values for the model layers, all of which
10 are lower by orders of magnitude than those indicated
11 in Table 4-3 of Exhibit 110.

12 Why the change, and how can my Springbank clients
13 and the NRCB have any confidence in a groundwater
14 numerical model that just keeps on changing and
15 incorporating lower and lower K values beneath the SR1
16 footprint, lower K values that lack a sufficient degree
17 of field verification?

18 A. **MR. YOSHISAKA:** Mr. Chairman, I must admit I had a
19 little bit of difficulty following Mr. Secord there.
20 You flipped through a number of exhibits and tables.
21 If you could perhaps walk me through that a little bit
22 slower, I think that would be helpful.

23 Q. Sure. So yesterday, Mr. Yoshisaka, you brought up
24 evidence in the newly filed Exhibit 375, Table 17-1 on
25 page PDF page 47 showing very different K levels or K

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1 values for the model layers, all of which are lower by
2 orders of magnitude than those indicated in Table 4-3
3 in Exhibit 110.

4 So the question -- the first part of the question
5 was why the change, and the second part of the question
6 was how can my clients and the Board have any
7 confidence in a groundwater numerical model that just
8 keeps on changing and incorporating lower and lower K
9 values beneath the SR1 footprint, lower K values that
10 lack a sufficient degree of field verification?

11 **A. MR. YOSHISAKA:** Mr. Chairman, I would contest that
12 notion that the K values assigned in the model were
13 lower than our field measurements.

14 I believe, as we noted yesterday, the measurements
15 or estimates of hydraulic conductivity values for both
16 the lacustrine clay unit, as well as the till unit, as
17 observed, were lower than the values which we -- we
18 carried in our model.

19 Now, further to that, we also discussed the
20 hypothetical examination of what could happen if higher
21 K values are indeed present, and we did that through
22 the sensitivity runs that we did conduct.

23 Those runs, again, we assigned K values much
24 higher than was observed, based on our measurements,
25 and the results of that sensitivity run again inform us

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1 as to, you know, the differences in the extent and
2 magnitude of effects that might be borne out, should
3 those conductivities be that much higher.

4 So we don't carry that as a case that supports our
5 effects assessment because those K values are not
6 reflective of the conditions; however, we did embark on
7 a journey to examine, again, the what-ifs of -- of if
8 they are.

9 So in either case, I mean, we understand that
10 overall the effects will be, you know, relatively
11 localized. We have used that sensitivity analysis to
12 also inform our plans for monitoring of these areas.

13 So our monitoring plan is robust. It is
14 scaleable, and it is adaptable. And it's really
15 designed to offer the appropriate level of monitoring
16 rigor over the entire project life cycle.

17 So this monitoring program establishes varying
18 levels of rigor, monitoring rigor that are commensurate
19 with the types of risks that are relevant during a
20 particular project phase. So this goes from
21 construction through to dry operations, through to
22 flood operations, as well.

23 So, you know, I do have confidence that, with the
24 monitoring plan in place, should some unexpected
25 response of the system develop, that we will be able to

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1 detect that change and in turn, implement additional
2 mitigations in those areas where it may be required.

3 Q. Now, Stantec states in Exhibit 327, PDF page 45, third
4 paragraph of Concern Number 2 that, and I quote, open
5 quotes: (as read)

6 "Examination of the groundwater flow
7 patterns under either baseline or
8 operational conditions indicate that in
9 general, groundwater flow within the
10 bedrock are generally directed south or
11 southeast from the reservoir area to
12 where the water discharges in the
13 Elbow River Valley."

14 Full stop, closed quotes.

15 Do you recall that sentence, Mr. Yoshisaka?

16 A. MR. YOSHISAKA Yes, sir, I do.

17 Q. Do you agree that the same flow pattern is true for the
18 glacial deposits under normal conditions?

19 A. MR. YOSHISAKA: Generally speaking, yes.

20 Q. Do you agree that there is no assessment by AT of how
21 contaminants may be further mobilized into, or flushed
22 from, the glacial sediments into the groundwater and
23 excavated diversion and outlet channels when SR1 is
24 constructed and operational?

25 A. MR. YOSHISAKA: Mr. Chairman, members of the

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1 Panel, I would not agree with that statement.

2 Again, we understand that yes, there could be some
3 small changes in flow directions and the flow regime
4 under flood operations. Also, there could be some
5 effects, localized effects in the diversion channel
6 area related to its incision in the landscape.

7 So we do acknowledge that there are potentials for
8 changes in flow patterns here, but, overall at the
9 scale of the PDA, the flow directions, as previously
10 noted, are still dominantly towards the Elbow River,
11 and that really is because, you know, the Elbow River
12 itself imparts a relatively large hydraulic control
13 over -- over this area.

14 It's very difficult to change the pressure regimes
15 when you're so close to something that serves as
16 pressured relief. And as such, it -- under flood
17 conditions or dry conditions, the directions of those
18 flow paths are generally directed to the Elbow River.

19 Again, in terms of changes in water quality, it
20 was considered. Again, we do acknowledge that there is
21 potential for some changes in groundwater quality, but
22 these changes are localized to the reservoir area, and
23 are -- would be irregular in their occurrence. Keeping
24 in mind that these changes would -- would only happen
25 during flood operations, particularly for the design

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1 flood event, it's a very infrequent event.

2 So again, these -- these potential changes are
3 duly considered. They have been characterized in the
4 EA [verbatim], and, again, we have some mitigation in
5 place to help address those concerns.

6 Q. Do you agree that there is equally no assessment by AT
7 of how mobilized contaminants may impact the receding
8 aquatic environment when groundwater discharges to
9 surface water?

10 A. MR. YOSHISAKA: Mr. Chairman, members of the
11 Panel, I would -- you know, just like to contextualize
12 again that, you know, when the project is in operation,
13 it's diverting floodwater from the river, and it's, you
14 know, essentially the same water that's getting
15 diverted into the reservoir as is flowing down and
16 continuing beyond the project down the Elbow River
17 valley.

18 One of the main constituents of floodwater in
19 terms of water quality are increased quantities of TSS,
20 so this would be total suspended solids. It's the
21 reason why, you know, floodwater, somewhat resembles
22 chocolate milk. There's just a lot of suspended
23 material in that water that is carried along with it
24 due to the, you know, the enhanced velocities that are
25 happening during a flood.

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1 Fortunately for the groundwater environment,
2 suspended materials have very little mobility, so
3 because of the small intergranular spaces between the
4 matrix particles, they serve as a means to filter out
5 that suspended material, and, as such, you know,
6 suspended material has -- has low mobility in the
7 subsurface environment. And, you know, really, that's
8 why you can have a well in the ground and clean, clear
9 water come out of it.

10 So, you know, in terms of the constituents of
11 floodwater that perhaps would change the most
12 dramatically, it's generally associated with the
13 suspended materials. And again, those materials would
14 have very low mobility in the subsurface.

15 Q. Document manager, could you please turn up Exhibit 110,
16 PDF page 78.

17 Now, a series of hydrograph figures were presented
18 in Exhibit 110, PDF pages 78 to 80. These figures were
19 made by a 3D Conceptual Site model or 3D CSM. Who
20 built the 3D CSM?

21 A. **MR. YOSHISAKA:** The 3D CSM would have been built
22 by our Stantec team and overseen by myself.

23 Q. And, for instance, in the Figure 3-24 under -- with the
24 information dealing with monitoring well 16-6-11, what
25 does the red line indicate?

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1 **A. MR. YOSHISAKA:** I believe that the red line
2 indicates that the elevation of the ground surface at
3 that location.

4 **Q.** Do you agree that some of the monitored locations have
5 a shallow and deep well installed to determine the
6 direction and magnitude of the gradient?

7 **A. MR. YOSHISAKA:** Yes, that's correct.

8 **Q.** And do you agree that, although Stantec has indicated
9 that upward flow exists from the bedrock to the
10 overlying clay tills, there is evidence that this
11 gradient is dynamic and weak, meaning it could switch,
12 depending on the seasonal water table conditions?

13 **A. MR. YOSHISAKA:** I certainly would accept that the
14 gradient is weak, it's -- it's, you know, slightly
15 upwards. It's, you know -- it could be characterized
16 as near -- near neutral.

17 Yes, it is possible that the direction of these
18 gradients could -- could switch over -- over time, and
19 this is simply a reflection of, you know, the response
20 of the shallow system to meteoric input to run-off
21 events, to precipitation events, things like that,
22 which can, you know, have an effect on water levels,
23 which in turn can affect the direction of these
24 gradients.

25 In terms of, you know, areas where -- in

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1 particular in areas under the reservoir, we understand
2 in that area the underlying heads within the bedrock
3 are being driven by their recharge areas, which are
4 situated at, you know, higher elevations than -- than
5 the ground surface. So pressures in the bedrock are
6 essentially being driven through their recharge areas
7 in higher elevation areas of the -- the local area.

8 That elevation difference and source of recharge
9 will, you know, always tend to keep those levels in
10 bedrock a little bit higher and, you know, it is the
11 reason that, you know, we see it manifest themselves in
12 the form of springs.

13 You know, we've certainly heard evidence from some
14 of the landowners in the area that many of the springs
15 in the area are flowing year-round and, you know,
16 despite changes in precipitation that happen during a
17 year, you know, some of these springs continue --
18 continue to flow. Some of them may cease to flow at
19 given times of the year.

20 So, yes, there is some variability in -- in those
21 relationships and that is, in part, dependent upon some
22 of those annual trends.

23 But, again, we don't anticipate that suddenly
24 gradients would shift to a strongly downward direction.
25 The controls on the flow regime in that area are --

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1 are, you know, most importantly, topographically
2 driven.

3 So given that the ground surface topography will
4 not be changing, those driving mechanisms will persist
5 over time.

6 Q. Document manager, could you go to PDF page 79, please,
7 and then PDF 80.

8 And what is the red line? What does that indicate
9 for the location NW16-26-18?

10 A. MR. YOSHISAKA: The red line in this case would
11 again indicate the elevation of the ground surface. As
12 you can see here, there's times within this record
13 where water levels are above ground surface, and as
14 well, points in time where the water levels are below
15 ground surface. Though the variation in those levels
16 is, you know, at an absolute scale is really not
17 that -- that much.

18 Q. And do I understand that the time period of Stantec's
19 reported data is very short. What is the time period
20 of Stantec's reported data that it plugged into the
21 3D CSM model?

22 A. MR. YOSHISAKA: The water level record that we
23 have for the wells which we instrumented is
24 approximately -- let's see here -- you can see it
25 starts in about October and ends at about May the

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1 following -- following year, late May.

2 Q. So not even a year's worth of data?

3 A. MR. YOSHISAKA: That -- that is correct, in terms
4 of our instrumented record here.

5 I will note, Mr. Chairman, that, as per our
6 monitoring plan, so we are still within the baseline
7 phase of our monitoring program. So, you know, as a --
8 we are still planning to continue that phase of the
9 program.

10 The monitoring program contemplates actually a
11 high level of rigor of monitoring during this baseline
12 phase prior to construction. And that again is to
13 enable further collection of information regarding
14 water well -- water levels, water quality, as we, you
15 know, are still within this baseline phase of the
16 monitoring program.

17 This is all pre-construction monitoring that's
18 being contemplated to, you know, assess if there's
19 unusual changes in levels or quality.

20 Q. Now, do you agree that the results from a hydrograph
21 near Big Hill Springs Provincial Park indicate that the
22 period of record assessed by Stantec is very short,
23 maybe 8 months, as you have just indicated on the
24 record, and is not representative of the magnitude of
25 water level changes up to 2 metres or more over a much

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1 longer period of record, say, at least 8 years, do you
2 agree that it is unrepresentative to say that the
3 vertical gradient will always be in an upward direction
4 from the bedrock?

5 **A. MR. YOSHISAKA:** Mr. Chairman, members of the
6 Panel, I will acknowledge that our monitoring record at
7 the PDA is not as long as obviously some of the
8 regional monitoring wells established by
9 Alberta Environment in the area. Certainly, they have
10 a longer monitoring record. However, that does not
11 necessarily mean that the levels that we have noted are
12 unrepresentative.

13 Again, we need to keep in mind that a couple
14 metres of change in water level elevation, while it may
15 be more marked at a particular location, when you
16 consider, you know, a couple of metres of change in
17 water levels, again, across a basin where there's more
18 than 200 metres of change in water levels, these
19 fluctuations are relatively small.

20 So despite those water levels, yes, going up and
21 down in response to precipitation events, perhaps even
22 interannual, you know, seasonal patterns, the degree of
23 flood mitigation at a particular location is minor
24 compared to the changes in head that are seen across
25 the whole -- the whole basin.

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1 So, with that in mind, yes, we acknowledge there
2 can be some variation locally, but it's not going to be
3 enough to change the overall flow patterns within the
4 study area.

5 Q. Document manager, you can take this exhibit down,
6 please, thank you.

7 Now, Stantec states in Exhibit 327, PDF page 42,
8 second paragraph, below Concern Number 3 that, open
9 quotes: (as read)

10 "While during flood operations the
11 vertical gradients are anticipated to be
12 downward directed due to the additional
13 head of water imparted by the impounded
14 water, once that water is released the
15 vertical gradients will revert to their
16 baseline conditions since the
17 topographic drivers that govern that
18 potential will remain unchanged."

19 Full stop.

20 : (as read)

21 "Thus in topographically lower areas of
22 the reservoir, water that temporarily
23 migrates downward into the clay till --
24 clays/till would again flow upward back
25 toward ground surface once the

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1 floodwater is released and gradients
2 return to baseline conditions."

3 Full stop, closed quotes.

4 Do you recall that -- those sentences in
5 Exhibit 327, Mr. Yoshisaka?

6 **A. MR. YOSHISAKA: Yes, I do.**

7 **Q.** Do you agree, however, that if the gradients are
8 reversed, this will not be the case, and why was this
9 dynamic not assessed given its role in continuing the
10 downward migration of contaminants from the clay/tills
11 into the bedrock when SR1 reservoir is filled?

12 **A. MR. YOSHISAKA: Mr. Chairman, again, we understand**
13 **that the flow system that governs those gradients,**
14 **particularly in the area of the reservoir, which is the**
15 **low -- topographically low area within the LAA, the**
16 **reason, again, the pressures in the levels in the**
17 **bedrock are slightly higher is because the recharge**
18 **areas for that bedrock is situated at higher elevations**
19 **than the low-lying areas of the reservoir area.**

20 **So those, again, topographic drivers are not going**
21 **to change over time with their -- without the project**
22 **in place; and, thus, we believe that the gradients that**
23 **are there naturally will reestablish themselves once**
24 **water is released.**

25 **Q.** What topographic influence will the construction of SR1

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1 have on local gradients?

2 **A. MR. YOSHISAKA:** In terms of the driving potential
3 for heads in the bedrock vary very little, if any.
4 There's no changes proposed to the upland areas of the
5 local area, there's no gross changes in topography that
6 are contemplated in this project.

7 **Q.** In Exhibit 327, second paragraph of concern Number 3,
8 Stantec indicates that, and I quote: (as read)

9 "It is an oversimplification to imply
10 that because the upper unconsolidated
11 and upper bedrock units are connected,
12 that in turn there will be high
13 potential for downward 'flushing' of
14 naturally occurring minerals into the
15 underlying bedrock given that in many
16 areas the vertical flow direction is
17 upward directed."

18 Full stop, closed quotes.

19 How can this statement be justified when there has
20 been no comprehensive assessment of how the vertical
21 gradients may change, include where and by how much,
22 once the SR1 is constructed and commissioned under
23 either dry, partially full, or full conditions?

24 **A. MR. YOSHISAKA:** Mr. Chairman, again, we -- we have
25 considered that effect pathway. We do, you know, need

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1 to keep in mind that the low permeability of these
2 materials, regardless of which direction that gradient
3 is directed, be it upwards or downwards, limits the
4 flux rates through those materials.

5 So, you know, to put things into context, if we
6 are talking about groundwater flow velocities in the
7 order of centimetres to perhaps metres to, maybe on the
8 upper end, tens of metres per year, so, you know, it's
9 over the course of a couple months of impoundment of
10 water within a reservoir at those rates of movement,
11 things just cannot travel that far.

12 So, yes, the, you know, vertical gradient is
13 anticipated to change during flood operations to a
14 downward directed flow, but the velocity at which
15 groundwater can move, even under those conditions, is
16 still very slow and, you know, in terms of the timeline
17 over which this project's going to operate, things just
18 can't move that far.

19 Q. Maybe we'll look at the Copithornes' situation maybe a
20 little later in terms of the proximity of some of my
21 clients to the PDA.

22 Dr. Fennell presents in Exhibit 261, page 17,
23 Eh and pH diagrams for selenium and uranium -- pH being
24 redox, right -- indicating that: (as read)

25 "The predominant species that would

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1 exist under assumed groundwater
2 conditions using redox sensitive
3 elements provided by Stantec as a
4 guide..."

5 You recall that in -- from Dr. Fennell's evidence that
6 we filed in February?

7 **A. MR. YOSHISAKA: Yes, I do.**

8 **Q.** And then Stantec, in response, states in Exhibit 327,
9 third paragraph, under Concern Number 3, and open
10 quotes, I quote: (as read)

11 "What is not clear from these diagrams
12 is how the introduction of oxygenated
13 flood water into a system that is
14 already oxygenated would exacerbate the
15 situation given the lack of other
16 species above the currently applicable
17 regions of the diagrams."

18 Full stop, closed quotes.

19 Do you agree that Stantec is assuming that the
20 groundwater is naturally oxygenated and has provided no
21 measurements to substantiate this claim.

22 **A. MR. YOSHISAKA: It is our belief that, yes, the**
23 **shallow subsurface in the area is under oxygenated**
24 **conditions. I believe Dr. Fennell, in his own**
25 **evidence, highlights the regions within those diagrams**

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1 that he believes as well persist in the area, and those
2 would be under oxygenated conditions.

3 The source of this oxygenation is in its baseline
4 condition, I mean, related to infiltration of
5 precipitation which is oxygenated; it can be some
6 infiltration of, you know, spring run-off.

7 Every year some water is going to flow over the
8 land surface in this area and -- as run-off, and that
9 water will be oxygenated. The uppermost materials here
10 that are exposed to the atmosphere are oxygenated
11 because, as we know, there's oxygen in air, as well.

12 So, yes, it's our position that the
13 system -- currently, the shallow system there is
14 currently under oxygenated conditions.

15 Q. My question -- I don't know that it deserved such a
16 fulsome response, Mr. Yoshisaka -- my question was
17 simply, do you agree that Stantec is assuming that the
18 groundwater is naturally oxygenated and has provided no
19 measures to substantiate this claim?

20 I think the short answer to my question would be
21 "yes." You gave a very long answer, but the question
22 was really quite simple. Do you agree that Stantec is
23 assuming that the groundwater is naturally oxygenated
24 and has provided no measures to substantiate this
25 claim?

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1 That was all I asked. If there are measurements,
2 please point them to me?

3 **A. MR. YOSHISAKA:** Mr. Chairman, I'll acknowledge
4 that we have not provided specific redox measurements,
5 though it is not an assumption that it is oxygenated,
6 again, for the reasons I just spoke to, it's -- it's
7 entirely appropriate to consider the conditions to be
8 oxygenated.

9 **Q.** So it's an appropriate assumption, Mr. Yoshisaka?

10 **A. MR. YOSHISAKA:** You could characterize it as such,
11 sure.

12 **Q.** Sure. So do you agree that Stantec has done no
13 geochemical modelling to determine how the introduction
14 of oxygenated floodwaters may exacerbate the
15 mobilization of certain contaminants through enhanced
16 mineral weathering and surface reactions?

17 Maybe you can talk about, first of all, what is
18 enhanced -- what is mineral weathering?

19 **A. MR. YOSHISAKA:** Mineral weathering would refer to
20 the release of certain constituents that are found
21 within various minerals that are present. So some of
22 the minerals present, naturally present in the clays
23 could bear within their crystalline structure, certain
24 elements, you know, things like selenium and uranium
25 that has been identified.

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1 Some weathering reactions could serve to free
2 those elements from those minerals and then, you know,
3 release them into the groundwater environment as a
4 dissolved species at that -- that point.

5 Q. So maybe just to go back then, the question was do you
6 agree that Stantec has done no geochemical modelling to
7 determine how the introduction of oxygenated
8 floodwaters, which you indicate as a certainty, may
9 exacerbate the mobilization of certain contaminants
10 through enhanced mineral weathering and surface
11 reactions?

12 A. MR. YOSHISAKA: Mr. Chairman, members of the
13 Panel, I can confirm that we did not do mathematical
14 geochemical modelling of this -- of these potential
15 reactions; however, again, I want to ensure that we
16 understand the context of these types of potentials
17 are, you know, limited in terms of the operating
18 scenarios for this project.

19 These types of reactions, this type of assessment
20 of potential geochemical reactions resulting in gross
21 changes in groundwater quality are something you would
22 most definitely consider in the case of a mine or some
23 other activity where you're disturbing the subsurface.
24 You know, in the case of a mine, you are excavating and
25 exposing rock material that perhaps has never seen the

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1 light of day.

2 And, yes, in those circumstances, you know, some
3 of those reactions could set up because there is a
4 gross change in what the minerals are used to seeing,
5 versus what they're now seeing as a result of -- of a
6 project.

7 The SR1 project really does not fit into that same
8 category, right? There's no gross disruption of the
9 materials in their present environment that would lead
10 to a high potential for driving some of these
11 reactions.

12 Further, I would like to mention that a lot of
13 these geochemical reactions are kinetically limited.
14 These reactions take time to -- to happen, and they
15 require a change in the conditions which, again, we
16 don't anticipate so. Because we're introducing
17 oxygenated water into a system that's oxygenated, the
18 driving potential for those reactions is -- is limited.

19 So yes, I acknowledge that we haven't modelled
20 this numerically through a geochemical model, but I
21 submit to the Panel that this is really not the driving
22 mechanism of concern for potential changes in
23 groundwater quality for this project.

24 Q. Mr. Yoshisaka, you anticipated my next question.
25 Stantec goes on to say in Exhibit 327 in the same

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1 paragraph that: (as read)

2 "In reality, these potential reactions
3 are kinetically limited and take time to
4 occur."

5 Full stop, closed quotes.

6 Do you agree that no work of any kind has been done
7 by Stantec to support this claim either? In fact, no
8 geochemical work beyond a cursory review of groundwater
9 quality has been provided, and so how can this statement
10 be substantiated?

11 **A. MR. YOSHISAKA:** Mr. Chairman, I would submit that
12 the laws of thermodynamics would govern those
13 reactions. So the basis for our statement that these
14 reactions are kinetically limited is founded in the
15 laws of thermodynamics.

16 So, you know, I don't again acknowledge that we
17 haven't numerically modelled this, but it remains a
18 fact that these reactions are kinetically limited. We
19 don't need field information to confirm that.

20 **Q.** Stantec then goes on to say in Exhibit 327: (as read)

21 "It is more likely that over the short
22 term duration of impoundment of flood
23 water, that if it were able to migrate
24 downward at a high rate as he suggests,
25 then it would serve to further dilute

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1 the concentrations of metals in
2 solution."

3 Full stop, closed quotes.

4 Do you agree that Stantec has done absolutely no
5 mass balance or fate and transport modelling to
6 substantiate this claim of dilution?

7 **A. MR. YOSHISAKA:** Mr. Chairman, we have not
8 conducted the fate to transport modelling, as was noted
9 there.

10 Again, I think we discussed yesterday that, you
11 know, we did not embark on that because,
12 conservatively, we are assuming that contaminants can
13 flow advectively with -- with groundwater.

14 Again, in terms of the potential for contaminants
15 to be transported in the subsurface, the maximum rate
16 at which they can move is the same as the rate of
17 movement of groundwater. In fact, in the subsurface,
18 there's additional reactions that could happen.

19 These could be again processes like absorption,
20 dispersion, other processes that happen in the
21 subsurface that, in effect, retard the movement of
22 contaminants relative to the speed of groundwater.

23 So by assuming, in the absence of detailed feet
24 modelling -- by assuming if the contaminants can move
25 at the same rate as groundwater, again, it would tend

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1 to overestimate the rate of that movement and, you
2 know, again, does inform us as to how far those
3 potential contaminants could -- could move.

4 Q. As we noted yesterday, there were exceedances of
5 selenium and uranium found in water wells in your
6 materials, uranium above the Canadian Drinking Water
7 Quality Guidelines.

8 Given that no comprehensive work has been
9 performed by Stantec or AT to provide the Board with
10 the information necessary to assess the risk, how can
11 the Board and my clients have any confidence that this
12 refusal to believe that such mobilizations of
13 contaminants is reasonable? How can we have any
14 confidence that that refusal to believe that such
15 mobilizations of contaminants is reasonable, given the
16 absolute lack of assessment?

17 A. MR. YOSHISAKA: Mr. Chairman, members of the Board
18 Panel, I wouldn't characterize that we've refused to
19 acknowledge the potential for these reactions to occur.
20 What we are saying is that it's unlikely that they'd be
21 the driving mechanism that we'd be most concerned
22 about, keeping in mind that, you know, the project, by
23 its design, will bring floodwater onto the landscape
24 behind the dam and reservoir, and that floodwater
25 carries with it constituents, you know, that are more

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1 likely to be the driving mechanism that we're -- that
2 we're most concerned about.

3 So, you know, it's not that we're totally
4 discounting that these things could what happen; what
5 we're saying is that they're not likely to be the
6 driving factor that we're most concerned about.

7 Further, the monitoring programs that we have
8 designed, again, are prepared in contemplation of the
9 changes that we anticipate could happen. So the
10 monitoring program is positioned with wells, both
11 shallow and deep, to cover these possibilities. And
12 again, we will know if there is a change in groundwater
13 quality that could lead to incremental risk to users in
14 the area, and if that is the case, then additional
15 mitigations will be put in place.

16 THE CHAIR: Mr. Secord.

17 MR. SECORD: Yes.

18 THE CHAIR: Not sure -- how many more
19 questions for Mr. Yoshisaka you have, but a break now
20 would work if it works for you or --

21 MR. SECORD: I was just thinking I would go to
22 10:45, but if you would like a break now, I can break,
23 yes.

24 THE CHAIR: Let's break until 10:10.

25 MR. SECORD: Yes, thank you.

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1 THE CHAIR: Okay, thank you.

2 (ADJOURNMENT)

3 THE CHAIR: Mr. Hebert, your panel is all
4 back?

5 A. MR. HEBERT: Mr. Speller has an item to address
6 before we continue, if that's possible.

7 THE CHAIR: Sorry, the -- from previous
8 questioning you mean?

9 A. MR. HEBERT: Yeah, from a previous item raised
10 yesterday.

11 MR. KENNEDY: I think the question to the Panel
12 is should this be on the record or not?

13 A. MR. HEBERT: Oh, yes, Mr. Chairman, it should
14 be on the record, yes.

15 THE CHAIR: So is this a further response to
16 today's question from Mr. Secord, is that -- do I have
17 this right?

18 A. MR. HEBERT: Yesterday's testimony.

19 THE CHAIR: Oh, yesterday's.

20 A. MR. SPELLER: Mr. Chairman, it's Wayne Speller.
21 Dr. Luzzi has identified a minor correction to a
22 reference he made yesterday, and he was hoping to share
23 it before we finish Mr. Secord's cross.

24 THE CHAIR: Mr. Secord, are you okay?

25 MR. SECORD: I'm fine with that. Thank you.

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1 THE CHAIR: Thank you.

2 A. MR. LUZI: Mr. Chair, this is Dr. Luzi. I
3 just wanted to correct yesterday that when I was
4 commenting on the uncertainty in the data used in the
5 tree ring data and the Sauchyn and Ilich paper, I was
6 actually referring to numbers in the Axelson paper
7 which did the -- which was the source of data for the
8 Sauchyn and Ilich paper. So I just wanted to correct
9 that mistake.

10 MR. SECORD: Okay, thank you.

11 THE CHAIR: Ms. DiPaolo, that was Dr. Luzi.
12 Sorry, Mr. Secord, go ahead.

13 MR. SECORD: Thank you.

14 Q. So, Mr. Yoshisaka, there has been no assessment of how
15 other contaminants like nutrients from fertilizers or
16 septic and sewer waste incorporated in the floodwaters
17 from inundated systems may impact the groundwater
18 beneath the SR1 reservoir and how those contaminants
19 may make their way into the local springs and ground --
20 and local groundwater supplies.

21 How can the NRCB and my clients judge this risk if
22 no work has been done to assess it?

23 A. MR. YOSHISAKA: Mr. Chairman, members of the
24 Panel, again, as we've stated previously in our
25 evidence, these -- the risk associated with, you know,

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1 the downward migration of flood-affected water has been
2 considered in our assessments. We do acknowledge
3 that -- that there is a risk of changes in groundwater
4 quality related to that affect pathway.

5 The -- the nature of those effects have -- have
6 been characterized and presented in the EIA and
7 further -- you know, with an understanding of how far
8 those effects could extend.

9 Again, we have developed the monitoring program to
10 monitor for those effects with that in mind, and,
11 again, have suitable mitigations presented that could
12 deal with those things, should -- should they come to
13 pass.

14 Q. Did AT engage a professional qualified in organic and
15 inorganic geochemistry to assist in the assessment of
16 water quality risk, or was the siting and design of SR1
17 mainly an engineering exercise?

18 A. MR. YOSHISAKA: Mr. Chairman, you know, I can't
19 speak directly to the siting of the site, I was not
20 involved in the siting of the project. But, you know,
21 regardless of why the project was sited where it is, we
22 are fortunate to have these low permeability materials
23 underlying the reservoir area.

24 I would suspect that that was a factor in their
25 site consideration, because it is an important one, and

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1 it is important mitigation that is in place for this
2 project, that it's passive mitigation, it doesn't
3 require, you know, human intervention to yield the
4 benefits of that mitigation.

5 But, you know, we definitely recognize that that
6 is in the project area, and it is good that it is.

7 Q. Yeah, my question was, did AT engage a professional
8 qualified in organic and inorganic geochemistry to
9 assist in the assessment of water quality risk?

10 A. MR. YOSHISAKA: Mr. Chairman, members of the
11 Panel, again, it's -- it was our approach to
12 conservatively look at the potential for migrations of
13 contaminants in combination with our understanding of
14 how groundwater moves advectively.

15 So, irregardless of the chemical species that
16 we're talking about, the maximum extent at which they
17 could move and travel is advectively with the flow of
18 groundwater.

19 The other factors that may be parameter specific,
20 contaminant specific, are those, you know, which you'd
21 consider in terms of fate modelling. Again, some of
22 those things will vary depending on the parameter; but,
23 again, all those serve to -- all those mechanisms serve
24 to further retard the movement of contaminants in the
25 subsurface.

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1 So we feel that the manner in which we've looked
2 at this issue is conservative, and -- and, again, our
3 monitoring and mitigation plans are designed with those
4 effects in -- in mind.

5 Q. Mr. Yoshisaka, I'll try this question for a third time
6 now.

7 Did AT engage a professional qualified in organic
8 and inorganic geochemistry to assist in the assessment
9 of water quality risk?

10 A. MR. YOSHISAKA: Mr. Chairman, no. No, we did not.
11 We did not feel it was necessary, given the analysis
12 that we did undertake.

13 Q. Now, release of water from SR1 will occur following a
14 flood event and could extend up to 40 or so days, we've
15 been told.

16 The release rate down the engineered low-level
17 outlet channel to the Elbow River will have a maximum
18 flow of 27 cubic metres per second, we've been told.

19 This water will contain contaminants entrained
20 during flooding of the Elbow River, which will also be
21 associated with any suspended sediment particles that
22 you've talked about.

23 So my first question, Question 1 is: It does not
24 appear that the release of this contaminated water and
25 its effects on the receiving aquatic environment has

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1 been fully assessed. Is that an accurate statement?

2 **A. MR. BRESCIA:** Mr. Chairman, it's Dave Brescia.

3 And first I'd like to just clarify. We don't
4 expect the water coming into the reservoir to be
5 contaminated. We expect it to be reflective of the
6 floodwaters in terms of their -- their constituents
7 that are picked up through the flood; and we don't
8 expect the contaminants to be at levels that would have
9 of concern flowing into the reservoir.

10 **Q.** But my understanding from the Luke and Mary Robinson's
11 presentations, Mr. Brescia --

12 **A. MR. BRESCIA:** Mr. Chair --

13 **Q.** -- which showed the sewage that was strewn across her
14 property from the Redwood Meadows' sewage facility.
15 Did you see that?

16 **A. MR. BRESCIA:** Mr. Chairman, I do recall seeing
17 that. That -- that, I believe, looked like a point
18 source release onto her property, and while we didn't
19 specifically assess sewage as a -- as an individual
20 component, we did some high-level calculations on the
21 total volume of sewage that would be contained at
22 either Bragg Creek or Redwood Meadows or both, and
23 based on the designs of those facilities, that would
24 amount to about 325 cubic metres of total wastewater.

25 And so if that were -- both of those treatment

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1 plants were to be completely inundated and the entire
2 wastewater mixed with the Elbow River, and I do mean it
3 would be mixed and diluted, and then even if we assume
4 the entire volume were to be entrained into the
5 reservoir, that would make up about 325 cubic metres
6 out of 77 million cubic metres, which would amount to
7 about .0004 percent of the total volume in the
8 reservoir. And, again, upon release into the river,
9 that would again mix and dilute with the Elbow River
10 floodwaters.

11 Q. So how can the Panel and my clients properly understand
12 and make a judgment on these risks if they haven't been
13 fully assessed?

14 A. MR. BRESCIA: Mr. Chairman, we have assessed
15 what we believe are the driving parameters for
16 contaminants, which are the TSS and nutrients, as
17 Mr. Yoshisaka mentioned earlier.

18 So those are fully assessed in the -- in the EIA
19 and the results and conclusions are presented.

20 Q. Now, Mr. Yoshisaka, are you a geochemist?

21 A. MR. YOSHISAKA: No, sir, I am not.

22 Q. Now, my clients have a few questions that they've asked
23 me to ask, and some conditions that they've asked me to
24 put to you, Mr. Hebert.

25 Now, my understanding -- and maybe you can accept

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1 this subject to check -- is that Springbank is named
2 after the Springbank Creek, which flows southeast into
3 the Elbow River; that Springbank was first given -- it
4 was first given as a school district name in 1887
5 because of the numerous springs breaking out of the
6 sides of the lesser coulees all over the district; and
7 perhaps you'd accept, subject to check, that most of
8 the early settlers located near the springs.

9 You heard from Mr. Copithorne about the
10 groundwater and springs that he has, which basically
11 about the PDA, but that's Brian Copithorne, in terms of
12 accessing drinking water and water for the cattle from
13 these springs.

14 What -- what is the potential for these springs to
15 be impacted by the reservoir in full supply level? Is
16 there any potential that these springs may be
17 negatively impacted and either reverse course or end up
18 not flowing?

19 I'm just wondering if there's been any assessment
20 of Mr. Copithorne's springs?

21 **A. MR. HEBERT:** **So, Mr. Chairman, the specific**
22 **details about the history of Springbank, certainly**
23 **subject to check, I'll accept Mr. Secord's information.**

24 In conversations with landowners and local area
25 residents, they've shared with me and they've shared

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1 with other members on the team the history of the area,
2 the nature of the springs, the reason why individuals
3 and farmers settled there. So I think that's certainly
4 accepted.

5 In terms of the specific question relating to
6 Mr. Copithorne, I'd invite the appropriate member of
7 the panel, which I believe it would be Mr. Yoshisaka,
8 to provide that response.

9 A. MR. YOSHISAKA: Thank you, Mr. Hebert.

10 Mr. Chairman, members of the Panel, yes, springs
11 were -- were duly considered in our assessment. We do
12 provide maps of known or suspected locations of springs
13 that fall within the LAA.

14 The locations of these, either known or suspected
15 spring locations, were derived based on our, again,
16 understanding of the shallow groundwater flow regimes,
17 you know, keeping in mind that springs really are a
18 manifestation of -- of groundwater levels.

19 So we know that, in the area, that there's, you
20 know, a good potential for the development of springs,
21 and this is due to, you know, a couple of things, a
22 couple of different types of springs can be present in
23 the area.

24 The springs I believe on Mr. Copithorne's property
25 are more what we would term "contact springs." So more

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1 likely related to, you know, because he is located next
2 to an area with a bit higher slope, those springs are
3 likely related to groundwater that's trying to move
4 down through the subsurface, but then, you know,
5 encounters a lower permeability unit below it, and thus
6 the path of least resistance let's say, is out --
7 outward to the side releasing, you know, out of -- of
8 the side of the valley wall.

9 So, you know, we understand through the baseline
10 work that we've done that the flow regimes, yes, can
11 promote the development of these springs.

12 It was interesting to note that, you know, when we
13 were mapping out shallow groundwater flow patterns in
14 the area, there was areas where, you know, even at a
15 desktop level, where we suspected, hey, there, this
16 looks like this is a condition favourable to the
17 development of springs, and it so did turn out in the
18 field as well that springs were found at some of those
19 locations. So, with that corroboration in mind, we're
20 confident that we understand where those locations are
21 and why they are where they are.

22 And, with that in mind, with that understanding in
23 mind, again, we can development an appropriate
24 monitoring program to monitor for those potential
25 effects to springs, and, yes, I think we'll have a good

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1 understanding of that.

2 Q. Did you do any physical or chemical measurements at
3 Mr. Brian Copithorne's springs?

4 A. MR. YOSHISAKA: At his springs in particular, no,
5 I don't believe that we -- we did. The couple of
6 springs that we were able to visit were visited in
7 combination with the domestic well testing program that
8 we completed.

9 Q. Now, Mr. Hebert, is the proponent aware that a new
10 development of 40 homes is proposed between
11 Range Road 34 and Range Road 35 just adjacent to the
12 east side of the SR1 project? Can you tell me, has AT
13 considered that the development may be negatively
14 impacted by the cumulative effects of SR1, including
15 possible groundwater effects, high groundwater tables
16 as a result of the project?

17 A. MR. HEBERT: Mr. Chairman, we're aware of the
18 development. I'd invite Mr. Yoshisaka to provide a
19 response on this specific question.

20 A. MR. YOSHISAKA: Mr. Chairman, sorry, I just would
21 offer a correction here, I am not intimately familiar
22 with this particular development.

23 However, based on our understanding of -- of the
24 flow regimes and potential changes to those flow
25 regimes under flood conditions, I mean, we know the

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1 extent of that eastward progression of the zone of
2 influence of the reservoir area.

3 If I could, I'll just bring up a figure here to
4 help support our discussion. Bear with me for -- for a
5 moment.

6 MR. BARBERO: Mr. Chair, it's Michael.

7 THE CHAIR: Yes?

8 MR. BARBERO: Sir, perhaps in the interest of
9 time, I could just update the Panel on an undertaking
10 Mr. Yoshisaka gave yesterday so that in case Mr. Secord
11 would like to ask any questions, he has an opportunity
12 to do that in his remaining time, sir.

13 THE CHAIR: Thank you, Mr. Barbero.

14 MR. BARBERO: So, yesterday, Mr. Yoshisaka noted
15 in direct there was a correction to a legend in a table
16 in Exhibit 157, page 9.

17 I can advise we have now provided the corrected
18 legend in a new document, and that has been filed at
19 Exhibit 381, and Mr. Secord has been provided a copy of
20 that directly.

21 THE CHAIR: Thank you.

22 MR. SECORD: Thank you, Mr. Barbero.

23 THE CHAIR: Ms. Friend, you have that in
24 exhibit number, as well?

25 MS. FRIEND: Yes, that's correct.

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1 **EXHIBIT 381 - CORRECTION TO LEGEND IN A**
2 **TABLE IN EXHIBIT 157, PAGE 9**

3 THE CHAIR: Thank you.

4 Q. MR. SECORD: So maybe while you're looking for
5 that, I am going to put some conditions to Mr. Hebert.

6 So Mr. Hebert, I've been asked to suggest to you
7 the following conditions as part of any approval that
8 might be given to SR1.

9 The first condition is the community requests that
10 an independent agency be set up to oversee the rights
11 of residents in the greater west Rocky View area with
12 regard to SR1.

13 The independent body or agency shall be the point
14 of contact for the community and shall be responsible
15 for the entire process of dispute resolution, with the
16 power to recommend mitigations, reporting requirements,
17 monitoring capabilities that would be implemented by --
18 I'm assuming it would be by AT, or I guess
19 Alberta Environment and Parks for the life of the
20 project, or whoever, I guess, ends up operating with
21 the SR1 because I mean governments change their --
22 department names seem to go through changes every once
23 in a while.

24 This agency would serve as a formal mechanism for
25 raising concerns, having these concerns addressed in a

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1 timely manner, and to represent community interests
2 with regard, you know -- regarding drinking water,
3 groundwater impacts, air quality, reservoir safety,
4 emergency response, land use, and
5 transportation-related concerns.

6 Would you consider having that attached as a
7 condition to an approval?

8 **A. MR. HEBERT:** One moment, Mr. Chair.

9 Mr. Chairman, I think as a matter of reality, the
10 regulator -- in the case, this Board, and the federal
11 regulator and other entities will be applying
12 conditions that will have legal force, there will be
13 other cases of legislation or regulation that the
14 project will be subject to.

15 We've made varying commitments as it relates to
16 monitoring plans and the existence of a community
17 liaison, but I think it would be responsible for
18 Transportation to take this as an undertaking, subject
19 to the advice of counsel.

20 **Q.** Thank you.

21 **UNDERTAKING - TO ADVISE IF AN**
22 **INDEPENDENT AGENCY CAN BE SET UP TO**
23 **OVERSEE THE RIGHTS OF RESIDENTS IN THE**
24 **GREATER WEST ROCKY VIEW AREA WITH**
25 **REGARD TO SR1 (SEE TRANSCRIPT FOR**

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1 **FURTHER CONDITIONS)**

2 Q. MR. SECORD: The second condition is as
3 follows: The proponent shall establish a contingent
4 liability fund to be administered by the independent
5 agency to address community concerns for air quality,
6 water quality, et cetera, to ensure that there is
7 sufficient funding set aside to address potential
8 complications and unexpected outcomes of the project.

9 My clients are concerned that issues raised by the
10 community, residents, and businesses may not be dealt
11 with in a timely manner or affected parties will be
12 forced to take legal action against the Alberta
13 government. So this liability fund would allow the
14 residents to access funding for independent
15 assessments, legal aid related to SR1 claims, and
16 provide a mechanism to address issues and avoid delays.

17 I wonder if you would consider taking that
18 condition away and getting back to us on that request.

19 A. MR. HEBERT: Mr. Chairman, we'll add that to
20 the undertaking.

21 **UNDERTAKING - TO ADVISE IF THE**
22 **PROPONENT WILL ESTABLISH A CONTINGENT**
23 **LIABILITY FUND TO BE ADMINISTERED BY**
24 **THE INDEPENDENT AGENCY TO ADDRESS**
25 **COMMUNITY CONCERNS FOR AIR QUALITY,**

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1 WATER QUALITY, ET CETERA (SEE
2 TRANSCRIPT FOR FURTHER CONDITIONS)

3 Q. MR. SECORD: The next condition is: The
4 proponents shall conduct baseline testing of all water
5 wells prior to construction or provide funding for well
6 testing for any Rocky View residential location,
7 commercial, and agricultural operation who so choose.

8 So it would be on a request basis.

9 MR. BARBERO: Mr. Secord, sir, sorry to
10 interrupt you. I'm just curious. The entire County of
11 Rocky View?

12 MR. SECORD: So these would be people who
13 request testing of their wells, and this would be for
14 any west Rocky View residents.

15 MR. BARBERO: And what constitutes "west Rocky
16 View," sir?

17 MR. SECORD: Those would be those who would be
18 sort of in the -- basically impacted by the footprint
19 of the project. So that could be something that could
20 be determined -- in terms of a geographical, that could
21 be part of the condition, but we're not talking about
22 all Rocky View County, Mr. Barbero.

23 I mean, we pulled up a map yesterday showing a
24 number of water wells in close proximity to the project
25 area. So it would be similar to the map that you saw

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1 yesterday.

2 So the condition would read: The proponent shall
3 conduct baseline testing of all water wells prior to
4 construction and provide funding for water well testing
5 for any west Rocky View residential location,
6 commercial and agricultural operation who so choose at
7 any point of the project lifecycle from
8 pre-construction through operations for the life of the
9 project.

10 These reports will serve as the basis for
11 future -- any future claims by residents negatively
12 impacted by SR1 and must be held on file.

13 The proponent shall create a mechanism for
14 landowners to submit these well reports, compensate
15 them for the cost, and provide a method for storing
16 these well report files.

17 I'm wondering, Mr. Hebert, whether you would take
18 away that request for consideration.

19 And, obviously, the wording -- if you suggest
20 refinement to the wording of these conditions, that
21 also would be something that you could come back to us
22 on, would be appreciated.

23 **A. MR. HEBERT:** Mr. Chairman, I would note that
24 the project has proposed a draft groundwater monitoring
25 plan that contemplates domestic well testing, but I

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1 think it would benefit if Transportation could provide
2 a response as part of the undertaking.

3 MR. SECORD: Thank you.

4 UNDERTAKING - TO ADVISE IF THE
5 PROPONENT WILL CONDUCT BASELINE TESTING
6 OF ALL WATER WELLS PRIOR TO
7 CONSTRUCTION AND PROVIDE FUNDING FOR
8 WATER WELL TESTING FOR ANY WEST ROCKY
9 VIEW RESIDENTIAL LOCATION, COMMERCIAL
10 AND AGRICULTURAL OPERATION WHO SO
11 CHOOSE AT ANY POINT OF THE PROJECT
12 LIFECYCLE FROM PRE-CONSTRUCTION THROUGH
13 OPERATIONS FOR THE LIFE OF THE PROJECT
14 (SEE TRANSCRIPT FOR FURTHER CONDITIONS)

15 Q. MR. SECORD: So the next condition is as
16 follows: When the reservoir is in use, the operator
17 shall be responsible for any adverse health or safety
18 outcomes from the use of the reservoir by trespassers
19 and accidents within the PDA.

20 A. MR. HEBERT: Mr. -- sorry, Mr. Secord.

21 Q. Would you be able to take that one away and get back to
22 us on it?

23 A. MR. HEBERT: Yes, Mr. Chairman, we'll add that
24 to the undertaking response.

25 UNDERTAKING - TO ADVISE WHETHER, WHEN

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1 THE RESERVOIR IS IN USE, THE OPERATOR
2 SHALL BE RESPONSIBLE FOR ANY ADVERSE
3 HEALTH OR SAFETY OUTCOMES FROM THE USE
4 OF THE RESERVOIR BY TRESPASSERS AND
5 ACCIDENTS WITHIN THE PDA

6 Q. MR. SECORD: The next undertaking is to -- that
7 the proponent shall provide, as a condition of
8 approval, resolutions with landowners downstream of SR1
9 who are not adequately protected by the project.

10 This may include land purchases, flood mitigation
11 projects, or compensation agreements as a result of the
12 inferior flood mitigation outcomes of SR1 for
13 downstream residents.

14 Is that a condition that you would be prepared to
15 look at -- take away and look at it and get back to us
16 on?

17 A. MR. HEBERT: Mr. Chairman, we've previously
18 addressed our position regarding residences or
19 infrastructure downstream of the project, but under the
20 circumstances, it may benefit from the response in
21 forming the undertaking.

22 UNDERTAKING - TO ADVISE WHETHER THE
23 PROPONENT SHALL PROVIDE, AS A CONDITION
24 OF APPROVAL, RESOLUTIONS WITH
25 LANDOWNERS DOWNSTREAM OF SR1 WHO ARE

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1 **NOT ADEQUATELY PROTECTED BY THE PROJECT**

2 **(SEE TRANSCRIPT FOR FURTHER CONDITIONS)**

3 Q. MR. SECORD: Now, the next condition is that
4 the independent agency or body shall ensure that
5 project reporting is made available to the public in a
6 format acceptable to the public and the Springbank
7 community.

8 Is that something that you could take away,
9 Mr. Hebert, and get back to us on?

10 A. MR. HEBERT: Mr. Chairman, we've made varying
11 commitments regarding the reporting of monitoring plans
12 and activities, but if it benefits Mr. Secord's
13 clients, we could certainly describe those in the form
14 of the undertaking.

15 **UNDERTAKING - TO ADVISE WHETHER THE**
16 **INDEPENDENT AGENCY OR BODY SHALL ENSURE**
17 **THAT PROJECT REPORTING IS MADE**
18 **AVAILABLE TO THE PUBLIC IN A FORMAT**
19 **ACCEPTABLE TO THE PUBLIC AND THE**
20 **SPRINGBANK COMMUNITY**

21 Q. MR. SECORD: The next condition is that the
22 proponent shall commit to remediate all roads,
23 driveways, access roads that are impacted by SR1,
24 including construction traffic and roads flooded
25 downstream of the SR1 outlet, and that these should be

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1 project costs and should not be borne by Rocky View
2 County taxpayers.

3 Mr. Hebert, would you be prepared to take that
4 condition away and get back to us on that?

5 **A. MR. HEBERT:** Mr. Chairman, we've previously
6 confirmed in our application, and with Rocky View
7 County itself, that Alberta Transportation would be
8 responsible for the cost of repairs of Springbank Road
9 in the event of project operations.

10 We can certainly identify that reference if it
11 benefits the Panel and Mr. Secord's clients.

12 I believe, as we've -- we've also clarified that
13 in the event that there were individuals that require
14 access points within the project development area --
15 access meaning to private residences or private
16 property -- that Transportation is interested in
17 discussing with those landowners the ability to -- to
18 create or maintain access and the associated costs.

19 **UNDERTAKING - TO ADVISE IF THE**
20 **PROPONENT SHALL COMMIT TO REMEDIATE ALL**
21 **ROADS, DRIVEWAYS, ACCESS ROADS THAT ARE**
22 **IMPACTED BY SR1, INCLUDING CONSTRUCTION**
23 **TRAFFIC AND ROADS FLOODED DOWNSTREAM OF**
24 **THE SR1 OUTLET, AND THAT THESE SHOULD**
25 **BE PROJECT COSTS AND SHOULD NOT BE**

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1 **BORNE BY ROCKY VIEW COUNTY TAXPAYERS**

2 Q. MR. SECORD: The next condition is the
3 proponent shall establish a detailed plan and process
4 steps for school bus rerouting during flood events.
5 This should consider the likelihood that roads upstream
6 and Bragg Creek and Highway 22 may also be impacted.

7 The proponent shall confirm the detour route for
8 school buses during Springbank Road closures as a
9 result of the operation of SR1 and ensure that all
10 detour routes meet standards for school bus traffic
11 safety.

12 My clients have been told that school buses cannot
13 turn left onto Highway 22, so are they going to send
14 the buses onto Highway No. 1?

15 As an alternative, perhaps the intersection at
16 Highway 22 and Range Road 250 could be upgraded.

17 Would AT undertake to take that condition away and
18 look at it and get back to us on that?

19 A. MR. HEBERT: Mr. Chairman, one moment.

20 Mr. Chairman, as we confirmed last week in a
21 different undertaking, we have made commitments related
22 to the upgrade of Range Road 40. A detour route in the
23 instance of the project's operations that would close
24 Springbank Road are identified. But for the benefit of
25 Mr. Secord's clients and the Panel, we will provide

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1 that in written response.

2 **UNDERTAKING - TO ADVISE WHETHER THE**
3 **PROPONENT SHALL ESTABLISH A DETAILED**
4 **PLAN AND PROCESS STEPS FOR SCHOOL BUS**
5 **REROUTING DURING FLOOD EVENTS (SEE**
6 **TRANSCRIPT FOR FURTHER CONDITIONS)**

7 Q. MR. SECORD: And just two further conditions.

8 If evacuations are recommended or mandated,
9 residents within the evacuation zone will be evacuated
10 in a timely fashion and housed at the expense of the
11 proponent until they can safely go home; and all
12 Springbank community members that will have to be
13 evacuated will be notified of this consequence to their
14 property as a condition of approval and before
15 construction takes place.

16 A. MR. HEBERT: Mr. Chairman, I believe it would
17 be appropriate for Transportation to take that as part
18 of the undertaking and provide a written response.

19 **UNDERTAKING - TO ADVISE, IF EVACUATIONS**
20 **ARE RECOMMENDED OR MANDATED, WHETHER**
21 **THE PROPONENT WILL EVACUATE RESIDENTS**
22 **IN A TIMELY FASHION (SEE TRANSCRIPT FOR**
23 **FURTHER CONDITIONS)**

24 Q. MR. SECORD: And then the last one is a request
25 by my clients that the proponent will not name this

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1 structure as the "Springbank Off-Stream Reservoir,"
2 that they requested it be named the "Elbow River
3 Diversion" or the "Elbow River Off-Stream Reservoir."

4 Would -- I think you've heard some of my clients
5 say they don't want it to be associated with the name
6 "Springbank."

7 Is that something that you would take away,
8 Mr. Hebert, and look at and maybe get back to us, that
9 name change?

10 **A. MR. HEBERT:** Mr. Chairman, that item can be
11 added to the undertaking.

12 **UNDERTAKING - TO ADVISE WHETHER THE**
13 **PROPONENT WILL AGREE TO NOT NAME THE**
14 **SUBJECT STRUCTURE THE "SPRINGBANK**
15 **OFF-STREAM RESERVOIR"**

16 **Q. MR. SECORD:** Thank you.

17 And then I just have a few questions on fish,
18 Mr. Chair, and I think Mr. Yoshisaka is to get back to
19 me, and I don't think I have many questions on fish,
20 but I would like to ask a few.

21 And I was going to say to you if I should go
22 over -- I think I've probably got till 11, but if I
23 should go over by a few minutes, could I have you
24 subtract that from our time allocation in Topic Block 5
25 if that would be agreed -- if that works?

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1 THE CHAIR: Yes.

2 MR. SECORD: Okay, thank you. I'm not trying
3 to go over by much.

4 Q. MR. SECORD: Did you get that reference,
5 Mr. Yoshisaka, while we were working?

6 A. MR. YOSHISAKA: Yes, I did. Thank you,
7 Mr. Chairman.

8 If I could please point you to Exhibit 157, and
9 document manager, if you could please bring this up,
10 and starting at page 9, please.

11 Okay, so I've called up this figure, we've seen it
12 before, this represents the conservative sensitivity
13 analysis run that shows the extent of the effects on
14 the project, again, under this most conservative of
15 cases of increased hydraulic conductivity, again,
16 retention of the water indefinitely within the
17 reservoir.

18 Mr. Secord, I believe your question was around
19 development situated to the east of -- of the project.

20 I believe that development would be situated
21 outside of these -- these areas, and with that in mind,
22 you know, I would submit that that development would be
23 outside of the zone of influence of this project under
24 flood operations.

25 Q. And I guess just picking up on Mr. Barbero's

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1 notification about the newly filed Exhibit 381, maybe
2 while I ask the fish questions, Mr. Yoshisaka, I could
3 ask you to consider this question: The revised
4 scenario provide results provided in Exhibit 381, I'm
5 told by Dr. Fennell, are very different than the result
6 provided in Exhibit 110 at PDF page 477.

7 So maybe you can look at that and get back to me,
8 or are you -- can you confirm that now that they are
9 different?

10 **A. MR. YOSHISAKA:** I can confirm that the simulation
11 results presented are not different. The change comes
12 in the labelling of the bins, which were erroneous, in
13 the figure presented within the original exhibit.

14 So even the figure that's up on the screen here
15 now, you can see the legend labels there, you know,
16 don't really make sense.

17 So the correction of the figure is solely limited
18 to the labelling of those -- those bins. Nothing else
19 changed in the figures. So there was no change in the
20 simulation result itself. It's solely limited to the
21 change in the legend to more -- and correctly label
22 those various colour regions.

23 **Q.** All right. So --

24 **A. MR. YOSHISAKA:** Sorry, Mr. Secord, just one more
25 thing to draw your attention to.

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1 I do believe I also still owed you a response in
2 relation to an undertaking we took yesterday. So when
3 it's convenient for you, I can speak to that, as well.

4 Q. Let's do that now before we move to fish.

5 A. MR. YOSHISAKA: Sure. So the...

6 Q. And, document host, you can take the exhibit down,
7 please. Thank you.

8 A. MR. YOSHISAKA: The undertaking was in relation to
9 a figure that denoted dots representing locations of
10 domestic wells in the RAA, all the way across the RAA.
11 The question was around one of the dots that was marked
12 in red as a location at which domestic well testing
13 occurred.

14 I believe, Mr. Secord, you were asking if that dot
15 represented a well of Ms. Robinson.

16 Q. Yeah, if any of those red dots were, you know, hers?

17 A. And we can confirm that the red dot that is near her
18 property was associated with the Hawes/Gervais property
19 adjacent to it, but does not represent Ms. Robinson's
20 wells.

21 Q. Right. I think she owns that together with her sister,
22 correct, the Hawes property?

23 A. MR. YOSHISAKA: I'm not sure of the familial
24 relationships there, but I can accept that, subject to
25 check.

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1 Q. All right --

2 THE CHAIR: Mr. Secord, that's a -- the
3 transcript on record is fine in terms of the response.
4 We don't need an exhibit.

5 MR. SECORD: Yes, that's fine, sir. Thank you.

6 THE CHAIR: Thank you.

7 Q. MR. SECORD: So Ms. AuCoin, do I pronounce your
8 name properly?

9 A. MS. AUCOIN: Yes, that's correct. Good
10 morning.

11 Q. Good morning. So I'll put some questions to you, and
12 you'll move them off to somebody else if you deem that
13 appropriate.

14 I assume you've seen Mr. Christensen's report that
15 was attached to the Alberta Environment letter deeming
16 the EIA complete?

17 A. MS. AUCOIN: Yes, I have read that.

18 Q. And you recall Mr. -- do you know Mr. Christensen?

19 A. MS. AUCOIN: I know him through the capacity of
20 the project and our communication.

21 Q. Right. And Mr. Christensen expressed some concern
22 about the project causing the extirpation of bull trout
23 in certain regions of the Elbow River. You read that?

24 A. MS. AUCOIN: I've seen that statement in this
25 letter, yes.

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1 Q. Would you consider Mr. Christensen's conclusion that
2 bull trout may be extirpated a positive outcome of SR1?

3 A. MS. AUCOIN: I'm sorry, did you ask whether
4 this would be a positive outcome?

5 Q. Yes, of constructing the project.

6 A. MS. AUCOIN: Mr. Chairman, AEP made a claim in
7 this letter that Mr. Secord mentions. They've claimed
8 that the project could result in the extirpation of
9 bull trout from the local reach of the Elbow River, and
10 Alberta Transportation maintains that this is an
11 unsubstantiated claim.

12 Our assessment items have been -- the assessment
13 items that have been identified in the AEP letter have
14 been assessed and evaluated to the extent possible, and
15 the outcome of our effects assessment does not indicate
16 that bull trout would be extirpated from the lower
17 reach of the Elbow River.

18 Alberta Transportation acknowledges that the
19 project has some potential to affect bull trout or its
20 habitat, but not to the level that poses a risk or
21 likelihood that the population would be extirpated.

22 Q. And is there a plan to offset this potential impact on
23 the bull trout?

24 A. MS. AUCOIN: Absolutely. Mr. Chairman, we've
25 been consulting with Fisheries and Ocean Canada on this

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1 file, it's an ongoing consultation currently, and as
2 part of the project requirements under the *Fisheries*
3 *Act*, Alberta Transportation is required to offset
4 potential effects, potential residual effects, to bull
5 trout or its critical habitat, and we're currently in
6 discussion with the DFO regarding the offsetting plan
7 and the offsetting options; but, to date, all the
8 options that have been considered align with the bull
9 trout recovery strategy.

10 So we're looking at offsetting options that
11 specifically deal with bull trout and its critical
12 habitat.

13 Q. Now, yesterday, it seems like ages ago now, in the
14 opening statement, AT -- AT stated that an in-stream
15 dam creates lake habitat where there was once river
16 habitat, whereas SR1 doesn't do that, so that's
17 preferable from a river system point of view. Do you
18 recall that?

19 A. MS. AUCOIN: Yes, I do. It is one of the
20 benefits of SRQ is that it's an off-stream structure
21 and it minimizes an in-stream footprint in an area.

22 Q. Now, my friend, Mr. Rae, on behalf of the Stoney Nakoda
23 Nation has asked many questions about the proposal to
24 build dams on the Bow River. I don't know whether
25 you've been part -- been around for any of that

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1 discussion. So is this reason, you know, changing
2 riverine habitat to lake habitat, would that then be a
3 reason not to build another dam on the Bow River?

4 **A. MR. WOOD:** Mr. Chairman, this is Matt Wood of
5 Transportation. I just wanted to highlight that, here
6 on the Elbow River at the location of the off-stream
7 storage reservoir, there is a unique topographic
8 opportunity to build an off-stream reservoir.

9 These -- you know, while these are available
10 locations all across the province, as we mentioned
11 earlier with the Pine Coulee Reservoir, those options
12 aren't available on the Bow.

13 And so to characterize the lacustrine or the lake
14 creation as a benefit or a drawback is not really
15 appropriate at the Elbow River site here. As my
16 colleague Ms. AuCoin mentioned, the benefit of
17 off-stream storage, again, given the ability to do it
18 at this location, is a benefit over the upstream option
19 that would have -- that could have created a permanent
20 pond for sediment management.

21 **Q.** Now, my clients have asked me to put forward this
22 question, and it is: The proponent has stated that the
23 emergency spillway is under design; where are the flows
24 from the emergency spillway meeting the Elbow River; is
25 erosion protection being supplied for the Elbow River

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1 across from where these waters will meet the river; and
2 has this erosion protection been considered for fish
3 passage and other environmental impacts; and where is
4 the design?

5 So it's maybe quite a bit in that question. But
6 perhaps somebody can take that away for me?

7 **A. MR. WOOD:** Mr. Chairman, this is Matt Wood.
8 Perhaps Mr. Secord could clarify. I believe you had
9 said, regarding the emergency spillway, the erosion
10 mitigations, and then something about fish passage.
11 Can you please clarify?

12 **Q.** Sure. So the first part of the question was the
13 proponent has stated that the emergency spillway is
14 under design. Where are -- assuming it is engaged,
15 where are the flows from the emergency spillway meeting
16 the Elbow River? So that would be question Number 1.

17 **A. MR. WOOD:** Mr. Chairman, they meet the
18 Elbow River downstream of the emergency spillway at the
19 Elbow River channel.

20 **Q.** And is erosion protection being supplied for the
21 Elbow River across from where these waters from the
22 emergency spillway will meet the Elbow River?

23 **A. MR. WOOD:** Mr. Chairman, no, it is not.

24 In the contemplated scenarios, again, as mentioned
25 in previous days' testimony, that these are

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1 undesirable, unplanned emergency situations. Where the
2 emergency spillway activates, it is contemplated that
3 the Elbow River would already be flooding in these
4 locations.

5 And so when you have flowing water meeting what is
6 essentially standing water in the floodplain, there's
7 limited need for those kind of erosion mitigation
8 measures.

9 Q. And then in relation to the low-level outlet, the
10 proponent stated last week that some form of erosion
11 protection will be used in the confluence of the
12 Unnamed Creek and the Elbow River. Has this been fully
13 assessed for its environmental consequences, including
14 fish passage?

15 A. MR. WOOD: Mr. Chairman, I can say that fish
16 passage was not an element of design for those erosion
17 mitigation measures.

18 Currently, the Unnamed Creek is not found to have
19 fish passage characteristics in it. And so while these
20 erosion mitigations were designed to in effect mimic
21 natural features, specifically a step pool feature,
22 fish passage wasn't necessary to be provided. And so
23 it was not evaluated.

24 Q. So the next question deals with fish rescue personnel.
25 Is fish rescue realistic? Has there ever been a

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1 successful fish rescue operation in conditions such as
2 this across hundreds of acres of reservoir, much of
3 which will, you know, have sediment?

4 So I don't know whether that's you, are you a --
5 is this the panel for the fish rescue efforts?

6 A. MR. HEBERT: Mr. Chairman, Ms. AuCoin can
7 provide that answer.

8 A. MS. AUCOIN: Yeah. Hi, this is Lacey AuCoin
9 speaking again.

10 Mr. Chairman, we've prepared a draft fish rescue
11 plan for the project; I can pull up the exhibit number
12 in a second. But this draft fish rescue plan
13 acknowledges the scale of effort that would be required
14 to rescue fish within the reservoir.

15 It's also -- the fish rescue plan is scaleable, in
16 terms of the area that rescue is required, as well as
17 the staffing requirements for the job.

18 In addition, we've provided some examples of other
19 large scale fish rescues to contextualize the plan in
20 response to Round 1 SIR 32. My apologies, I don't
21 have -- okay, so the fish rescue plan is Exhibit 140,
22 and one moment, and I can get the Round 2 response,
23 Exhibit 138.

24 So the examples that we've provided give the fish
25 rescue context. We acknowledge that it is a large

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1 program that would be undertaken during a design flood
2 event. But it's important to remember that the fish
3 rescue operation is scaleable, so the effort that is
4 required is proportional to the amount of water that
5 gets diverted into that area.

6 Q. And what is the cost of this program?

7 A. MR. WOOD: Mr. Chairman, it's Matt Wood here.
8 If I may request just a brief caucus.

9 THE CHAIR: Yes, please proceed.

10 A. MR. HEBERT: So, Mr. Chairman, there's a couple
11 points on the question: One, the fish rescue plan is
12 embedded within a draft monitoring plan that remains
13 under development, presumably will be subject to
14 regulatory approval by the appropriate body.

15 Second, the extent and scale of the fish rescue
16 plan is subject to the size of the event. But I think
17 just to assure the Panel that ultimately in the event
18 that project is operated necessitating a fish rescue
19 plan that will be captured within the operational costs
20 of the project, that would be set and appropriated at
21 the time.

22 Q. And what is the time required to rescue a fish? And
23 are the fish placed in a bucket of water while they're
24 being assessed? I'm just wondering how this -- so how
25 much time do you have to get the fish out of the

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1 reservoir, what do you put the fish in, that sort of
2 thing?

3 A. MS. AUCOIN: Yeah, again -- this is
4 Lacey AuCoin speaking, and there's a couple of points
5 that should be made.

6 Firstly, it's important to remember that the
7 low-level outlet provides opportunity for fish to exit
8 the reservoir; therefore, it's not intended -- or it's
9 not expected that every fish needs to be rescued from
10 the reservoir.

11 So the intention of the fish rescue is to really
12 focus on the perimeter of the reservoir and then work
13 our way in so that we're ensuring that not -- there are
14 no stranded pools as water levels recede.

15 So the fish rescue is not -- it's -- the intention
16 is never to capture every fish in there because it's
17 expected that a lot of them are going to naturally
18 egress out through the low-level outlet.

19 So I think that answers one of your points.

20 Can you remind me what other question you had?

21 Oh, it was with respect to --

22 Q. What do you put them in?

23 A. MS. AUCOIN: What do you put them in, right.

24 So how it will work is multiple crews will be
25 working concurrently in the reservoir. And, again,

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1 we're working along the perimeter of that reservoir.
2 And the crews have portable buckets or totes with
3 battery-operated aerated pumps in them, so as fish are
4 captured, they're put into these smaller totes that the
5 crews can carry around with them, and the buckets are
6 aerated so that fish don't become distressed after
7 capture. And then crews are bringing the totes back to
8 a larger capacity tank -- like, a very large, like,
9 1,500-litre tank I think is what we said in the plan --
10 at a staging area.

11 So it requires a lot of trips back and forth, but
12 the smaller totes are brought into the larger capacity
13 tank, and that is also operated with a larger capacity
14 aerated pump to keep the fish within healthy conditions
15 upon capture.

16 Q. Now, I take it it's your understanding that AT has not
17 provided any redundancies for the low-level outlet.
18 There's only one low-level outlet being proposed for
19 SR1. Do you understand that?

20 A. **MS. AUCOIN:** I do understand that, yes.

21 Q. And so if that low-level outlet is blocked, or if, for
22 some reason, fish are unable to exit the low-level
23 outlet, then the fish rescue will have to do more than
24 simply look at the perimeter of the flooded area;
25 correct?

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1 A. MR. WOOD: Mr. Chairman, this is Matt Wood.
2 I would like to add that there are redundancies built
3 into the gating system, specifically gates that are
4 double gates at the low-level outlet to help manage any
5 risk of the structure becoming inoperable.

6 Q. And so in relation to the fish rescue effort, will the
7 people who do the fish rescue, will they be volunteers,
8 will they be AEP personnel? Like, where will these
9 people come from? Will they have any special training?

10 A. MS. AUCOIN: Mr. Chairman, I can -- I can open
11 with part of this answer.

12 The fish rescue will be led by a qualified aquatic
13 biologist, and each crew that is included in the fish
14 rescue will have electrofishing certification that
15 allows each crew to operate independently, given that
16 the efforts could -- could be large enough that
17 multiple crews are required.

18 So the entire program is overseen by the qualified
19 aquatic biologist, and there's likely some redundancy
20 in that in that additional biologists are employed
21 within each crew, and each crew has in -- an
22 electrofishing certified lead.

23 And it's also important to note that the fish
24 rescues -- a permit is required for this through both
25 the province and DFO, and, as part of the permit

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1 through DFO, crew leads are required to submit résumés
2 in order to ensure that the leads that are employed in
3 this program meet the qualifications required to handle
4 fish and reduce injury to fish during rescues.

5 Q. So you have a -- let's say we have a 2013 flood. The
6 reservoir is full. It fills up in a matter of hours.
7 The fish, then, are going to be in that environment
8 over the course of 40 days while the reservoir drains.

9 Do you apply for the permit once the reservoir is
10 starting to fill? Do you wait until the reservoir is
11 full and then apply the DFO and AEP for permits? I
12 mean, how long does this permitting process takes place
13 before you can actually get in there and start bagging
14 the fish up?

15 A. MS. AUCOIN: Just one moment, Mr. Chair.

16 Thank you, Mr. Chair. I just wanted to
17 double-check something with my colleagues.

18 The intention is that these permits would be
19 secured prior to flood season, whether that's a blanket
20 approval for multiple years or secured from year to
21 year, but the intention is that the approvals would be
22 in place prior to a flood season so that a program
23 could be executed quickly.

24 Q. Right. So you've got your permits, you're going in
25 with the team to electroshock the fish. So how does

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1 that work? How -- how close do these people have to be
2 to a bull trout in order to lasso it into the tote bag,
3 so to speak? How does that work?

4 **A. MS. AUCOIN:** **Sorry, could you clarify your**
5 **question?**

6 **Q.** So you mentioned that the -- these people would be
7 coming into the reservoir with their electrofishing
8 equipment. They're not catching the bull trout by
9 hand; right? They're electrofishing?

10 **A. MS. AUCOIN:** **So Mr. Chairman, it's important to**
11 **note that what we know of the current distribution of**
12 **bull trout is that bull trout are predominantly located**
13 **in areas upstream of the project. We found very low**
14 **captures near the project area; therefore, it's a point**
15 **of clarification that the number of bull trout that**
16 **might be in the reservoir is very low.**

17 That being said, your question, it sounded like it
18 was a combination of potentially -- like, how close,
19 like, a radius you need to catch them. Efficiency --

20 **Q.** Yeah, so Ms. AuCoin, I wasn't really -- typically
21 really concerned about the type of fish, whether it's a
22 bull trout or whether, you know, it's a brook trout or
23 whether it is some other species of fish.

24 My understanding is there's a fish rescue. So
25 when they come into the reservoir with their

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1 electrofishing equipment to rescue these fish, do you
2 need to be able to see the fish before you can, you
3 know, use your electrofishing equipment? Just can you
4 run me through how that process works? My clients are
5 interested in that.

6 **A. MS. AUCOIN:** Yeah. So, again, going back to
7 how the electrofishing process, or, I guess, the fish
8 rescue process would work, is you're working along the
9 perimeter and working inwards as water levels recede;
10 therefore, electrofishing is one method that we would
11 use to capture fish, but there's other methods, as
12 well. It could be -- it could be the reliance on nets
13 or seine nets in order to catch fish. So it's not --
14 it's not exclusively the use of electrofishing
15 equipment.

16 **Q.** And what is the expected survival rate of fish that are
17 caught through electrofishing? You talked about the
18 fish not being stressed, but wouldn't the electrofished
19 fish be stressed through that process?

20 **A. MS. AUCOIN:** Mr. Chair, this is, again, going
21 back to the requirements of our crew, having crew leads
22 that are certified electrofishing crew members,
23 certified electrofishing operators. Part of that
24 training is you have a good understanding of the
25 frequency and voltage used on the electrofishing

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1 equipment, such that injury to fish is minimized. This
2 is a requirement of the permit holder.

3 Q. And do you have any concept of what the cost would be
4 for the crew per day? Is it so many acres per crew per
5 day, depending upon the size of the flood?

6 I mean, how many -- how many personnel would you
7 have, you know, walking the edges of this large
8 reservoir looking for fish that may be on the edges?
9 I'm just wondering in terms of number of people.

10 A. MS. AUCOIN: Again, Mr. Chairman, this depends
11 on the size of the flood, the magnitude of the flood,
12 and the amount of volume of water that's getting
13 diverted.

14 The amount of water that is diverted into the
15 reservoir will dictate how many crew members are
16 required for the event.

17 Q. If it was a design flood, do you know how many crew
18 members would be required?

19 A. MS. AUCOIN: Just one moment, Mr. Chair.

20 Thank you, Mr. Chair and Mr. Secord. I was just
21 double-checking something with my colleagues.

22 We haven't provided a cost of the electrofishing
23 programs or I guess -- sorry, my apologies -- the fish
24 rescue programs. But in our draft plan, we included a
25 potential staff count on a design flood, and that was

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1 **approximately 30 people that would be required.**

2 Q. That would include the overseeing biologist?

3 A. **MS. AUCOIN: Correct.**

4 Q. So 30 people plus. What would be the going rate of the
5 biologist overseeing the project on a daily basis?

6 A. **MR. WOOD: Mr. Chairman, I believe the rates
7 of the biologist would be subject to the economics at
8 the time. These things do vary quite a bit.**

9 Q. And then am I correct, there is no budget for fish
10 rescue in Exhibit 159?

11 MR. FITCH: Mr. Chair, it's Gavin Fitch. I
12 think the witnesses have already explained that there's
13 no budget or no cost, because of course it will depend
14 on how large the flood event is. Presumably a large
15 flood will cost more, in terms of fish rescue, and a
16 smaller flood will cost less.

17 So I think the answer is there is no budget
18 because it's too -- it's premature.

19 MR. SECORD: Thank you, Mr. Fitch. And
20 Mr. Chair, I believe those are all of my questions, but
21 could I just have one minute to just check with my
22 clients; is that agreeable?

23 THE CHAIR: Yeah, go ahead, yeah, yes.

24 MR. SECORD: Thank you. Thank you very much,
25 Mr. Chair, so just one last follow-up question.

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Secord

1 Q. MR. SECORD: In Exhibit 159, PDF page 231,
2 Table 49, we don't need to turn this up, AT have
3 included estimated flood maintenance costs in their
4 budget.

5 And so my question is given that -- can you
6 explain, if you have included estimated flood
7 maintenance costs in the budget, including debris
8 clean-up, why haven't you also included costs of fish
9 rescue?

10 A. MR. HEBERT: One moment, Mr. Chair.
11 Mr. Chairman, I believe the costs that Mr. Secord has
12 referred to relate to the operation of the -- or sorry,
13 the maintenance of the physical infrastructure.

14 The fish rescue plan would be part of the
15 operational costs of the project, which would be under
16 the responsibility of AEP as -- as the operator. And
17 as we've referenced this morning, the operational costs
18 will be established at a point of operation. And then
19 particular costs that would relate to something like a
20 fish rescue plan would be -- would be set and would be
21 established in response to the actual extent or size of
22 the operation that will be required at time of flood
23 event.

24 MR. SECORD: Thank you, thank you, Mr. Hebert.
25 Thank you, Mr. Chair, and if you deem it appropriate,

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Williams

1 I'm sorry I've gone a bit over, but by all means
2 subtract from the next session. Thank you.

3 THE CHAIR: Thank you, Mr. Secord. I believe
4 that -- and thank you, panel, for that.

5 Mr. Williams with Calalta I believe may have a
6 couple questions on cross. Mr. Williams, are you
7 online?

8 MR. WILLIAMS: Yes, I am. Can you hear me?

9 THE CHAIR: Yes, we can, we'll just give
10 Mr. Wiebe you one second to get you up on the screen.
11 There we are. Perfect, just try that again for your
12 volume.

13 MR. WILLIAMS: Yeah, it's Bob. I can turn my
14 volume up I think.

15 THE CHAIR: That's pretty good, thank you.

16 **MR. WILLIAMS CROSS-EXAMINES THE PANEL:**

17 Q. I have a couple questions for fish, with regards to
18 fish, believe it or not.

19 For those that don't know, Calalta, Calaway Park
20 has a live trout pond, which we're the only one who
21 believed in the amusement park industry which people
22 can catch fish. And we had a situation off the
23 Elbow River that I'd like to talk -- ask a few
24 questions to whoever's appropriate, with a fish
25 biologist. Is there somebody?

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Williams

1 **A. MS. AUCOIN:** Yeah, that is Lacey AuCoin here.
2 I can -- I can take the first stab at your questions.

3 **Q.** Sure, okay, thank you.

4 When -- post the flood of 2013, was there -- was
5 any research completed on the impact to the fish
6 population, to fish disease or anything that -- that
7 happened subsequent of the 2013 flood on the Elbow or
8 the Bow?

9 **A. MS. AUCOIN:** Just one moment, please.

10 Hi, thank you, Mr. Chair and Mr. Williams. This
11 is Lacey AuCoin again.

12 In the process of our environmental assessment, it
13 does not appear from all of our research that there are
14 any published studies on the effects to fish as a
15 result of the 2013 flood.

16 However, there is some anecdotal information on
17 what happened to fish in -- in the 2013 flood. And a
18 good -- a good example of this is actually in the AEP
19 fisheries management letter that was filed to the NRCB.
20 It was attached to the EIA completeness letter.

21 Mr. Paul Christensen states in this letter that
22 following the 2013 flood, a lot of fish, I don't think
23 he specifies whether it's the Elbow or the Bow, but he
24 states that a lot of fish were trapped in isolated
25 pools or I think -- I think he's even implying maybe

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Williams

1 even dugouts.

2 But in the process of the flood, a lot of fish got
3 trapped in all these urban areas and required rescue
4 following the flood.

5 And I believe the Calgary group that provided
6 evidence in the first couple of days also had a couple
7 of slides that indicated that some fish were trapped in
8 basements and stuff like that.

9 Q. And was there any evidence or any research done on the
10 sediment impact of a flood and the correlation or the
11 impact it has on fish?

12 So the sediment gets stirred up in a flood;
13 correct? And so my question I'm asking is -- and this
14 is a reach -- and let me lead to you why I'm asking
15 this question.

16 Are you aware of post-2013 flood, and it was a
17 three- to four-year period afterwards, but the Elbow
18 had whirling disease?

19 A. MS. AUCOIN: Yes, correct.

20 Q. And are you aware that -- like, the impact on us was
21 that our fish pond license was held back then for a
22 two-year period from Alberta Environment until we could
23 prove our pond did not have whirling.

24 Now, we're six kilometres inland, but the -- the
25 impact on us was that we needed a biologist from

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Williams

1 Alberta Environment to take samples from our pond
2 because the water came from the Elbow River, and
3 therefore, we could have whirling in -- in our pond.

4 And so I guess my question was is there any
5 correlation to whirling disease and possibly the
6 stirring up of sediment or sediment impact from a
7 flood?

8 A. MS. AUCOIN: Thanks, Mr. Williams. That's a
9 great question.

10 With respect to -- I'm going to answer -- I'm
11 going to partially answer your question. With respect
12 to the effects of TSS on fish, there are a lot of
13 studies that show the effects of sediment on fish, but
14 there were no published studies on how TSS affected
15 fish following the 2013 flood.

16 We do have some material in our -- in our filed
17 documents that demonstrate what happens -- or what the
18 possible effects of TSS are on fish, but there were no
19 published studies related to 2013.

20 And subject to check, I don't think -- just one
21 moment. I'm not aware of any link between the
22 concentration of sediment and its relationship to
23 whirling disease. I don't know if there's necessarily
24 been a link that's been demonstrated.

25 Q. And what is the cause of whirling disease?

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Cross-examined by Mr. Williams

1 A. MS. AUCOIN: Whirling disease is a parasite
2 that's found in the watershed. So if you go to the
3 province of Alberta website, there is -- there is a
4 whole page dedicated to information on whirling
5 disease, and it shows which watersheds have the
6 parasite and which ones don't.

7 It's a really hardy parasite. It can -- it can
8 survive in dry conditions for up to 24 hours. So what
9 happens is it's easily spread through, like, your
10 weighting boots or your fishing equipment, and it's
11 also spread by boats. So similar to how like zebra
12 mussels can be spread. It's the same idea where it's
13 such a hardy little -- hardy little parasite that it
14 can carry from watershed to watershed usually by --
15 usually by fishing.

16 Q. Okay, that's good to know, and that answers my -- I
17 just was wondering if there was any correlation between
18 flood or sediment, the stirring of sediment and
19 whirling disease itself. And so -- because we don't
20 want to have that post-flood impact us again, not
21 saying it was the flood that caused that, but...

22 A. MS. AUCOIN: Yeah, no, it's a great question.

23 Q. Yeah, okay. No, that's -- would be all my questions,
24 thank you.

25 A. MS. AUCOIN: Thank you, Mr. Williams.

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Ms. Vance

1 MR. WILLIAMS: Thank you, Mr. Chair and
2 Ms. AuCoin.

3 THE CHAIR: Thank you, Mr. Williams.
4 Mr. Wagner, did you have questions for the panel?

5 MR. WAGNER: Is Mr. Wagner online? He had
6 indicated that he had short cross.

7 MS. FRIEND: Peter, this is Laura, and he did
8 send me an email saying he -- yesterday or Monday
9 saying he would have none for this section.

10 THE CHAIR: Okay. Thank you, Ms. Friend.

11 So Board staff and Panel members. Ms. Vance, do
12 you have questions for Transportation panel.

13 MS. VANCE: Thank you, Mr. Chair. I just have
14 a couple. Maybe I'll start with the fish because
15 that's where we are currently.

16 **MS. VANCE QUESTIONS THE PANEL:**

17 Q. So my question relates to the summer of 2020 fieldwork
18 for the fish survey. And I wonder if document manager
19 could bring up Exhibit 157, page -- PDF page 23. Maybe
20 just a little larger if you could, please. Perfect,
21 and then just down to below the 1.4.

22 So on the bottom of page 23 and to the top of 24,
23 it -- this discussion talks about baseline, including
24 summer of 2020 and talks about bull trout occurrences,
25 and it seems that there were very few captured. And,

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Ms. Vance

1 this is a roundabout way of asking.

2 I understand that this work was done -- the
3 capture, at least, of the bull trout was done in August
4 of 2020, and I'm wondering why August?

5 A. MS. AUCOIN: Yes, Mr. Chair, this is
6 Lacey AuCoin speaking again.

7 The survey was timed to align with the opening in
8 the restricted activity periods of the Elbow River. So
9 as with most large watercourses in Alberta, restricted
10 activity periods are scheduled times when it's expected
11 that disturbance in the river is low. Like,
12 electrofishing would not occur within a restricted
13 activity period unless there's a really good reason to
14 do so.

15 It's -- it overlaps with sensitive times for
16 certain fish species, and the restricted activity
17 period of the Elbow is quite long. It kicks in on
18 September 16th, I believe, and it extends until April.
19 And then there's a small opening in April, and then the
20 restricted window kicks in again, May up until
21 July 15th I think.

22 So there's -- for the majority of the year,
23 activity in the Elbow, including electrofishing, would
24 be limited. This is to respect the fall spawning
25 species and the spring spawning species and the

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Ms. Vance

1 overwintering period of eggs. So it really leaves a
2 very low window of when you can get in. And
3 electrofishing in April isn't desirable because,
4 oftentimes, the river is still covered with ice, or
5 even the low temperatures can make electrofishing
6 fairly inefficient.

7 And then in the summer window, water levels in the
8 Elbow River are still really high in mid-July, so you
9 want to wait until the water levels are a little lower
10 and a little safer to access by foot.

11 Q. Okay, that helps me.

12 I guess my other question relates to hydrogeology.
13 And for this one, actually it's still -- document
14 manager, it's still 157, so actually we can stay there,
15 PDF page 13. Maybe just make it a little smaller. Is
16 this -- yes. And it is the drawing on the right that I
17 am most interested in, but we can leave the page as is
18 for now. Thank you.

19 So I understand that -- actually, if you could
20 just scroll down just a tad 'cause I want to see the
21 titles of these. Thank you, that's perfect.

22 So I understand that the drawing on the right
23 shows -- well, they both show changes in head for --
24 based on increased hydraulic conductivity.

25 So during dry operations, did Alberta

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Ms. Vance

1 Transportation quantify -- so this is talking about
2 groundwater quantity as opposed to quality. Did
3 Alberta Transportation quantify the drawdown and the
4 percent change available head at each of the domestic
5 water wells that are shown on this figure?

6 **A. MR. YOSHISAKA:** **Mr. Chairman, it's Dan Yoshisaka**
7 **speaking here. I can speak to this figure.**

8 Yes, so the figure, indeed, indicates areas of
9 potential drawdown in water levels and then the
10 mechanism for that in this case is related to incision
11 of that channel into -- into the land surface. So that
12 tends to -- because the channel is free-flowing, it
13 basically sets up a seepage face through which
14 groundwater can then discharge into the channel, and
15 that effect being some reductions of groundwater
16 levels.

17 Now, it's also indicated in this figure are the
18 blue dots, and they represent well locations that fall
19 within that area of effect.

20 We have reviewed the available head figures for
21 those blue dots that are there. We can confirm that
22 for all but one of those well locations, there is
23 sufficient available head remaining in the well to
24 accommodate these -- these drawdowns.

25 The one well that is an exception is within the

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Ms. Vance

1 footprint of the PDA, and as such, you know, should
2 this project be approved and constructed, that well
3 would be decommissioned and taken out of service.

4 Q. Just as a follow-up, Mr. Yoshisaka. When you say
5 "sufficient," that doesn't really answer my question
6 about whether you quantify what that change would be.

7 Are there numbers -- can you be more specific
8 about what you mean when you say "sufficient"?

9 A. MR. YOSHISAKA: Sure. As you can see, the
10 drawdown figures are shown there. They range,
11 depending on how close you are to the channel. So
12 values close to the diversion channel are higher up to
13 about 9 metres. And as you move upwards, those
14 drawdown values decrease with increasing distance away
15 from the channel.

16 I believe that the available head numbers for
17 those wells was -- was reported as well. Generally,
18 there's -- there's more than 10 metres of available
19 head remaining.

20 So in relation to the drawdowns that are
21 anticipated, the drawdowns are less than the remaining
22 available head, aside from the one record that I
23 mentioned.

24 Q. Okay, I think that answers my question.

25 MS. VANCE: And, Mr. Chair, I don't think I

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Mr. Heaney

1 have further questions on this topic. Thank you.

2 THE CHAIR: Thank you, Ms. Vance.

3 Document manager, I think you can take that down
4 now, the exhibit, thank you.

5 Mr. -- or Dr. Heaney, do you have questions for
6 the panel?

7 MR. HEANEY: Yes, I have a fish question to
8 start, so probably for Ms. AuCoin.

9 MR. HEANEY QUESTIONS THE PANEL:

10 Q. Ms. AuCoin, you've previously alluded to Exhibit 187,
11 which is the AEP letter, so I'm assuming you're
12 familiar with it from Paul Christensen.

13 A. MS. AUCOIN: Yes, I am.

14 Q. So would you agree that the substance of his letter is
15 that the 2020 fish survey methodology did not
16 adequately account for adult fish?

17 A. MS. AUCOIN: Mr. Chairman, there's a number of
18 items in this letter that -- sorry, there's a number of
19 items that are identified in this letter, and for the
20 most part, the claims around the fieldwork -- the
21 fieldwork was -- the fieldwork was done in the most
22 appropriate manner at the time of -- at the time of the
23 field survey.

24 Field conditions of the Elbow River dictated that
25 backpack electrofishers were the most appropriate

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Mr. Heaney

1 equipment at the time for safety reasons.

2 So I'm not sure if that answers your question.

3 Q. Well, I guess my subsequent question would be did your
4 choice of methodology in the -- in order to keep
5 your -- keep your people safe end up that you did not
6 recover adult fish, as outlined by Mr. Christensen?

7 A. MS. AUCOIN: So the fish population survey
8 required the use of backpack electrofishers, and we
9 acknowledged that this can introduce some sampling
10 bias. We've acknowledged the potential sampling bias
11 in our population report which was attached to I'll
12 get -- I'll get the exhibit number in a second.

13 So we've outlined the uncertainties in our
14 population estimate. The driver -- or I guess the
15 objective of the fish population survey was to obtain
16 reasonable insight into the abundance and distribution
17 of fish species such that we could estimate potential
18 fish loss as a result of construction or operation of
19 the project.

20 So there -- there is potential that there is some
21 sampling bias in our results.

22 I would argue that any type of fishing equipment
23 could introduce some sampling bias, and this isn't
24 exclusive to the use of backpack electrofishers. So --

25 But for the most part, Mr. Chair, the population

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Mr. Ceroici

1 estimates that have been derived from our survey
2 provide a reasonable insight into the Elbow River fish
3 community for the purposes of predicting effects.

4 Q. Thank you, Mr. Chair. That's my questions.

5 THE CHAIR: Mr. Ceroici?

6 MR. CEROICI: Yes, maybe I'll start with a fish
7 question as well.

8 THE CHAIR: You're just a little soft,
9 Mr. Ceroici. Just speak up a bit. We can hear you,
10 but it's a little soft.

11 MR. CEROICI: Okay, is that better?

12 THE CHAIR: That's a little better. Thank
13 you.

14 **MR. CEROICI QUESTIONS THE PANEL:**

15 Q. So I have a question about the low-level outlet. After
16 a flood -- you know, I understand that the majority --
17 as stated, the majority of fish will be migrating
18 through the outlet down the Unnamed Creek to the Elbow,
19 but would this lead to a concentration of fish at the
20 confluence of the outlet creek and the Elbow, and if
21 so, what action will be taken to prevent any
22 harvesting -- illegal harvesting of those fish?

23 A. MS. AUCOIN: Just one moment, Mr. Chair. Thank
24 you for your patience, Mr. Chair.

25 So I can answer this question. When the water

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Mr. Ceroici

1 levels recede from the reservoir and are being
2 discharged through the low-level outlet back to the
3 Elbow River, you're correct in that fish will be making
4 their way down back to the confluence of the
5 Elbow River.

6 At this time, it's expected that the water levels
7 in the Elbow River are still relatively high such that
8 if fish are making their way down the creek back to the
9 Elbow, it's not -- it's not expected that they would be
10 in a position where they become very easy to capture
11 because they have -- they have the opportunity to find
12 refuge upon entering the Elbow River. They're -- the
13 water levels are still relatively high.

14 Q. Yeah. I was speaking more in the Unnamed Creek just
15 before it reaches the Elbow, because I imagine it would
16 be a lot -- much more narrow than the Elbow at that
17 point.

18 Okay. My next question is on hydrogeology. Just
19 a question -- AT, yesterday, was mentioning that they
20 found no evidence of fracturing in the clay units, the
21 lacustrine and the till units. And I heard no
22 fracturing or no fracturing except in the upper
23 two metres. And I was just wondering, what is that
24 based on? Is it based on -- 'cause I imagine there was
25 some auger rig used which generates disturbed cuttings

ALBERTA TRANSPORTATION TOPIC #4 PANEL

Questioned by Mr. Ceroici

1 which will be difficult to identify fractures.

2 So was there any coring done to visually look at
3 the presence of fracturing or not?

4 A. MR. YOSHISAKA: This is -- sorry, Mr. Back, you
5 can start.

6 A. MR. BACK: This is Dan Back, the geotechnical
7 engineer.

8 Yes, you're correct. Most of the boreholes were
9 advanced with an auger rig. There's a sonic rig used
10 for a few.

11 We didn't do any undisturbed coring of the soil
12 per se, but what we did do was undisturbed sampling,
13 and we did standard penetration tests or SPT sampling
14 that gives us a very good view of the soil in a
15 relatively undisturbed state.

16 So while it's true that we could have done a more
17 extensive -- and looking only for fractures, we were
18 trying to, you know, capture a wide variety of
19 information from the sampling. And so I think if there
20 had been fractures that had passed through the soil
21 while we were drilling, we would have seen it.

22 In addition to that, there were a number of test
23 pits that were open. Those were largely concentrated
24 in Unnamed Creek because the geology was a little bit
25 more difficult to follow there. But there were several

1 that were opened in the upland areas under the
2 footprint of the dam. And those, in the process,
3 exposed a very large area of the soil for visual
4 observation.

5 Q. Okay, thank you.

6 MR. CEROICI: And that's all my questions,
7 Mr. Chair.

8 THE CHAIR: Thank you, Mr. Ceroici.
9 Ms. Roberts?

10 MS. ROBERTS: I have no more questions. Thank
11 you.

12 THE CHAIR: Well, thank you. And I have no
13 further questions for the panel. So with that, I'd
14 like to thank you.

15 (PANEL STANDS DOWN)

16 Mr. Barbero, Mr. Fitch, does Alberta Transportation have
17 any redirect on direct -- or, sorry, on your evidence?

18 MR. BARBERO: Mr. Chair, it's Michael Barbero.
19 Alberta Transportation has no redirect, sir.

20 THE CHAIR: Okay. So given that we're right
21 close to 12 o'clock, I think it's appropriate time for
22 a break.

23 Ms. Senek, are you ready to go after lunch for
24 your City of Calgary direct?

25 MS. SENEK: Yes, sir, we'll be ready to go

1 right after lunch.

2 THE CHAIR: Okay, so one o'clock return for
3 City of Calgary direct. Thank you.

4 (PROCEEDINGS ADJOURNED AT 11:52 A.M.)

5 _____

6 PROCEEDINGS ADJOURNED TO 1:00 P.M.

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1 Volume 7
2 March 30, 2021
3 P.M. Session

4
5 (PROCEEDINGS COMMENCED AT 1:00 P.M.)

6 THE CHAIR: I think we've got everyone here.

7 Mr. Kruhlak, Ms. Senek, are you both online?

8 MS. SENEK: Yes, this is Ms. Senek. I'm here.

9 MR. KRUHLAK: It's Ron Kruhlak, sir. I'm here.

10 THE CHAIR: Okay. Thank you.

11 I think just before we start, Ms. Senek, with the
12 City of Calgary direct, I'd like to address, if you're
13 ready, if you have a response in terms of the questions
14 that the Panel posed this morning and then I'll give an
15 opportunity for other parties to weigh in if you have
16 any other submissions or comments to make, and then we
17 could move on to the direct by Calgary, but then the
18 Board would be in a position, or the Panel, to make a
19 decision and let parties know tomorrow.

20 So Mr. Kruhlak?

21 MR. KRUHLAK: Sure, sir. So I'm responding to
22 the questions that we received in written form from
23 Mr. Kennedy this morning. And the first question was
24 whether Alberta Transportation can confirm that the
25 benefits measured through damage avoidance for SR1 are

1 completely attributable to the operation of SR1.

2 And, Mr. Chairman, Alberta Transportation can
3 confirm that the benefits, which are the damages
4 averted, were completely attributable to the operation
5 of SR1.

6 The results were constrained to benefits within
7 Calgary between the Glenmore Reservoir and the
8 Bow River with no influence from operations such as
9 those that might be referred to between TransAlta and
10 Alberta Environment and Parks.

11 The second question that the Panel posed was
12 whether it's correct in its understanding that Alberta
13 Transportation indicates it has no knowledge and has
14 not considered the TransAlta government of Alberta
15 operating agreement in preparation of the EIA,
16 including cost benefit analysis.

17 And I would say there that -- I think Mr. Hebert
18 did mention briefly yesterday that there's some general
19 awareness of the existence of the agreement, but that
20 the costs and benefits were calculated completely
21 independent of any operating parameters that might be
22 considered for the TransAlta/government of Alberta
23 operations.

24 There were two further sub questions about,
25 regardless of the operating parameters for the

1 Ghost Reservoir, is it Alberta Transportation's
2 position that the costs and benefits of SR1 are
3 calculated -- as calculated are completely independent
4 of those operating parameters.

5 And Alberta Transportation, sir, would confirm
6 that they are; that is, the costs and benefits are
7 completely independent of those operating parameters.

8 And finally, there was -- the enquiry of the Panel
9 was, if there could be impacts on the EIA from the
10 Ghost Reservoir, are these impacts expected to be
11 significant.

12 And, again, Alberta Transportation would simply
13 reaffirm that there are no impacts from any of the
14 Bow River concepts that would have any impact on the
15 EIA for Springbank or SR1.

16 THE CHAIR: Thank you, Mr. Kruhlak.

17 Ms. Senek, would City of Calgary have anything
18 further?

19 MS. SENEK: Thank you, Mr. Chair. In response
20 to the first question as to whether the City of Calgary
21 can confirm that benefits measured through damage
22 avoidance for SR1 are completely attributable to SR1,
23 the City can confirm that. The presented benefit of
24 SR1 in the City of Calgary cost benefit analysis is
25 completely attributable to SR1.

1 THE CHAIR: Thank you.

2 Mr. Rae or Ms. Louden, did you have anything
3 further to add in terms of the motion that you asked
4 the Board to undertake?

5 MR. RAE: It's Mr. Rae, sir.

6 THE CHAIR: Good afternoon.

7 MR. RAE: No, Mr. Chair, I don't think we
8 have anything to add. And I might mention, I
9 appreciate the Board putting those questions to the
10 participants. Thank you very much.

11 THE CHAIR: Thank you, Mr. Rae.

12 MR. KENNEDY: Can I just perhaps -- it's
13 Bill Kennedy -- jump in?

14 Mr. Rae, do you still want the motion considered
15 by the Board, having now heard the response from
16 Alberta Transportation and the City of Calgary?

17 MR. RAE: If I might, Mr. Chair. There's no
18 need for the question that I posed, given the responses
19 of both Alberta and the City of Calgary.

20 As I hear it, both of them are saying that the
21 management of the Ghost Reservoir pursuant to the 2016
22 agreement bears no relationship to the SR1 project and
23 flood control in the City of Calgary. Begs the
24 question, of course, what then is the purpose of the
25 2016 agreement?

CITY OF CALGARY TOPIC #4 WITNESS

Examined by Ms. Senek

1 But, Mr. Chair, I readily acknowledge that is
2 beyond the purview of the terms of reference of the
3 Board at this point in time.

4 THE CHAIR: Thank you, Mr. Rae. Thanks,
5 Mr. Kennedy. Great question.

6 So the Board will not need to make any further
7 rulings on the motion.

8 Any parties objecting?

9 Hearing none. The matter is settled then. Thank
10 you very much.

11 Ms. Senek, City of Calgary direct evidence, you're
12 up.

13

14 F. FRIGO (For City of Calgary), previously sworn

15 MS. SENEK EXAMINES THE WITNESS:

16 Q. My mute button keeps disappearing. Thank you.

17 Mr. Frigo, I see you're there. Can I ask you to
18 confirm, please, that you're still under oath?

19 A. **Confirmed.**

20 Q. Thank you. And I understand you have a presentation
21 again prepared for Topic 4 and it is Exhibit 351. And
22 I think it's starting on Slide 20; is that correct?

23 A. **That is correct.**

24 Q. Perfect.

25 Document manager, if you could please load that

CITY OF CALGARY TOPIC #4 WITNESS

Examined by Ms. Senek

1 PowerPoint presentation. Perfect.

2 Okay, Mr. Frigo, please go ahead.

3 A. Thank you, document manager. Can we advance to the
4 next slide, please? Thank you.

5 Mr. Chairman, as noted throughout proceedings,
6 SR1's off-stream design means that it will have minimal
7 impact on the Elbow Basin's fluvial system other than
8 during the intermittent and relatively brief proportion
9 of time during and immediately following major flood
10 events.

11 As such, pre-project relationships between
12 catchment run-off, alluvial aquifer dynamics, in-stream
13 morphology, and water quality will largely persist.

14 When SR1 is filled, the City understands that
15 changes to groundwater levels in the reservoir area
16 will be limited due to the low permeability of the soil
17 strata in the reservoir area.

18 Evaporative loss from the area is also limited due
19 to the relatively brief period that the reservoir will
20 hold water following floods.

21 Since the wettable footprint of the reservoir is
22 expected to have passive, open-space land uses when not
23 in flood storage mode, the City does not anticipate
24 that mechanisms which could negatively impact source
25 water, quality or quantity in the Elbow River are

CITY OF CALGARY TOPIC #4 WITNESS

Examined by Ms. Senek

1 likely.

2 Further, as noted with regard to representations
3 offered during Topic 3, the City expects that it will,
4 in addition to continuing with its own water quality
5 and water quantity monitoring, assessment and
6 management programs, be invited to participate within
7 information sharing, seasonal and event planning, and
8 operations coordination committees.

9 As discussed during Topic 3, the City sees
10 information sharing as a critical aspect of informed
11 water resources stewardship, but has no expectation
12 that this would be unduly challenging to sustain with
13 SR1's operators.

14 Next slide, please, document manager.

15 Throughout proceedings, Mr. Chairman, the question
16 of long-term water supply has been addressed in a few
17 instances. The City supplies potable water to almost
18 25 percent of Alberta's population, including to
19 Calgary and a number of regional partners.

20 As is perhaps evident, not only from Exhibit 345,
21 the "One Water" document that's been referred to, but
22 from other initiatives like our "30-in-30" water
23 efficiency target, our YardSmart, universal metering
24 and toilet rebate programs, the City takes long-term
25 water sustainability for Calgary, the region, and the

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Examined by Ms. Senek

1 Bow and Elbow River water basins very seriously.

2 Calgary presently is delivering a multi-hundred
3 million dollar series of investments to wastewater
4 treatment facilities to continue to ensure that the
5 water that is returned to the basin, which averages
6 over 85 percent of that withdrawn is of the high
7 quality that is necessary to support irrigation,
8 environmental and other water management objectives
9 downstream.

10 As is evident from Exhibit 345, the one water
11 document, the City maintains and continually refines
12 long-term water treatment and supply infrastructure
13 plans as well looking 50 to 70 years into the future in
14 order to manage the appreciable infrastructure,
15 technology, financial, and environmental elements
16 related to supply.

17 The City also recognizes that the surface waters
18 of the Bow and the Elbow River are susceptible to
19 various risks that include quantity and quality
20 aspects, whether from natural or anthropogenic causes.
21 It, therefore, has built a water supply system using
22 two major water treatment plants on separate catchments
23 and incorporates an internal storage and distribution
24 network that can, at least intermittently and for given
25 durations, continue to supply water with major

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1 components disabled or with interruptions in source
2 quantity or quality that prevent use of either source
3 basin for some time.

4 That being said, the City recognizes that further
5 water supply security for the basin would be
6 ameliorated at least partly by the development of
7 incremental water storage capability.

8 As discussed during Topic 3, the City of Calgary,
9 within its long-term plans, identifies the Bow River as
10 the more efficient and responsible choice for such
11 consideration, largely due to some of the very same
12 physiographic, hydrologic, and meteorologic
13 characteristics that give the Bow and the Elbow their
14 respective flood generation dynamics.

15 To put it simply, the Bow River catchment is about
16 six times larger than the Elbow, contains a much higher
17 percentage of high elevation alpine terrain, which not
18 only receives greater annual precipitation, but retains
19 more permanent snowfield and glacier.

20 The Bow also has a greater net volume of
21 controlled storage distributed throughout the basin at
22 existing hydro power storage reservoirs like the
23 Kananaskis, Barrier, Spray, Cascade, Ghost, and
24 Bearspaw Reservoirs. Accordingly, long-term
25 infrastructure, licensing, and distribution system

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Examined by Ms. Senek

1 design choices recognize the Bow River as the more
2 appropriate focal point for evolving water supply needs
3 as water reuse, water efficiency, population and even
4 climate change dynamics unfold.

5 Next slide, please, document manager.

6 Perhaps, again, I can stress that SR1 offers a
7 modest source water benefit in that it may allow some
8 refinement of Glenmore's operation to store water that
9 would otherwise be passed downstream to optimize flood
10 attenuation potential seasonally or ahead of a
11 forecasted, but not materialized, flood event.

12 I'll also add that incremental storage on the
13 Bow River is not needed to make SR1 beneficial in terms
14 of flood mitigation, though perhaps, that's somewhat
15 extraneous to the topic of -- focus area of Topic 4.

16 Again, the City's baseline cost-benefit scenarios
17 used to understand the flood benefits of SR1 did not
18 assume that incremental storage on the Bow exists, and
19 we carefully, if not conservatively, isolated the
20 benefits of SR1.

21 Still, due to both regional water supply and flood
22 mitigation potential merits, the City does support the
23 government of Alberta's investigation of Bow River
24 reservoir options.

25 Next and final slide, please, document manager.

CITY OF CALGARY TOPIC #4 WITNESS

Examined by Ms. Senek

1 Focusing now on post-flood releases, Mr. Chairman,
2 the City reiterates it expects water quality changes in
3 the Elbow to be intermittent, of short duration, and
4 reversible.

5 Some of the key aspects of the City's review have
6 been around water temperature and nutrient dynamics.
7 The degree of mixing with the Elbow River flows will be
8 significant since floods large enough to trigger the
9 use of SR1 will almost invariably be followed by
10 extended baseflow recession periods, a shallow
11 groundwater returns to the river, and normal seasonal
12 rainfall in July and August generate additional natural
13 run-off.

14 Again, it is noted that the City has attempted to
15 develop a resilient water supply system such that
16 reduction or even periods of curtailment of treatment
17 could be sustained at Glenmore, along with intentional
18 operation of Glenmore Reservoir itself.

19 Though we don't anticipate we'd need to,
20 Mr. Chairman, the City, if engaged in communicating
21 with SR1's operators and other water stakeholders in
22 the basin, could lower or raise Glenmore's level in
23 response to unexpected water quality and water quality
24 conditions.

25 So if a water quality incident did occur, water

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Examined by Ms. Senek

1 supply operations could likely be adapted to either
2 pass, dilute, or sequester water either at SR1 or at
3 Glenmore. This is one illustration of the flexibility
4 inherent in the infrastructure and the value inherent
5 in a coordinated, collaborative data and operational
6 information-sharing framework that the City expects to
7 participate in with the project's operators.

8 The City considers that the glacial valley being
9 assessed as SR1's reservoir footprint presents a
10 geographic and hydrologic opportunity. Nature has left
11 a glacial valley close to a flood-vulnerable major
12 population centre at the right elevations to permit
13 diversion of the Elbow River by gravity flow, a valley
14 that also happens to be underlain by low permeability
15 soils that make for favourable reservoir, hydrogeology,
16 and water quality conditions.

17 In summary, the City has conducted reviews of SR1
18 and its potential range of effects on hydrology and
19 water quality of the Elbow River and does not
20 anticipate significant or enduring negative impacts.

21 This concludes the City's direct evidence for
22 Topic 4.

23 MS. SENEK: Thank you, Mr. Frigo.

24 THE CHAIR: Thank you, Mr. Frigo.

25 Is that your full direct, then?

CITY OF CALGARY TOPIC #4 WITNESS

Cross-examined by Mr. Rae

1 MS. SENEK: Yes. That would be all for the
2 City's direct, thank you.

3 THE CHAIR: All right. So thank you very
4 much.

5 Calgary River Communities Action Group,
6 Mr. Cusano, do you have any cross?

7 MR. CUSANO: No, thank you, sir.

8 THE CHAIR: And Mr. Kruhlak, Alberta
9 Transportation?

10 MR. BARBERO: Mr. Chair, it's Michael Barbero,
11 sir. No cross here, sir.

12 THE CHAIR: Thank you. And Mr. Rae of
13 Stoney Nakoda.

14 MR. RAE: Yes, sir, if I might, a couple of
15 questions.

16 **MR. RAE CROSS-EXAMINES THE WITNESS:**

17 Q. Mr. Frigo, I find it ironic that no sooner does the
18 City of Calgary respond to the questions posed by the
19 Chairman this morning in regard to the Bow River and
20 water supplies to the Bow River, no sooner do you say
21 that it's not relevant to SR1, and then you proceed to
22 make a statement on what sort of water supplies the
23 City support of upstream Bow River water storage and
24 how that relates to water quality issues.

25 Can you help me by reconciling the evidence you

CITY OF CALGARY TOPIC #4 WITNESS

Cross-examined by Mr. Rae

1 keep giving in regard to the Bow River, and while at
2 the same time, the City states that what happens on the
3 Bow River is not relevant to the SR1 project or the
4 projected benefits from it?

5 **A. Yes, good afternoon, Mr. Rae.**

6 My understanding throughout the proceedings was
7 that there were a number of questions around water
8 supply potential along the Elbow River.

9 To assist the Board, it was the intention of the
10 City to make it very clear that its water supply and
11 treatment operations consider the Bow the more
12 appropriate source for a number of reasons just
13 outlined, and that is fundamentally the reason this was
14 included as a component for consideration by the Board.

15 **Q.** Is it fair to say that the City is adducing the
16 evidence in regard to Bow River water supplies and
17 water quality simply to show in the City's mind or the
18 City's view that the merits of the SR1 project are not
19 related to that evidence on water supplies and water
20 quality?

21 **A.** As I stated in the preceding response, Mr. Rae, I would
22 say that, again, in the sense of total water benefit,
23 which has been a component of the discussion throughout
24 the proceedings, we're aiming to make it very clear
25 that long-term development of water supply would be

CITY OF CALGARY TOPIC #4 WITNESS

Cross-examined by Mr. Rae

1 appropriate from the City's perspective to occur from
2 the Bow River Basin.

3 MR. RAE: Mr. Chairman, I have no further
4 questions.

5 THE CHAIR: Thank you, Mr. Rae.

6 Mr. Secord, I don't believe you had entered, if I
7 have that right, or requested time for cross of
8 Calgary. Do I have right?

9 MR. SECORD: You are right, sir. And if you
10 ask me, I would say I have no cross-examination in any
11 event. Thank you.

12 THE CHAIR: Thank you.

13 Mr. Williams?

14 MR. WILLIAMS: Yeah, we have no questions for
15 cross.

16 THE CHAIR: And Mr. Wagner?

17 MR. WAGNER: No questions for cross.

18 THE CHAIR: Thank you.

19 Mr. Kennedy?

20 MR. KENNEDY: Mr. Chair, thank you. I have no
21 questions.

22 THE CHAIR: Ms. Vance?

23 MS. VANCE: I have no questions, sir, thank
24 you.

25 THE CHAIR: And Mr. Ceroici?

CITY OF CALGARY TOPIC #4 WITNESS

Questioned by Mr. Heaney

1 MR. CEROICI: I have no questions, thank you.

2 THE CHAIR: Ms. Roberts?

3 MS. ROBERTS: I have no questions, thank you.

4 THE CHAIR: Dr. Heaney?

5 MR. HEANEY: I just would like Mr. Frigo to

6 clarify.

7 **MR. HEANEY QUESTIONS THE WITNESS:**

8 Q. In his direct, he said sequester water at SR1 in
9 relation to water quality incidents. If he could just
10 clarify what he meant by "sequester" at SR1?

11 A. So through the Chair, what I was referring to was that
12 we recognize, and certainly City of Calgary have dealt
13 with, a number of water quality elements in the past,
14 incidents that have occurred.

15 A couple of years ago, there was a forest fire
16 over part of the Ghost River basin and fire suppression
17 materials that could impact water quality. There was
18 some potential for that to travel downstream.

19 So recognizing that SR1 would be in similar place
20 in an upstream part of the basin, there would be the
21 possibility to potentially retain water if the water
22 could have negative environmental or water supply
23 impacts.

24 Again, this would be for an unforeseen type of
25 condition beyond normal operations, but that was

CITY OF CALGARY TOPIC #4 WITNESS

Questioned by Mr. Heaney

1 exactly what I was referring to.

2 Similarly, the same kind of thing could be done in
3 the Glenmore Reservoir. So, for instance, if there
4 were issues with water temperature, by having that
5 water mix with the Glenmore Reservoir, we could have
6 flows passing downstream that could be a better
7 temperature for better environmental outcomes.

8 Those are a couple of examples of the type of
9 management flexibility that the City understands to be
10 inherent, again, in the infrastructure design and
11 operations that we anticipate associated with SR1, very
12 similar to how we are operating, but in an extended way
13 to how we are operating Glenmore Reservoir, for
14 instance, presently.

15 Q. So, this would be sequestration for water quality
16 following a flood?

17 A. Potentially. Again, if during a flood event there was
18 some associated water quality incident, some form of
19 release, some form of other -- other impact that might
20 cause an unexpected impact to the water quality.

21 But by having SR1 in place, again, there would be
22 the management ability to, in a controlled manner,
23 either sustain that water, keep that water for a longer
24 period in SR1, or pass it downstream in a very
25 controlled manner, again, to -- with consideration of

1 the mixing and the dynamics that would occur not only
2 within the river but also within the Glenmore Reservoir
3 further downstream.

4 MR. HEANEY: Okay. Thank you.

5 THE CHAIR: Thank you, Mr. Frigo. And I have
6 no further questions.

7 So, Ms. Senek, did you have any redirect?

8 MS. SENEK: Thank you, Mr. Chair. We don't
9 have any redirect.

10 THE CHAIR: Okay. Thank you very much.

11 (WITNESS STANDS DOWN)

12 THE CHAIR: Mr. Cusano, I don't believe you
13 requested time for direct here. Is that still the
14 case?

15 MR. CUSANO: Yes, sir, it is, thank you.

16 THE CHAIR: Mr. Rae, Stoney Nakoda, are you
17 ready to proceed with your direct?

18 MR. RAE: Yes, we are, sir. The
19 Stoney Nakoda do have a witness panel this afternoon.
20 I hope -- Mr. Bill Snow, I hope you're available and
21 online.

22 The witness panel will consist of Mr. Snow,
23 consultation manager for the Stoney Tribal
24 Administration, and Ms. Leslie Beckmann, an
25 environmental scientist contracted by the Stoney Nakoda

1 as part of the review of the SR1 project application.
2 And the two of them constitute the Stoney Nakoda
3 witness panel for Topic 4.

4 Mr. Snow appeared last week as part of the
5 Stoney Nakoda's witness panel on Topic 2 and was
6 affirmed by way of a prayer from Stoney Nakoda elder at
7 that time.

8 And Mr. Snow has requested that Stoney Nakoda
9 elder, Mr. Henry Holloway, perform a prayer this
10 afternoon ahead of Mr. Snow's testimony on this topic.
11 And we would ask, Mr. Chair, if again that is
12 acceptable to the Board to introduce the panel this
13 way.

14 THE CHAIR: It is acceptable. Thank you,
15 Mr. Rae, and please proceed.

16 MR. RAE: Mr. Snow and Elder Holloway, I'd
17 invite you to perform the prayer.

18 MR. W. SNOW: Good day. Henry, Elder Henry, are
19 you available?

20 THE CHAIR: Perhaps wait just one minute, see
21 if Mr. Wiebe can locate Elder Henry.

22 MR. RAE: Mr. Chair and Mr. Snow, perhaps
23 while we're waiting for Elder Holloway, perhaps it
24 would be appropriate to swear or affirm Ms. Beckmann
25 while we're waiting for Elder Holloway to appear.

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 Would that be appropriate, Mr. Chair?

2 THE CHAIR: Yes, please proceed. Ms. Vespa.

3

4 W. SNOW, L. BECKMANN (For Stoney Nakoda Nations), affirmed,
5 affirmed by prayer

6 MR. RAE EXAMINES THE PANEL:

7 MR. RAE: Mr. Chair, I see that we've lost
8 Mr. Snow as well.

9 With your indulgence, we can wait a few more
10 seconds for Elder Holloway.

11 THE CHAIR: Yes. No problem.

12 A. MR. SNOW: Good day. I've just been informed
13 that Mr. Holloway is still out at lunch. So once he
14 returns, I imagine that we can get started.

15 But I would say maybe we can begin with
16 Leslie Beckmann's presentation. Would that be
17 suitable?

18 MR. RAE: Mr. Chair, if that's suitable to
19 you, we can start.

20 THE CHAIR: That's fine.

21 Was Mr. Snow going to be providing evidence? He
22 was sworn before, but he just may need to confirm that
23 he's still under oath, if we haven't done that already.
24 Or is he not providing --

25 MR. RAE: Mr. Snow, would you be prepared to

STONE Y NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 have the court reporter confirm your -- and affirm your
2 previous under oath affirmation?

3 MR. W. SNOW: Yeah, I can confirm that.

4 (DISCUSSION OFF THE RECORD)

5 Q. MR. RAE: Ms. Beckmann, good afternoon.

6 Your curriculum vitae is on the record as
7 Exhibit Number 342. Can you confirm that your CV is
8 accurate?

9 A. MS. BECKMANN: I can confirm that, yes.

10 Q. And can you confirm that you were contracted by the
11 Stoney Nakoda, by the individual Stoney Nakoda Nations
12 to complete assessments related to aquatic ecology of
13 the SR1 project?

14 A. MS. BECKMANN: Yes, I can.

15 Q. And can you provide a summary of your education and
16 experience?

17 A. MS. BECKMANN: Absolutely. And if you'll forgive
18 me, my notes are on this screen which is why I'm not
19 looking at all of you that way.

20 Mr. Chair, Panel members and participants (OTHER
21 LANGUAGE SPOKEN). Hello.

22 As you know, my name is Leslie Beckmann. I'm
23 joining you today from (OTHER LANGUAGE SPOKEN) or, in
24 English, Indian Arm, which is the eastern boundary of
25 North Vancouver in the traditional territory of the

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 Tsleil-Waututh, Squamish and Musqueam Nations. And it
2 is just past lunchtime here.

3 I have been an environmental scientist for almost
4 30 years. I completed an undergraduate degree from
5 Queen's in biology in 1988. I completed my master's
6 degree from the University of Toronto in environmental
7 studies and political science in 1991. And I'm a
8 member of the International Association of Impact
9 Assessors, or IAIA. And my focus has been on these
10 science-for-decision-making and its formalization in
11 impact assessment methods as well as their application.

12 I'm currently a senior environmental consultant at
13 PGL. I joined PGL in 2006. And over the course of the
14 past decade, my practice with PGL has been on how to
15 make the goals and techniques of IA more responsive to
16 the needs of Indigenous communities.

17 In addition to all of that, I'm a mother of a
18 21-year-old daughter who's soldiering through a
19 geosciences degree online as a result of the pandemic;
20 a mentor to STEM students and young environmental
21 professionals; a published writer with commitment to
22 excellence in science communication; and, also, the
23 owner of an exceptionally old dog who has occasionally
24 trouble with stairs and doors. So if I suddenly
25 disappear, I'm dealing with him.

STONE Y NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 Q. Thank you, Ms. Beckmann.

2 Can you explain what your role was in preparing
3 the evidence of the Stoney Nakoda Nations regarding the
4 SR1 project?

5 A. MS. BECKMANN: Absolutely.

6 COURT REPORTER: Ms. Beckmann -- Ms. Beckmann, I'm
7 just going to ask if you can slow down, please. This
8 is the court reporter.

9 A. Oh, sorry, will do. That's nerves for you.

10 So speaking to the current assignment, PGL, along
11 with our associate Derek McCoy at Boreal Water
12 Resources, was retained in early February 2021 by
13 Stoney to help them evaluate the sufficiency of the EIS
14 to address and resolve their concerns.

15 Further to Bill Snow's comments on March 25th, my
16 understanding is that Stoney was only provided with
17 capacity relatively recently. We were given two weeks
18 to review the EIS, and the assignment was scoped
19 tightly to allow the work to be completed in that
20 timeline. So that's my -- that was the assignment.

21 Q. Mr. Snow, could I turn it over to you to begin the
22 presentation of Stoney Nakoda evidence on this topic.

23 A. MR. SNOW: Good day. I still don't have
24 contact here with Elder Holloway, but I think at some
25 point, I would like to have that -- the prayer done as

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 soon as Mr. Holloway is present. And I'm -- as I
2 understand it, he's on his way, and should be -- should
3 be available soon. But I'm fine to present as well.

4 THE CHAIR: Let's proceed, then, Mr. Snow.
5 That works for the Panel. Thank you.

6 A. MR. W. SNOW: (OTHER LANGUAGE SPOKEN) day.
7 Thank you to the Board and the Chair for hearing the
8 presentation for Stoney Nakoda today presenting on
9 water-related issues for SR1.

10 Today I will be speaking about the traditional
11 understanding of water. I will also be speaking
12 briefly about traditional fish capture as well as
13 Stoney water rights and the 2016 hydrology funding
14 request for this project.

15 With regards to the traditional understanding of
16 water, for the Stoney Nakoda, water is life. To
17 illustrate the traditional understanding of water, I
18 will be presenting portions of the book, "These
19 Mountains Are Sacred Places" by Chief John Snow.

20 This material for the book was submitted as part
21 of Stoney Nakoda's evidence for this project.

22 On page 106: (as read)

23 "The sacred waters, the hot springs that
24 we use for healing and cleansing were to
25 become tourist resorts. Our sacred

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 mountains were to become ski areas and
2 parks where we no longer have the right
3 to pursue our religious practice. The
4 pipe stones that we got from the
5 mountains, and the natural earth paints
6 that we used in our religious ceremonies
7 and for other special occasions were
8 bulldozed over and concrete now covers
9 them."

10 And a further -- another quote is on page 212:
11 (as read)

12 "My people say, 'If you destroy nature
13 and the environment, you are destroying
14 yourself. But if you protect the
15 environment and safeguard the water,
16 ultimately, you are protecting
17 yourself.' Wisdom, harnessed with
18 technology, can go a long way in
19 creating a better social order, a world
20 in which all creation can survive and
21 enjoy life to the fullest."

22 The understanding of the traditional views of water are
23 non-existent in the current environmental impact
24 statement and draft environmental assessment for the
25 project.

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 The traditional Stoney names for the Elbow River
2 (verbatim), Nothna Wapta (phonetic), and that is
3 translated as Crackling River, or Winchispa Waptan
4 (phonetic) as Elbow River. These descriptions are not
5 in any of the project reports. These descriptions come
6 from the Chiniki Place Names Report that has also been
7 submitted as evidence for this project.

8 Many of the cultural stories of the Stoney Nakoda
9 Nations that are also described in the Chiniki Place
10 Names Report are not included in either of the
11 environmental impact statement nor the draft
12 environmental assessments.

13 The long-term impact of this proposed project on
14 existing water sources for humans and wildlife is
15 unknown.

16 The culturally important wildlife that graze,
17 migrate, and utilize lands within the proposed project
18 area will be impacted by this project for many years to
19 come.

20 With regards to Stoney water rights, the
21 Stoney Nakoda Nations have not surrendered nor ceded the
22 use of waters originating and flowing in Stoney Nakoda
23 traditional territory, including the bed and banks of
24 those waters since time immemorial.

25 The Stoney Nakoda have enjoyed continuous use of

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 water in the traditional lands to facilitate hunting,
2 fishing, and trapping as well as camping, gathering, and
3 other cultural and spiritual activities.

4 Since 1911, the Stoney Nakoda have been one of the
5 oldest producers of hydropower in Alberta. The water
6 rentals that have been paid by the Calgary Power
7 Company, now TransAlta, every year since 1911 are a
8 testament to the Stoney Nakoda leadership that fought
9 for our Stoney Nakoda water rights in the 20th and 21st
10 centuries.

11 Stoney water rights are embedded in the Natural
12 Transfer of Resources Agreement between Canada and the
13 province of Alberta.

14 With regards to hydrology funding in 2016, in a
15 letter to Alberta Transportation and the Canadian
16 Environmental Assessment Agency, the Stoney Nakoda
17 requested funding for a hydrological study of the
18 project area and that this funding request was denied by
19 Alberta Transportation.

20 This morning, we heard questions on the Alberta
21 Transportation fish rescue plan, and I would note to the
22 Chair and the Board that the Stoney Nakoda have
23 traditional ways of capturing fish and that these
24 traditional ways do not pose a high mortality to the
25 fish being transported or captured until the fish are

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 ready to be harvested.

2 With regards to the fish rescue plan and the fish
3 being moved, alternate methods of fish capture, like the
4 Stoney Nakoda traditional fish capture ways, have not
5 been considered in the current fish rescue plan.

6 In summary, the traditional understanding of water,
7 the traditional fish capture methods, the Stoney water
8 rights, all of those understandings are non-existent in
9 the reviews of this project.

10 The denial of the hydro funding -- the hydrology
11 funding speaks to the narrow and pre-determined nature
12 of how the project appears in its reporting. A narrow
13 and pre-determined view is not how we should be
14 proceeding for a project that may impact the landscape
15 for 100 years or more.

16 For these reasons, the NRCB should dismiss this
17 project. These are my comments for today.

18 Q. Mr. Snow and Mr. Chairman, I note that Elder Holloway
19 is now online. Would it be appropriate to have him
20 conduct a prayer?

21 A. MR. W. SNOW: Yes. Well, excuse me. Sorry.
22 Elder Henry, are you there?

23 THE CHAIR: Elder Henry is on mute.

24 A. MR. W. SNOW: There. (OTHER LANGUAGE SPOKEN.)

25 A. ELDER HOLLOWAY: (OTHER LANGUAGE SPOKEN.)

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 We were hoping that you could have done a prayer
2 today, but maybe we can do a closing prayer because I
3 just finished the presentation. But would you be
4 willing to do a prayer for us today, Elder Henry?

5 **A. ELDER HOLLOWAY:** **Sure. Hi Duck. (OTHER LANGUAGE**
6 **SPOKEN.)**

7 **MR. RAE:** Mr. Snow, are you suggesting that
8 Elder Holloway stay online and, at the conclusion of
9 your and Ms. Beckmann's evidence, that he then do his
10 prayer?

11 **A. MR. W. SNOW:** I would suggest Elder Henry do a
12 prayer now and then do a closing prayer when we
13 conclude our -- when we're at the end of our session,
14 if that's agreeable.

15 **THE CHAIR:** Please proceed. Go ahead. Thank
16 you.

17 **A. ELDER HOLLOWAY:** **(OTHER LANGUAGE SPOKEN.)**

18 **MR. RAE:** Mr. Chair, as long as its
19 appropriate with you, I'd now invite Ms. Beckmann to
20 provide her direct evidence to the Panel.

21 **THE CHAIR:** Please proceed. Thank you.

22 **Q. MR. RAE:** Leslie, you can proceed.

23 **A. MS. BECKMANN:** **Perfect. Yes, I can. I'm just**
24 **making sure my sound system is working properly.**

25 **To the court reporters, if I speed up, please let**

STONEY NAKODA NATIONS TOPIC #4 PANEL

Examined by Mr. Rae

1 me know to slow down and with everyone's forbearance,
2 thank you, Mr. Chair, Panel members. Everyone.

3 I will be speaking to the memo PGL prepared for
4 Stoney that is on reference -- I don't have the
5 reference number, but I don't believe it needs to be
6 pulled up.

7 As mentioned, the memo was a joint effort. My
8 testimony today will focus on portions of what has been
9 referred to in that memo, and also to portions of
10 Alberta Transportation's response to it provided in
11 Appendix L to the reply submission of Alberta
12 Transportation to the interveners and hearing
13 participants opposed to the Springbank Off-Stream
14 Reservoir Project dated March 12th.

15 Specifically, I'll be speaking to you about what
16 PGL and Boreal were tasked with doing, the context in
17 which our task was executed, the findings related to
18 aquatic ecology, and our advice to Stoney.

19 I will not be able to speak to matters in the memo
20 related specifically to hydrology; these portions were,
21 as I said, prepared by Derek McCoy, and Derek is unable
22 to be here.

23 Since I'm not qualified to speak to those issues,
24 I will note any questions that you have about the
25 material, and I believe on advice of counsel, we can

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1 undertake to provide you with a reply.

2 At the outset, I'm going to scoop myself doing the
3 very unscientific thing of beginning with my
4 conclusions so you know where we're going to end, and
5 that is that there are several key pieces of
6 information that should have been in the EIS that are
7 not or are not presented in sufficient detail to be
8 able to allay Stoney's concerns regarding the potential
9 impacts of the SR1 project on the components of the
10 aquatic environment that they rely on for them to be
11 able to determine the project's impacts to their
12 Indigenous and Treaty rights and whether their members
13 can live with whatever those impacts might be.

14 So that gives you a sense of where we're headed.

15 I'll start with why PGL was retained. We're
16 committed above all else doing good science in the
17 service of answering questions for our clients. In the
18 case of our assignment for Stoney, we were tasked with
19 understanding their concerns about the project and
20 reviewing sections of the EIS to see if the EIS
21 contained information to defensively allay those
22 concerns. So this is essentially a question about
23 decision-making.

24 And our view is that the EIS or at least the
25 sections we reviewed is insufficient to ensure that the

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1 best possible project, the project that adequately
2 protects for all reasonable flood scenarios, including
3 those that may, pardon the pun, be precipitated by
4 climate change without compromising the biophysical
5 components of the environment on which Stoney's
6 exercise of constitutionally protected rights is based.

7 The point here is that impact assessment as a
8 discipline is specifically designed to do these things,
9 but in this case, it hasn't. To explain why, forgive
10 me, I'm going to digress and do the littlest recap of
11 what other members of the panel already know about
12 impact assessment, and that was mentioned briefly in
13 Mr. Hebert's presentation yesterday in his introductory
14 remarks.

15 To that end, I'm wondering if I can reference my
16 aid to testimony. I believe it was submitted, it's a
17 one-pager. I don't have an exhibit number for it.

18 THE CHAIR: Ms. Friend, was that advanced to
19 you or Mr. Kennedy?

20 MR. RAE: Mr. Chair --

21 MS. FRIEND: Yes, we have it, and here it
22 comes.

23 THE CHAIR: Okay, thank you.

24 A. MS. BECKMANN: Thank you very much. It's very
25 simple.

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1 And so as Iman (phonetic) noted earlier,
2 Mr. Hebert mentioned this, an impact assessment, as a
3 discipline, is a predictive decision-making tool used
4 to identify and evaluate the potential effects of a
5 project. Since its first use in the US in the 1970s, a
6 deep body of accepted best practices has been
7 developed, and basically the topographic shows you how
8 it works.

9 In brief, you start with the project description;
10 you identify the possible effects. You study how
11 things now are in a pair of defined areas, and those
12 defined areas are one where there are likely to be
13 direct effects and then a second larger one where there
14 may be cumulative effects of the project in conjunction
15 with other activities.

16 Then you arrive at the box identified by Arrow A
17 where you predict, to the best of your ability, how the
18 defined project will affect the existing conditions.
19 With an understanding of the potential effects, you
20 then explore mitigation, anything from design changes
21 to habitat restoration that will reduce or eliminate
22 your unwanted effects.

23 Then, with an understanding of how the mitigations
24 will specifically reduce impacts, you reassess the
25 remaining or residual effects.

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1 Since it's very challenging in reality to
2 eliminate all effects, it's generally considered
3 possible to reduce those effects to the level that's
4 acceptable, and acceptability is determined on the
5 basis of both biological realities and socioeconomic
6 needs.

7 Because acceptability represents a value judgment,
8 decision-makers require that EAs give them the best
9 information possible about the things they care about
10 in order to make an informed decision about what
11 usually environmental capital is being spent to gain
12 some usually social benefit.

13 The point that's critical is that the progression
14 from A to B to C requires that enough information about
15 the mitigation at B be available to understand how it
16 will reduce an A level effect to a C level residual
17 effect. In the absence of sufficient information about
18 B and how it reduces A, an impact assessment requires
19 conservatively that impacts at C are considered
20 materially the same as impacts at A.

21 So that's the first graphic.

22 The second graphic addresses the final box of the
23 first flowchart. What's left at C moves forward to be
24 considered in conjunction with other projects. Doing
25 this properly requires that all existing and reasonably

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1 foreseeable projects, and the term "reasonably
2 foreseeable" is important, reasonably foreseeable
3 projects that are likely to interact with a project in
4 question to be considered.

5 So that's -- brings me finally -- and thank you
6 very much for your patience -- to the reason why we
7 can't yet allay Stoney's concerns regarding impacts and
8 why it's not a decision-making tool that is useful for
9 them completely.

10 We can't do this for two reasons: First, there's
11 insufficient information about B to understand what
12 remains at C with respect to fish habitat; and second,
13 the scoping of cumulative impacts omits consideration
14 of impacts to other fish habitat on which Stoney also
15 relies. So there's no clear way to advise Stoney about
16 the longer term impacts of the resources underpinning
17 their rights.

18 And I should say that neither of these is a
19 reflection on the practitioners who did the work. It's
20 a reflection on the scope that was advanced and
21 directed by the proponent. So I'm not trying to throw
22 any practitioners under the bus here.

23 With respect to not understanding B, Alberta
24 Transportation has made it very clear in their response
25 in Appendix L, and I think we're finished with that

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1 graphic. So if it's helpful to take it down, that's
2 fine.

3 So in Appendix L, Alberta Transportation has made
4 it clear that the project will be applying for an
5 authorization under the *Fisheries Act* and that:

6 (as read)

7 "Offsetting is required for temporary
8 and permanent HADD..."

9 Or habitat alteration...something, and destruction.

10 Someone can fill me in. We all say HADD: (as read)

11 "...associated with construction and
12 operation of the project and death of
13 fish associated with operation of the
14 project."

15 And that's the Appendix L response to Section 4.2.2.

16 Alberta Transportation has also made it clear that
17 it is, quote, "developing an offsetting measures plan"
18 and that options were presented to Stoney on January 26,
19 2021.

20 These options include building replacement habitat
21 on the Bow River for habitat lost on the Elbow River,
22 ostensibly, for fish in general, but not necessarily for
23 the Elbow River populations.

24 In the case of an application to alter or destroy
25 fish habitat, Fisheries and Oceans Canada or "DFO"

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1 requires that a proponent prepare both mitigation, which
2 is reducing the adverse effects, and then, where
3 residual effects can't be avoided, offsetting those such
4 that there is no net loss of habitat. And offsetting,
5 as many of you are familiar with, includes creating
6 habitat, building habitat.

7 In order to evaluate mitigation and offsetting, DFO
8 requires some very detailed information, and it's
9 identified clearly in DFO's applicant's guide.

10 But this is the information they require to make a
11 decision about the appropriateness of granting an
12 application to harmfully alter or destroy fish habitat.
13 They need to understand the geographic coordinates of
14 the location; a site plan; a detailed description of the
15 measures, usually conceptual engineering drawings that
16 go with habitat offsetting; contingency measures in the
17 event that it doesn't work; general costing; and a bond
18 for that work. So there's quite a bit of information
19 that DFO requires in order to make an informed decision.

20 It's our view that if the proponent understands the
21 habitat impacts and understands that offsetting is
22 already required, it's reasonable to require that the
23 offsetting be sufficiently advanced prior to project
24 approval so that its efficiency or efficacy can be
25 evaluated by this Board and also by Stoney.

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1 It's further our contention that the minister of
2 Fisheries and Oceans requires -- if the minister of
3 Fisheries and Oceans requires this level of information,
4 the level of detail should be presented in the
5 application itself. And given that the flood of record
6 to which the project is designed and occurred in 2013 or
7 eight years ago, it seems that there should have been
8 ample time to do this work.

9 In the absence of that detailed information, it's
10 not possible to make a determination whether Stoney's
11 specific concerns, whether fish and fish habitat in the
12 Elbow River will be functionally unharmed by the end of
13 the project. This piece of information is critical to
14 address the overlying issue, which they have to address
15 for themselves as whether the Indigenous and Treaty
16 rights they rely on -- or those rights that rely on the
17 continuing health of those biophysical components are
18 affected.

19 So that's the order of considering the various
20 pieces.

21 With respect to cumulative impacts, the issues
22 above are compounded. The application doesn't speak to
23 issues where that represents a concern for Stoney with
24 respect to cumulative impacts; specifically, Stoney is
25 concerned that the works on the Elbow River are not in

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1 and of themselves sufficient to protect Calgary from
2 another flood equivalent to the 2013 flood of record and
3 that additional works with unknown additional effects
4 will also affect their interests.

5 Nor is this concern unfounded. Alberta
6 Transportation has responded in Appendix L as follows:
7 (as read)

8 "The government of Alberta, GoA, is
9 pursuing flood mitigation projects on
10 both the Bow River and the Elbow River.
11 The SR1 is the selected project for the
12 Elbow River currently undergoing
13 regulatory review."

14 This is the crux of a methodologically common error that
15 all decision-makers, including Panel members, should be
16 concerned about because it means that you may not be
17 considering evidence that dramatically underestimates
18 cumulative impacts and may result in making
19 recommendations regarding works that will have
20 unintended regional consequences.

21 It's an error that can be rectified in this case in
22 one of two ways: Either by assessing both the Elbow and
23 Bow works together, since it's understood to be the plan
24 for full protection of the city of Calgary, or by
25 including future works on the Bow River as one of the

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1 projects to be considered in assessing the combined or
2 cumulative effects of the SR1 project with the future
3 Bow project.

4 Neither of these is unreasonable. The former,
5 which is a single assessment of a large-scale
6 infrastructure project, is considered to be more robust
7 and more efficient, and it's been done in many, many
8 places around the world.

9 Failing that, the latter consideration of Bow River
10 works in the cumulative assessment of the SR1 project is
11 a requirement. A cumulative effects assessment must
12 consider the effects of the project under assessment in
13 conjunction with all reasonably foreseeable projects.
14 And given that Alberta Transportation has stated that
15 the government is pursuing flood mitigation projects on
16 both the Bow and Elbow, it suggests that the works are
17 more than reasonably foreseeable; they're expected.

18 In the absence of either inclusion of the Bow River
19 works in the cumulative effects assessment or a
20 comprehensive assessment of both Elbow and Bow River
21 works together, the EIS contains insufficient
22 information for us to be able to provide a confident
23 opinion that the SR1 project, in concert with other
24 projects, will not cause significant cumulative effects
25 on fish and fish habitat with a resulting impact on

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1 Stoney's rights.

2 Specifically, we can't say if the promised
3 offsetting, some of which is proposed to be built on the
4 Bow River, will meet the biophysical needs of fish
5 populations on the Elbow River yet because we haven't
6 seen it. We can't say if future Bow River works will
7 result in destruction of the habitat constructed on the
8 Bow River to offset the Elbow River impacts, or how much
9 additional fish habitat will be affected by the
10 Bow River works, and Stoney is interested in a
11 comprehensive understanding of all the impacts that will
12 come from the obvious need and requirement to protect
13 the City of Calgary.

14 So the absence of the information on these combined
15 effects to the biophysical underpinnings means that EIS
16 doesn't serve Stoney well as a tool for making a
17 decision about impacts to their rights.

18 And that is what I have, Mr. Rae, and Panel members
19 and Mr. Chairman.

20 THE CHAIR: Mr. Rae.

21 MR. RAE: Thank you, Ms. Beckmann.

22 Mr. Chair, Ms. Beckmann and Mr. Snow are now
23 available for cross-examination.

24 THE CHAIR: Okay. Thank you. Thank you,
25 Ms. Beckmann, Mr. Snow.

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Cross-examined by Mr. Kruhlak

1 Mr. Secord?

2 MR. SECORD: No questions, sir. Thank you.

3 THE CHAIR: Thank you. Mr. Williams? I don't
4 believe he's on.

5 Mr. Wagner.

6 MR. WAGNER: No questions, Mr. Chair.

7 THE CHAIR: Thank you, Mr. Wagner.

8 Ms. Senek, City of Calgary.

9 MS. SENEK: No questions. Thank you.

10 THE CHAIR: And Mr. Cusano.

11 MR. CUSANO: No questions, sir. Thank you.

12 THE CHAIR: Mr. Barbero.

13 MR. BARBERO: Mr. Chairman, sir --

14 MR. KRUHLAK: Mr. Chairman, it's Ron Kruhlak. I
15 might first have a couple of questions of Mr. Snow
16 prior to my friend Mr. Barbero following up with a few
17 additional questions, if I could.

18 THE CHAIR: Your call. Please proceed.

19 **MR. KRUHLAK CROSS-EXAMINES THE PANEL:**

20 Q. Mr. Snow, I don't see you up on the screen.

21 THE CHAIR: One second. As long as he's still
22 there, Mr. Wiebe will be getting him up.

23 Mr. Snow?

24 A. MR. W. SNOW: Hello. Good day. I'm available.

25 Q. MR. KRUHLAK: Mr. Snow, thank you. You've been

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1 consultation manager for Stoney Nakoda Nations since --
2 at least since 2014. Do I have that right?

3 **A. MR. W. SNOW: 2012.**

4 **Q.** 2012. And you certainly would have been involved from
5 the start of the Springbank project, the SR1 project in
6 dealing with Alberta Transportation since 2014;
7 correct?

8 **A. MR. W. SNOW: Yes.**

9 **Q.** And you would have likely been dealing with
10 Mr. Dallas Maynard of DEMA. You're aware of
11 Mr. Maynard?

12 **A. MR. W. SNOW: Yes.**

13 **Q.** And you probably dealt with him on a variety of
14 projects with respect to consultation?

15 **A. MR. W. SNOW: Yes.**

16 **Q.** And you're aware that Mr. Maynard passed away last
17 year?

18 **A. MR. W. SNOW: Yes.**

19 **Q.** And I wanted to just follow up on one of the points
20 you've raised with the Board, and that is, as I
21 understand it, you indicated that a request was made
22 for funding for a hydrology report, 2016, and that was
23 denied. Did I get that right?

24 **A. MR. W. SNOW: Yes.**

25 **Q.** Are you referring to a letter or a direction from

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1 Alberta Transportation where they said they will not
2 fund a hydrology report for the Stoney Nakoda Nations?

3 **A. MR. W. SNOW:** Well, I'm referring to the letter
4 from 2016 where we had -- it went to both agencies,
5 Alberta Transportation and the Canadian Environmental
6 Assessment Agency.

7 **Q.** I'm aware of your letter, sir, but I just want to make
8 sure I understand.

9 You're not suggesting there's any letter from
10 Alberta Transportation which rejects the Stoney Nakoda
11 Nations' request for a hydrology report?

12 **A. MR. W. SNOW:** No, I'm not referring to a letter
13 response from Alberta Transportation.

14 **Q.** Right. Mr. Snow, did you happen to review the response
15 that Alberta Transportation prepared in response to the
16 Stoney Nakoda Nations' submission that reviewed the
17 consultation history?

18 **A. MR. W. SNOW:** I have reviewed many letters, many
19 pieces of correspondence over the years, but there's a
20 lot of material, and I'm dealing with a lot of
21 projects. I can't recall specifically, but I do get
22 directed to many documents.

23 **Q.** Fair enough. SR1 was one of many projects that was
24 crossing your desk over the last several years. Is
25 that fair?

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1 A. MR. W. SNOW: Yes.

2 Q. Perhaps it might just help so we can try to clear this
3 up.

4 Could I ask the document manager to pull up
5 Exhibit 324?

6 MS. FRIEND: Mr. Chair, this is Laura. It
7 looks like her screen may be frozen. We do have a
8 backup document share and she could see if she can open
9 it.

10 THE CHAIR: And who is that? Ms. Decosemo --

11 MS. FRIEND: Carolyn is the backup.

12 THE CHAIR: Let's see if we can get that up.

13 Q. MR. KRUHLAK: Could I ask you just to scroll
14 forward in this first appendice to paragraph 7?

15 And to assist you -- thank you, document
16 manager -- to assist you, Mr. Snow, what I'm referring
17 you here to is paragraph 7 of this Appendix J to the
18 response submissions by Alberta Transportation, which
19 reviews the various meetings and discussions.

20 And I just wanted to take you to this particular
21 entry in paragraph 7 and 8 to see if that helps refresh
22 your memory on some of the history that's transpired
23 here.

24 It indicates: (as read)

25 "A further meeting was held on

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1 September 13th, 2018 between Alberta
2 Transportation and Stoney Nakoda Nation
3 with the purpose to discuss and plan a
4 strategy to complete work on the
5 Springbank SR1 that the Stoney Nakoda,
6 Bears paw, Chiniki, Wesley nations had
7 identified and the resources to complete
8 that work."

9 And it refers to an email sent September 11, 2018.

10 (as read)

11 "At this meeting, AT enquired on the
12 status of the TUS report and if
13 Stoney Nakoda Nations still wished to
14 undertake further site visits.
15 Stoney Nakoda Nation committed to
16 providing a budget for additional work
17 Stoney Nakoda Nations wished to complete
18 for the SR1 project. During the
19 September 13, 2018 meeting,
20 Stoney Nakoda Nation requested the
21 hydrology information from the EIA but
22 did not make a request for a hydrology
23 study."

24 Do you see that, Mr. Snow?

25 **A. MR. W. SNOW: Yes.**

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1 Q. And -- and we could move on to then paragraph 8.

2 (as read)

3 "AT requested the budget for additional
4 work Stoney Nakoda Nations committed to
5 provide at the September 13, 2018
6 meeting via emails on October 24, 2018;
7 December 18, 2018; January 9; 2019;
8 January 11, 2019, as well as in person
9 on December 19, 2018."

10 And it indicates here, no budget from Stoney Nakoda
11 Nation was received.

12 Does that coincide with your recollection,
13 Mr. Snow, that Stoney Nakoda Nation never provided any
14 budget in support of any request for a hydrology study?

15 **A. MR. W. SNOW: Yes. I would say that's correct,**
16 **and I would also point out that, along that timeline,**
17 **in May 6 of 2019 is when our leadership issued the**
18 **objection letter to the project.**

19 Q. Well, I appreciate that, Mr. Snow, but you had a clear
20 understanding of the arrangements with respect to
21 resources that the Stoney Nakoda Nations needed that
22 the practice on this project, as I assume others, is
23 that a budget -- if the request is made for resources,
24 the nations submit a budget and that budget then would
25 be -- if approved, the work would be proceeded with in

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1 the normal fashion. Is that the fair process of the
2 description?

3 A. MR. W. SNOW: DEMA Land was facilitating the
4 on-site field work alongside Alberta Transportation,
5 and the work that was remaining to be finished -- the
6 reporting that was remaining to be finished was
7 concerning these communications from DEMA Land to
8 Stoney. Those were all concerning -- in my mind, those
9 were all concerning the completion of the cultural
10 assessment.

11 One of the things that's not captured in here that
12 I may have alluded to in the -- in the previous topic
13 is the -- the way in which -- or the process that we
14 would use to confront some of the -- the field issues
15 that we had experienced in 2016.

16 We really had no way to address those concerning
17 the treatment of elders. At that time of the project,
18 our -- our -- there was no real way forward since 2016
19 to -- to rectify those field issues in a suitable
20 manner -- no way that I could see concerning how to
21 raise these issues with a regulator and then try
22 to -- try to resolve them.

23 So that was one of the sort of underlying issues
24 during that time.

25 Q. I appreciate that, Mr. Snow. I believe you addressed

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1 that earlier during the Crown consultation topic and
2 confirmed that at no time did you or Mr. Goodstoney
3 ever communicate those issues to Alberta Transportation
4 or, for that matter, to DEMA as we can see here in the
5 subsequent meetings and collection of correspondence.
6 I think you both confirmed that there was no letter
7 that was issued?

8 **A. MR. W. SNOW: Yes.**

9 **Q.** And I thought it was also important, if I could simply
10 touch on the issue of the -- the environmental impact
11 assessment.

12 Sir, you recall that the draft traditional land
13 use and resource use sections of the EIA were shared
14 and submitted to the Stoney Nakoda Nations prior to
15 them being finalized?

16 **A. MR. W. SNOW: Yes.**

17 **Q.** And no feedback was provided by Stoney Nakoda with
18 respect to reviewing those draft sections of the TLRU?

19 **A. MR. W. SNOW: No. No feedback was provided**
20 **until we had -- again, I would come back to one of the**
21 **issues that I had spoken to in Topic 2, and that is**
22 **that, our availability or the availability of capacity**
23 **to review those projects really did not come about**
24 **until December of 2020.**

25 **Q.** I think you were referring to the federal funding that

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1 you indicated --

2 **A. MR. W. SNOW:** **Yes.**

3 **Q.** -- was addressed then?

4 **A. MR. W. SNOW:** **Yes.**

5 **Q.** But you also recall, I assume, that there was still
6 available funding available -- there was still
7 available funding to Stoney Nakoda to complete its
8 traditional land use assessment and, in fact, that was
9 offered to the Stoney Nakoda Nations, that they still
10 had approximately \$10,000 of the 40,000 budget that was
11 not yet distributed to them that was available to
12 complete their TLU.

13 **A. MR. W. SNOW:** **Yes, I agree that was available,**
14 **that funding was available, but we did not access it**
15 **for the reasons of the treatment of our personnel and**
16 **elders during that time.**

17 **MR. KRUHLAK:** Thank you, Mr. Snow. Those are my
18 questions. I believe my colleague, Mr. Barbero, has a
19 few additional questions.

20 **MR. BARBERO:** Yes I do, Mr. Chair, if that's
21 agreeable, sir.

22 **THE CHAIR:** Yes, please proceed, Mr. Barbero.

23 **MR. BARBERO CROSS-EXAMINES THE PANEL:**

24 **Q.** And my questions are to be directed to Ms. Beckmann.

25 Ms. Beckmann, are you there? I don't have you on

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1 my screen.

2 A. MS. BECKMANN: I am here.

3 Q. Good afternoon.

4 A. MS. BECKMANN: Good afternoon.

5 Q. As you probably gathered, I'm one of the lawyers
6 representing Alberta Transportation, and I just have a
7 you few questions arising from your evidence a few
8 moments ago.

9 The first thing I wanted to ask you, though, was
10 have you been monitoring this proceeding? Last week in
11 particular?

12 A. MS. BECKMANN: I reviewed the transcript from
13 last week and have been auditing, if you like, since
14 yesterday morning.

15 Can I just make a quick statement? I was not
16 aware of Mr. Maynard, Dallas Maynard's passing, and I
17 just wanted to extend my condolences to any of those
18 people who knew and worked with him. I had occasion to
19 work with him, as well, and I hadn't known, and I'm
20 quite sorry to hear the news.

21 So sorry, just an aside.

22 Q. Thank you, ma'am. I can tell you there are some of
23 those folks in this room with me right now, and I'm
24 sure they appreciate that.

25 You had said in your earlier evidence that you are

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1 a senior environmental consultant. Did I get that
2 right?

3 **A. MS. BECKMANN: Correct, mm-hmm.**

4 **Q.** And I just want to confirm, do you have any
5 professional designation in the province of Alberta?

6 **A. MS. BECKMANN: I do not.**

7 **Q.** No. And you'd agree with me, ma'am, you're not a
8 professional biologist, are you?

9 **A. MS. BECKMANN: I am not a professional biologist.**
10 **I'm an unaccredited professional biologist in the way**
11 **that some consulting engineers are not professional**
12 **engineers; correct.**

13 **Q.** And ma'am, you're also not a hydrologist?

14 **A. MS. BECKMANN: No, I am not a hydrologist.**

15 **Q.** And to be fair to you, I think you made a comment at
16 the outset regarding the aspects of the materials that
17 you were here to speak to and that others had prepared
18 some of the more technical aspects.

19 But you did mention one organization; was it the
20 IAIA membership?

21 **A. MS. BECKMANN: Correct.**

22 **Q.** Right. And of course you'd agree with me that that's
23 about impact assessments; correct?

24 **A. MS. BECKMANN: Correct.**

25 **Q.** Right. It's not about aquatics or hydrology; you'd

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1 agree with that, ma'am?

2 A. MS. BECKMANN: Not entirely, no.

3 Q. What would you dispute about that statement?

4 A. MS. BECKMANN: Can you repeat the statement for
5 me, please?

6 Q. Yes, you have a membership in the IAIA?

7 A. MS. BECKMANN: Correct.

8 Q. Which I put to you, ma'am, means recognition in an
9 institute that focuses on practices with impact
10 assessments?

11 A. MS. BECKMANN: Correct.

12 Q. Right. It's not about experience with technical
13 aspects of projects like aquatics or hydrology;
14 correct?

15 A. MS. BECKMANN: Impact assessment is a very
16 specific discipline and in much the same way that law
17 has very important procedural elements in order for the
18 delivery of justice, so to speak. Impact assessment
19 has very specific methodologies which must be followed
20 in order for the ultimate impact assessment to be
21 defensible.

22 And this is a roundabout way of answering your
23 question. It is true that I am neither a hydrologist
24 nor a fisheries biologist. I do, however, work with a
25 very significantly deep team of technical experts. And

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1 PGL was retained, not just me.

2 The question was I was in effect given the
3 material to triage, and that is, was there enough
4 information about habitat offsetting that it could be
5 forwarded to a fisheries biologist, an expert, to
6 evaluate for sufficiency. Was this a workable
7 offsetting plan.

8 There is no offsetting plan, and therefore, my a
9 argument is that the methods of impact assessment don't
10 yield enough information to say anything technically
11 about fish habitat.

12 Q. Ma'am, let me just get to the point.

13 A. MS. BECKMANN: Sure.

14 Q. Are you even qualified to triage this document or these
15 materials, to use your word?

16 A. MS. BECKMANN: I would ask you on what grounds
17 you think I'm not qualified?

18 Q. Well, I'm pretty sure you told me you're not a
19 professional biologist?

20 A. MS. BECKMANN: I am an impact assessor, sir.

21 Q. Yes, ma'am, you focus on process?

22 A. MS. BECKMANN: You're not suggesting that because
23 the members of the Board or the Chairman have no
24 professional biology designations, that they are not
25 suitably equipped to make decisions about those

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1 matters? You're not suggesting that, are you?

2 Q. Ma'am, with all due respect, I'm here to ask you
3 questions, and I would appreciate if we could do that
4 so that we can go through this material efficiently.

5 A. MS. BECKMANN: Sure.

6 Q. In your resume, you have set out select experience; we
7 don't have to turn it up, but it's page 2. One of the
8 things that I noted there was this entry, second bullet
9 point: (as read)

10 "Supporting Stoney Nakoda First Nation
11 in reviewing the habitat offsetting
12 provisions for the SR1 project."

13 That's what has you here today; correct?

14 A. MS. BECKMANN: Mm-hmm.

15 Q. Very good. Further down the page, I note another
16 entry: (as read)

17 "Project manager for independent third
18 party review of the SR1 flood control
19 project near Calgary on behalf of the
20 Tsuut'ina Nation 2017/2018."

21 Do you recall that engagement?

22 A. MS. BECKMANN: Yes, I do.

23 Q. And just so that I'm clear, so that is, you'll
24 acknowledge, the same project?

25 A. MS. BECKMANN: Yes, it is. Different sections,

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1 different sections for review.

2 Q. That's what I wanted to ask you. What was that
3 engagement about?

4 A. MS. BECKMANN: That engagement was, again, about
5 impact assessment methodology, and it was about working
6 with our technical staff, supporting our technical
7 staff to look at the hydrogeological material.

8 And I am sure that Dan will remember working with
9 Christina Trotter in our office about the technical
10 elements of the hydrogeological assessment. In that
11 capacity, I was supporting a technical review providing
12 administrative support to a technical team, and I was
13 not speaking to hydrogeology.

14 Q. That's analogous to what you're doing here, is it not?

15 A. MS. BECKMANN: No. The question here is about
16 process. The argument is that the process isn't
17 sufficient for Stoney's needs.

18 Q. Based on the status of the technical material you and
19 your team were able to review?

20 A. MS. BECKMANN: Based on the absence of an
21 offsetting plan.

22 Q. All right. Ma'am, you spoke to an aid to direct; it
23 was a one page.

24 Mr. Chair, sir, I don't believe we ever entered
25 that as an exhibit or if we did, I missed it. If I

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1 could just have some direction, sir, on whether that
2 was entered, and if not, could we enter it?

3 THE CHAIR: Ms. Beckmann, was that sent to --
4 or Mr. Secord -- sorry, not Mr. Secord, Mr. Rae, was
5 that sent to other counsels, do you know, beforehand?

6 MR. BARBERO: Mr. Chairman, I can advise that I
7 did receive an advance copy of it, yes.

8 THE CHAIR: You did?

9 MR. BARBERO: Yes.

10 THE CHAIR: So Ms. Friend, has that been
11 entered already as an exhibit?

12 MS. FRIEND: Mr. Chair, I'm sorry I'm not clear
13 what document is being referred to.

14 MR. BARBERO: Mr. Chair, it's Michael Barbero.
15 Ms. Friend, I'm referring to the one-page document that
16 Ms. Beckmann used or was referring to during her
17 opening remarks. It's entitled at the top, "Aids to
18 Testimony - L. Beckmann for SNN."

19 MS. FRIEND: Yes, yes. That's her PowerPoint
20 presentation, and I have that on file. But we don't
21 have an exhibit number on it yet.

22 MR. BARBERO: Mr. Chairman, sir, I would suggest
23 we mark it as an exhibit, if that's agreeable to all.

24 THE CHAIR: Yes. What number are we at,
25 Ms. Friend?

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1 MS. FRIEND: The next number would be 382.

2 MR. SECORD: Just on that point, Mr. Chair, is
3 the PowerPoint just the one page? I thought that was
4 an aid to your --

5 A. MS. BECKMANN: That's correct. That's correct.

6 MR. SECORD: That's what the PowerPoint is.
7 Thank you.

8 A. MS. BECKMANN: It's just a one-pager just to give
9 people an indication of sort of the general procedure.

10 THE CHAIR: Thank you. So that is now entered
11 as Exhibit 382. Thank you.

12 EXHIBIT 382 - POWERPOINT DOCUMENT

13 ENTITLED, "AIDS TO TESTIMONY -

14 L. BECKMANN FOR SNN"

15 Q. MR. BARBERO: Mr. Secord was anticipating where
16 I was going with this because I wanted to ask you about
17 a February 25, 2021, memo exhibited 289. Document
18 manager, perhaps we could bring that up. Again, that's
19 Exhibit 289. Were?

20 THE CHAIR: Ms. Decosemo, it may be your
21 machine again. Is it Ms. Taylor or Ms. Decosemo right
22 now trying to get the document up?

23 MS. FRIEND: I believe it's Ms. Decosemo, but
24 we could ask Ms. Taylor to take over.

25 THE CHAIR: Yeah, we'll check on the break.

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1 There seems to be some glitch going on there.

2 So Ms. Taylor, if you could screen share and get
3 Exhibit -- it was 289; is that right, Mr. Barbero? Do
4 I have that?

5 MR. BARBERO: Correct, Mr. Chair, 289.

6 THE CHAIR: Thank you.

7 MR. WIEBE: This Justin Wiebe speaking. May I
8 suggest that she restarts the computer during the
9 break? That should probably fix it.

10 THE CHAIR: Ms. Taylor, if you could stay
11 online for now then, and Ms. Decosemo, you could
12 actually then just restart now, thanks.

13 Please proceed, sorry about the interruption.
14 Thank you.

15 MR. BARBERO: No problem, sir. Thank you.

16 Q. MR. BARBERO: So, Ms. Beckmann, my question to
17 you, just so that I'm clear, in terms of the material
18 that you have filed in this proceeding and are speaking
19 to, there is this document, 289, a technical memorandum
20 or a technical review, dated February 25, 2021; is that
21 correct?

22 A. MS. BECKMANN: Correct. I'm looking at my own
23 version here.

24 Q. And as we were looking at Exhibit 382, those are the
25 only documents that you've put forward to speak to;

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1 correct?

2 **A. MS. BECKMANN: Correct.**

3 **Q.** Very good. And, ma'am -- sorry, document manager, if
4 we just scroll down to Section 2 of this first page.
5 And ma'am, if you need a moment to read it please take
6 it.

7 But my question for you is I just want to confirm,
8 this technical review only relates to hydrology and
9 aquatic ecosystems.

10 **A. MS. BECKMANN: Aquatic ecology, yes.**

11 **Q.** Right. Well, I see "Ecosystems" in the re line, but,
12 yes, I see ecology, as you just pointed out.

13 And, ma'am, you are listed as an author. Again,
14 if we go to the top of the page you'll see that?

15 **A. MS. BECKMANN: Mm-hmm.**

16 **Q.** And just so that I'm clear, did you have a hand in
17 drafting this document?

18 **A. MS. BECKMANN: Yes, I did.**

19 **Q.** But as per your earlier evidence, you did not draft any
20 of the technical aspects; correct?

21 **A. MS. BECKMANN: Perhaps you could help me**
22 **understand which section you're questioning my ability**
23 **to speak to. I'm just confused. If you could help me.**

24 **Q.** Ma'am, I'm not questioning your ability at all. I'm
25 just wondering if I have it right that you did not

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1 draft the technical portions -- wherever the document
2 may be technical in nature. So, for example, the
3 aquatic ecology section at 4.2 or the species assessed
4 at 4.23.

5 **A. MS. BECKMANN:** I see your point. I drafted
6 section 4.2, which was senior reviewed by Matt Hammond,
7 as you see from the "from" list at the top of the memo.

8 **Q.** So you drafted section 4.2, but it was senior reviewed
9 by Mr. Hammond?

10 **A. MS. BECKMANN:** Correct.

11 **Q.** Very good. 4.1.6. So that would be page -- I believe
12 page 4.

13 **A. MS. BECKMANN:** I'm going to have to stop you
14 there just because I can't speak to 4.1.6 because that
15 was produced by Mr. McCoy.

16 **Q.** Oh, but I think you can. It's a very basic question.
17 It says there in the last sentence, actually,
18 that: (as read)

19 "These will be discussed at greater
20 length in revisions to this memo to be
21 delivered no later than March 3rd,
22 2021."

23 Do you have any information about a further revision of
24 this memo?

25 **A. MS. BECKMANN:** Can I -- we have -- I'm going to

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1 ask, Doug, if you can speak to that because we've been
2 doing some work with our client.

3 Q. Well, ma'am, and Mr. Rae, sir, I think --

4 MR. RAE: Mr. Chairman, it's Mr. Rae. I can
5 help in that regard.

6 Mr. Chairman, you'll recall that the federal
7 impact assessment agency has a deadline later this
8 month, early next month, in regard to further comments
9 on their draft environmental impact assessment. The
10 Stoney Nakoda and, of course, its consultants continue
11 to develop work product and comments in that regard.

12 So what has been filed with the Board is the work
13 done to date, but it is a work in progress as the
14 Stoney Nakoda Nations intend to submit detailed sort of
15 comments to the federal agency. And that is the
16 explanation why what has been filed before this Board
17 is, as I say, a work in progress. I hope that helps.

18 MR. BARBERO: Mr. Rae, that is helpful. Thank
19 you, sir.

20 So, Ms. Beckmann, is it fair, then, to say that
21 this is actually a document, Exhibit 289, that was
22 written primarily for submission in the IAAC process?

23 A. MS. BECKMANN: This version was intended to meet
24 the NRCB deadline.

25 Q. Ma'am I'd like to ask you a few questions, if I can,

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1 about your -- your Exhibit 382, which is your one
2 pager?

3 A. MS. BECKMANN: Mm-hmm.

4 Q. And just because I was curious, you mentioned
5 Bragg Creek and Rocky View master drainage plan. And I
6 don't think you spoke to that. Why did you do that?

7 A. MS. BECKMANN: Right. What I was trying to
8 illustrate with that is that, in looking at the EIS
9 document, I was trying to ascertain which projects had
10 been included in the cumulative effects assessment
11 component to see if any of the planned works on the
12 Bow River had been included in the cumulative impact
13 assessment.

14 They had not, but both the Bragg Creek
15 piece -- let me just grab the document -- but both the
16 Bragg Creek and Rocky View master drainage plans were
17 included for consideration in the cumulative impact
18 assessment. So the project was considered in
19 terms -- in the context of those other two works but
20 not in the context of future works on the Bow River.

21 Q. Okay. That's helpful.

22 MR. BARBERO: Mr. Chairman, if I could have one
23 or two minutes to consult with my client.

24 THE CHAIR: Yes, please proceed.

25 MR. BARBERO: Mr. Chair, it's Michael Barbero,

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Questioned by Ms. Vance

1 Alberta Transportation again, sir.

2 THE CHAIR: Thank you.

3 MR. BARBERO: No, thank you. Appreciate having
4 that time to review my notes.

5 We have no further questions for this witness.

6 Thank you, sir.

7 Ms. Beckmann, thank you for your time today.

8 A. MS. BECKMANN: Thank you very much.

9 THE CHAIR: Thank you, Ms. Beckmann. Thank
10 you, Mr. Barbero.

11 Ms. Vance do you have any questions?

12 MS. VANCE: I do have one, and it may be
13 coming from a place of curiosity as much as anything.

14 **MS. VANCE QUESTIONS THE PANEL:**

15 Q. The question I have is for Mr. Snow. I'm going to pull
16 up my notes. This may not be exactly what you said.

17 But you spoke a bit about fish rescue and that the
18 Stoney Nakoda Nations have traditional ways of
19 capturing fish that don't pose a high mortality to
20 fish. And you said "alternative methods of fish
21 capture had not been considered."

22 I wonder if you can tell me a little bit about
23 those methods because I'm kind of interested.

24 A. MR. W. SNOW: Yes. I think we use -- I can't
25 really speak to the -- the exact method, but I can say

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Questioned by Ms. Vance

1 that the methods are still used in our communities, and
2 used natural materials from the landscape, and are ways
3 that we capture fish and then where we can utilize them
4 until -- until we're ready to harvest them and where we
5 can actually select the ones that we want to harvest,
6 not just harvest all together.

7 And the reason why I had mentioned this was
8 because many times during the electrolyte fishing
9 process, that can cause a high mortality to fish that
10 are trying to be preserved or moved to another location
11 or for whatever -- for testing or other purposes.

12 And so I wanted to just note that, from the
13 discussion this morning, that one method that
14 Stoney Nakoda utilized to capture fish is -- doesn't
15 cause that mortality.

16 Q. And that method of capture, as I understand you saying,
17 it would be ultimately for harvest as opposed to
18 transporting the fish. Would that be accurate to say?
19 Or could you use those methods also to transport fish?

20 A. MR. W. SNOW: In my understanding, those methods
21 are used to harvest, but presumably, I believe that
22 those methods could also be used -- utilized towards
23 transport. And these are -- I think these are some of
24 the areas of our study.

25 Had we been able to properly conduct and complete

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Questioned by Mr. Kennedy

1 our study for the project area, I think these are the
2 things that eventually we would have got to in
3 our -- in our report, which is why our report is
4 labelled as an interim report.

5 Q. Okay. Thank you. Thank you so much. That was the
6 only question I had.

7 THE CHAIR: Thank you, Ms. Vance.

8 Mr. Kennedy?

9 MR. KENNEDY: I have a couple of questions, I
10 think, for Ms. Beckmann.

11 MR. KENNEDY QUESTIONS THE PANEL:

12 Q. They relate to cumulative effects. Just wait for
13 Ms. Beckmann to come up on the --

14 A. MS. BECKMANN: Hi. I'm here, yeah.

15 Q. I think I heard you advocating that in this project, in
16 terms of its reviews, should consider cumulative
17 effects of a Bow River flood control project?

18 A. MS. BECKMANN: Without it, it's not possible to
19 give -- for Stoney to understand how their treaty
20 rights will be affected, yes.

21 Q. So in terms of impact assessment generally -- I mean
22 this is an issue that arises to regulators all the
23 time.

24 Right now, we have a single application related to
25 project, flood control -- largely flood control for the

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Questioned by Mr. Kennedy

1 City -- to protect the City of Calgary, and everything
2 that could or may happen on the Bow River in the future
3 has perhaps a similar large picture objective but
4 projects that would operate independently. So I don't
5 think there's a suggestion that these two projects need
6 to operate in concert with each other. Is that your
7 understanding?

8 **A. MS. BECKMANN:** That is my understanding. And can
9 I speak a little bit to cumulative effects? I don't
10 know if you just wanted the one answer.

11 **Q.** I have further questions, so perhaps let me kind of
12 carry down the road --

13 **A. MS. BECKMANN:** Sure.

14 **Q.** -- and I'll give you an opportunity at the end if you
15 want to provide some further comments.

16 And in terms of understanding cumulative effects,
17 is there some magic to the fact that we would have the
18 same proponent for these two projects? And I ask that
19 in the context, there might be a whole bunch of other
20 developments that could impact the Stoney Nakoda
21 Nations' constitutional and treaty rights that aren't
22 before -- would never come before this Board, and may
23 come before a variety of different regulators, many of
24 which probably wouldn't undergo an environmental impact
25 assessment. And where does that take you in terms of

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Questioned by Mr. Kennedy

1 cumulative effects assessment?

2 A. MS. BECKMANN: Mm-hmm. It's a very -- it's an
3 excellent question, for starters.

4 It's -- as I'm sure you can appreciate, because
5 you see so many different projects that interact. It's
6 a very complicated thing, and that's why there have
7 been efforts to change federal law regarding impact
8 assessment, to start allowing strategic and group
9 assessments so that we can start looking at suites of
10 projects.

11 And the examples -- there are examples in other
12 places in the world, and I'd be happy to share
13 references, where a number of related projects that
14 have related functions that don't necessarily work in
15 concert, but how the impacts in the same general area
16 dealing with the same ecological subsystem can be
17 assessed together.

18 The concern at this point is that the expected
19 works on the Bow were not even referenced in the
20 assessment, so the question then becomes for Stoney,
21 what is going to happen with that?

22 If some understanding of the scoping of that work,
23 which is presumably underway, were carried forward to
24 this, the entire document would be better for
25 decision-making so that you, as decision-makers, would

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Questioned by Mr. Kennedy

1 know what the overall set of potential impacts around
2 the region might be.

3 Does that answer your question?

4 Q. Well, in part. What you dealt with was the geographic
5 relationship, I think between various projects, but you
6 didn't deal with the temporal piece. And the question
7 arises, here we are, we're by the end of this process,
8 we will have a very good understanding of the
9 environmental impacts and the effects on the
10 Stoney Nakoda Nations from this project. But what we
11 couldn't have, because the work has not been done, is
12 an understanding of the effects from any other -- a
13 project on the Bow River because that work has not been
14 done.

15 So, in terms of timing, so here we are in 2021,
16 near the end of what has been a very long process, and
17 the Bow -- any project that might come forward on the
18 Bow River, in terms of being in the same position, is
19 years away.

20 A. MS. BECKMANN: I see your point. The way in
21 which various pieces of legislation are written, they
22 speak to, including in the scope of the cumulative
23 effects assessment, reasonably foreseeable projects.
24 And because this is a predicted exercise, the goal is
25 to look forward to projects that are reasonably

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Questioned by Mr. Kennedy

1 foreseeable and to the best of practitioners'
2 ability -- and there are quite a few very skilled
3 engineers and hydrogeologists on the technical team --
4 and predict what works on the Bow might do in concert
5 presuming that that project is reasonably foreseeable.

6 And the point that we were just making is that
7 works on the Bow are reasonably foreseeable because of
8 the material that Alberta Transportation put forward.
9 That is the works are expected on the Bow, therefore,
10 reasonably foreseeable.

11 Q. Well, in terms of being reasonably foreseeable, I think
12 it's well established on the record that we have is
13 that there may be a number of potential alternative
14 projects on the Bow River if they choose to proceed
15 with any of them. So there's uncertainty as to whether
16 they'll proceed with any of them, and there's
17 uncertainty as to what projects they might proceed
18 with.

19 And that puts you in a very difficult position as
20 a regulator if we accept what you're putting forward is
21 does cumulative effects assessment say we need to
22 paralyze the regulatory process until we can get a
23 grasp on projects that may come forward many years into
24 the future?

25 A. MS. BECKMANN: I hear what you're saying, and I

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Questioned by Mr. Kennedy

1 don't think the intent is to paralyze the system. I
2 think the intent is to create a better predictive tool
3 such that -- I mean if you're telling me that Alberta
4 Transportation has no plans to construct something on
5 the Bow River, then they have no plans.

6 I'm just responding to the material provided by
7 Alberta Transportation in which they said, "We have
8 other works in the works for the Bow River. This is
9 the SR1 project, and there are other works for the
10 Bow."

11 So I'm just responding to the methodology there.
12 I'm not suggesting that -- I don't think anyone is
13 suggesting that Calgary should be exposed to floods. I
14 have family and friends, and I know the concerns about
15 flooding in Calgary.

16 I think that we're just trying to provide
17 decision-makers with a better predictive tool and
18 provide you with the context, which is additional works
19 around the city in the event that the SR1 project is
20 not sufficient to protect the city.

21 Q. Ms. Beckmann, I suggested that after I had finished
22 questions, my questions, I'd give you an opportunity.
23 This is your opportunity.

24 A. MS. BECKMANN: I think I've shared it. It's a
25 really important discussion, and I agree that it's a

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Questioned by Mr. Kennedy

1 very tough place.

2 I think, though, that in the interest of using
3 this as a decision-making tool, at least understanding
4 that there are a ring of projects related to water
5 management, all of which could impact Stoney is the
6 context that's relevant.

7 Q. Perhaps one more question.

8 A. MS. BECKMANN: Sure.

9 Q. And I promise to end there.

10 So in terms of addressing cumulative effects, it's
11 much easier to do with the next -- when you're
12 assessing the next project when the previous projects'
13 effects are not only forecast, but perhaps they're
14 better understood through actual operations because
15 they exist. So you can truth the projections and
16 understand those effects when you're then looking at a
17 new project that is distinct and separate?

18 A. MS. BECKMANN: Yes.

19 Q. It seems obvious.

20 A. MS. BECKMANN: It does, except that then you
21 start with a different baseline. And you have not --
22 you are -- depending on how you have scoped your new
23 project, you may result in incremental -- the
24 "death-by-a-thousand-cuts" argument.

25 Q. Well, so, again, one more question. This project will

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Questioned by Mr. Kennedy

1 not get an approval from this Board unless they
2 determine it's in the public interest. Having regard
3 for the very effects that I think you're identifying
4 are important to be included in good EIA practice.

5 Now, that said, the "death by a thousand cuts"
6 is -- this project, if it gets an approval, would be
7 determined to be in the public interest.

8 It would be the next project, in terms of
9 cumulative effects, that if death is something that is
10 going to be a result, it would be assessed at that
11 stage from the future projects, not -- not the project
12 that is determined to be acceptable. Fair?

13 **A. MS. BECKMANN:** I think the challenge is that we
14 have no threshold established. And, generally, when
15 you're looking at cumulative impacts, you also have the
16 concept of threshold of the "when is enough enough"
17 argument.

18 So, ideally, we would have gone into this process
19 with an understanding of how much the systems that
20 contribute to flooding in the Calgary region can
21 withstand in terms of human alteration before they no
22 longer function the way they once did or no longer
23 function in the way that humans want them to. Because
24 we have no threshold, it's very difficult to say which
25 project puts it over the edge.

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Questioned by Mr. Heaney

1 So if you approve this one in the public interest,
2 we still don't know whether it's gone past that tipping
3 point.

4 MR. KENNEDY: Ms. Beckmann, those are my
5 questions, thank you.

6 A. MS. BECKMANN: Thank you very much.

7 THE CHAIR: Thank you, Mr. Kennedy.

8 Ms. Roberts, do you have any questions?

9 MS. ROBERTS: I have no questions.

10 THE CHAIR: Mr. Ceroici?

11 MR. CEROICI: I have no questions, thank you.

12 THE CHAIR: And Dr. Heaney, do you have any
13 questions?

14 MR. HEANEY: Just a question for Mr. Snow.

15 THE CHAIR: Yes.

16 MR. HEANEY QUESTIONS THE PANEL:

17 Q. And it's a follow-up on Ms. Vance's question, Mr. Snow.

18 Without getting into the particulars of the
19 traditional methods, at some point, you would have to
20 be a little more forthcoming about these methods, I
21 imagine, in order for them to be included in a fish
22 rescue program. And under that context, would
23 Stoney Nakoda be -- be open to being more detailed
24 about methodologies you discussed?

25 A. MR. W. SNOW: I think that would depend on a few

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Questioned by The Chair

1 other things happening. Number one, that our
2 Stoney Nakoda leadership is in agreement with such a
3 process. Right now, it's our opposition that
4 is -- that is in place to the project. So community
5 leadership -- leadership of Stoney Nakoda Nation
6 would -- would need to be -- some agreement there would
7 need to happen.

8 I only pointed out the traditional fish capture
9 method as I know that there is a high mortality rate
10 with the -- with the current electro-fishing process.

11 So there is -- there are alternative methods out
12 there. That was my -- the point of my relaying of
13 those -- of that traditional capture method.

14 MR. HEANEY: Okay. Thank you, Mr. Snow.

15 THE CHAIR QUESTIONS THE PANEL:

16 Q. Mr. Snow, I just have one question.

17 You mentioned a number of times sort of the
18 position of Stoney Nakoda is based on the Stoney Nakoda
19 leadership, and you also referred to a number of times
20 on questions from Alberta Transportation, in terms of
21 sort of pulling back from some of the activities of
22 consultation with SR1, that those resulted because of
23 the -- your assertions about mistreatment of elders,
24 and you didn't go back to Alberta Transportation with
25 that concern.

STONEY NAKODA NATIONS TOPIC #4 PANEL

Questioned by The Chair

1 Was that because the leadership was consulted, in
2 terms of what was happening at that time and they
3 recommended that you didn't go back and express your
4 concerns to Alberta Transportation, perhaps some
5 senior -- at the senior level in terms of those
6 concerns or how did that all play out?

7 Because the Board is in a bit of a tough spot in
8 terms of assessing this area of the consultation. So
9 I'm just curious about how that decision was made in
10 terms of sort of drawing back from the process, to some
11 extent, and why it is that -- or who made the decision
12 not to express those concerns to Alberta
13 Transportation?

14 **A. MR. W. SNOW:** I think sort of two things are
15 going on, two parallel processes: One is that the
16 consultation process where we came up -- where we came
17 to this impasse regarding fieldwork. So that was sort
18 of one cycle that was happening that started in 2016.

19 And we -- basically we still don't have any kind
20 of resolution, aside from, you know, a public hearing
21 process to go through, but I think you'll appreciate
22 that not all of our projects are in a public hearing
23 process.

24 So it's sort of an open question that we have I
25 think in terms of how do we move forward when we have

STONEY NAKODA NATIONS TOPIC #4 PANEL

Questioned by The Chair

1 an impasse with a proponent, especially when that
2 proponent is the regulator. So that situation exists
3 today and will likely come up -- I'm not saying it will
4 come up again, but it's likely that it may come up
5 again.

6 And then the second process is the Stoney Nakoda
7 leadership. Stoney Nakoda leadership, as I understand
8 it, is involved in -- with various government
9 departments and their own discussions on various
10 issues.

11 So I really can't comment on that process because
12 I'm not privy to all of that. But when we do give --
13 as a consultation department, we do give updates to our
14 leadership about program -- many programs, many
15 processes that are happening, whether they be the
16 government-led proponents or industry-led or whatever.

17 Q. So when that, you know, misstep from your perspective
18 was taken at the site visits, then, it was then your
19 decision not to get back to Alberta Transportation, or
20 was that information relaid to your leadership team and
21 then it was left with them?

22 A. MR. W. SNOW: It was -- it was consultation's
23 position that because we couldn't -- we didn't have a
24 path forward to really move on this issue of continuing
25 the fieldwork.

STONEY NAKODA NATIONS TOPIC #4 PANEL

Re-examined by Mr. Rae

1 The danger I guess is what we were trying to weigh
2 is that sort of treatment that happened previously, is
3 that going to happen again, and would we -- would we be
4 risking something, you know, somebody reacting
5 negatively out in the field if that did happen again.

6 So those are the kind of issues we were trying to
7 weigh in our mind during that time, and we just didn't
8 come to a resolution to continue until we've had -- and
9 basically just -- we didn't have a way forward.

10 Q. Okay. Thank you.

11 THE CHAIR: Mr. Rae, those are my questions,
12 thank you.

13 Mr. Rae, do you have any redirect?

14 MR. RAE: Yes, sir, I have one question on
15 redirect for Mr. Snow, and it pertains to the questions
16 my friend Mr. Kruhlak was posing.

17 **MR. RAE RE-EXAMINES THE PANEL:**

18 Q. Mr. Snow, in regard to flood control projects on both
19 the Elbow and Bow Rivers and the hydrology and
20 hydrogeological studies related thereto, are there
21 currently outstanding any budget requests from the
22 Stoney Nakoda to the government of Alberta that, as I
23 say, are outstanding and have not been responded to?

24 MR. KRUHLAK: Mr. Rae, it's Ron Kruhlak. I
25 guess if you're raising this question in response to a

STONEY NAKODA NATIONS TOPIC #4 PANEL

Re-examined by Mr. Rae

1 question I raised, I, of course, did not raise any
2 questions with respect to the Bow.

3 As I understood it, Mr. Snow's comments I assumed
4 related to hydrology as it pertained to the Springbank
5 project. So guess if -- I just want to make sure we're
6 clear on a distinction between the respective projects.

7 MR. RAE: Well, Mr. Chairman, I guess that's
8 partly the point. We've heard lots of evidence on both
9 the Bow and the Elbow and the distinction between the
10 two, and it has been clarified somewhat.

11 My question of Mr. Snow, since Mr. Kruhlak raised
12 the issue of outstanding funding, my question of
13 Mr. Snow concerns any outstanding requests that pertain
14 to either or both of the two river systems because, as
15 you've just heard this afternoon, that has been the way
16 that the Stoney Nakoda have been approaching these
17 issues.

18 MR. KRUHLAK: Well -- it's Ron Kruhlak again. I
19 guess I'd just say, with respect to redirect, I
20 certainly recognize that your entitlement to redirect
21 on an issue that's been raised that wasn't
22 contemplated. And I guess my comment is I had raised
23 no questions with respect to the Bow project.

24 So if -- as I understood it, and the questions I
25 dealt with were pertaining solely to the Springbank

STONEY NAKODA NATIONS TOPIC #4 PANEL

Re-examined by Mr. Rae

1 project.

2 MR. RAE: Mr. Chair, I'm not going to press
3 the point. If my friend, Mr. Kruhlak, truly objects to
4 the question, we can accept that.

5 THE CHAIR: Okay. Thank you. Anything
6 further?

7 MR. RAE: No, sir, I have no further
8 questions on redirect.

9 And perhaps this might be an appropriate time for
10 Elder Holloway to do a closing prayer?

11 THE CHAIR: Yes, thank you. Yes, please
12 proceed.

13 MR. RAE: Mr. Snow, is that appropriate at
14 this point in time?

15 A. MR. W. SNOW: Yes, I believe Elder Henry is now
16 available or is available to do our closing. I'll just
17 confer with my colleague.

18 (OTHER LANGUAGE SPOKEN)

19 A. MR. W. SNOW: Oh, Henry. Thank you. We're
20 ready to do a closing prayer, if you could give us a
21 closing prayer for today.

22 A. ELDER HOLLOWAY: Yes, thank you.

23 I'd like to thank all your Panel and Mr. Chairman,
24 and I would like to put the prayer for you people for
25 today, and I'd like to thank everyone that's

1 participated in this project. Thank you.

2 (OTHER LANGUAGE SPOKEN.)

3 THE CHAIR: You're on mute there, Mr. Snow.

4 A. MR. W. SNOW: Thank you, Elder Henry.

5 Thank you to the Board for our presentations
6 today, and thank you to everyone for participating.

7 THE CHAIR: Thank you. And thank you,
8 Elder Henry, for the two prayers. Thank you.

9 (PANEL STANDS DOWN)

10 THE CHAIR: Let's break now. Mr. Secord, you
11 are ready for direct when we return?

12 MR. SECORD: Yeah, we're ready to go, sir. So
13 what time would you like us back?

14 THE CHAIR: At 25 after 3, please. See you
15 then, everybody.

16 (ADJOURNMENT)

17 THE CHAIR: Okay, Mr. Wiebe, I think we can
18 get started. In fact, I think I might be a minute
19 late, so my apologies, everyone.

20 Can everybody hear me? I'm not hearing audio
21 right now. Mr. Secord, can you hear me?

22 MR. SECORD: Loud and clear.

23 THE CHAIR: Perfect. Okay, good. So
24 Mr. Wiebe, we can probably have sort of regular screen
25 back up now. Thank you, thank you very much.

A. LOCKE

Examined by Mr. Secord

1 Okay, so Mr. Secord, you are ready to go and your
2 panel?

3 MR. SECORD: Yes. So this is SCLG Panel 4, and
4 we will -- we have three witnesses. We will start with
5 Mr. Locke. He will be followed by Dr. Klepacki, and
6 then Dr. Fennell.

7 So if we could start, could I have the court
8 reporter please swear or affirm Mr. Allan Locke.

9 Thank you, Ms. Vespa.

10

11 **A. LOCKE (For SCLG), affirmed**

12 **MR. SECORD EXAMINES THE WITNESS:**

13 Q. Good afternoon, Mr. Locke. I know Mr. Kennedy will
14 know Mr. Locke from a previous appearance in front of
15 the Natural Resources Conservation Board relating to a
16 dam project in the past.

17 Mr. Locke is a registered professional biologist.
18 After some encouragement from me, and perhaps with a
19 slight underestimate of the amount of material
20 involved, Mr. Locke reviewed Alberta Transportation's
21 project's impacts on fish populations, fish habitat,
22 migration, and breeding grounds in the Elbow River.
23 And I am very grateful to Mr. Locke that he took this
24 matter on for my clients.

25 Mr. Locke, I'm referring you to your curriculum

A. LOCKE

Examined by Mr. Second

1 vitae which was filed as Exhibit 267, your report dated
2 February 2021 filed as Exhibit 266. Were these
3 documents prepared by you or under your direction and
4 control?

5 **A. MR. LOCKE: Yes.**

6 **Q.** Are there any changes that you would like to make to
7 these documents at this time?

8 **A. MR. LOCKE: No, I do not wish to make any
9 changes.**

10 **Q.** Are these documents accurate, to the best of your
11 knowledge and belief?

12 **A. MR. LOCKE: Yes.**

13 **Q.** Do you adopt your report as part of your evidence in
14 these proceedings?

15 **A. MR. LOCKE: Yes.**

16 **Q.** And Mr. Locke, do you acknowledge that you have a duty
17 to provide opinion evidence to the Natural Resources
18 Conservation Board that is fair, objective, and
19 non-partisan?

20 **A. MR. LOCKE: Yes, I do.**

21 **Q.** Would you please provide the Board with a brief summary
22 of your professional qualifications and experience?

23 **A. MR. LOCKE: I'm a member of the British
24 Columbia College of Applied Biology and the
25 Alberta Society of Professional Biologists. I have**

1 worked as a biologist since the late '70s.

2 I worked for two years in the fisheries branch of
3 the Ontario government. I then worked for a
4 conservation authority in Ontario for a couple of
5 years.

6 Following that, I worked as the provincial aquatic
7 habitat protection biologist in the Alberta fish and
8 wildlife division from 1981 to 2013. During that time,
9 I dealt with many aspects of aquatic habitat issues.

10 From 1981 to sometime around 2002, one of my
11 duties was to be the Fish and Wildlife Division
12 representative and chairman of the Alberta Fishways
13 Working Group.

14 This group was comprised of biologists,
15 hydrologists, and engineers from Fish and Wildlife,
16 Alberta Environment, Alberta Transportation, and
17 Fisheries and Oceans Canada. We were tasked with
18 reviewing proposed projects and designing government
19 weir and culvert projects where fish passage was
20 required. The group also addressed fish exclusion and
21 fish return systems at headwork structures.

22 From 1991 to 2001, I was a member of the fisheries
23 and recreation enhancement working group. The group
24 was a partnership among Trout Unlimited Canada,
25 TransAlta Utilities, Parks Canada, Fisheries and Oceans

1 Canada, Alberta Environment, and the Fish and Wildlife
2 Division.

3 The group was formed to examine options for
4 improving fish habitat and recreational opportunities
5 for reservoirs and rivers affected by hydroelectric
6 operations in Alberta. The primary focus of the group
7 was on the Kananaskis river system.

8 When I left the Alberta Fish and Wildlife
9 Division, I started a consulting company working
10 primarily on environmental flow issues for governments,
11 NGOs, in the private sector.

12 I've also provided regulatory advice for water
13 sourcing and for oil and gas projects in
14 British Columbia and Alberta.

15 Q. Thank you. Would you please provide the Panel with an
16 overview of your findings and analysis in this matter?

17 MR. KENNEDY: Mr. Secord, I'm wondering if we
18 could swear in your witness, please.

19 MR. SECORD: I thought we did that already,
20 Mr. Kennedy.

21 MR. KENNEDY: Maybe I missed it.

22 A. MR. LOCKE: Am I good?

23 THE CHAIR: You're sworn; is that correct?

24 MR. SECORD: I think we're good, Mr. Locke.

25 THE CHAIR: Ms. Vespa?

A. LOCKE

Examined by Mr. Secord

1 Yes, we're good.

2 Q. MR. SECORD: So, Mr. Locke, would you please
3 provide the Panel with an overview of your findings and
4 analysis in this matter?

5 A. MR. LOCKE: Yes. As stated in my report, I
6 believe the work done by the proponent addressed much
7 of the inherent uncertainty when carrying out studies
8 to address potential impacts to fish and fish habitat.
9 The response to my report by the proponent is well
10 taken, and I appreciate the clarification.

11 As stated in my report, the method used for
12 ensuring fish passage during low flows is reasonable.
13 I do suggest that it would be beneficial, especially
14 for the public, to highlight the fact the fish passage
15 structure will not be the critical reach in terms of
16 velocities and depths of low flows.

17 With respect to fish entrainment and possible
18 deterrence to fish entering the diversion channel, it
19 is understood the proponent is willing to look at all
20 potential solutions.

21 In response to the proponent's question regarding
22 other alternatives, in the past, physical structures
23 have been investigated. We looked into a louvre system
24 which would be attached to a debris deflector to keep
25 fish in the river.

1 Given the information provided by the proponent
2 and what is known for other headwork structures in
3 Alberta, all that is possible should be done to, first,
4 keep fish out of the diversion channel; secondly,
5 return fish during lower flow diversions where it is
6 feasible; and thirdly, have a comprehensive fish rescue
7 plan.

8 With respect to the release of water back to the
9 Elbow River, it is acknowledged the decision was made
10 to model the two bookend release scenarios to
11 understand the boundaries of the potential effects of
12 the project on sediment and fish and fish habitat.

13 It is further stated the adaptive management
14 approach in response to findings in the monitoring plan
15 would be a better place to understand and evaluate the
16 potential effects of the project than additional
17 modelling.

18 The point about adaptive management is well taken.
19 It is also well taken that monitoring data collected
20 during operations can be used to potentially update the
21 models with the observed data.

22 However, it has been my experience that it is
23 better to incorporate environmental considerations as
24 best as possible before final design comparing to going
25 back in after the fact to make changes.

1 For example, the fishway on the Bow River was
2 refitted quite a number of years ago, and while the
3 data collection and modelling to determine a more
4 efficient fishway was challenging, it was an even
5 greater challenge to secure funding and move the
6 project along.

7 Similarly, my recommendation to consider
8 alternative release scenarios is it is better to
9 consider all reasonable flow release scenarios now so
10 that the findings can be incorporated into the final
11 design.

12 The reason I recommend modelling scenarios using
13 the 10 percent and 15 percent increase flow criteria
14 above instantaneous is because they are common criteria
15 in terms of level of protection in the field of
16 environmental flow science and will provide useful
17 benchmarks relative to the early and late release
18 scenarios.

19 As has already been determined, it is unlikely all
20 aquatic environmental parameters will be met by any one
21 release scenario. Tradeoffs between parameters will be
22 necessary. Carrying out a tradeoff analysis for a
23 range of flow scenarios, which should include flow
24 scenarios that are meant to provide a high level of
25 protection, would incorporate all the modelled aquatic

1 environmental parameters and would show whether or not
2 changing the release flow quantity and timing would
3 have a small, large, negative or positive effect.

4 Included the aquatic tradeoff analysis would be
5 the potential of effecting egg incubation periods for
6 species that have spawned in the fall, and the analysis
7 would ultimately include all the other parameters that
8 have been considered to date; for example, to name a
9 few, wildlife, dust management, and cost.

10 With respect to collecting pre-project baseline
11 data, my experience has been there is always the
12 potential to miss something. By way of example, in the
13 years leading up to the construction of the Oldman
14 River Dam, a lot of data was collected, and a lot of
15 modelling was carried out.

16 The temperature modelling led to selecting brown
17 trout as the primary management species. Over time, it
18 has become evident that while brown trout persist,
19 there are now more rainbow trout below the dam than the
20 brown trout.

21 But the biggest revelation was to discover bull
22 trout congregating at the base of the dam trying to
23 move upstream. This happened for such numbers for a
24 few years, they were captured and relocated upstream.
25 All the pre-project data and modelling did not point to

A. LOCKE

Examined by Mr. Secord

1 bull trout as a management species.

2 Finally, I wish to suggest that spending more time
3 upfront would be better than spending more time later
4 reacting to possible unintended outcomes. Making sure
5 all reasonable alternatives have been identified as
6 best as possible and have been investigated should be
7 done before final design.

8 Out of all the water management projects that have
9 been carried out in Alberta where I was involved, the
10 lower Athabasca water management planning process was
11 the best in that every attempt was made to not discount
12 unknowns, and the structured tradeoff analysis provided
13 the opportunity for everyone to understand the
14 increases and decreases for all interests over a
15 reasonable range of flow scenarios.

16 I wish to thank the Chairman and the other Panel
17 members for this opportunity to participate.

18 Q. Thank you, Mr. Locke.

19 I would now like to turn to Dr. David Klepacki.

20 And, Mr. Chair, as you will know from
21 Dr. Klepacki's involvement in SCLG Panel 3, he is a
22 retired geophysicist, a resident of Bragg Creek, and an
23 active conservationist.

24 And just to refresh your memory, he has already
25 had -- he's already adopted his curriculum vitae and

D. KLEPACKI

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1 his two reports, Exhibits 263 and 264.

2 And I think what we've done in the past is I think
3 it's agreeable if we just have Dr. Klepacki confirm
4 that he has previously been affirmed and considers
5 himself under oath or under affirmation?

6 THE CHAIR: Yes. Ms. Vespa?

7

8 **D. KLEPACKI** (For SCLG), previously affirmed

9 Q. So I think we don't have to really go through the
10 examination in chief if you did before with my partner
11 Ms. Okoye, that's already on the record. So I think we
12 can cut to the chase here.

13 Your evidence in Topic Block 4, water, is covered
14 in Exhibits 263 and 264. Would you please provide the
15 Board with an overview of your concerns under this
16 topic block?

17 A. MR. KLEPACKI: Yes, sir. And thank you very
18 much, Mr. Chair and the Panel and the other
19 participants.

20 Can you hear me well enough, Court Reporter?

21 MR. SECORD: Yes. She's nodding her head.

22 A. MR. KLEPACKI: Okay. That's great.

23 Could we -- document manager, could you please
24 bring up Exhibit 263, PDF 1. Thanks. Just on the top
25 there is fine.

1 Okay. This report summarizes my concerns over the
2 flood frequency analysis that's been done on the
3 Elbow River thus far. I have three different points
4 that I would like to cover along these lines.

5 And the first point is that, the statistics are
6 dependent on the input data set, which certainly seems
7 like common sense, and -- but I think it's particularly
8 important to note that the unusual events on the tails
9 of any distribution end up being really important, as
10 we'll talk about here.

11 Secondly, I would like to suggest that best
12 practices are not ignoring these large events on the
13 tails, and it's better and safer to try and include
14 them in some way. I know that the USGS report 17C has
15 a methodology for including them. What I've done here
16 is I've tried a bit of a different way of including
17 them.

18 And then, finally, the third point is I'd like to
19 go back to the climate change issues, and, in
20 particular, the climate drivers, the Pacific Decadal
21 Oscillation and the El Niño southern oscillation in
22 driving our climates.

23 Now, if I can start with a quick little anecdote.
24 My own interest in distributions actually started when
25 I was finishing my master's work at the University of

1 British Columbia, and I was employed as a consultant by
2 B.C. Hydro to go up to the Meager mountain area and
3 help with a partner in Geotek's Consulting in mapping
4 out the landslide distributions in the volcanic rocks
5 there.

6 And what we did was we pulled out pieces of wood
7 that were involved in these ancient avalanche deposits
8 and had them either dated with dendrochronology or with
9 Carbon 14 methods.

10 And really interestingly, these land slides all
11 seemed to come, you know, within the accuracy we had,
12 of about 300 years ago. And to move forward, it now
13 appears that they all fell down during a very large
14 earthquake that occurred along the Fraser River valley,
15 again, about 3 years ago -- or 300 years
16 ago -- hopefully, not 3 years ago. And with the
17 recognition of the actual fault zone in some of the
18 gravel pits in the Surrey area, that led to a whole
19 rewrite for the seismic protection design programs for
20 the City of Vancouver.

21 What I'm getting to with all of this is, you know,
22 it's really important to look to these unusual events
23 that we have bits and pieces of in our past.

24 And pertinent to the subject at hand, of course,
25 is this picture right here, which is from the 1897

1 flood and it's from the area of what's now
2 Reconciliation Bridge looking north across the
3 Bow River.

4 The 1897 flood, of course, as this historian here
5 quotes, is one of the three worst floods before the
6 2013 flood. The 1879 being the other one, and the 1902
7 flood. If we can scroll down.

8 So in this diagram, this is one that we've seen
9 before, and I'm sure many of the other panelists -- or
10 the other people in these hearings are very familiar
11 with, it's the Bow River floods that occurred.

12 And you can see again, on the left-hand part of
13 this figure is the 1879, the 1897 and then the 1902
14 flood. As I'd like to say my friend Matt Wood has
15 pointed out several times, there's no good numbers for
16 these -- for these floods in terms of quantity.

17 The quantity for the 1897 flood is guesstimated by
18 the height that it was on the CP Rail bridge at that
19 time. 1902 has a bit better definition. The 1897 is
20 all anecdotal evidence about how high the water was
21 relative to Fort Calgary at that time.

22 So if we can just scroll down to the next
23 paragraph, please, document -- yes, that's fine.

24 I just want to point out here the relationship
25 between the input data and the final determination of

1 frequency analysis.

2 You know, again, it's a whole subject of
3 mathematics that looks at distributions in the past and
4 then uses those distributions to identify the
5 probabilities that these events will occur in the
6 future.

7 So, you know, to start off with, I acknowledge
8 that, on the Elbow River, we have no quantitative
9 information for these early events, and the way that I
10 attempted to take a look at these events was to try and
11 get some kind of ratio relative to the events on the
12 Bow.

13 Now, there's uncertainty built into this too,
14 because following basically 1910, there was a -- to
15 1963, there was a series of dams constructed on the
16 Bow, so you don't get -- you don't get a full
17 indication of the uncontrolled release of water down
18 the Bow River.

19 Having said that, nonetheless, if we could go to
20 the next page, please, PDF 3, at the bottom of the
21 page, please. Thank you.

22 I went ahead and tried to create a ratio through
23 the years, which you can see here, between flows on the
24 Elbow which, of course, are dependent on the
25 information I had on the Elbow to flood events on the

1 Bow.

2 Like I mentioned, there's uncertainty in here, but
3 what you can see is generally they're about -- they're
4 somewhere on the order of 60 percent. Generally, the
5 Elbow flows have about 60 percent of the Bow River
6 flows over the time interval presented here which was
7 1950 to the present time.

8 So if we can continue to the next page, please.

9 So what I did with that ratio is I created values
10 for flow on the Elbow River relative to the Bow River,
11 which, again I used 50 percent, and you can see what
12 those flows are.

13 Now, I'm aware of the Golder Associates report of
14 December 2020 which looked at this data and used, you
15 know, a more commonly used statistical analysis
16 technique which is called the "Log-Pearson Type III
17 plot."

18 I wanted to look at these flows or at this data in
19 another way. I'm very familiar with -- it's called
20 cumulative frequency or ogive plot, and it's what we in
21 the oil and gas industry use often to try and
22 understand the field size distribution of oilfields in
23 a developing oil and gas play to understand, again,
24 what you're -- how much money you might make in the
25 course of drilling up all of the different

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Examined by Mr. Secord

1 pools -- pool targets in that field.

2 So if we can go to the next page, please.

3 Q. And maybe, Dr. Klepacki, if you could refer to the PDF
4 page number at the top, it would make it easier when
5 reviewing the transcript. So this is PDF page 5.

6 A. MR. KLEPACKI: Thank you so much, Richard. My
7 apologies.

8 So here -- here is this ogive plot of looking at
9 the flood data along the Elbow River from 1879 to 2018
10 in this created format that I've spoken about earlier,
11 which is taking the ratio of the flows.

12 The Y axis is the number of flood events, and the
13 X axis is the flow range in metres cubed per second,
14 and they're called "bins," flow bins when you create
15 this type of graph.

16 And, of course, you can see what you might expect
17 is that the bulk of flood events are -- are small
18 and -- but the ones that we're most concerned about in
19 doing property damage are, again, these ones that are
20 at the upper tail of this distribution, which would be
21 the ones on the right-hand side, which are from 1100 to
22 1200 metres per second.

23 And that bin is populated by floods of 1879, 1897,
24 1902 and 2013, and they comprise about 4 percent of the
25 population, which, when we look into reoccurrence --

1 when we translate that to recurrence intervals, because
2 it's 4 percent, it's about 25 percent of the recurrence
3 time. It's actually a bit less than that
4 statistically. It's something like about 3.7 is I
5 believe -- was the exact number.

6 So this is a much different answer than the 1 to
7 200 calculation that Stantec is using, and actually
8 Golder is using as well.

9 So is this a difference of the statistical
10 technique the ogive versus the Log-Pearson Type III
11 analysis, or what could have caused this?

12 Well, in my own reading of -- of the flood event
13 of 2013, and remembering Golder's work, I remember the
14 work that John Pomeroy had done, and looked at the
15 fringe of the -- what Frank Frigo called the centroid
16 of rainfall on the north side up in Banff.

17 Can we go to the next plot, please? The PDF which
18 is 6 of 9?

19 And perhaps we can increase this a little bit.
20 There we go. Perfect. Thank you very much, document
21 manager.

22 So this is the Golder Log-Pearson Type III flood
23 frequency analysis of the 2013 at Banff using the 1911
24 to 2015 data set. So this does not include those
25 larger events in Banff.

1 And what you can see is the dot on the right-hand
2 side of the graph in the upper right-hand corner is
3 actually the 2013 event and it comes in at about -- it
4 comes in at about 1 to 200.

5 Document handler, can we go to PDF 7 of -- so, and
6 maybe we need to go down just a little bit. Yeah.

7 So this was the analysis that was published in
8 Pomeroy, Stewart and Whitfield. It is also a
9 Log-Pearson Type III plot. It includes the 2013 event,
10 but it also includes the 1897 and 1902 events, and the
11 2013 event is actually that third little open square
12 from the right-hand side.

13 And what you can see in this analysis of
14 geographically the same area and, temporally, the same
15 flood event, but the difference is the data input into
16 this analysis. This data is from 1884 to 2013, as you
17 can read in the caption underneath the figure here.

18 So, in this event, the authors calculated about a
19 1 in 40 recurrence interval for this event here.

20 Now, again, I realize that this is on the northern
21 edge of the centrum for the 2013 precipitation bull's
22 eye, but that's not the point. The point is using the
23 same data, you get a much different -- sorry, using a
24 different data set with a larger sample size that
25 happened to catch some of these major events, you get a

1 much different return interval for the flood, which is
2 1 in 40.

3 Okay, document handler, could we please go to
4 PDF 8.

5 So let's go back to the controversial
6 paleodendrology, tree ring data for three
7 different -- sorry, for four different watersheds in
8 Alberta. Now, this is taken from Ravizi et al. in 2016
9 in their analysis of drought events in Alberta, drought
10 and flood events.

11 What -- the point that I make in my report for
12 this diagram is if you look closely -- maybe we need to
13 zoom in just a little bit more, document handler.
14 Thank you so much.

15 So you can see about a quarter of the way from the
16 right is the 1900 axis, the 1900 year throughout
17 Alberta. And it is what we've been calling so far in
18 these hearings a "wet spell" in the climate.

19 And in the past, you know a wet spell doesn't mean
20 floods. In this case, this wet spell meant floods
21 because we have the historical eyewitness accounts to
22 these floods. So these large floods, you know,
23 occurred in this wet spell.

24 Now, I'll just finish my analysis here by saying
25 I'm a resident of Bragg Creek, and one of the things we

1 Bragg Creekers talk about, especially since 2018, is
2 wildfires here. Actually Bragg Creek is -- and
3 Whitecourt are the two riskiest places to live in the
4 province of Alberta for wildfires.

5 So it seems to me that the wildfire people or the
6 fire recurrence people are ahead of where we are flood
7 frequencies, because there was an abundance of
8 professional papers that were published in -- starting
9 around 2004, all the way through to, you know, to the
10 current day.

11 But there was an abundance 2004 to about 2015
12 where they related the drought episodes and the wet
13 episodes to what are the two climate drivers for us,
14 which are the Pacific Decadal Oscillation and the
15 El Niño Southern Oscillation.

16 Now, I'm -- not being an adept climatologist, I
17 can't offer anything significant for this, other than
18 to say these forest fire people recognize that episode
19 as being a wet time, and 2013 was also a wet time where
20 both the PDO and the ENSO were in a negative phase,
21 which is -- negative phase is a wet phase, which
22 is -- which is good for heavy precipitation events.
23 And of course, we are witness to that 2013 event.

24 So, Board members, I'd like to kind of reaffirm
25 something that, again, my friend Matt Wood has said

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1 several times, and that's there is some uncertainty in
2 how we calculate flood frequencies. And I'm taking it
3 a step farther and saying I think that that uncertainty
4 is very significant and that an analysis that would
5 include these earlier events would create a much
6 shorter recurrence interval for these kinds of floods.

7 The big question we have is when is the next time
8 when we have concatenation is the word of both the PDO
9 in its very wet phase and the El Niño Southern
10 Oscillation and its wet phase that would put us at risk
11 for another design flood for the Springbank Off-Stream
12 Reservoir.

13 And with that, I believe I've made the three
14 principal points I'm trying to make, and especially
15 regarding the need to better consider a flood frequency
16 analysis for those of us who live near the Elbow and
17 Bow Rivers.

18 Thank you very much.

19 Q. Thank you. Thank you, Dr. Klepacki, well done.

20 And Mr. Chair, just to refresh your memory,
21 Dr. Klepacki will be available to be -- to be asked
22 questions about both Exhibit 263, the first nine pages
23 of Exhibit 263, and of course, Exhibit 264, which was
24 the erosion and riverbed integrity at the low-level
25 outlet for the SORP, which he spoke to in Topic

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1 Block 3.

2 And so with that, I will turn to our final witness
3 for Topic Block 4, and that is Dr. Fennell.

4 And if we could, Ms. Vespa, would you please swear
5 or affirm Dr. Jon Fennell, please.

6 THE COURT REPORTER: My understanding is Dr.
7 Jon Fennell was sworn before, or no?

8 MR. FENNELL: No, I wasn't.

9 THE COURT REPORTER: Okay, thank you.

10 MR. SECORD: No, not when I was around, I don't
11 think.

12

13 **J. FENNELL (For SCLG), affirmed**

14 MR. SECORD: Dr. Fennell is a hydrogeologist, a
15 geologist, and a geochemist, and he has also given
16 expert evidence on climate change matters as recently
17 as November, I believe, of 2020 in the joint review
18 panel hearing into the Benga Mining-Grassy Mountain
19 project and other proceedings as well.

20 Dr. Fennell, I'm referring you to your curriculum
21 vitae which was filed as Exhibit 262; your report dated
22 February 21 -- sorry, February 2021 filed as
23 Exhibit 261; an errata to Exhibit 261 that you have
24 submitted that corrects typographical errors; and a
25 spreadsheet calculation error related to snowpack

J. FENNELL**Examined by Mr. Secord**

1 readings; and your PowerPoint presentation that has
2 been pre-loaded.

3 Were all of these documents prepared by you or
4 under your direction and control?

5 **A. MR. FENNELL: Yes, they were.**

6 **Q.** Are these documents accurate, to the best of your
7 knowledge and belief?

8 **A. MR. FENNELL: Yes, they are.**

9 **Q.** Do you adopt the information in these documents as part
10 of your evidence in these proceedings?

11 **A. MR. FENNELL: I certainly do.**

12 **Q.** Dr. Fennell, do you acknowledge you have a duty to
13 provide opinion evidence to the Board that is fair,
14 objective, and non-partisan?

15 **A. MR. FENNELL: Yes, I do.**

16 **Q.** And in what capacity did you participate in this
17 proceeding?

18 **A. MR. FENNELL: I was engaged to review the**
19 **climate change, the geology and hydrogeology and the**
20 **geochemistry and water quality aspects of this**
21 **particular project, the SR1.**

22 **Q.** Would you please provide the Board with a brief summary
23 of your professional qualifications and experience?

24 **A. MR. FENNELL: I certainly will.**

25 **Yes, good afternoon, Mr. Chair, respected Panel**

1 members, and hearing participants.

2 You do have a copy of my CV as been provided in
3 the SCLG submission made to the Board, which you can
4 review at your leisure, but I will provide a very brief
5 overview.

6 I'm a professional with over 30 years' experience
7 in the natural resources and environmental assessment
8 sectors. I hold a bachelor's degree in geology, which
9 I obtained in 1985; a master's degree in physical and
10 chemical hydrogeology with a specialization in isotope
11 geochemistry, which I obtained in 1994; and a doctorate
12 degree in geochemistry with a specialization in trace
13 elements, which I obtained in 2008.

14 I am a member in good standing with a number of
15 professional engineering and geoscience organizations
16 here in Canada, including APEGA, and I've worked on a
17 variety of projects in British Columbia, Alberta,
18 Saskatchewan, Manitoba, and the Northwest Territories.
19 Some of this work has actually been done here in the
20 Rocky View County in Calgary area.

21 My clients have included various energy and mining
22 companies, municipalities, watershed stewardship
23 groups, government agencies, academic institutions, and
24 research groups, including universities.

25 I've also supported a number of citizen groups and

1 non-governmental organizations to address concerns
2 relating to resource development projects and the
3 implications for surface and groundwater quantity and
4 quality.

5 And as Mr. Secord pointed out, one of the recent
6 interactions was with the Grassy Mountain Coal Project
7 and even more recently, the Mountain Ash Summit Pit
8 hearing at Rocky View County council for a gravel pit
9 to be placed in the headwaters of Big Hill Springs.
10 And I was actually supporting the Friends of Big Hill
11 Springs Creek Provincial Park on that as a private
12 citizen.

13 Outside of Canada, I've worked internationally in
14 countries such as Australia, Belize, Colombia, Ecuador,
15 Guyana, Mexico, parts of the United States, and Yemen,
16 where I've provided support and assistance on
17 hydrogeological and water resource management
18 challenges for both industry and government.

19 This has included the analysis of climate change
20 modelling output and the development of adaptation
21 strategies most recently for a project that I did with
22 the United Nations in the Caribbean basin, and that was
23 for Belize and Guyana doing national adaptation plans.

24 During the course of my work, I've applied various
25 types of remote sensing, non-intrusive and intrusive

1 geophysical techniques, and I've conducted numerous
2 field investigations and drilling programs to obtain
3 and analyze soil and water samples.

4 This work has included the installation of
5 monitoring wells; completion of aquifer tests;
6 measurements of springs and stream flows; completion of
7 groundwater/surface water interaction evaluations; the
8 development of monitoring and management programs
9 applying statistical methods; the application of
10 environmental forensics, including the use of trace
11 elements and isotopes, both stable and radiogenic to
12 identify source waters and subsurface processes; the
13 assessment of climate variability and climate change;
14 and risk assessments.

15 I've held adjunct positions at both the University
16 of Alberta and the University of Lethbridge relating to
17 provincial scale water projects, and I'm currently a
18 program advisor at the Southern Alberta Institute of
19 Technology assisting with the development and delivery
20 of their new integrated water management program.

21 I have sat on a number of boards and panels to
22 provide support on water and climate-related issues and
23 have appeared a number of times before panels such as
24 this, both on the industry and public side, providing
25 evidence and testimony to assist with project

1 **decisions.**

2 Q. Thank you.

3 Document manager, would you please pull up the
4 PowerPoint presentation of Dr. Fennell. And
5 Dr. Fennell, if you would please proceed with an
6 overview of your findings and analysis in this matter.

7 A. MR. FENNELL: **Certainly. And I apologize if I'm**
8 **looking away because I'm looking at a bigger screen**
9 **here, so I'm still paying attention, obviously.**

10 But I will give you a quick overview of my
11 submission. I know Dr. Klepacki has touched on some of
12 this, so I won't belabour the information that he has
13 provided so far.

14 But I will be talking about the climate change
15 aspects, the concerns there, as well as the
16 hydrogeology, geochemistry, and water quality.

17 So if we could advance to the next slide, document
18 host, please, Slide 2.

19 So I've identified a number of concerns with
20 respect to the SR1 project.

21 With respect to climate change, this includes the
22 impacts from extreme flood and drought conditions and
23 how that might affect the safe and efficient operation
24 of the reservoir and the works itself.

25 The second is the knowledge of the hydrogeological

1 regime and its influence on the success of SR1
2 achieving its goals.

3 Thirdly, we have the efficacy of the groundwater
4 modelling to allow an informed decision to be made
5 regarding whether or not to approve this particular
6 project.

7 And lastly, the review of the geochemical and
8 water quality issues that could arise if SR1 is
9 constructed and operated as planned.

10 So those are the four areas I'm going to cover.

11 Next slide, please. This will be Slide Number 3.

12 So with respect to climate change, which I'll deal
13 with first and get that out of the way, SR1 design has
14 not considered the likely magnitudes of floods that
15 have occurred in the past due to protracted flow
16 records for the Elbow River. Dr. Klepacki has pointed
17 this out, and it's obvious that this is a major
18 concern.

19 Secondly, the design does not consider the
20 magnitude of floods that are likely to occur in the
21 future. And I know that the statement was made by
22 Mr. Wood that, you know, it's difficult to predict, but
23 it's -- you have to anticipate, and sometimes using the
24 past as an indicator of the future can be very, very
25 useful. And so with an intensifying hydroclimate, we

1 need to keep this in mind.

2 The SR1 does not consider the risk that the
3 structure poses from extended drought conditions. And
4 I'll explain that as I get into this.

5 And then the SR1 does not increase the water
6 security for the Calgary of City (verbatim) contrary to
7 what others have said as stated by Alberta
8 Transportation and -- and the City of Calgary.

9 Next slide, please. PDF 4.

10 I won't belabour this. Dr. Klepacki did a very,
11 very good job of pointing this out. What I'd like to
12 say is that there is some similarity in the periods of
13 record for the Elbow and the Bow despite the fact that
14 the earlier high magnitude floods were not captured by
15 the Bow. So when you look at the years when the floods
16 occur, they're very similar for both rivers. So there
17 is similarity and that's important.

18 And I think the thing to keep in mind is just
19 because high magnitude floods that predate the record
20 have not been captured in the record, this does not
21 necessarily mean they haven't occurred. And
22 precautionary principle does dictate that we need to
23 realize that and keep that in mind when we're trying to
24 assess the efficacy of a project like this.

25 And so comparisons are important and so when we do

1 these comparisons, we do know that, in the period of
2 record, the flood flows may not have been as high
3 magnitude as the Bow but they could be higher, two
4 times or more greater, depending on how you do the
5 math.

6 And, of course, there's a lot of intricacies
7 around there, and we've heard about centroids of storms
8 and things like that, but we can't get so transfixed on
9 being so focused on that particular aspect. And I do
10 believe we have to take a broader view.

11 Next slide, please. Slide 5.

12 There has been the discussion about the use of
13 tree rings and trying to understand the broader scale
14 events in the past. And we do know, as Dr. Klepacki
15 pointed out, that in the record, there have been
16 extended wet periods and extended dry periods.

17 And on the left-hand side of this slide, I'm
18 showing you tree ring results from a tree core from the
19 Wildcat Hills taking us back quite a few hundreds of
20 years. And I've put it on this plot, a 90th percentile
21 and a 10th percentile. And usually when you're looking
22 at extremes, looking at things that fall above the 90th
23 percentile and below the 10th percentile is where you
24 start getting indications of higher magnitude events,
25 as Dave said, on the outer ends of the tail of the bell

1 curve.

2 And so what you can see is there have been some
3 extended periods of wet in the particular study area,
4 as well as some very long extended periods of dry, some
5 of these lasting several years to even across decades.

6 Now, I understand that this does not speak to
7 individual flood events, and that's not what the intent
8 of a slide like this is meant to give an impression.
9 What it is meant to say is that -- and you have to
10 agree that floods are more likely to happen in wet
11 periods than extended dry periods. It only makes
12 common sense.

13 And so this is meant to indicate that this has
14 occurred in the past, and we can expect it to occur in
15 the future. This is just how the cycles of nature
16 work.

17 And then when we throw climate change on top of
18 that, it starts to get maybe a little bit more
19 complicated and maybe amplified. But it's important to
20 keep in mind that the past is an indication of the
21 future.

22 And on the right-hand side is a slide from Sauchyn
23 and Ilich from 2017, just showing how variable the flow
24 has been around the average over an extended period of
25 time. And you can see that, again, you have high

1 magnitude events, sometimes back to back, that have
2 been occurring in the past, as well as very extended
3 periods of deficit leading to low-flow conditions.

4 So what's important to keep in mind in here, is
5 that when we're looking at data like this, with
6 variability like this, we cannot be focused on anything
7 like the average. We need to understand the
8 deviation -- the variants, the deviation from the
9 standard, and focus on those outer tails on the
10 distribution curve.

11 Next slide, please.

12 And this next slide, Slide 6, basically does show
13 that. On the left left-hand side I'm showing you the
14 bell curves under normal conditions and under shifted
15 conditions, both for the mean, the variability and the
16 symmetry.

17 And so what happens? Well, as the earth warms,
18 the mean of the temperatures shift. So it shifts to
19 the right, and what happens is that the area under the
20 90th percentile and higher becomes larger. That means
21 more probability of events, more events occurring.

22 The same thing happens when the variability
23 shifts. And as you can see in the panel next to that
24 to the right, the variability has broadened out so that
25 means the variability has moderated to a bit, but it is

1 amplified at the end. So your extremes become more
2 probable. That's your floods, your droughts.

3 And then, lastly, the symmetry shifting. And,
4 again, you get a similar effect on the upper 90th
5 percentile tail.

6 So it's important to know that the climate is not
7 static, it's changing, it's always changing. It is a
8 manifestation of the data that we collect, whether it's
9 instrumental records or it's paleo records, which are
10 equally as useful, although you may be using
11 resolution, but they're still important.

12 Equally, and we look at, you know, the intensity,
13 duration and the frequency or the IDF curves with
14 respect to particular storm events, whether it be
15 rainfall or snow or whatever. We can see that some
16 work by Kuo et al. in 2015 looking at how these IDF
17 curves are anticipated to shift in the future.

18 And what they found is that the IDF curves are
19 expected to shift upward because of increased air
20 temperature and precipitable water that's in the
21 atmosphere.

22 With every degree of Celsius increase, the
23 atmosphere can hold about 7 percent more moisture.
24 That's the Clausius-Clapeyron relationship, and some of
25 that will be precipitable water, of course.

1 So it just goes to the physics of it, hope, that
2 in the future as we get warmer, we can expect to have
3 more moisture in the atmosphere and it has to come down
4 somewhere and it does like to fall in mountains because
5 of the orographic effect.

6 So what is expected to occur is a change in about
7 2.9 or about 3 degrees Celsius in the province here
8 over the next -- in this decade, and about 29 percent
9 increase in these IDF curves. So the images at the top
10 basically show that.

11 What happens is you have a recurrence interval of
12 T equals 50 years. In the future, that's expected to
13 shift to a 25-year event, and, equally, a 25 event
14 shifting to a 10-year event. And so this is what
15 happens when the climate shifts. The return periods
16 change.

17 And as Dr. Klepacki pointed out, return periods
18 are only a factor of the data that you have. They're
19 constantly changing. Every next storm adds to that
20 dataset that changes that, so they're not static.

21 When you hear of a 100-year floodplain, that's
22 using today's data. What is a 1-in-100 floodplain
23 tomorrow, in the future? A 1 in 200, a 1 in 500, and
24 that's something you have to keep in mind because this
25 is not -- this is a dynamic process.

1 Next slide, please. Slide 7.

2 So this is using -- I've taken some data from the
3 climate atlas of Canada, which is an information portal
4 for climate model information that's available to the
5 public.

6 So this is -- no one actually -- I don't do
7 climate modelling; the climate modelers do that.
8 Alberta Transportation doesn't do climate modelling.
9 They use the data that climate modelers use or
10 generate. So we're using the same information and
11 we're trying to understand what it means in our area of
12 interest.

13 So on a left-hand side what I'm showing is the
14 projections going forward in time into this century for
15 two different climate scenarios or what we call
16 representative concentration pathways.

17 RCP 4.5 is kind of a middle-of-the-road
18 projection, and RCP 8.5 is an extreme case with no CO₂
19 mitigation going on. So it would be, arguably, the
20 worst-case scenario.

21 So what you see here is the shift in seasonality
22 of precipitation that's projected for the study area,
23 and particularly in the mountain watersheds.

24 You can see that I've got a dotted line at
25 0 percent. So this is a shift from the baseline period

1 of 1975 to 2005. You can see that, in both cases,
2 RCP 4.5 and RCP 8.5, that they shift up, upwards of
3 30 percent or more compared to that baseline period,
4 and so that's an increase in the amount of
5 precipitation that is expected to fall in that period
6 of time.

7 It is also expected to occur earlier in the year.
8 Because of the warming conditions and the shortening of
9 the winter period, this is expected to fall earlier, in
10 some cases, a couple of weeks, perhaps to a month,
11 depending.

12 Next what you can see is as we move through the
13 year into the summer period, we see a decrease in
14 precipitation of upwards of 25 percent.

15 So what you're seeing is a front-loading of all
16 the precipitation into the earlier part of the year,
17 rather than being spread across the year more equally,
18 and that's what can generate flood conditions, having
19 more of that precipitation piled up in the earlier part
20 of the year.

21 If we shift our attention to the graph on the
22 right-hand side. This is some work from David Sauchyn
23 and a number of his colleagues back in 2011, looking at
24 mountain watersheds on the front ranges on the eastern
25 slopes of the Rockies, and looking at a number of

1 different climate scenarios, hotter weather, warmer
2 weather, all of that. And what I'm showing here is
3 just the various scenarios and the implications -- the
4 model implications that has both the change in percent
5 of stream flow.

6 Now, what I'm showing is the dotted line at 100 is
7 the 1961 to 1990 baseline period. And what you're
8 seeing is, in all cases, all climate scenarios, you see
9 a shift in stream flow, the percent increase in stream
10 flow.

11 In the most extreme case, we see an increase of
12 upwards of 225 percent in the earlier part of the year.
13 And so you can see it's lower in different types of
14 scenarios. Pick the one you want, but in general,
15 they're all an increase. Equally, in the latter part
16 of the year, we're seeing as much as a 50 percent
17 decrease in baseflow conditions in the streams.

18 Now, this speaks to water security when you're
19 talking about having extended periods of less
20 precipitation and less stream flow or baseflow
21 contribution for longer periods of the year. That
22 speaks to water security risk. And so we see that,
23 from this information, it can be anticipated there can
24 be larger floods and there can be longer low-flow
25 periods.

1 Next slide, please. It will be Slide 8.

2 So I wanted to talk a little bit about this
3 shifting and flood frequency. And I know we had
4 discussed this, Dr. Luzi had questioned what I was
5 attempting to do here and this is not a sleight of
6 hand. This is simply taking information and trying to
7 tease out a signal, much like Dr. Klepacki was doing.
8 We're trying to understand what are the implications in
9 weather periods for flood frequency.

10 So what I've done is I've taken the record, the
11 instrumental record of average daily maximum discharge
12 from the Elbow River that is readily available on the
13 Water Survey of Canada website -- this is all publicly
14 available data -- and I've taken that data for the
15 entire period of record, and I've separated out the wet
16 faces. And, as Dr. Klepacki pointed out, I used the
17 Pacific Decadal Oscillation, which is a climate
18 phenomenon that has a 25 to 35-year return period,
19 cycle, and it goes through wet phases, it goes through
20 dry phases.

21 I took out the data from the wet phases and I did
22 a separate set of flood statistics on it because,
23 remember, we're expecting to be wetter in the future.
24 So this is a reasonable way of looking at it.

25 What you see here -- so the wet data are the blue

1 symbols and I've regressed the line through them. And
2 the red symbols are just all of the data together and
3 I've regressed the line through them. And as you can
4 see right up in the top in the brown symbol, that's the
5 2013 flood. It was anomalous, of course.

6 But I've only regressed through the other data. I
7 haven't looked at that one because it just pulls the
8 line higher and it makes things look even worse. So
9 it's somewhat of an outlier.

10 But what's important to take away from this is you
11 see, as that line shifts into wetter phases, a 1 in
12 100-return period becomes a 1 in 60-return period. So
13 that actually shifts to earlier. Similarly, a 1 in 200
14 becomes a 1 in 100, and a 1 in 500 becomes about a 1 in
15 220- or 230-year event.

16 So you can be thinking you're designing to 1 in
17 200 event, when in actual fact you're under-designing
18 when you're not considering a wetter future and looking
19 at the statistics this way.

20 What I've done is tried to exemplify it a little
21 bit better with a percent chance of occurrence table
22 here. So you might have heard Mr. Secord referring to
23 this in cross yesterday, but it's really important to
24 keep in mind because what happens is when these return
25 periods shift, their percent chance of occurrence

1 increases.

2 So, for example, if you have -- over a period of
3 50 years, there's a 39 percent chance of a 1 in 100
4 event occurring. If that's a 1 in 200 event, it's
5 22.2 percent and 9.5 percent for a 1 in 500. But if a
6 1 in 500 becomes a 1 in 200, it actually doubles, more
7 than doubles its percent chance of occurrence.

8 So that's important to know when you're designing
9 these things. Are you designing them, that their
10 robustness is there to deal with this type of percent
11 chance of occurrence increase. You could be thinking
12 you're designing properly, but you could -- you're not
13 taking into account these high magnitude events that
14 have occurred and are likely to occur in the near
15 future.

16 Next slide, please. Slide 9.

17 Then there's a risk posed by prolonged drought.
18 We've talked about windblown dust and the respiratory
19 risks. We're going to have sediment in a very large
20 area that's going to be subject to wind. This sediment
21 is going to have contaminants associated on the
22 surface. They're fine-grain sediments. They have high
23 surface area; they're going to have things associated
24 with them. This becomes an inhalation risk.

25 Similarly, accumulated water with nutrients, plus

1 seasonal warming can lead to algal blooms. There was
2 some discussion about the risk of cyanobacteria which
3 is a toxin; this could lead to more opportunities for
4 insect breeding.

5 From what I understand about the design of SR1,
6 there could be water that stays accumulated in there
7 just from a rainfall event or whatever that won't be
8 spilled; it can still accumulate in there and warm up.
9 And we know there are some nutrients in the groundwater
10 there, and it's obviously coming from the land. So the
11 nutrients are there, so there's a risk around that.

12 We talked about ground cracking and the increased
13 seepage risk in cross-examination. Extended drought is
14 going to lead to a drop in the water table. We've seen
15 this before in the paleo records. It's part of the
16 reason why we have weathered till horizons that can
17 extend down to 10 metres. This happened several
18 thousands of years ago an epithermal period. And so if
19 it happened in the past, it can happen again.

20 Fractures form, they can extend to depth, and when
21 you crack clay, it's not a barrier anymore. And it can
22 enhance seepage pathways.

23 And, lastly, as Dr. Klepacki pointed out, wildfire
24 risk is a very, very real risk here. The hazard is
25 high in the Elbow River watershed. And what happens

1 when you burn a landscape and you burn trees, you've
2 obviously lost the cover, the canopy. So more moisture
3 can actually fall on the ground and run off. Soils can
4 become hydrophobic, they repel the water.

5 And so you get higher run-off coefficients, higher
6 watershed yields, higher associated river flows, and
7 degraded water quality because there's grain sediment
8 with metals and organics and all kinds of things
9 downstream into downstream-receiving bodies.

10 Q. Dr. Fennell, before you move from that slide, Mr. Frigo
11 today said that the degraded water, degraded water
12 quality from a forest fire in the catchment area, that
13 all of that degraded water could be funneled into SR1
14 and held there in order to enhance the -- Calgary's
15 water quality. Did you hear Mr. Frigo state that?

16 A. **MR. FENNELL:** I certainly did. And, frankly, I
17 was quite surprised because I didn't think that was the
18 intent of this structure.

19 Q. And in your review of the application, did AT -- my
20 understanding is AT said they're not going to use the
21 SR1 for storage of water. But did -- in your review of
22 the application, was there any modelling done by AT to
23 show what the effects might be of using SR1 to store
24 degraded water that would be coming down the
25 Elbow River as a result of a forest fire?

1 A. MR. FENNELL: No.

2 Q. Okay.

3 A. MR. FENNELL: I think that's the last slide for
4 the climate.

5 If we could dispense the next slide, document
6 host, please, Slide 10. So I'm going to talk about
7 hydrogeology, geochemistry, and water quality. And
8 I'll try to get through this as quickly as possible.
9 I've identified a number of points here that I'd like
10 to discuss.

11 The model setup in my opinion does not honour the
12 geology of the site. I don't know how much more I can
13 say that and how much more we'd have to belabour that.
14 We went through it excruciatingly in the
15 cross-examination, but it's pretty apparent that it
16 doesn't.

17 There's a lack of hydraulic conductivity or
18 K value measurements; there was three and one in the
19 till, sorry, one in the clay. And this leads to
20 concerns regarding the appropriateness of the results
21 that have been modelled.

22 There appears to be some systemic bias, despite
23 what has been said by the AT panel, which leads to
24 concerns regarding the efficacy of the model in certain
25 parts of the model domain. We have seepage estimates

1 that are considered -- that are way too low due to
2 model-layering issues; this is my opinion; some geotech
3 concerns related to pore pressures and the risk of
4 shear-slip; and then we have the water quality
5 assessment which is lacking with respect to any
6 geochemical risk evaluation, in particular the
7 mobilization of contaminants to local receptors,
8 whether it's groundwater or surface water.

9 Next slide, please. Slide 11.

10 I won't belabour this. Mr. Secord did an
11 excellent job of dealing with this. But the majority
12 of the footprint underneath the SR1 reservoir is
13 covered by lacustrine clay, upwards of 5 metres of the
14 material. You can see that on the panel on the
15 left-hand side, which is from Exhibit 110, PDF page 47.

16 And on the right-hand side, I'm showing you a
17 slide view, which again, if you look closely enough,
18 you can see the outline of the SR1 design and the
19 reservoir with a brown swath coming through the middle.
20 That is that lacustrine clay, and then it's flanked on
21 either side by till. That particular image is from
22 Exhibit 110, PDF page 50. So the majority of the area
23 in the reservoir that's going to accumulate water is
24 sitting otop of lacustrine clay.

25 Next slide, please. Slide 12.

1 Well, I found this very interesting because there
2 was a discrepancy in the geological configuration.

3 In the first quotation at the top, which is from
4 Exhibit 327, PDF page 44, from Alberta Transportation's
5 response to my submission, they seem to not believe
6 that there are coarser textured units underneath the
7 present SR1 PDA.

8 That completely conflicts with what was said in
9 other submissions by Alberta Transportation. For
10 example, Exhibit 159, PDF page 195, goes on to say:
11 (as read)

12 "Unnamed Creek is an undersized river
13 valley infilled with fluvial materials
14 (sand and gravel) overlain by a glacial
15 till."

16 Another exhibit, Exhibit 178, PDF page 16, goes on to
17 say: (as read)

18 "Alluvial sand and gravel soils were
19 encountered in the low-lying area of the
20 Unnamed Creek near Station 23 plus 200
21 of the storage dam."

22 Next slide, please.

23 There's been some challenges with the reported
24 model layer parameter values. I have to apologize.
25 This particular table, which is from Exhibit 110, PDF

1 page 473, has now been superseded from another table
2 from Exhibit 375, PDF page 48, that changes the values
3 and actually makes them an order of magnitude or more
4 lower.

5 But that still doesn't --

6 Q. Just for the record, that was the exhibit that was just
7 newly entered yesterday afternoon?

8 A. MR. FENNELLS: Correct, correct. It's just been
9 surprising at how these things have been changing, hard
10 to keep up with all these changes.

11 But despite that fact, it doesn't change the
12 context around this data. And so I'm just going to
13 carry on, because this is what I prepared.

14 So as I indicated, only three hydraulic
15 conductivity field tests were conducted to give real
16 data, not laboratory data, real data, real data that's
17 giving you a better idea of a larger area around a
18 borehole, as opposed to a small core that's confined in
19 a laboratory and tested under controlled conditions.
20 One of those was for the clay, and two were for the
21 till.

22 Now, I would argue this is definitely not enough
23 information to properly constrain a clay field.

24 What I found very interesting was their response
25 that, "Well, we attempted to do a number of tests, but

1 there wasn't enough water or they were too slow." Well
2 why didn't you report that? That's good information.
3 That was not reported. All that was reported was three
4 tests.

5 And as Mr. Secord pointed out, 16 monitoring wells
6 in the unconsolidated deposits were successfully
7 sampled for water quality, so they had to have water in
8 them. Well, why weren't they tested, then? "Well,
9 they're too slow," we get the response. "Well, that's
10 still good information, isn't it?" I would say.
11 Anyways...

12 Also there's been some very interesting
13 configurations regarding K values. I draw your
14 attention to the blue box, which is the till height
15 conductivity north. We have an 8.3 times 10 to the
16 minus 5; that's really, really high for a till.

17 What I think is important is a lot of these
18 numbers have been changing, and that's very
19 disconcerting.

20 Next slide, please.

21 This is Slide 14. So now I'm going to show you
22 visually.

23 These are the five top model layers, there's seven
24 layers in general. But what I'm showing, and in the
25 larger image on the left-hand side, you can see that

1 purple area. That is the area of the clay. That's
2 that lacustrine clay. And the more green-ish-blue or
3 turquoise area is the flanking areas of the till that's
4 underneath.

5 So what's interesting is the clay, which in the
6 previous table was shown as having a hydraulic
7 conductivity of 5.1 times 10 to the minus 6 metres per
8 second in this image is shown as having 7.2 times 10 to
9 the minus 8. That is an inconsistency. And we also
10 see that that inconsistency carries on all the way down
11 into the Layer 2 and Layer 3 and so on and so on.

12 So that's just an inconsistency. And that's going
13 to affect the model results. When you have a lower
14 hydraulic conductivity underneath, you're going to have
15 less seepage, less leakage out of the bottom. This
16 doesn't even take into account the possibility for the
17 presence of fractures or other high permeability lenses
18 within these units that would increase the hydraulic
19 conductivity.

20 So they've just -- they've used a low value here.

21 Equally, as you saw in the previous slide, the
22 presence of this sand and gravel has been substantiated
23 by the geotechnical team; yet it is missing underneath
24 the footprint of the SR1 reservoir. That's where the
25 Unnamed Creek valley is. It's not there. It's totally

1 missing.

2 Where we were led yesterday I have no idea, and
3 even this morning, we were led to areas outside of the
4 reservoir. Well, I don't care about those. I really
5 care about underneath the reservoir because this is
6 where water is going to go.

7 Certainly I care about the diversion channel and
8 the drawdown effects and the outlet channel equally;
9 that needs to be considered. But the main player here
10 is the reservoir, and we can see that we've got major
11 discrepancies here.

12 Next slide, please.

13 THE CHAIR: Mr. Secord, sorry to interrupt
14 Dr. Fennell. You had requested about an hour and we're
15 approaching an hour and a half, which is not a big deal
16 but we were hoping to adjourn around 5. Are you
17 expecting to be done your direct around 5:00, or where
18 are we at?

19 MR. SECORD: Yes, sir. And, as you know, we
20 had expected Dr. Fennell to give a presentation in
21 Topic Block 3 so he then moved so it's almost really
22 like a combined, which is why -- I probably should have
23 alerted you to the fact that, you know, we had this
24 discrepancy in the process.

25 So, yes, we would be -- I mean, we've got ten

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1 slides left and so, yes, we would be done before -- I'm
2 hoping we'll be done by 5. And if we have to go maybe
3 over a little bit, it would be nice if we could
4 complete our panel, the examination-in-chief, and then
5 my friends -- Mr. Fitch would have a complete record
6 and then tomorrow morning we would come back for cross.

7 THE CHAIR: Agreed, and my apologies. No, we
8 had talked about this and, for some reason, I just had
9 in my head it was a cross; it was really on direct from
10 Dr. Fennell as well. So my apologies.

11 But I would agree, if we can get that done today
12 and allow Transportation to prepare, that would be
13 perfect. So thank you very much.

14 MR. SECORD: Thank you.

15 A. MR. FENNELL: Thank you. I appreciate that and
16 I will pick up the pace here. I know we've covered
17 some of this ground so I won't belabour it.

18 THE CHAIR: Fair enough. But do not pick up
19 the pace on your speaking. I think Ms. Vespa would
20 appreciate that as well, so it's all good. Thank you.

21 A. MR. FENNELL: I will do that. Thank you, sir.

22 What we're looking at on this slide, which is
23 slide 15, is model bias. And it is apparent Mr. Secord
24 took Mr. Yoshisaka through this yesterday, but we do
25 have a systemic bias. We have a 50 percent --

1 58 percent positive bias, and a lot of that positive
2 bias is to the -- obviously to the east side of the
3 structure, but what it does talk to is that there is
4 bias in the model.

5 You were presented with a one-to-one line
6 yesterday by Mr. Yoshisaka indicating that, while there
7 was a good one-to-one correlation, but that's averaged
8 across the entire model domain.

9 If you were to carve this model domain up into
10 sectors, you would get very different results. So what
11 it speaks to is the model is not performing well in
12 certain parts of the domain compared to others. That's
13 the point to take away from this, and so it does reduce
14 the confidence.

15 Next slide, please.

16 MR. SECORD: Slide 16.

17 A. MR. FENNELL: Thank you. There is drawdown
18 discrepancy. Again, I know that there's been an update
19 to this particular image that I'm showing here which is
20 from Exhibit 110, PDF page 141.

21 But what I find very interesting is that there's
22 no drawdown along the outlet channel leading from the
23 reservoir to the Elbow River.

24 Now, we have been told, and it is shown in
25 Exhibit 110, PDF page 75, the image that I have up in

1 the top right-hand corner, that the water table is
2 relatively close to surface, anywhere from a metre to 2
3 metres within the surface, below the surface of the
4 land. And you can see that in the blue colours in the
5 outlet leading down to the Elbow River.

6 Well, we do know that we're going to have an
7 outlet channel and from the design in Exhibit 159, PDF
8 page 206, but that channel is going to be excavated
9 down upwards of 8 or 9 metres below the landscape.
10 Well, that's 7 metres below the water table. And we
11 also know that we have alluvial deposits in this area,
12 alluvial sands and gravels, and we have the tills that
13 will drain. There's going to be water that's going to
14 be draining out of this material towards this
15 excavation. And, of course, if it creates to surface
16 flow, it's going to go into the Elbow River and it's
17 going to take with it whatever it has.

18 Next slide, please. Slide 17.

19 This is looking at the modelled head increase and
20 leakage estimates.

21 The image I'm showing here is from Exhibit 110,
22 PDF page 149. It shows the depth of water that could
23 be expected under a design like in the SR1 reservoir.
24 So you can see upwards of 24 metres of head
25 accumulated -- of water accumulated in this structure.

1 Now, I understand it thins out towards the
2 northwest, but it's quite deep for a significant
3 portion of the footprint, 12 metres. So 24 to
4 12 metres of water. When you have an increased head of
5 that much and you have an elevated depth to
6 groundwater, you're going to get greater leakage
7 potential from the base. That's just the physics of
8 it. And if it's really, really low conductivity,
9 hydraulic conductivity material, you'll get less
10 leakage; if it's a little bit higher hydraulic
11 conductivity, you get more leakage. That's just the
12 way it works.

13 So I struggled with the seepage estimates that
14 Alberta Transportation has given us of 426 cubic metres
15 per day when this structure is full.

16 When I actually use the hydraulic conductivity
17 values that they have in their model for the clay,
18 which was 5.1 times 10 to the minus 6, as a matter of
19 fact, I took the geometric mean between the till,
20 7.2 times 10 to the minus 8, and the clay, 5.1 times 10
21 to the minus 6. I took the geometric mean, just to be
22 fair. And when I did my math on the leakage from the
23 base of this structure, I get over 100,000 cubic metres
24 per day. And if you use the high conductivity till to
25 the north, you get even higher values.

1 So I really don't know where they got this value,
2 and it wasn't explained in the documentation or in the
3 testimony.

4 So this is a big wild card here because, yes, if
5 you don't want to have leakage out and have things
6 flushed out of the till, just make it hydraulic
7 conductivity and it won't happen.

8 Next slide, please. Slide 18.

9 Looking at mapped vertical flow gradients. We
10 know that we have upward gradients in some parts of the
11 model domain, or the study domain, particularly in the
12 footprint of the reservoir, but it's weak, and I'll
13 show you in the next slide.

14 We also have some steeper gradients under
15 topographic highs, and that was pointed out in the
16 cross-examination testimony. So that makes sense. I
17 don't struggle with that.

18 But we also see in the panel to the -- so that
19 particular image was Exhibit 110, PDF page 74, that was
20 the left image.

21 The right image is showing the depth to water
22 table again, from Exhibit 110, PDF page 75. And we can
23 see that it's fairly shallow underneath the footprint
24 of the Springbank reservoir -- Springbank off-stream
25 reservoir, but it does extend, in some locations, 2 to

1 5 metres. So it can be anywhere from 2 to 5 metres, or
2 within a metre. So it's variable. So that's going to
3 dictate what those gradients are going to be like.

4 And so the depth of water table is generally
5 greater than 1 metre and up to 10 metres or more in
6 some locations, so you have to keep that in mind.

7 Next slide, please. Slide 19.

8 Well, what I'm showing you is what I just clipped
9 out of the application documents. So on the left-hand
10 side, we're showing from Exhibit 110, PDF pages 78 to
11 80. And I've just taken them, and I've overlain them,
12 and I've aligned up the elevations.

13 So what we're showing on the top panel with the
14 red star in it, and where that red star is indicated in
15 the image underneath in the middle, that's where it's
16 located. This is actual measured data. So what you
17 see that, yes, okay, the bedrock does have a higher
18 groundwater elevation than the clay and tills, but not
19 always. Sometimes they cross over, sometimes they
20 approach. And so this is talking about the dynamics of
21 the vertical gradient. They're not consistently upward
22 from the bedrock. They do have the possibility of
23 shifting. And I think in this image you can see that
24 they're getting pretty close to shifting.

25 Certainly on the right-hand side we've got a much

1 bigger separation, probably about a metre or so or more
2 between the bedrock and the till with the
3 gradient -- with the groundwater elevation and the
4 bedrock higher than the till and clay. So, yes, that's
5 clearly an upward gradient, but it's also on the outer
6 edge of the reservoir itself.

7 So it really depends on where you are in the
8 structure what the gradients are going to be, upward or
9 downward, weak or strong.

10 Now, Mr. Secord did bring up in the
11 cross-examination this hydrograph that I pulled from
12 the Alberta Environment and Parks groundwater
13 observation well. This well is located close to the
14 Big Hill Springs Provincial Park. And what I've shown
15 is the monitoring period that was assessed by Alberta
16 Transportation. Those are those two little red lines.

17 You can see that that period does not capture, by
18 any means, the variability that can be expected in the
19 water tables. And so this can have a serious
20 ramification for these gradients. You could have
21 strong downward gradients if your water table increases
22 substantially compared to your bedrock.

23 And so this is something that needs to be kept in
24 mind for potential long-term sustained gradient
25 reversals in future climates.

1 Next slide, please. Slide 20.

2 I wanted to bring up the geotechnical concerns
3 because these are something that are extremely
4 important and speak to the risk of the structure
5 failure.

6 We know that a lot of geotechnical work has been
7 done on sediments, and Mr. Back pointed that out quite
8 a bit in his testimony cross-examine, but the question
9 here is whether or not the interfaces between these
10 particular formations were tested? Yes, you can test
11 the materials but when you have one sediment sitting on
12 top of a different type of sediment, that can be a
13 point of weakness.

14 And we do know that when you put an external load
15 on the ground, that the pore pressures have to respond
16 in kind. So if the total stress increases, that's the
17 loading -- the total stress, so that's the weight of
18 the soil, the weight of the water increases, that
19 increases the effective stress, which is the
20 grain-to-grain contact between -- in the soil,
21 increases that, and so then the pore pressures have to
22 adjust accordingly, and they can go up.

23 So that's a concern for creating a shear slip
24 situation.

25 And we also know that some of these deposits are

1 montmorillonite rich. This was in the Moran 1986
2 report. He's indicating there could be upwards of 40
3 or 50 percent montmorillonite in some of these
4 deposits. Montmorillonite is a swelling clay. It's
5 like bentonite. When it gets wet, it gets slippery,
6 and it can slip.

7 So it's important that we understand that, and I
8 guess the point that was made in Exhibit 327 and PDF
9 page 45, and this was brought up in the
10 cross-examination, is that the load was not placed on
11 the till and the clay; it was placed directly on the
12 underlying bedrock.

13 Well, we're not interested in that in this
14 particular scenario; we're interested in what's going
15 on at the interface between the clay and the tills and
16 the bedrock. Not just the bedrock, not just the mud
17 spills. Everything.

18 Next slide, please. I'm getting close.

19 I wanted to talk about the connectivity of the
20 clays and tills in the bedrock. This slide is
21 providing some chemical evidence of this. There is
22 some physical evidence with the water levels but there
23 is chemical evidence.

24 I'm showing you a Piper plot here, this
25 trilateral -- or this triangular plot here on the left

1 side. This is from Exhibit 110 of PDF page 92.

2 What you see is some grey dots which are
3 associated with the bedrock, and blue dots which are
4 associated with the surficial deposit.

5 So this is showing the major ion composition, the
6 calcium, magnesium, sodium, potassium, bicarbonate,
7 sulfate, chloride ions, and it's grouping them. And
8 you expect waters with similar hydrochemical character
9 to plot in the same area of these diagrams. And what
10 you see is a lot of the surficial deposits have
11 groundwater similar to the bedrock.

12 Now, what we heard the statement made was that
13 there's a difference to the TDS. The average TDS of
14 the bedrock is different than the average TDS of the
15 tills and the clays. Well, if you're just looking at
16 the average, you'd be fooled to believe that that's the
17 case, but you have to look at standard deviations or
18 variants around a median.

19 What I actually did is two statistical tests, I
20 did a sign test and a Wilcoxon signed-rank test; they
21 are not different, statistically different. This is
22 how you have to compare data. You can't just say well,
23 the averages are different. That's not good enough. A
24 statistical test is required to validate that.

25 And what these statistical tests indicate is that

1 there is no difference. There is no statistically
2 significant difference between the TDS and the tills,
3 the clays, and the upper bedrock.

4 Next slide, please.

5 This is Slide 22. Talking about water quality and
6 risk to connected systems.

7 So Alberta Transportation did do some baseline
8 work on the water quality, and they did identify some
9 constituents of concern, such as selenium and uranium.
10 And these were above levels safe for human consumption
11 and protection of aquatic life.

12 There was also some elevated nutrients identified
13 in the groundwater in the form of organic nitrogen, and
14 there was also some coliform form bacteria. So we know
15 whatever has happened on this landscape over the past,
16 that's got into the bedrock, sorry, into the
17 groundwater and the tills. And that can get into the
18 bedrock.

19 So there's this issue of the flushing that I
20 talked about earlier of these contaminants from the
21 clays and tills into the bedrock because they're
22 connected; there is connectivity between them. And
23 this flushing will occur, you know, whether the SR1 is
24 full or partially full.

25 There's also the issue around mobilization of

1 additional constituents by oxygenated waters, enhanced
2 reactions. Now, we know that no measurements were done
3 for redox, so the assumption is made that they're
4 oxygenated but how oxygenated? They could be partially
5 reducing for all we know.

6 I attempted to dial it in by looking at some
7 things and looking at some published redox ranges, but
8 by no means am I a hundred percent right on. I would
9 rather take some measurements or actually measure some
10 redox couples chemically and do the calculation. But
11 that has not been done, only assumption.

12 The other thing to keep in mind is when freshwater
13 like water that will be coming in from a flood meets
14 higher TDS waters in the till, certain things can
15 happen. Certain chemical reactions can happen. There
16 can be ion exchange reactions on surfaces of clays.
17 They can bump off certain things. It's complicated;
18 I'm not going to go there.

19 But what I can tell you is that absolutely no
20 assessment of this was done. No assessment for the
21 potential impact to groundwater quality, none of the
22 actual redox state of the groundwater was identified,
23 no geochemical reactions or fate transport
24 characteristics were assessed. Only an assumption or a
25 belief that the water quality will not be an issue.

1 So it remains unassessed and unresolved.

2 Next slide, please.

3 So the final considerations here. The SR1 does
4 not address floods greater than the 2013 event. We
5 know they have happened, likely have happened in the
6 past and will likely happen in the future.

7 In my opinion, the MC -- McLean Creek 1 or MC1 is
8 a superior option given its ability to manage higher
9 magnitude floods up to the PMF, protect all downstream
10 communities, store water for future drought mitigation,
11 which is great for the city of Calgary, keeps ahead of
12 water on the sediment so we don't have dust blowing.
13 There's so many pluses there, but in my professional
14 opinion, this is more in the public interest. But I
15 know we're just looking at SR1 now.

16 SR1 will increase the risk to human and ecological
17 health due to this flushing or leakage of water out,
18 the accumulation of contaminants in there. It's going
19 to be flushed into the underlying groundwater and
20 connected systems, the groundwater, the bedrock water,
21 the surface water in the outlet channel, dust
22 inhalation from large open areas, and the accumulated
23 sediments with associated contaminants is obviously a
24 risk.

25 SR1 only provides additional water security for

1 the city of Calgary in flood years because, in my
2 opinion, and this only just makes logical sense.
3 During a prolonged drought condition, I don't think
4 that the city is going to be dropping water levels in
5 their reservoir if they don't have to because they're
6 going to want to keep that water as much as they can.

7 And so -- and during a prolonged drought period,
8 there is going to be a lower flood risk anyways because
9 there's going to be a lack of precipitation likely
10 including a snowpack. And so SR1 will not be needed at
11 all.

12 So I have no idea how this increases the water
13 security for the city of Calgary. That, to me, is just
14 a gap in -- that's pretzel logic.

15 Next slide, please.

16 Alberta Transportation has not provided a
17 sufficient level of assessment relating to the physical
18 and chemical hazards and related risks posed to SR1.
19 This is -- I hope I'm making this a clear point.

20 Alberta Transportation have assessed these
21 hazards. If they would have assessed these hazards
22 more fully and all the stakeholders had the information
23 to understand the risks to the community and the
24 environment, I think we would be in a much better
25 position.

1 Alberta Transportation has relied on models to
2 frame the hydrological and hydrogeological risk of SR1,
3 but nothing has been done to address the geochemical
4 risk. And I would even argue that the hydrogeological
5 modelling from the physics is flawed.

6 And it's important to remember, and I do believe
7 that it was either Mr. Wood or somebody pointed out
8 that -- please back one slide -- that it's important to
9 remember that models are only as good as the
10 information used, understanding of the site, the skill
11 of the modeler, your imagination. They are not unique
12 and inherently inaccurate, but they are sometimes
13 useful. And so it's not that they're totally useless;
14 they guide us. They are meant to enhance human
15 intelligence, not replace it.

16 Alberta Transportation has been relying on
17 monitoring to assess the information gaps noted, and I
18 argue that monitoring is not mitigation, and often
19 times when you detect things, it can be too late, and
20 it can be very difficult and sometimes impossible to
21 remediate. So this is why we assess the worst-case
22 scenario and I don't think that that's happened here.

23 Next slide, please.

24 This is the final slide.

25 So, again, I say many, if not all, of the issues

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1 that I've raised today for SR1 would disappear if the
2 MC1 option had been advanced, but, unfortunately, it
3 has not.

4 And really at the very least, if this project is
5 going to get approval, the proponent should be
6 compelled to undertake more assessment work to provide
7 the information necessary so the Board can make a good
8 decision in the public interest.

9 So I thank you for the accommodation of this extra
10 time, Mr. Chair, Panel members and participants. I'll
11 end there, thank you.

12 MR. SECORD: Thank you, Dr. Fennell. And thank
13 you, Mr. Chair, for letting us go over the usual 5:00
14 end point. And if I could as a housekeeping matter,
15 I'm not sure Ms. Friend, if Dr. Fennell's errata sheet
16 has been marked as an exhibit, and also if we could
17 mark the PowerPoint as an exhibit.

18 THE CHAIR: Thank you. I was going to do
19 that. So thank you, Mr. Secord, they do need to be
20 marked. Ms. Friend?

21 MS. FRIEND: Okay. So the errata will be
22 Number 383, and the PowerPoint will be Number 384.

23 **EXHIBIT 383 - DR. FENNELL ERRATA SHEET**

24

25 **EXHIBIT 384 - DR. FENNEL POWERPOINT**

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1 **PRESENTATION**

2 MR. SECORD: Thank you, Ms. Friend. And
3 Mr. Chair, with that my panel is available to answer
4 any questions when the hearing resumes.

5 THE CHAIR: Right. And I think we'll start
6 the cross tomorrow morning, for obvious reasons.

7 Real quickly, a couple of things: One, thank you
8 to document managers today, Ms. Kaminski, Ms. Decosemo,
9 and Ms. Taylor. A job well done.

10 And Ms. Vespa and Ms. DiPaolo, a lot of technical
11 jargon to get down in transcripts, so we thank you very
12 much. It's a tough job for sure.

13 We were asked about a break. I don't think we'll
14 have much of a break, Mr. Secord. I mentioned I think
15 your time forecast for finishing tomorrow was
16 ambitious.

17 MR. SECORD: I think so.

18 THE CHAIR: I think it is. I would like to
19 be -- it would be I think if we're finished Topic 5,
20 all of the evidentiary portion, by end of Thursday, I
21 think that would be pretty good. My estimation is that
22 may not happen, actually.

23 I mean depends on what time we end up taking for
24 sure, but based on what I've got on paper, it will be
25 close.

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1 However, so let's wait and see where that takes
2 us, but the panel is open to not sitting on the Monday,
3 Easter Monday. In particular, if we can -- if there is
4 a little bit of evidentiary portion to be completed on
5 the Tuesday, if we were to sit Tuesday, April 6th, and
6 then have direct following that, that might work as
7 well.

8 So we may also canvass over the next day or two, I
9 might have Mr. Kennedy canvass, I've got some ideas in
10 terms of time for direct, but he might canvass counsels
11 about that as well, to see how that fits.

12 So we're open to not sitting on the Monday. I
13 think we do need to wait until we see where we're at
14 about noon on Thursday before anything final. But for
15 now, let's assume that we'll be done close to Thursday
16 or Tuesday morning and finals finished on Tuesday by
17 5:00 hopefully. So --

18 MR. SECORD: Thank you.

19 THE CHAIR: And thanks to your panel, much
20 appreciated. It's been, you know, a good day I think,
21 folks, but it is I think time to adjourn.

22 But are there any outstanding matters that anyone
23 has before we close hearing today?

24 Hearing none, we're adjourned for the day. See
25 you tomorrow morning, 7:45 sign-in, 8:30 start. Thank

1 you .

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3 PROCEEDINGS ADJOURNED TO MARCH 31, 2021, AT 8:30 A.M.

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1 Certificate of Transcript

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3 We, the undersigned, hereby certify that the foregoing
4 pages 1629 to 1888 are a complete and accurate transcript
5 of the proceedings taken down by us in shorthand and
6 transcribed from our shorthand notes to the best of our
7 skill and ability.

8 Dated at the City of Calgary, Province of Alberta, on
9 March 30, 2021.

10

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12

"Lorelee Vespa"

13

Lorelee Vespa, CSR(A) RPR CRR
Official Court Reporter

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16

"Deanna DiPaolo"

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Deanna DiPaolo, CSR(A)

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Official Court Reporter

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