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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 5

March 26, 2021

(Via videoconferencing)

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

3

4 Volume 5

5 March 26, 2021

6

7

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10 Walter Ceroici	Commission Member
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24 Ron Kruhlak, Q.C.	For Alberta Transportation
25 Gavin Fitch, Q.C.	
26 Michael Barbero	

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28 Melissa Senek	For City of Calgary
29 Sara Munkittrick	
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32 Luigi Cusano, Q.C.	For Calgary River Communities
33 Gino Bruni	Action Group and Flood Free
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35 L. Douglas Rae	For Stoney Nakoda Nation
36 Sara Louden	

37

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1 Richard Secord For SR1 Concerned Landowners
Ifeoma Okoye Group

2

3 Bob Williams For Calalta Amusements Ltd.
and Calalta Waterworks Ltd.

4

5 Scott Wagner For Scott Wagner

6

7 Lorelee Vespa CSR(A) CRR RPR Official Court Reporters
Deanna DiPaolo, CSR(A)

8

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

9

10 THE CHAIR: Good morning, everyone, and I
11 apologize for the quick disconnect yesterday. I think
12 we've got that rectified.

13

14 So the discussion that Mr. Secord and I were
15 having, I think, was taken as an active point pretty
16 quickly, and the Zoom meeting was ended, which maybe
17 didn't hurt too many people's feelings. It was the end
18 of day, a long day, but we do have that, I think,
19 figured out for today.

20

21 But if we did have a problem, I don't think we
22 talked about that, but if you had an IT problem where
23 either you're disconnected, the first thing to do is
24 contact Ms. Friend in a hurry to get back on. And if
25 you're part of the witness panel at the time, or you're
crossing, we'll know that, of course, because you won't
be there anymore, so we'll hold on.

26

But if you're not and you want to rejoin, you

1 still need to get a hold of Ms. Friend, and maybe I'll
2 just say this number again in case you don't have it or
3 misplaced it, but area code 403-620-8294. So her cell
4 phone can be the best way to get a hold of her.

5 And if we have kind of a massive disconnect for
6 some reason, then what we'll -- you can just use the --
7 wait 5 minutes, 8 minutes or so, and use the original
8 link that you had to get into this meeting to just get
9 back to the Zoom. So the same link will work again.
10 You just need to go back in and reactivate it, and then
11 Mr. Wiebe will allow you back in.

12 So before we start this morning, I was wondering
13 also if anybody had any prelim matters for the morning
14 or housekeeping?

15 MR. FITCH: Yes, Mr. Chair. It's Gavin Fitch.
16 Can everyone hear me?

17 THE CHAIR: Yes, good morning.

18 MR. FITCH: I just wanted to advise the Board
19 that Alberta Transportation is in the process of filing
20 within the next five minutes or so with Ms. Friend a
21 response to an undertaking, and that's Undertaking 11,
22 which is basically whether Alberta Transportation would
23 consider moving Springbank Road to allow uninterrupted
24 access for residents in the event of a design flood.

25 So we've got a written response, and that will be,

1 as I said, provided to the Board and Mr. Secord
2 momentarily.

3 THE CHAIR: Okay, thank you, Mr. Fitch.

4 So, and I would like to -- I guess we're going to
5 start off with Mr. Secord or for you to finish up your
6 cross this morning.

7 By my accounts, we've got a -- about to 11:30 for
8 your allotted time, thereabouts, so it's going to take
9 us pretty close to the lunch hour. Of course, we'll
10 see how that time goes.

11 Mr. Secord, did you expect that that was the time
12 that you had requested and we had granted is still
13 going to be appropriate for your cross on this topic?

14 MR. SECORD: I do, sir. I have a number of
15 climate change questions, but I was thinking what I
16 might do is ask all of those climate change questions
17 in Topic Block 4.

18 I'm assuming the witness that is dealing with
19 climate change in Topic Block 3 will also be in Topic
20 Block 4, but maybe, Mr. Fitch, you could confirm that
21 because that will obviously impact my time today.

22 THE CHAIR: Mr. Fitch?

23 MR. FITCH: Yes, I was just confirming with
24 Mr. Barbero.

25 Yeah, I think it's safe to say that Alberta

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Cross-examined by Mr. Secord

1 Transportation will have witnesses who can speak to
2 climate change, both in this topic session and also the
3 next.

4 MR. SECORD: So that might expedite matters
5 this morning, sir, if I could move -- shift that piece
6 over.

7 So with that, that's the only question I had.

8 THE CHAIR: Okay. Well, thank you.

9 Mr. Secord, please proceed.

10

11 M. HEBERT, M. SVENSON, W. SPELLER, D. BRESCIA, M. WOOD,
12 Y. CARIGNAN, D. BACK, D. LUZI, D. YOSHISAKA (For Alberta
13 Transportation), previously sworn/affirmed

14 MR. SECORD CROSS-EXAMINES THE PANEL:

15 Q. All right. If the document host could pull up
16 Exhibit 339. We were looking at that yesterday. PDF
17 page 9. And while he or she is looking for that, I
18 might also note, I'm going to want to refer to
19 Exhibit 249, so if that could be pre-loaded and
20 available when the time comes.

21 MS. FRIEND: This is Laura. Is it 339 that
22 we're looking for?

23 MR. SECORD: Yes, we were looking -- that's
24 where we ended off abruptly yesterday.

25 MS. FRIEND: Okay. I don't see it pre-loaded,

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Cross-examined by Mr. Secord

1 so she's probably going to have to go to the
2 exhibit list to look for it, but she'll find it.

3 MR. SECORD: Yeah, it was there yesterday, and
4 I just assumed my documents from yesterday would carry
5 over to today for this panel. So I'll need all of
6 those references sent yesterday pre-loaded for the
7 continuation of my cross today.

8 MS. FRIEND: Right. Okay, will do.

9 Q. So, panel, I think you had just caucus and you were
10 going to get back to me with a response to the question
11 I had about sharing testing and commissioning details
12 with my clients.

13 A. MR. HEBERT: Mr. Secord, it's Matt Hebert. I
14 could provide an answer now that we've returned today.

15 So, Mr. Chairman, as we've been discussing through
16 the balance, or through the course of the hearing so
17 far, Transportation is committed to regular and
18 transparent communications with landowners of the
19 Springbank community during construction project
20 start-up. We are committed to providing regular
21 updates through the ongoing regulatory process.

22 As we discussed yesterday, the steps discussed
23 occurred in a different process, but, nevertheless,
24 Transportation is committed to continue to provide
25 updates about the parallel or subsequent or regulatory

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1 steps through the construction project start-up stages.

2 Transportation commits, at a minimum, should the
3 project be approved for yearly open houses for the
4 community to share updates on constructions and plans
5 for upcoming activities.

6 But I must say, unfortunately, AT cannot commit to
7 providing detailed information on equipment
8 commissioning/testing. This information is considered
9 highly sensitive and confidential. And for security
10 purposes, it is the policy of the government of Alberta
11 to not circulate the information in the public domain.

12 However, saying that, once available and subject
13 to the project's regulatory approval, AT is prepared to
14 provide a fact sheet outlining the testing,
15 commissioning, and operating framework for the project
16 to the surrounding landowners in the community.

17 Q. Thank you, Mr. Hebert. And if we could turn to PDF
18 page 10 of Exhibit 339, under the heading -- under
19 Section 2.3, "Information Required For Environmental
20 Impact Assessment," subsection 1 (a)(viii), it states:
21 (as read)

22 "When an environmental impact assessment
23 is required to support an application
24 for authorization in relation to a dam,
25 the dam owner must submit to the

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1 director in writing all of the following
2 information: (a) general information
3 about the dam including (viii) the
4 normal operating range."

5 What is the expected normal operating range for SR1?

6 **A. MR. MENNINGER:** Mr. Chairman, this is
7 John Menninger. The normal operating range for SR1 is
8 described within the Preliminary Design Report. And,
9 as we mentioned, it is when flows exceed 160 cubic
10 metres per second, and up to the design flood event of
11 1240 cubic metres per second. That's what we would
12 consider a typical or normal operating range for the
13 project.

14 We go on to further describe operation frameworks
15 for flows that would exceed 1240 cubic metres per
16 second in the event that we were to operate in those
17 conditions.

18 And then, finally, we identify the performance of
19 the project under various dam safety flows.

20 **Q.** And then if we go down the page, Section 2.3, sub (b),
21 it says: (as read)

22 "Details regarding potential accidents
23 or malfunctions including:

24 1. The identification of potential
25 accidents and malfunctions that it could

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Cross-examined by Mr. Secord

1 occur for all stages of the project,
2 such as cofferdam leakage or failure,
3 sediment control failure, or other dam
4 safety incidents."

5 Can you advise what -- I think you had a hard time with
6 this yesterday, Mr. Menninger, but can you tell me what
7 will you be advising the director with regards to
8 potential accidents or malfunctions, including the
9 identification of potential accidents or malfunctions
10 that occur for all stages of the project, such as
11 cofferdam leakage or failure, sediment control failure,
12 or other dam safety incidents?

13 **A. MR. MENNINGER:** Mr. Chairman, the identification
14 of potential accidents and malfunctions was provided in
15 the environmental impact assessment as submitted, and
16 detailed -- we could identify, if necessary, the
17 location of that within the EIA for your benefit, but
18 that's already been submitted.

19 **Q.** If you could do that for me, if you could point to the
20 description of potential accidents and malfunctions?

21 **A. MR. MENNINGER:** One moment, please.

22 **Q.** And while you're looking for that, would that also
23 include a description of the effects of a failure by
24 tabulating the flow arrival down -- time at a
25 downstream of the structures until the estimated

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Cross-examined by Mr. Secord

1 contents of the reservoir are within the estimated 1 in
2 a 100-year flood level?

3 A. MR. MENNINGER: Sure. So the accidents and
4 malfunctions section of the environmental impact
5 assessment is Exhibit 60. It is Volume 3 and Volume 3D
6 of the Environmental Impact Assessment.

7 Within that, we provide identification of
8 potential accidents and malfunctions scenarios,
9 including the potential off-stream dam failure breach
10 or diversion structure, as well as other potential
11 accidents and malfunctions as described within those
12 components.

13 With regards to the dam -- the second part, the
14 description of the failure by tabulating the flow
15 arrival time at downstream of the structures, that was
16 provided as it's the latest -- it's described in that
17 same Exhibit 60, and it's also described within the
18 appendices of the Preliminary Design Report.

19 Q. And that -- that Preliminary Design Report was dated --

20 A. MR. MENNINGER: It's been included in both the
21 interim report that was submitted in 2017 and then in
22 the final report provided in 2020.

23 Q. Exhibit 159?

24 A. MR. MENNINGER: That's correct. Well, it would be
25 in the appendices. So it would actually be

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Cross-examined by Mr. Secord

1 **Exhibit 174, I believe.**

2 Q. And if we go to PDF page 13, this is under Section 3.2,
3 "Requirements in Determining Consequence
4 Classification." It says: (as read)

5 "Unless otherwise specified in writing
6 by the director, a dam owner must use
7 the following types of procedures in
8 determining a consequence
9 classification."

10 And at the top of PDF 13, it states: (as read)

11 "A quantitative assessment that consists
12 of:

13 (i) a detailed breach inundation study
14 that includes failure mode -- that
15 includes failure mode evaluation,
16 computerized dam break, and hydraulic
17 routing models, detailed hydrological
18 estimates, and high quality input data;
19 and;

20 (ii) detailed scientific analyses and
21 assessments of environmental and
22 economic losses."

23 Can you tell me, Mr. Menninger, has that information
24 been provided to the NRCB?

25 **A. MR. MENNINGER:** **So as you mentioned, Mr. Secord,**

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Cross-examined by Mr. Secord

1 it says "one of" must use the following types of
2 procedures. It does not stipulate that all of those
3 procedures must be performed.

4 However, we did perform a quantitative assessment
5 that utilized a detailed breach inundation study that
6 includes the failure mode evaluation, computerized dam
7 break, hydraulic routing models, detailed hydrological
8 estimates and high quality input data.

9 The -- for the purposes of a hazard
10 classification, Mr. Chairman, we utilize those detailed
11 breach inundation studies to determine the potential
12 effects, and then classified the dam accordingly, based
13 off of those effects.

14 Q. And where is that quantitative assessment in the
15 material?

16 A. MR. MENNINGER: It is in exhibit -- I just had it
17 up. It is in Exhibit 174, and that would be PDF --
18 starting at PDF page 335.

19 Q. And has AT also completed a detailed scientific
20 analyses of assessments of environmental and economic
21 losses as a result of --

22 A. MR. MENNINGER: It was determined that those were
23 not necessary in order to classify the dam structure
24 according -- according to the elements identified. So
25 we did not perform a detailed break -- although we do

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1 provide that -- we do provide an overview of the
2 potential environmental and economic impacts within the
3 EIA. So I guess it would be -- we'll provide an
4 assessment.

5 A. MR. WOOD: Mr. Chair, but if I may supplement
6 my colleague's response.

7 COURT REPORTER: Sorry --

8 A. MR. WOOD: We have to remember that the
9 exercises to determine --

10 THE CHAIR: Mr. Wood, just -- let the court
11 reporter get your name in first, please. Thanks.

12 A. MR. WOOD: My apologies, Mr. Chair. It is
13 Matt Wood.

14 What I was going to say and supplement
15 Mr. Menninger's response is that the exercises that
16 determine the consequences classification, the reason
17 why environmental assessment and things are included in
18 there is in the cases where those may be added on to
19 raise a classification. We are dealing with an extreme
20 consequence structure that was verified by the exercise
21 Mr. Menninger described, and that is why those were not
22 included.

23 Q. And so, finally, with respect to Exhibit 339, PDF 15,
24 just while we're turning there, Mr. Menninger, in terms
25 of the analyses that was done, would there be loss of

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1 life in the --

2 A. MR. MENNINGER: In the highly unlikely scenario of
3 a breach of the off-stream storage reservoir, it was
4 determined that there was the potential for life loss
5 downstream, and that was the basis for the
6 determination of an extreme consequence structure.

7 And, as I think we've explained before, these --
8 an extreme consequence classification is not uncommon
9 in the dam safety industry, but it is taken very
10 seriously by the design team.

11 And for that reasons -- for those reasons within
12 the dam safety industry, that stipulates the
13 requirements for the stringent criteria applied to the
14 design and the loadings to the dam, and the
15 requirements for post-construction operation and
16 maintenance of the dam.

17 Q. And was there a determination of how many lives would
18 be lost in the Springbank community?

19 A. MR. MENNINGER: We did not do an exact
20 determination on the individual number of lives to a
21 specific degree, Mr. Secord.

22 Q. Is there a range of loss of life?

23 A. MR. MENNINGER: In the dam classification criteria
24 for an extreme consequence structure, there is a number
25 for what would qualify as an extreme consequence.

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1 Q. And what is that number?

2 A. MR. MENNINGER: So in the Alberta Dam and Canal
3 Safety Directive, it identifies an extreme consequence
4 structure as a structure that if -- if, as I said, in
5 the very unlikely effect of a failure, there is the
6 potential for life loss of more than 100 people or
7 individuals. It doesn't mean that it's guaranteed, but
8 that means that there is the potential, and so that's
9 how you classify it accordingly.

10 Q. All right. If we could turn to PDF 15, and I'm looking
11 at the safety management plan -- and I know that we
12 talked about this yesterday, but my clients had some
13 questions that they wanted me to ask.

14 So in this "Section 4.1 - Safety Management Plan,"
15 it states: (as read)

16 "The safety management plan must, at a
17 minimum, include all of the following
18 information..."

19 And then it sets out under (b), which is what I'm
20 interested in: (as read)

21 "The roles and responsibilities of key
22 individuals involved in the safe
23 operation of a dam or a canal including:
24 (i) the dam owner; (ii) the safety
25 manager; (iii) the engineer of record;

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1 (vi) the designer of record; (v) the
2 regulatory reporting contact; (vi) the
3 operator; and (vii) the emergency
4 contact."

5 Now, my clients have said it would be good to know where
6 these individuals will be located and who the
7 alternative contacts will be.

8 And their concerns -- I'd like you to comment on
9 that -- their concerned about (a) the ability to
10 contact; (b) response times; and (c) how long it would
11 take them to -- or whether they're required to be at the
12 site at all.

13 So can you comment on, first of all, ability to
14 contact, and so -- I guess where they will be located,
15 one --

16 **A. MR. MENNINGER:** So --

17 **Q.** I'll do it one at a time, I think, Mr. Menninger, or,
18 Mr. Wood, if you want to jump in.

19 **A. MR. HEBERT:** Mr. Chairman, just one moment.
20 Because of Mr. Menninger's location, we're just trying
21 to sorting out the right person, so just bear with us
22 for one moment.

23 **THE CHAIR:** Thank you. And when you get the
24 right person, please announce the name for the court
25 reporter.

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1 Q. MR. SECORD: Mr. Menninger, I take it you're in
2 the midwest of the US, are you?

3 A. MR. MENNINGER: I am.

4 A. MR. HEBERT: Mr. Chairman, Yvonne Carignan --
5 or, sorry, Matt Wood will start the response, and it
6 may be supplemented by others.

7 Q. MR. SECORD: Maybe I'll just give you one at a
8 time, Mr. Wood.

9 So, first of all, where will these individuals be
10 located and who will the alternative contacts be?

11 A. MR. WOOD: Mr. Chairman, thank you for the
12 question.

13 You know, I think what's important here is that
14 part of preparing the plan is identifying these
15 individuals, and that is why it's stipulated here very
16 clearly is the safety management plan identifies these
17 individuals with their contact, and it's frequently
18 updated, as I believe Mr. Menninger mentioned earlier,
19 I believe every five years an extreme consequences dam
20 plan is revisited, and I believe there's provision for
21 annual updates of things like this.

22 So it's not determined at this time for any of
23 these items, and that is -- that is essentially the
24 point of preparing this plan at a later date and those
25 individuals are all identified.

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1 Q. And are you able to comment at all on the concerns
2 about (a) ability to contact; (b) response times; and
3 (c) whether they're required to be at the site?

4 A. MR. WOOD: I think --

5 A. MR. MENNINGER: Mr. Chairman, I'll take that
6 that's an important consideration, and will go into the
7 provision of the safety management plan, including the
8 responsibilities; and their contact, which is common
9 within the dam safety industry, to identify all of
10 these individuals and how one would contact them,
11 including backups.

12 A. MR. HEBERT: Mr. Chairman, for the benefit of
13 the Panel, as we've previously indicated,
14 Alberta Transportation has committed a community
15 liaison function, both the construction and operation
16 phases of the project. That would be, you know,
17 certainly a contact available to -- to residents and to
18 members of the community in parallel to the -- to the
19 contact that was contemplated in the plan itself.

20 Q. And in terms of the potential for a catastrophic breach
21 and potential for a hundred lives being lost, can you
22 tell me, how much notice would people downstream in
23 Rocky View County and Springbank and Rocky View
24 County [verbatim], how much notice would people have to
25 evacuate, and how would that be communicated?

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1 A. MR. MENNINGER: The -- so the details of the full
2 communication plan will be developed as part of the
3 emergency management plan, emergency response plans for
4 the project.

5 As I mentioned, during operations of the
6 structure, this facility will be attended to in -- and
7 observed throughout its filling and operations. So the
8 identification of potential issues with the structure
9 is the -- is the first step within an emergency action
10 plan, emergency response plan.

11 So the -- the step process goes is: You would
12 identify a potential issue, you would classify that
13 issue, whether -- and then, basically, there's
14 step-by-step processes and the contact of the
15 vulnerable populations downstream.

16 So if it's just an observe and report versus a
17 mitigation measure, there's different levels of
18 notification, but that the intent would be to notify
19 those immediately once upon an issue is identified.

20 Q. Thank you, Mr. Menninger.

21 Document host, you can take down this exhibit, and
22 could you please put up SCLG Aid to Cross Number 2. I
23 think it's AQ2 in your -- thank you. It's the revised
24 one that I sent this morning, Ms. Friend. There we go.
25 Thank you.

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Cross-examined by Mr. Secord

1 So, yesterday, Mr. Menninger, we were -- we were
2 going back on and forth on dam classification, and can
3 you tell me, are you dam with the International
4 Commission on Large Dams, I-C-O-L-D?

5 **A. MR. MENNINGER: I am.**

6 **Q.** And can you confirm that the ICOLD has defined a large
7 dam as one whose height is 15 metres or higher and:
8 (as read)

9 "Between 10 and 15 metres if it meets at
10 least one of the following conditions:

11 A crest length of not less than
12 500 metres;.

13 A spillway discharge potential of at
14 least 2,000 cubic metres per second;.

15 A reservoir volume of 15,000 [verbatim]
16 cubic metres or more."

17 Are you familiar with that definition?

18 **A. MR. MENNINGER: Until you provided it this**
19 **morning, I was not aware that ICOLD had a specific**
20 **definition for a large dam.**

21 Mr. Chairman, we'd acknowledge ICOLD's definition
22 in that SR1 would be fit within the definition of a
23 large dam as indicated.

24 But I'll also note that this designation does not
25 change the design criteria. The dam was, as I

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1 mentioned yesterday, was classified and is classified
2 as an extreme consequence structure and, as such, we're
3 utilizing the most conservative design standards and
4 criteria that are established by Alberta Environment
5 and Parks and the Canadian Dam Association.

6 Q. And just to put the SR1 into context, it is 15 metres
7 in height?

8 A. MR. MENNINGER: It exceeds 15 metres in height.

9 Q. And what is its crest length?

10 A. MR. MENNINGER: Approximately, 3,000 metres, a
11 little bit more.

12 Q. And what is its spillway discharge potential?

13 A. MR. MENNINGER: The emergency spillway is a little
14 over 300 cubic metres per second -- the low-level
15 outlet works is 27.

16 Q. And what is the reservoir volume?

17 A. MR. MENNINGER: I believe we've covered this.
18 It's 77 million cubic metres --

19 Q. So 77,000 dam cubed?

20 A. MR. MENNINGER: Yes.

21 Q. -- or 77,000 [verbatim] cubic metres? That's the
22 conversion?

23 A. MR. MENNINGER: 77 million cubic metres, yes.

24 Q. 77 million cubic metres. Okay.

25 A. MR. MENNINGER: Yes.

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1 Q. Lots of zeros there, Mr. Menninger.

2 A. **MR. MENNINGER:** There are.

3 Q. Yeah, okay.

4 All right. If we could then turn to, document
5 host, Exhibit 149 -- or sorry, 249, we can take this
6 down now. And if we could scroll down to the bottom of
7 where we see the Robinson properties. Just go down a
8 little more, please. Perfect. Thank you.

9 So Mr. -- I don't know who is the best for this.
10 I think this is -- this could be the hydrologist
11 getting involved here, as well. I know part of it
12 probably is for you, Mr. Menninger, or Mr. Wood, but,
13 you know, please feel free to jump in whoever is
14 appropriate.

15 So, in this case, we can see the Robinson/Hawes
16 property, which is going to have an embankment running
17 through the middle of that -- I guess through the
18 middle of that property; correct?

19 A. **MR. WOOD:** Mr. Chair, this is Matt Wood.

20 That is correct.

21 Q. And then we see Mrs. Robinson's property essentially
22 just, I guess that would be the southwest quarter of
23 5-4-24-3, that would be just to the southwest of that
24 diversion embankment; correct?

25 A. **MR. MENNINGER:** The floodplain berm. Yes, it's

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1 **located southwest of it.**

2 Q. Right. So we have a series of questions relating to
3 the operation of the SR1 in relation to impacts on
4 Ms. Robinson.

5 So perhaps what we could do is, in relation to --
6 so now that we've got the Robinson -- as I understand
7 it, part of the Robinson/Hawes property will be
8 expropriated for the diversion berm. Is that correct,
9 Mr. Woods?

10 A. **MR. HEBERT:** **Mr. Chairman, it's Matt Hebert.**
11 **We would, as I referenced this week, we would be**
12 **interested in having discussions with Ms. Robinson and**
13 **Ms. Hawes about the acquisition of property within the**
14 **project development area.**

15 Q. So either it's -- one way or another, for this project
16 to proceed, you have to acquire the Robinson/Hawes
17 parcel in the northeast and northwest of 5-4-24-3;
18 correct? Or at least a good portion of it?

19 A. **MR. HEBERT:** **Mr. Chairman, that is correct.**

20 Q. So could we now pull up Exhibit 327, PDF page 54 -- 64,
21 6-4. Keep going. There we go.

22 And can you just fit the photograph into the frame
23 for us? That's the -- you need to go up or down.

24 There we go.

25 Now, can you -- what have you got there, you've

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Cross-examined by Mr. Secord

1 got 75 percent. Is it possible to, I guess, go down to
2 70 or 65 percent?

3 THE CHAIR: Does this work, Mr. Secord?

4 MR. SECORD: That's -- that's working. Thank
5 you. It just seems the resolution is --

6 THE CHAIR: It is -- it appears fine on my
7 screen --

8 MR. SECORD: Yeah, I'm just going to pull up my
9 copy of the exhibit.

10 Okay. So from my -- from my screen, I need -- I
11 need a resolution of -- I think you have to go down.
12 Let's try -- let's try -- yeah, that's not -- you know
13 what, that's good enough, thank you very much. That's
14 perfect.

15 Q. All right. So can you tell me, Mr. Menninger -- well,
16 first of all, you probably don't know this, but I'm
17 sure Mr. Wood/Mr. Hebert can confirm -- but the
18 buildings that we see on the bottom of Exhibit 327,
19 PDF 64, you can confirm that that is the -- those
20 buildings belong to my client, Mary Robinson? Can you
21 confirm that, Mr. Wood?

22 A. MR. WOOD: Mr. Chairman, it's Matt Wood.

23 I can confirm that.

24 Q. And can you, either you or Mr. Menninger, advise the
25 Board how far the diversion berm comes down towards the

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Cross-examined by Mr. Secord

1 buildings that we see? And I'm going to suggest to
2 you -- I'm going to suggest to you that the diversion
3 berm -- what happened here? There we go.

4 THE CHAIR: Mr. Secord and Alberta

5 Transportation, we're going to have this transcribed --
6 so far so good -- but I think we need to ensure that
7 our descriptions in the transcripts will allow us to go
8 back to page 64 of Exhibit 327 and really identify
9 what's been discussed here if we want it recorded.

10 So, so far, I think we've identified the buildings
11 in the bottom of page 64 of Exhibit 327 is
12 Ms. Robinson.

13 So we're on the right track, but let's make sure
14 that our descriptions allow us to read the transcripts
15 and come back to this piece of testimony and figure out
16 what was said and why. Thanks.

17 Q. MR. SECORD: Okay, so maybe I can put this to
18 you.

19 You see the legend on the right-hand side of
20 the -- of PDF page 64 of Exhibit 327? You see that
21 legend there, Mr. Wood?

22 A. MR. WOOD: This is Matt Wood.

23 Yes, I do see the legend.

24 Q. And you'll see that there's a road that runs to the
25 north from that legend?

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Cross-examined by Mr. Secord

1 **A. MR. WOOD:** **Yes, I do.**

2 **Q.** And you'll notice that there are some trees that come
3 in from the west side of the road. Can you tell me,
4 does the diversion berm -- the southernmost tip of the
5 diversion berm, would it intersect that basically
6 halfway up the road that we see on the right-hand side
7 of the map that I've just described?

8 **A. MR. WOOD:** **Mr. Chair, this is Matt Wood. We**
9 **may want to reference another figure. What Mr. Secord**
10 **is referencing is the footprint of the floodplain berm,**
11 **and it's unfortunately not shown on this figure. This**
12 **is the figure showing the model output overlaid on the**
13 **air photo, but, Mr. Secord, I believe I can effectively**
14 **answer your question.**

15 **The berm terminates before crossing into the**
16 **property that's solely owned by Mrs. Robinson. It's**
17 **located on the Robinson/Hawes property.**

18 **Q.** Right. And so can you pinpoint where that termination
19 point is on this map?

20 **A. MR. WOOD:** **I can.**

21 **A. MR. MENNINGER:** **Matt, I can --**

22 **Mr. Chairman, approximately where you see where**
23 **the river makes a bend to -- the river goes north and**
24 **then makes a bend to the west, if you follow that**
25 **across, the floodplain berm terminates pretty close to**

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Cross-examined by Mr. Secord

1 where that, like, white dot is, you know, basically
2 even with the turn -- the rivers turn left.

3 So I think as Mr. Secord may have mentioned, the
4 floodplain berm terminates about halfway between the
5 legend and the kink in the roadway, you know, based off
6 of what generally I can tell from this aerial.

7 Q. I think that works for me. Thank you, Mr. Menninger.

8 Now, this particular figure that -- this
9 particular image on PDF page 64 of Exhibit 327 is
10 showing a one in 100-year flood; correct?

11 A. MR. MENNINGER: Mr. Chair, if we could please
12 request the document controller to scroll down, just to
13 check the legend, that would probably be the best way
14 to verify it.

15 THE CHAIR: Thank you, Ms. Kaminski.

16 A. MR. WOOD: Yes, it -- it's Matt Wood here.
17 Yes, it is a 100-year flood.

18 Q. MR. SECORD: And what is this -- what is this
19 actually showing in relation to the impact of the
20 operation of SR1 on Ms. Robinson's property in a 1 in a
21 100-year flood?

22 A. MR. WOOD: Matt Wood here, Mr. Chair. What
23 we're looking at here is a hydraulic model, and if we
24 want to discuss the details, I may request those from
25 Mr. Menninger, but this is the output from a hydraulic

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Cross-examined by Mr. Secord

1 model that shows flooding and, effectively, the effects
2 of the service spillway creating the head pond that
3 Mr. Menninger had mentioned earlier.

4 Now, I must draw to the Board's attention that the
5 effects from the rise in the head pond are within
6 this -- within a portion of this area shown here.

7 What you're seeing on -- largely on the left side
8 is the existing flooding that would happen in a
9 100-year event anyways. And somewhere around the
10 midway point there is where you start to see the --
11 experience the influence from the operation of the
12 diversion structure.

13 And if I may draw to the Board's attention, in
14 Exhibit 131, we actually have a much better description
15 of the operational backwater effects. This here it's
16 unfortunate, this is used for determining velocities
17 and depths, but it doesn't help show the separation of
18 the impacts from the diversion structure versus what
19 would be experienced in an existing 100-year flood.

20 A. MR. MENNINGER: Matt, I guess what I would note on
21 and just continue that discussion point. Two things
22 that you may note: One, is that the 100-year is not
23 even touching the floodplain berm at its termination
24 point or really up until that kink in the road there.
25 So it's constrained by the natural floodplain in this

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Cross-examined by Mr. Secord

1 scenario that you observed here, and to --

2 Q. How is it observed?

3 A. MR. MENNINGER: Oh, sure, no problem. So the
4 floodplain berm runs along that -- basically right
5 along that road as proposed. And so you can see the
6 separation of the colour from the -- from the green.

7 So basically, you can see the natural grades and
8 the jagged edges. If it looks like a straight line,
9 it's against the berm; if it's got a jagged, looks like
10 it's following contours, it's following natural grade
11 in that scenario.

12 The -- you know, in that case. And as Matt had
13 mentioned, Mr. Wood had mentioned in Exhibit 131, we
14 demonstrate or we show the area of impact. So
15 basically, what we did was we took two models. We took
16 the existing conditions, what's out there today, and
17 modelled it. And so we have -- and we used a grid. So
18 this shows water surface elevation at every small grid
19 space across this whole area, and then we compared that
20 with project and without. And what we've demonstrated
21 in that analyses and presented in Exhibit 131 is that
22 the extent of this project do not go beyond the -- or
23 do not extend onto that land -- Mrs. Robinson's land in
24 that case, and in this case, to the end of the
25 floodplain berm, because it doesn't even touch the

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Cross-examined by Mr. Secord

1 floodplain berm at the end. Basically it has no
2 effect.

3 A. MR. WOOD: Mr. Chair, it's Matt Wood here.
4 If I may request that the document controller bring up
5 131, it may help explain. It's 131, page 565.

6 THE CHAIR: Thank you. I was hoping you'd do
7 that.

8 A. MR. WOOD: And while this is being brought
9 up, I would just highlight that the figure was prepared
10 to communicate the extent of these effects, and it
11 shows some distances on it to the Tsuut'ina Reserve,
12 but the parcels, while not labelled, does show the
13 boundaries and the footprints of the structures I was
14 referencing earlier.

15 THE CHAIR: It's a new document being brought
16 up, and it is a large document. So it'll take a couple
17 seconds off our web server.

18 Q. MR. SECORD: So while it's being brought up,
19 Mr. Menninger, let me take you down the path that is of
20 concern to my client, Ms. Robinson.

21 And we've looked at Exhibit 249, the map of where
22 the property is. We've looked at the 1 in 100-year
23 flood showing where -- the impact, as you said in the
24 head pond, and we're going to get back to discussing
25 the head pond effects from a design flood 'cause this

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1 one is not even the design flood but something, you
2 know, half of the design flood.

3 But the question -- the question I have is what --
4 are we here? Okay, let's go --

5 THE CHAIR: Thank you.

6 Q. MR. SECORD: What page do you want, Mr. Wood?

7 A. MR. WOOD: Thank you. It's this page here
8 that's shown.

9 Q. Page 565?

10 A. MR. WOOD: Correct, PDF page 565. And as I
11 mentioned earlier, this figure shows the distances from
12 various reference points, some from the structure, some
13 from the different waters, and some from the PDA
14 boundary to the Tsut'ina Reserve for the purposes of
15 communicating what we're discussing here.

16 As I mentioned when we were looking at --

17 Q. Could we see the legend, please. Maybe take it down to
18 75 percent. That's good. Thanks.

19 A. MR. WOOD: So this figure shows in purple the
20 floodplain berm and its extents. And, as well, in grey
21 there -- it's probably a bit of a familiar shade, but
22 in grey, that's the PDA boundary. And where you see it
23 starting to go a little squiggly on the bottom left
24 side, that is starting to fall -- follow down into the
25 river bed and following a contour there.

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1 But what's important in this figure is the light
2 blue area. That is the extents of the hydraulic
3 impacts of the diversion structure during the design
4 flood. And so, you know, contrary to the previous
5 figure that showed water and depth and velocity through
6 there, the impact from the diversion structure service
7 spillway gates raising from the river and creating that
8 backwater that drives water -- floodwater into the
9 reservoir -- that impact, that hydraulic impact is
10 limited to that light blue area in the -- during the
11 design event.

12 Q. And what is the elevation -- is this what you called
13 the head pond, Mr. Menninger?

14 A. MR. MENNINGER: This would be the extent of it,
15 yeah. So it would be that dashed -- that kind of dash
16 line down at the bottom of the light blue blob, yeah,
17 in that scenario.

18 Q. And what's the elevation under the head pond?

19 A. MR. MENNINGER: 1215.8 at the structure. It
20 varies a little bit as it goes upstream.

21 Q. But at the dotted line, what would be the elevation?

22 A. MR. MENNINGER: We could pull up the -- we could
23 pull up the hydraulic profile if necessary.

24 A. MR. WOOD: I do have those available. This
25 is Mr. Wood.

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Cross-examined by Mr. Secord

1 Q. Can you get me that elevation, Mr. Wood? I don't know
2 that I need to get it now, but could you get me that
3 elevation at an appropriate point?

4 A. MR. WOOD: I would suggest maybe that it's
5 presented in Exhibit 174, page 18 of the PDF.

6 Q. Thanks. I don't need that. Thank you. Let's stay
7 there, please, where you were before. Thank you.

8 And so can you tell me, does the -- does the head
9 pond also cause water to back up onto Ms. Robinson's
10 property and farming operations?

11 A. MR. MENNINGER: No. The -- the fact of the matter
12 is that the Elbow River is a steep riverbed, average
13 slope of about 1 percent or greater. That elevation
14 increase is localized to the area within the influence
15 of the floodplain berm. And by the time you get to the
16 end of the floodplain berm, and before you get to the
17 end of the floodplain berm, the effects of the gate
18 operations in SR1 basically run back into the natural
19 conveyance of the river.

20 Q. And one of the things that I was wondering about is
21 you've indicated that when a design flood comes along,
22 you can operate at 480 or 600 cubic metres per second
23 in terms of diverting water. Is the head pond that we
24 see here on Exhibit 131, PDF 565, is that head pond as
25 a result of having the gates operating at a 600 cubic

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Cross-examined by Mr. Secord

1 metres per second level or 480 cubic metres per second
2 level?

3 **A. MR. MENNINGER:** I believe it's 600.

4 **Q.** And what would be the dotted line if your operators
5 were operating at 480 cubic metres per second?

6 **A. MR. MENNINGER:** It would be slightly closer to the
7 structure upstream -- or downstream, sorry. So
8 smaller, smaller influence, less -- the less flow we're
9 pushing into the channel, the lower the water surface
10 elevation is.

11 **Q.** So what my clients -- both Ms. Robinson and my clients
12 are concerned about is what measures are in place if
13 the water in the Elbow River decides to cut a channel
14 eastwardly before it reaches the intake, i.e. across
15 Ms. Robinson's front field, to the east of the
16 floodplain berm?

17 **A. MR. WOOD:** Mr. Chairman, I can answer that.
18 Essentially from what we're looking at here, the
19 diversion structure itself has no bearing or impact on
20 the risk of that occurring.

21 I would note that that blue line crossing through
22 the number 619 is an old side channel of the
23 Elbow River, and what was once turned into a canal
24 inlet. You know, something like that in a 100-year
25 flood may create a sort of an evulsion through there,

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Cross-examined by Mr. Secord

1 and that type of action is not influenced by the
2 diversion structure because its hydraulic impact is
3 limited to the blue area we see here.

4 Q. So you're saying where the line -- where you see the
5 black line with the number 619 metres, that shows that
6 this is an old channel, did he say?

7 A. MR. WOOD: Yes, I've had the fortune of
8 Ms. Robinson escorting me around her property in that
9 area, and it is an old channel that was upgraded to be
10 the inlet for the Pirmez canal diversion.

11 Q. Right. And I don't know whether the hydrologist wants
12 to chime in here. This would be Dr. -- no, I guess it
13 would be Dr. Luzi, Luzi, L-U-Z-I, but have you looked
14 at Ms. Robinson's property and noted old channels of
15 the Elbow River on her property that would be capable
16 of moving water to the east of the floodplain berm?

17 A. MR. WOOD: Mr. Chairman, if I may speak for
18 Mr. Luzi on this question. It's Matt Wood.

19 As indicated in the figure, that channel is beyond
20 the PDA. It wasn't studied in depth. I've simply made
21 my observations based on what I was available to see
22 while being escorted by Ms. Robinson.

23 Q. And did you note that, in her front field to the east
24 of -- of the floodplain berm, did you note that the
25 elevation drops very rapidly to the east?

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Cross-examined by Mr. Secord

1 A. MR. WOOD: I did not note that, no.

2 Q. And can you confirm that, if the water did choose to go
3 through the Pirmez canal, it would bypass the entire
4 SR1 structure?

5 A. MR. WOOD: It is limited by the Highway 22
6 there, there's culverts in that. I mean, it is a
7 potential, but there's culverts there, and it's -- it's
8 in low probability.

9 A. MR. MENNINGER: And Matt -- and this is
10 John Menninger.

11 And we would note the Elbow River channel here is
12 very wide and has a significant amount of capacity. So
13 some -- if some water went that way, a lot of water
14 will stay in the river and proceed to SR1.

15 Q. Now, in terms of how channels are created and how
16 rivers can move, is it possible that the debris from
17 fallen trees, F350s and other, you know, boulders from
18 berms upstream are capable of creating trenches and
19 changing the Elbow River's course downstream of the
20 floodplain berm such that the water may completely
21 bypass the SR1 structure?

22 A. MR. WOOD: Mr. Chairman, I'm not sure if --
23 you know, maybe if we can go back to the previous
24 figure, if I may. I don't have the exhibit number, but
25 the one that was brought up showing the --

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Cross-examined by Mr. Secord

1 Q. Sure.

2 A. MR. WOOD: -- modeling results. I think I
3 can best explain using that.

4 Q. Exhibit 357, PDF 64.

5 A. MR. WOOD: So what you see in this figure is
6 the velocities within the floodwaters that are coming
7 down, and within the backwater created by the diversion
8 structure.

9 And the velocities notably are quite high in
10 areas, particularly in the channel, and in the floods
11 like this, it's transporting that material through this
12 reach and through that head pond area.

13 So, you know, while -- while during a flood,
14 debris does influence channel switches, and all kinds
15 of things, throughout the Elbow River, you know,
16 there's nothing within these modelling results that
17 would suggest that anywhere within here is a
18 particularly prone location to debris accumulations
19 that could cause such features; and I say that because
20 of the conveyance through the channel, the high
21 velocities through that reach.

22 Q. Mr. Wood, did Elbow River floodwater run along
23 Highway 22 in 2013 in this area that you've described?

24 A. MR. WOOD: I believe it ran along Highway 22,
25 but I believe that most of it came from a little bit

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Cross-examined by Mr. Secord

1 more from the Kiwanis area -- I know there was areas of
2 from Mrs. Robinson's -- Ms. Robinson's property
3 inundated, but that water then concentrated down
4 towards Kiwanis and pulled in up against Highway 22 and
5 through.

6 And may I add in that scenario, it did not avulse
7 a new channel through that area, and so it's not a
8 guaranteed thing that that kind of rapid geomorphic
9 change would happen at a given location.

10 Q. Yeah, and the Kiwanis property, do we see that on this
11 figure just to the -- I guess on the top right-hand
12 corner, basically located downstream of the auxiliary
13 spillway?

14 A. MR. WOOD: That is correct. Mr. Chair, it's
15 not the entire property, but it's up in the uppermost
16 right corner in this figure.

17 Q. And looking at the map, does the proposed cement plant,
18 would that be located on this -- on the Kiwanis
19 property or to the north of it, where it's proposed?

20 A. MR. MENNINGER: Mr. Chairman, we do not have a
21 proposed location for a cement plant. We have
22 identified areas for contractor staging and use during
23 construction.

24 Whether the contractor ultimately decides to
25 utilize a concrete plant at that location -- or at a

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Cross-examined by Mr. Secord

1 particular location will be constrained to within the
2 construction footprint for the project and will be at
3 the discretion -- it will be at the determination of
4 need and as approved by Alberta Transportation.

5 Q. And I think my last question in this area is, if the
6 Elbow River channel scoured the cut bank just north of
7 Mary Robinson's arena, where would those waters flow
8 relative to the southern edge of the diversion berm?

9 A. MR. WOOD: Mr. Chairman, it's Matt Wood here.
10 The waters would continue to flow downstream.

11 Q. And can you tell me, are there any inundation maps for
12 Mary Robinson's property that we see on PDF page 64 of
13 Exhibit 327 that would show the impact of a design
14 flood on her farm in the event the inlet was operated
15 at 480 cubic metres per second versus 600 cubic metres
16 per second?

17 A. MR. MENNINGER: Could you repeat your question,
18 Mr. Secord?

19 Q. Are there any inundation maps for Ms. Robinson's
20 property showing the effects of a design flood on her
21 land?

22 A. MR. MENNINGER: The -- there are -- there are
23 analyses and maps -- I'm not sure if we have it
24 extending to her property in the Preliminary Design
25 Report, primarily, because the effects of the project

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Cross-examined by Mr. Secord

1 do not extend that distance, as mentioned previously.

2 So we constrained, I think, the figures to the
3 direct impacts of the project in that particular set.

4 Q. So the answer, then, is no? There are no inundation
5 maps for Ms. Robinson's property showing what the
6 impacts on her property would be of a design flood?

7 A. MR. WOOD: Mr. Chairman, I'd request that we
8 can caucus? This is Matt Wood.

9 Q. Sure. And while you're doing that, maybe we could pull
10 up exhibit...

11 MR. FITCH: Mr. Chair, it's Gavin -- here we
12 go.

13 MR. SECORD: Exhibit 355. Too many documents
14 open, Mr. Fitch.

15 MR. FITCH: Wasn't sure if we were still
16 waiting on you. That's all.

17 A. MR. HEBERT: Mr. Chairman, it's Matt Hebert.

18 I believe the members of the Transportation panel
19 have emerged from the breakout room, and Mr. Menninger
20 is in a position to respond.

21 THE CHAIR: Thank you.

22 A. MR. MENNINGER: Yes, this is John Menninger. On
23 Exhibit 327, I believe just page 66 shows the design
24 flood.

25 Q. MR. SECORD: All right, and let's just --

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1 before we get there, if we could go to PDF pages 3 --
2 sorry, yes. So this is Exhibit 355, PDF page 3 showing
3 the banks of the river below the arena. And
4 floodwaters were to the top of the bank. And then if
5 we go to the next page, please, PDF 4, again, this
6 shows the floodwaters.

7 Will -- will the -- will SR1 improve the flooding
8 that Ms. Robinson experienced as a result of the design
9 flood or the flood of record?

10 **A. MR. MENNINGER:** Mr. Chairman, the -- and I think,
11 as stated earlier, SR1 will not have an effect on the
12 design flood elevations based off of our analyses at
13 her property, either negative or positive.

14 **Q.** So SR1 is not going to do anything for Ms. Robinson in
15 terms of mitigating that design flood. Doesn't matter
16 how you operate SR1, it has no effect, then?

17 **A. MR. MENNINGER:** That's correct. The area within
18 the influence of her property is the natural floodplain
19 of the Elbow will be functioning as a natural
20 floodplain or flood conveyance of the Elbow River at
21 that location.

22 **Q.** And then if we could turn up your reference, please,
23 sir?

24 **A. MR. MENNINGER:** Sure, so that was Exhibit 327, PDF
25 page 66.

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1 Q. And this is entitled, "Elbow River Flow Paths and
2 Velocities in the River Channel at Flood Zone through
3 the Project Spillway Diversion Inlet that may Affect
4 Fish Displacement and Entrainment During Design
5 Flood-Scenario Operations." Correct?

6 A. MR. MENNINGER: Correct.

7 THE CHAIR: Sorry, can we see -- is there a
8 legend on the bottom of this page still?

9 MR. SECORD: Yeah. It's called Attachment A,
10 Figure 5.

11 THE CHAIR: And sorry, this represents design
12 flood inundation?

13 MR. SECORD: Yes, that's what it says at the
14 bottom of this.

15 A. MR. MENNINGER: That's correct, Mr. Chairman.

16 A. MR. WOOD: Mr. Chairman, this is Matt Wood
17 here.

18 If I may, I believe we're having a similar
19 scrolling issue as earlier. It's possible you might
20 have to go up and come back down. It seems to cut off
21 the legend there. Thank you. That seems to be
22 working. If you wouldn't mind keep going just so we
23 can see the legend. Thank you.

24 THE CHAIR: Right. Thank you. Thank you very
25 much.

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1 Q. MR. SECORD: All right. Thank you. Thank you,
2 panel.

3 If we could now turn to some questions on failure
4 modes.

5 In the event of -- in the event that a situation
6 where water is redirected back to the river due to
7 issues with dam operations, would this be considered a
8 natural flood or a dam failure? And where I'm going
9 with this is where does the responsibility reside?
10 Will this impact insurance claims for disaster recovery
11 funding for homeowners downstream?

12 So yesterday we looked at the auxiliary spillway
13 basically pointing at Kamp Kiwanis, and then we've
14 already looked at the emergency spillway and have seen
15 that it would have to run over private property land --
16 over private property back to the Elbow River in the
17 event it was engaged.

18 So in the event that these waters are redirected
19 back to the river due to issues with dam operations,
20 would that be considered a natural flood or a dam
21 failure?

22 A. MR. WOOD: Mr. Chairman, I believe that may
23 be a question for the administrators of the DRP
24 program, and the other one Mr. Secord mentioned.

25 COURT REPORTER: Excuse me, sorry --

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1 A. MR. WOOD: That was Matt Wood.

2 Q. Mr. Wood, yeah. That would be the disaster recovery
3 program?

4 A. MR. WOOD: That is correct.

5 Q. And the other one I mentioned is that -- that's the
6 insurance companies; is that what you're referring to,
7 Mr. Wood?

8 A. MR. WOOD: My apologies. This is Mr. Wood,
9 and you're correct. You did say insurance company.

10 A. MR. MENNINGER: Mr. Chairman, I guess I should
11 also note quickly that the auxiliary spillway is not
12 pointed at Kamp Kiwanis. It is a component of the
13 floodplain berm that is upstream of the property of
14 Kamp Kiwanis.

15 We have looked at the potential conveyance routes
16 downstream of that structure during events, and we are
17 not showing impacts to their buildings and properties
18 with activation of the structure. So I would note that
19 I think that is a bit of a false characterization to
20 say that it is pointed at the camp.

21 Q. But that was actually going into my next question,
22 Mr. Menninger.

23 If there is an issue and the operators need to
24 redirect water back into the river, will they delay the
25 redirect of the water through the auxiliary spillway or

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Cross-examined by Mr. Secord

1 the emergency spillway in order to allow time to
2 evacuate downstream residents?

3 A. MR. MENNINGER: Mr. Chairman, I guess to explain a
4 little bit of the operations of this structure, and how
5 they function, the -- the reference was to redirect.
6 So the water is in the river until we divert. And we
7 explained the operating scenarios for when that
8 diversion would occur.

9 It's simply passing downstream otherwise. It's
10 still within the river. It's not a redirect back.

11 The spillways that are indicated by Mr. Secord,
12 the emergency spillway and the auxiliary spillway are
13 fail-safes. They're not intended for operation;
14 they're located to provide a dam safety function and
15 feature.

16 So, typically, our flows will be controlled by the
17 service spillway in the river, and water will pass
18 through it.

19 Q. Has AT provided inundation maps caused by malfunctions
20 at the floodplain berm or inlet?

21 A. MR. MENNINGER: Mr. Chairman, I'll start with the
22 diversion inlet. There is no inundation map to
23 provide. There's not a path for breach other than into
24 the channel and then into the reservoir.

25 So it's -- the malfunction there is the mapping of

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1 water through the channel, as indicated.

2 The auxiliary spillway is a -- is a function, in
3 part, of the floodplain berm. We evaluated a failure
4 of that component as part of that referenced document
5 in the malfunction section and in the dam breach
6 scenario and assessed the potential effects of a
7 failure downstream.

8 The failure scenarios that were investigated
9 indicated a very small rise and less than a metre
10 downstream of the project, and by the time they reach
11 Highway 22 will primarily have dissipated.

12 Q. In terms of the operation of SR1, can the operators
13 delay redirecting the water through the auxiliary
14 spillway or the emergency spillway?

15 A. MR. MENNINGER: So, Mr. Chairman, the emergency
16 spillway should not operate. The design and function
17 of the project is to not operate the emergency
18 spillway. It is to close the gates before -- you know,
19 when the dam is complete. And so there's not a
20 redirect to the emergency spillway; it is a fail-safe
21 function of the reservoir.

22 So we are not delaying or directing water to the
23 emergency spillway in any scenario. It is a passive
24 structure that functions.

25 The auxiliary spillway functions in very much the

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1 same way. It is a run of -- it is a component that has
2 a fixed elevation and, depending on the water level in
3 the river, will activate when the water exceeds that
4 level. That level is higher than the design operation
5 for the structure, and so again, it is not intended to
6 operate in other -- other than a dam safety scenario as
7 a fail-safe measure.

8 Q. And under what circumstances would the emergency
9 spillway be engaged in the operation of SR1?

10 A. MR. MENNINGER: Only in the scenario where the
11 reservoir is full and water is continued to be directed
12 into the channel.

13 Q. When you say "into the channel," are we talking the
14 Elbow River?

15 A. MR. MENNINGER: No, the diversion channel. The
16 emergency spillway is located on the diversion channel.
17 So with the gates closed at the diversion inlet, water
18 can't enter the channel, water will not flow over the
19 emergency spillway.

20 Q. And under what circumstances, then, would it flow into
21 the emergency spillway?

22 A. MR. MENNINGER: In an extremely unlikely scenario.
23 Number 1, the flood would have to exceed the flood of
24 record, the 1 in 200-year recurrence interval, so that
25 would mean -- because you'd have to fill the reservoir.

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1 So, Number 1, you would have to have a recurrence
2 interval that exceeds that. And then you would have to
3 have the unlikely scenarios of not being able to close
4 our gates at the structure.

5 As I mentioned previously, we've added several
6 safeguards to that scenario, including the provision of
7 debris barrier to prevent debris from affecting the
8 closure of those gates, we have primary and backup
9 power, and we have the ability to close the gates
10 without power.

11 Q. So what you're saying, then, is the emergency spillway
12 would not be engaged unless the flood was higher than a
13 flood of record or the 2013 flood, Number 1, that's the
14 first -- the first point. You're saying that the
15 emergency spillway could never be operated or engaged
16 in a design flood scenario?

17 A. **MR. MENNINGER:** What I'm saying is that the
18 recurrence interval of that type of scenario would
19 exceed 1 in 200 years. Whether it is two 100-year
20 floods that happen in the same year, which has -- which
21 has a probability that's less than 1 in 200 -- or a 1
22 in 200 event. That type of scenario would have to fill
23 the reservoir to its capacity.

24 And so the starting point there is that you have
25 an extremely unlikely sequence of events, whether it is

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1 a -- the full reservoir is a very unlikely and low
2 probability occurrence in any given year.

3 Q. What are the flooding consequences for downstream
4 communities of SR1 during larger floods than the 1,240
5 cubic metres per second flood of 2013, and has this
6 been considered by the proponent?

7 A. MR. WOOD: Mr. Chairman, this is Matt Wood.
8 I believe I can answer that. If I may begin by stating
9 that SR1 reduces flood risk to all -- all -- all
10 properties downstream event.

11 Mr. Secord's question about larger floods, while
12 possible, we have to remember that in those scenarios,
13 SR1 will have reduced the flow rates in those events by
14 up to 600 cubic metres per second, which is
15 considerable.

16 And so while -- while there is -- it's still
17 residual flood risk, as there's residual flood risk
18 with any flood mitigation structure, a 200-year service
19 level is considerable and -- and, in addition to that,
20 we also have additional factors of safety that raise
21 that service level.

22 And so while I understand Mr. Secord is asking
23 about what could happen to these properties or what is
24 the risk, we have to -- we have to be aware that the
25 risk is far less than it would have been without SR1 in

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1 play.

2 Q. So your design report indicates that the SR1 reservoir
3 will work in tandem with the Glenmore Reservoir to
4 limit flood rates downstream of the Glenmore Reservoir
5 for floods equivalent to the 2013 flood such that flow
6 rates below Glenmore are less than 160 cubic metres per
7 second. So I've got that right, Mr. Wood?

8 A. MR. WOOD: Mr. Chair, this is Mr. Wood.
9 That's correct.

10 Q. And you've indicated the following operational
11 parameters, SR1 can divert flows from the Elbow River
12 up to 600 cubic metres per second into active storage.
13 I've got that right?

14 A. MR. WOOD: 600 cubic metres per second into
15 the SR1 off-stream storage reservoir.

16 Q. And storage capacity in SR1 is 77,771 -- or I should
17 say 77,771,000 cubic metres plus an additional 10,000
18 cubic metres in Glenmore Reservoir?

19 A. MR. WOOD: That is the total active flood
20 storage of the SR1 system, the first number being the
21 storage at the off-stream storage dam; the 10,000 being
22 what's allocated at Glenmore by the City of Calgary.

23 Q. And excess flows bypassing the SR1 diversion structure
24 will be stored in the Glenmore Reservoir; is this
25 correct?

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1 **A. MR. WOOD:** That is correct, up to its active
2 **storage capacity.**

3 **Q.** And are flows in excess of 160 cubic metres per second
4 considered levels beyond which flooding is expected it?

5 **A. MR. WOOD:** It depends on which location of
6 the river you're referencing. Downstream of Glenmore,
7 the city has actually identified that 170 cubic metres
8 per second is where overland flood damages occur to
9 private property. That is what helps set the design
10 **basis.**

11 Again, as Mr. Menninger mentioned earlier, 160 was
12 **selected by the design team to coincide with the**
13 **low-level outlet at Glenmore.**

14 **Q.** And if we could pull up, please, SCLG Aid to Cross
15 Number 1, it might be AQ1.

16 So to help us gain a better understanding of the
17 operations of SR1 during flood conditions, could you
18 provide us with a brief explanation of "Figure A3 -
19 Design Flood, Diversion Hydrograph" as it relates to
20 those parameters discussed above -- that we've just
21 discussed above.

22 First of all, can you confirm that the blue line
23 in this figure represents a maximum diversion rate of
24 600 cubic metres per second?

25 **A. MR. WOOD:** **Sure. Mr. Chair, this is**

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1 **Matt Wood.**

2 **That is correct.**

3 Q. And can you confirm that the dark grey area represents
4 the peak flow upstream of SR1?

5 A. **MR. WOOD: That is correct. This is the**
6 **hydrograph from the Bragg Creek hydrometric station.**

7 Q. And the light grey area downstream to the Glenmore Dam?

8 A. **MR. WOOD: That is correct.**

9 Q. And the light grey would be basically that -- we see a
10 peak, it looks like, on the -- those lines -- between
11 June the 20th and June the 21st, is that -- what time
12 is that, Mr. Wood? Is that midnight or is that noon?

13 A. **MR. WOOD: I'm not too sure from the scale,**
14 **Mr. Chair. It looks like it's about --**

15 Q. Every 12 hours?

16 A. **-- I guess noon. Yeah, those are every 12 hour --**

17 Q. So basically the grey -- the grey portion that we
18 mentioned -- the grey area that represents flow
19 continuing downstream to the Glenmore Dam, that -- it
20 looks like that would have peaked at noon on the 20th
21 of June; correct?

22 A. **MR. WOOD: I believe, yes, that's correct.**

23 Q. And in looking at this graph, is it your understanding
24 that for the design flood, i.e., the 2013 flood, the
25 SR1 diversion structure is only capable of diverting

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1 about one-half of the peak flow; the remaining flow
2 will travel downstream and will be stored in the
3 Glenmore Reservoir such that flows below the Glenmore
4 Dam are moderated below the 160 cubic metres per
5 second. Would that be correct?

6 **A. MR. WOOD:** If -- if SR1 was in place in 2013,
7 it could have cut the flows downstream of the diversion
8 structure in half, that is correct.

9 **Q.** So do you agree, then, that your design expects flow
10 levels in the section of the Elbow River below SR1 and
11 above Glenmore to exceed 160 cubic metres per second
12 and that flooding will occur?

13 **A. MR. WOOD:** The flows downstream of the
14 diversion structure could exceed 160 cubic metres per
15 second if the incoming flows were greater than
16 760 cubic metres per second.

17 **Q.** And, in this case, during the noon hour on the 20th of
18 June, it would appear the flows were in the order --
19 somewhere in the order of 1150 cubic metres per second?

20 **A. MR. WOOD:** That is correct. In accordance
21 with the Bragg Creek gauge, which is coming down. You
22 may see other references -- that hydrograph below
23 utilizes the hydrograph recorded at Glenmore and
24 brought up.

25 So just pointing that out because there's a slight

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1 discrepancy there, but that is also why I said it
2 essentially cut those flows in half.

3 Q. So, then, looking at this hydrograph downstream of --
4 in a design flood, the flows downstream of SR1 for the
5 Springbank community and other residents of Rocky View
6 County could be in the order of 550 cubic metres per
7 second?

8 A. MR. WOOD: If -- if there was another 2013
9 flood, and it came in in this shape and format, with
10 this type of peak, at these rates, yes.

11 Q. And do you agree that, in fact, depending how --
12 depending on how SR1 is operated, you could make the
13 situation even worse for the Springbank residents, and
14 other residents in Rocky View County?

15 So what I'm getting at is, rather than diverting
16 at 600 cubic metres per second, your operators
17 apparently are at liberty to divert at 480 cubic metres
18 per second, so that would send even more floodwaters
19 downstream of SR1, impacting Springbank residents --

20 A. MR. WOOD: Mr. Chairman, in any of these
21 scenarios, SR1, when operating, diverting, only makes a
22 situation better for all downstream residents.

23 It diverts a considerable portion of flood flow
24 from the river and sends it to the off-stream storage
25 reservoir.

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1 Q. But you could -- you could operate SR1 to make things
2 better by 120 cubic metres a second at the peak for the
3 Springbank residents downstream of SR1, could you not?

4 A. MR. WOOD: Could you maybe rephrase that
5 question?

6 Q. It's just math, Mr. Wood. You say, "Oh, well, SR1 is
7 going to make things better."

8 What I'm saying is, by choosing to divert the peak
9 at only a rate of 480 cubic metres per second, you
10 increase the amount of flooding for my clients below
11 the structure.

12 What I'm -- what I'm saying is, isn't it just
13 math?

14 A. MR. WOOD: You don't --

15 Q. If you're diverting -- diverting it at 600 -- diverting
16 the peak at 600 cubic metres per second is better for
17 everybody downstream of SR1 than diverting the peak the
18 480 cubic metres per second?

19 A. MR. MENNINGER: MR. Chairman, if I may. We
20 provided a range because we're operating a structure in
21 a rivering environment. Ignoring the potential and
22 just saying a solid 600 number is not the appropriate
23 communication to those at -- downstream.

24 What we've communicated is the project will
25 provide a benefit to downstream residents between 480

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1 and 600 cubic metres per second less, and that is the
2 stated goal for the project, and we will strive to meet
3 that goal in the operations of the structure.

4 MR. SECORD: Mr. Chair, now would be an
5 appropriate time for a break, if that's agreeable?

6 You're on mute, sir.

7 MR. FITCH: No one can hear you, Mr. Chairman.

8 THE CHAIR: It would help if I unmuted, sorry,
9 sorry. Sorry, folks.

10 Yeah, I mean, I was planning a break any time now.

11 Mr. Secord, are you planning on wrapping up around
12 11:30?

13 MR. SECORD: I think that's the direction from
14 you, sir. So yes.

15 THE CHAIR: It is, thank you. I mean, you
16 know, we've got some flexibility -- we've shown some
17 flexibility, but without asking, it's hard to know;
18 right?

19 MR. SECORD: Sure. I expect that I should be
20 close to being done, sir.

21 THE CHAIR: Thank you. So let's get back at
22 just after 20 minutes after 10. About 22 minutes
23 after. Thanks.

24 (ADJOURNMENT)

25 THE CHAIR: Welcome back, everyone.

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1 So, Mr. Secord, if you're ready to go, the next
2 hour is yours. So please proceed.

3 MR. SECORD: Thank you.

4 Q. If we could turn up AQ1, document host. I seem to
5 be -- looks like I'm freezing sometimes.

6 THE CHAIR: All good on this end.

7 MR. SECORD: Okay, good.

8 Are we -- are we getting this document pulled up?

9 THE CHAIR: Which? Do we have the wrong
10 document -- I've got the hydrograph back on screen --

11 MR. SECORD: I've got nothing on the screen.

12 THE CHAIR: Okay. You may be having issues.
13 Does everyone else see the Figure A3 on the screen?

14 Yeah, we do, Mr. Secord. So it might be your end
15 on Internet speed, I'm not sure.

16 Or is it a view -- unless you've got your Zoom set
17 to a different view that doesn't have the screen share,
18 I don't know:

19 Mr. Secord? Actually, I think I may have lost
20 Mr. Secord. Does everybody see -- Mr. Secord, can you
21 hear us?

22 MR. WIEBE: I think he's left, and he's going
23 to come back to try to resolve the problem.

24 THE CHAIR: Okay, thank you, Mr. Wiebe.

25 MR. WIEBE: I'm just waiting for him to show

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1 up in the waiting room, and then I'll admit back in.

2 THE CHAIR: He has not shown up back yet.

3 MR. WIEBE: No, he hasn't.

4 THE CHAIR: Mr. Kennedy, perhaps just maybe
5 make sure that he is able to get back for us. Thanks.

6 I'm not hearing Mr. Kennedy.

7 MR. KENNEDY: Help if I put on my headset. I'll
8 give him a phone call.

9 MS. FRIEND: Actually, this is Laura.

10 Mr. Secord just called me, and he said he's going to
11 call in again. He's going to try to reconnect.

12 THE CHAIR: Okay. Great, thank you,
13 Ms. Friend.

14 MR. WIEBE: Yeah, he was just in the waiting
15 room, and I've admitted him.

16 THE CHAIR: Thanks, Mr. Wiebe.

17 Mr. Secord, can you see the document on the screen
18 now?

19 MR. SECORD: I am back. I don't know what
20 happened. So sorry about that.

21 THE CHAIR: Can you see the document now?

22 MR. SECORD: Oh, yes. Everything's fine.

23 THE CHAIR: Great. Thanks.

24 MR. SECORD: Perfect, thank you.

25 Q. So let me just go back to my notes here.

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1 So if we could go to Figure 12, please. Go down
2 one.

3 Can you hear me? Again, it booted me out again.
4 Are you able to hear me?

5 THE CHAIR: We can.

6 MR. SECORD: Oh, good. Okay.

7 THE CHAIR: Do you have a hard copy? We do
8 have Figure 12 in front of us. Do you have a copy -- a
9 hard copy even or --

10 MR. SECORD: No, I can see the figure clearly
11 now. So, hopefully, we're -- I'm good to go.

12 Q. So this is from Section 8.1.2 in Exhibit 159, the
13 Preliminary Design Report, and it's PDF page 84, but I
14 just thought it would be quicker having everything in
15 one place.

16 In looking at Figure 12, does this accurately
17 describe how under idealized conditions, you would or
18 could operate the diversion structure?

19 A. **MR. MENNINGER:** **No. Mr. Chairman, this is
20 John Menninger.**

21 **The -- this does not represent the idealized
22 condition for operation. This represents the bare
23 minimum required in order to mitigate against the
24 event.**

25 **Now, similarly, you would not try to hug the**

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1 bottom of your design operating range, that, in order
2 to -- but this identified, at a minimum, what we would
3 have to achieve in order to offset for the 2013 design
4 flood.

5 Q. And looking at Figure 12, would it be correct that the
6 cross-hatched area above the grey area represents flows
7 that would be directed downstream to the Glenmore
8 Reservoir?

9 A. MR. MENNINGER: That is correct.

10 MR. SECORD: And then document host, if you
11 could turn down to Mr. Frigo's slide Number 11. So
12 just hit the button up top, the arrow. Arrow. The one
13 on the left, that changes the pages. There's an arrow
14 beside the Number 2, and you can just click on it.
15 Yeah, go down. There we go. Thank you.

16 Q. So, Mr. Menninger, this is -- Mr. Frigo's slide
17 Number 11 in Exhibit 351 -- and I don't think you need
18 to turn this up, but it's Section 3 of the Preliminary
19 Design Report, Exhibit 159, starting at page PDF 28.
20 The second sentence indicates that, and I quote:
21 (as read)

22 "Probabilistic discharge and volume
23 estimates for a range of annual return
24 intervals were developed from the
25 historic gauge record."

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1 Is the range that you evaluated the same as the range
2 presented in Mr. Frigo's slide Number 11 in Exhibit 351?

3 A. MR. WOOD: Mr. Chairman, this is Matt Wood
4 here.

5 I believe Mr. Frigo is actually pointing -- the
6 results in that are pointing to another exhibit, which
7 is...

8 Q. 229.

9 A. MR. WOOD: Subject to check, it's 229.

10 Those estimates are -- were prepared by Golder and
11 Associates in draft for AEP in 2020. They were
12 submitted as evidence by SCLG.

13 And those -- those estimates, while they use the
14 same hydrometric data, those estimates also consider
15 historical events on the Bow River transposed to the
16 Elbow River.

17 Q. So is that what Mr. Frigo has done, then, in this
18 slide?

19 A. MR. WOOD: I can't speak for Mr. Frigo, as
20 you're saying that the estimates shown there for flood
21 frequency are those from that source report.

22 Q. From the Golder report?

23 A. MR. WOOD: Correct.

24 Q. And -- and so how does that information differ from the
25 ranges that you used in your application?

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1 A. MR. WOOD: Mr. Chair, I just explained that.
2 It is the same hydrometric record, one that uses a
3 combined station of hydrometric recorded data on the
4 Elbow River, with the exception, the ones in blue above
5 also take anecdotal information about floods on the
6 Bow River, and attempt to transpose that to the
7 Elbow River to -- as part of the estimates.

8 So it's a few extra years of floods, although I
9 must point out that those floods were not specifically
10 known to have occurred on the Elbow.

11 Q. And then if we could scroll down -- if you could hit
12 the arrow. Keep going. Keep going. One more. There
13 we go.

14 So PDF 7 of AQ1. Are you aware and have you
15 considered the rates of flood return periods and
16 associated peak flow rates published by AEP?

17 A. MR. WOOD: Mr. Chair, we've considered them
18 as -- as they were submitted as draft. I believe they
19 were made public as draft December of 2020, we were
20 aware of those and have been considering them through
21 correspondence here as part of this regulatory review.

22 Q. And are you aware the accompanying Flood Inundation Map
23 Library?

24 A. MR. WOOD: Mr. Chair, this is Matt Wood.
25 Yes, we are aware of that.

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1 Q. And Zoom host, if you could go down to page 8.

2 This shows -- I have this annoying little blue
3 thing that shows up on mine -- oh, yeah, it says "Zoom
4 host --" I can get rid of that.

5 So the first map shows an AEP inundation map of
6 1 in 10 years, then there's a second map below, another
7 AEP inundation map, 1 in 20.

8 Then if could go to page 9, please?

9 THE CHAIR: Ms. DiPaolo, are you still okay
10 with Mr. Secord's voice level?

11 A little bit higher? Okay. Thank you.

12 Q. MR. SECORD: And then we have, then, on the
13 page 10 of AQ1, a further AEP inundation map, 1 in
14 20 years.

15 If we could go back to PDF 7.

16 So are those -- are those the accompanying flood
17 inundation maps that are part of the library that
18 you've looked at?

19 A. MR. WOOD: Those maps appear to have been
20 annotated; but, yes, the base layer on them is the
21 flood map.

22 Q. And would you agree that the AEP data sent corresponds
23 with the values that the City of Calgary has advanced
24 in Mr. Frigo's slide Number 11 that we looked at a
25 moment ago?

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1 **A. MR. WOOD:** **Mr. Chair, that's what I stated**
2 **earlier, yes.**

3 **Q.** And would you agree that the range of peak rates and
4 return periods that you have considered is somewhat
5 different than those advanced by AEP?

6 **A. MR. WOOD:** **Yes, those -- the estimates that**
7 **were considered during the design of SR1 are indicated**
8 **in the table above and, yes, they are different.**

9 **Q.** And do you have an opinion about the validity of the
10 AEP materials, and can you comment on these
11 differences?

12 **A. MR. WOOD:** **I would say that both are valid.**
13 **You know, they are a product of the approaches taken,**
14 **and for their intended purpose.**

15 **Q.** Is there anything in Canada that is comparable to the
16 SR1 project? And where can we see one in operation?

17 **A. MR. MENNINGER:** **Mr. Chairman, if we could clarify**
18 **what aspects are the comparable -- or comparison you're**
19 **looking for?**

20 **Q.** Well, maybe we could start here. How many dry
21 reservoirs have been built in the last 50 years in
22 Canada?

23 **A. MR. MENNINGER:** **Mr. Chairman, the function of SR1**
24 **as a -- with a flood storage surcharge component of the**
25 **project is not unique.**

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1 The function that the reservoir is completely
2 drained is -- may be -- may be the terminology utilized
3 for a dry dam.

4 However, many dams that serve as flood control
5 function have a base level, and then a flood surcharge
6 level that occurs rapidly and then empties over a
7 period of days. This is not an uncommon aspect for --
8 for a project.

9 Q. And can you give me an example of anything in Canada
10 that is comparable to the SR1 project?

11 A. MR. WOOD: Mr. Chair, if I may, we have an
12 example that is very similar right here in Alberta, the
13 Pine Coulee Reservoir.

14 It's an off-stream storage reservoir, with a
15 diversion structure located on the river channel, and a
16 diversion channel that takes the water from the
17 diversion structure to the off-stream storage
18 reservoir. That water is held there and then released
19 for later use.

20 Q. Can you tell me how did -- how did AT arrive at time
21 estimates for various locations during -- as a result
22 of the failure of the embankment? Is that inundation
23 mapping that provides those time estimates?

24 A. MR. WOOD: Mr. Chairman, would you please ask
25 Mr. Secord if he could please clarify.

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1 Q. So, for instance, my clients have wondered how it is
2 possible that the Sarcee Bridge arrival time takes
3 two hours when the dam is only 10 kilometres upstream
4 with a failure of 17,000 cubic metres per second.

5 A. MR. MENNINGER: Sure. So the failure -- so the
6 time -- the time is the time to peak from the
7 analysis -- in the analysis. So I believe what you're
8 referring to is the dam bridge analysis developed for
9 the hazard classification for the project.

10 I will, again, note that that is under an extreme
11 scenario with a -- you know, highly unlikely scenario
12 to occur, and it also utilizes parameters in the breach
13 analysis that are conservative for the purposes of
14 hazard classification. That said, the numbers reported
15 for arrival times represents the peak. So a breach
16 takes a while to occur; it doesn't instantaneously show
17 up in the river.

18 And so those elements that you're talking about is
19 from time to breach -- time of breach of the reservoir
20 to the peak downstream. So that's -- that would be the
21 timing that you're referring to.

22 Q. Sorry, go ahead, Mr. Wood.

23 A. MR. WOOD: If I may supplement my colleague's
24 response. We ask the Board to remember that when water
25 flows down a channel like that, especially large

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1 volumes suddenly, it's not what a lot of people
2 envision which is a wall of water coming or a torrent
3 of water, it is a series of fills and spills.

4 When the -- when the rate is coming very high, it
5 takes -- still takes some time to fill up those areas
6 of the floodplain and work its way down. So it's maybe
7 a common falsity that water can move very, very quickly
8 down a channel. It takes time just by the nature of
9 how it flows in the scenario.

10 MR. FITCH: Mr. Chair, it's Gavin Fitch. I
11 don't know about anybody else, but Mr. Wood's video has
12 gone off on my screen. I could hear him fine, but
13 couldn't see him. There he is.

14 THE CHAIR: It was the same here, and I heard
15 him fine, so I let it go. Thank you, Mr. Fitch.

16 A. MR. WOOD: My apologies.

17 Q. MR. SECORD: And how long would it take for the
18 peak to reach Range Road 440 on the south side of the
19 embankment?

20 A. MR. MENNINGER: One moment.

21 Mr. Chairman, our analysis does not present that
22 specific arrival time in our analysis, so I can't offer
23 a specific time for that.

24 Q. Would it be a matter of minutes? If it takes two hours
25 to get to the Sarcee Bridge --

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1 **A. MR. MENNINGER:** It would be -- I don't know what
2 that -- I guess I don't know what a matter of minutes
3 means. It would be less than the time of Sarcee,
4 correct, probably within the hour.

5 **Q.** What is the diversion rate of the Pine Coulee
6 Reservoir?

7 **A. MR. WOOD:** Mr. Chairman, can I request a
8 brief caucus?

9 **Q.** While you're doing that Mr. Wood, what is the storage
10 capacity of the Pine Coulee Reservoir? Is the
11 reservoir fully emptied, and is Pine Coulee a wet
12 reservoir and used as a park?

13 **A. MR. WOOD:** The question is noted, thank you.
14 Again, if I may, may we have a brief caucus.

15 **Q.** Yes, sure.

16 **A. MR. WOOD:** Thank you.

17 **THE CHAIR:** Welcome break, Ms. DiPaolo.
18 All good? Okay.

19 **A. MR. HEBERT:** Mr. Chair, it's Matt Hebert. The
20 Transportation panel should be returning from the
21 breakout room if Zoom is treating us kindly today.
22 Mr. Svenson is in a position to respond.

23 **THE CHAIR:** Thank you.

24 **A. MR. SVENSON:** Good morning, Mr. Chair. This is
25 Mark Svenson.

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1 So, yes, in reference to the Pine Coulee
2 Reservoir, the volume of Pine Coulee Reservoir is
3 50,000 dam cubes, so 50 million cubic metres of water,
4 and it has a dam length of 3.5 kilometres.

5 It does not completely empty, so it is -- it does
6 hold some water during -- year-round. And there are
7 some park-like amenities that do surround the top of
8 that reservoir.

9 Q. So it's not a mud bowl, as Mr. Copithorne stated
10 earlier in the week, Mr. Svenson?

11 A. **MR. SVENSON:** Pine Coulee Reservoir does not
12 completely empty, but I don't think Mr. Copithorne
13 mentioned Pine Coulee at all.

14 Q. And what river does Pine Coulee divert?

15 A. **MR. SVENSON:** Pine Coulee diverts Willow Creek.

16 Q. And what is Pine Coulees's low-level outlet rate?

17 A. **MR. SVENSON:** That is not a figure that I have.

18 Q. And is Pine Coulee in a mountainous flood region with
19 all kinds of debris coming at it from the headwaters of
20 Willow Creek?

21 A. **MR. SVENSON:** Pine Coulee Reservoir is in the
22 foothills of Alberta.

23 Q. And are the headwaters of Willow Creek comparable to
24 the headwaters of the Elbow River?

25 A. **MR. SVENSON:** The headwaters of Willow Creek

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1 extend to the east slopes of the mountains.

2 Q. Is there a debris deflector at Pine Coulee?

3 A. MR. SVENSON: I'm unable to answer that one at
4 this time.

5 Q. I thought you were on that hearing, Mr. Svenson?

6 A. MR. SVENSON: Pine Coulee? No, I was never
7 on...

8 Q. You were on the Little Bow, was it, Highwood hearing?

9 A. MR. SVENSON: I was not on a hearing for either.

10 Q. Okay, I thought somebody on -- I thought I made a note
11 that somebody on the panel had been on one of the
12 previous NRCB hearings. Maybe I got that wrong.

13 And the purpose of the Pine Creek project is for
14 irrigation?

15 A. MR. SVENSON: The reservoir serves a number of
16 purposes, one of which may be irrigation.

17 Q. And one of the other purposes is water and
18 conservation?

19 A. MR. SVENSON: I don't know. I'm not going to
20 claim to know all of the purposes of Pine Coulee
21 Reservoir.

22 Q. Well, let's move away from that example of a -- it's
23 not a dry dam, then, Mr. Svenson?

24 A. MR. SVENSON: As I mentioned, no, it is not a
25 dry reservoir.

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Cross-examined by Mr. Secord

1 Q. Let's move on to diversion capacity.

2 My clients would like to know why was 600 cubic
3 metres per second chosen?

4 MR. FITCH: Mr. Chair, it's Gavin Fitch. I
5 believe it's fair to say the witnesses have, in the
6 course of the hearing so far, explained many times how
7 the 600 metres cubed per second diversion rate was --
8 or why it was selected. And I mean, you know, my
9 friend, of course, is free to ask whatever questions he
10 wants, but it seems to me in the last hour or two in
11 particular, we've really been re-ploughing very old
12 ground. And so I just -- I question why we need to
13 keep asking the same questions over and over again.

14 MR. SECORD: Well, I don't think I have asked
15 that question, and I don't think I have re-ploughed any
16 new ground or old ground.

17 Every question has been, to my mind, quite
18 different. But my clients would like to know whether
19 there would be the ability to divert more than 600
20 cubic metres per second. And contrary to what
21 Mr. Fitch says, that question hasn't been asked.

22 MR. FITCH: That's a slightly different
23 question, and I'm fine to let the witnesses answer.

24 THE CHAIR: And, Mr. Fitch, you know, from my
25 perspective, I've -- we have received time requests

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1 from folks, we have honoured those time requests. So
2 from Chair's and Panels's perspective, you know, we've
3 given a lot of deference on questions, in part, because
4 it's not our job to sort of, you know, tell you what
5 questions are appropriate or not, but also because
6 there's a time limit.

7 We may have been a little more watchful of
8 repeating, and that sort of thing, if we had no time
9 limit set, but Mr. Secord has his time, and to some
10 extent, I guess, you know, really, Mr. Secord, if there
11 are some repeat questions, it's your time. But so --

12 MR. SECORD: Thank you, sir.

13 Q. So my clients would like to know is there an
14 opportunity in SR1 to divert more than 600 cubic metres
15 per second at the peak?

16 A. MR. MENNINGER: Mr. Chairman, this is
17 John Menninger. The design, the maximum design rate
18 for the channel is 600 cubic metres per second, as
19 explained previously. So the design is not intended to
20 divert more than 600.

21 Q. And then, Mr. Menninger, would it be fair to say there
22 is no opportunity to divert more; that's the max.
23 Would that be fair?

24 A. MR. MENNINGER: That should be viewed as the max.

25 Q. Okay, thank you.

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1 So my understanding is that there is much debris
2 left over from the 2013 flood upstream from the
3 diversion inlet. I don't know if that's correct or
4 not.

5 Can you tell me, does -- has -- has AT or Stantec
6 considered what the existing debris field is upstream
7 of SR1 as a result of the 2013 flood?

8 **A. MR. WOOD:** **Mr. Chairman, this is Matt Wood.**
9 **Yes, that was explicitly considered. I don't have the**
10 **reference at hand right now, but in the materials,**
11 **you'll see there's maps quantifying that debris using**
12 **the air photos.**

13 **Q.** And is there concern that in a design flood in the
14 future, that debris field may be mobilized and come
15 barreling down the Elbow at the SR1?

16 **A. MR. WOOD:** **Mr. Chairman, this is Matt Wood**
17 **again. It doesn't use the word "barreling down," but**
18 **it does look at the potential for remobilizing some of**
19 **that degree from the bars, and that's what was used in**
20 **the design of the debris deflection barrier.**

21 **Q.** And in terms of the operation of the debris deflector
22 barrier, will that debris then essentially bounce off
23 of the deflector for the most part and then go on
24 down -- downstream past the SR1 structure?

25 **A. MR. WOOD:** **It -- Mr. Chair, this is Matt Wood**

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1 again. It has been designed as such. You know, as we
2 discussed yesterday, there's a lot of analysis looking
3 at impacts from accumulation and clogging, again,
4 similar to some of the redundancies. It's been
5 designed to promote the passage of debris downstream,
6 but its design does not rely on the passage of that
7 debris downstream.

8 Q. Now, the community -- in terms of transportation risk,
9 the project has removed community detour roads.

10 Does the proponent agree that the original
11 recommendation to upgrade range -- Township Road 250
12 and to upgrade Range Road 40 with a dedicated turn
13 lane, can you tell me where those projects sit today,
14 in terms of transportation risk from the SR1 project?

15 A. **MS. CARIGNAN:** Yes, Mr. Chairman. This is
16 Yvonne Carignan.

17 I believe what Mr. Secord is referring to is my
18 response from Monday when I had indicated that those
19 two pieces of the project had been removed, as part of
20 Undertaking 11 from Topic day 2 as -- sorry --

21 Q. Go ahead. Is that the one that was just filed this
22 morning?

23 A. **MS. CARIGNAN:** That is correct, Mr. Secord, yes.

24 Q. I haven't had a chance to look at that yet,
25 Ms. Carignan.

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1 **A. MS. CARIGNAN:** Can you just give me one moment,
2 Mr. Secord?

3 **Q.** Sure.

4 **A. MS. CARIGNAN:** Mr. Secord, if -- and
5 Mr. Chairman, if it pleases you, I could actually
6 summarize the contents of that undertaking here right
7 now.

8 **Q.** That would be great.

9 **A. MS. CARIGNAN:** I don't know if it's possible, but
10 it may be helpful to actually pull up the response to
11 that undertaking.

12 **Q.** Has that been given a number, Ms. Friend?

13 **MS. FRIEND:** Yes. It's been given 369, but,
14 document manager, you'll have to go to the website.
15 It's not on the exhibit list yet.

16 **THE CHAIR:** I'm not sure about the size of
17 this one, but the one that we got last time was 3
18 gigabytes, which is why it did take document manager a
19 little bit of time to download it off the web. I think
20 it was a 3000-page part of the EIA, so. This one looks
21 to be a lot shorter, but if there's a delay, often
22 that's what it is.

23 **A. MS. CARIGNAN:** This is not the right document,
24 sorry. It's only a one-page document.

25 **MR. SECORD:** I got an email from Mr. Fitch this

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1 morning, I thought with some undertaking...what's the
2 description of it?

3 MS. FRIEND: I've got it named as the response
4 to Undertaking 11, 369, but it looks like a -- may have
5 saved the wrong document on there.

6 Can you open that, Sylvia?

7 Oh, there it is. And scroll down, I think it's --
8 there it is.

9 A. MS. CARIGNAN: Excellent. Thank you very much.
10 It may be helpful to zoom this in just a little bit so
11 that everyone can read it a little bit more easily, in
12 particular, to focus on the three options near the
13 top -- oops -- sorry. Right there where it says
14 "Response" there. So there's a 1, 2, and a 3.

15 So earlier in the project, the department had
16 considered three options for addressing traffic
17 concerns when flow was being diverted, and one of those
18 was to raise Springbank Road.

19 Another one was to retain the existing
20 Springbank Road, and divert traffic north along Range
21 Road 40 and then westward along Township Road 250.

22 And then the third option was to realign
23 Springbank Road to the south and run it along the crest
24 of the dam.

25 So, as part of that earlier analysis, everything

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1 was kind of given a rating of good, average or poor,
2 and Option 2 came out as the clear winner.

3 Further to that, if you could just scroll down a
4 little bit more, there were discussions this week after
5 concerns were raised by stakeholders that improvements
6 weren't going to be made to Range Road 40 and Township
7 Road 250.

8 So I'm happy to report back that
9 Alberta Transportation, as part of this undertaking, is
10 going to be improving Range Road 40 to a county
11 collector road, as well as improving the intersection
12 of Township Road 250 with Highway 22 for improved
13 safety.

14 Q. And will that Range Road 40 have a dedicated left-turn
15 lane?

16 A. MS. CARIGNAN: That would be subject to the
17 engineering design, Mr. Secord. Mr. Chairman, I can't
18 speak to that yet. We would need to proceed with more
19 detailed engineering on that.

20 Q. Thank you, Ms. Carignan. Now, in terms of potential
21 conditions -- I know my clients don't like me asking
22 questions about conditions because, obviously, they
23 made their views pretty clear about what they view the
24 project -- but in the event that an approval was
25 provided to AT for this project, my clients believe

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1 that the community must be engaged in the creation of
2 an early warning system, including methods of
3 communication.

4 And so from an emergency planning point of view,
5 would AT provide a commitment to engage the community
6 in a thorough way to create an early warning system in
7 the event of some malfunction with SR1?

8 MR. FITCH: Mr. Chair, it's Gavin Fitch, just
9 while the witnesses are conferring, I would just simply
10 note for the record that one potential difficulty with
11 the question being asked is that the evidence on the
12 record already is that the emergency management plan
13 will be created by Alberta Environment and Parks, not
14 Alberta Transportation.

15 So I just wanted to, I guess, flag that potential
16 issue.

17 But happy to now turn it back to the witness
18 panel.

19 A. MR. HEBERT: Mr. -- Mr. Chairman --

20 THE COURT REPORTER: Sorry, who's speaking?

21 A. MR. HEBERT: My apologies, it's Matt Hebert.

22 A couple aspects to the question. One, as part of
23 the development of the emergency management plan that
24 Transportation counsel referred to, there is engagement
25 with stakeholders, particularly the local authority,

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1 there are certain protocols that must be followed when
2 building a structure of this nature.

3 I also noted this morning the interest of
4 Transportation in engaging with local landowners in the
5 community as it relates to the finalization of these
6 plans and to ensure that they're kept up to date of the
7 development, that they're aware of the implications to
8 them from a public safety perspective.

9 You asked a very specific question about a
10 specific system. I propose that, subject to the advice
11 of our counsel, that's taken on as an undertaking.

12 **UNDERTAKING - TO ADVISE WHETHER AT**
13 **WOULD PROVIDE A COMMITMENT TO ENGAGE**
14 **THE COMMUNITY IN A THOROUGH WAY TO**
15 **CREATE AN EARLY WARNING SYSTEM IN THE**
16 **EVENT OF SOME MALFUNCTION WITH SR1**

17 Q. MR. SECORD: And then to Mr. Fitch's point,
18 we're in a situation where really AT, presumably, you
19 know, gets the -- goes through the regulatory process,
20 gets the approval to construct, I guess then you do the
21 construction, and then, at some point, you hand it off
22 to Alberta Environment to operate. Do I have that
23 right?

24 A. MR. HEBERT: That's correct, sir.

25 Q. And so is Mr. Fitch right in the sense that, would

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1 there be no emergency plan in place during construction
2 while AT is still notionally the owner of this dam?

3 **A. MR. HEBERT:** Mr. Chairman, I would invite the
4 appropriate person on the panel to provide a response
5 on emergency management during construction.

6 **A. MR. MENNINGER:** So the emergency management plan
7 will be developed during the construction period.

8 And, you know, the nice thing about SR1 is that it
9 is off-stream, so we will not operate as a dam until we
10 have an emergency management plan. So that it -- and
11 it's been approved. So we choose to operate, right?
12 Not if -- we're not in the river.

13 **Q.** So do I understand, then, you don't need an emergency
14 plan to construct the work in-stream, to put up the
15 diversion gates?

16 **A. MR. MENNINGER:** So the river will be running
17 through without -- without the tension or -- during
18 that period of time.

19 **Q.** So you're able to construct the diversion gates in the
20 river while the river is flowing?

21 **A. MR. MENNINGER:** We will -- as -- as the
22 application demonstrates, we will divert the river
23 around the construction works for a period of time, and
24 those construction works will be protected in an --
25 encompassed within an isolation, but it won't -- the

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1 thing that's protected in that scenario is only the
2 construction works.

3 Q. And --

4 A. **MR. MENNINGER:** So it's surrounded by a berm.

5 Q. Does the diversion around the construction works create
6 any additional risks for any of my clients who are
7 adjacent to the diversion in the event a flood event
8 coming down the river?

9 A. **MR. MENNINGER:** We don't foresee any additional
10 risks associated with the diversion.

11 Q. So in relation, then, to the emergency planning
12 document, is AT in a position, then, to pass on -- to
13 make a commitment to conditions that would be passed on
14 to the operator?

15 A. **MR. HEBERT:** Mr. Chairman, as -- as the
16 proponent to the department currently responsible for
17 the project, conditions then are -- that we applied as
18 a part of this regulatory proceeding in the transfer to
19 AEP would equally apply to them as to what would then
20 be the department responsible for the Springbank
21 project.

22 Q. So then Alberta Transportation would have no objections
23 concerning the NRCB imposing conditions that would be
24 passed onto the eventual operator of this high
25 consequence dam?

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1 A. MR. HEBERT: Mr. Chairman, as I just stated,
2 Alberta Transportation as proponent is the department
3 responsible for the project up until the point where
4 the project is transferred to Alberta Environment and
5 Parks, or the department that may be responsible for
6 the operation of -- of these types of projects in the
7 future.

8 Those conditions are attached to the project,
9 regardless of the government department responsible at
10 the given time.

11 THE CHAIR: Mr. Secord, perhaps I could just
12 interject. This comes up with NRCB often. I see
13 Mr. Kennedy is back. I was going to ask him to perhaps
14 explain how the NRCB has dealt with this before.

15 But we are not the downstream regulator, so we've
16 faced this before, and we do have conditions that are
17 returnable to Alberta Environment as an example -- most
18 often it's Alberta Environment, so is this is not
19 uncommon for the NRCB to -- in terms of approvals that
20 we have issued in the past.

21 Mr. Kennedy, would you mind maybe just weighing
22 in?

23 MR. KENNEDY: Well, I'd love to weigh in, but I
24 was on the phone with Mr. Williams dealing with a
25 procedural question. So I totally missed the

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1 discussion on the table, if you --

2 THE CHAIR: Sure. So, Mr. Kennedy, it's kind
3 of being punted back and forth in terms of AT's
4 willingness to accept conditions, and then what happens
5 after the project has passed from AT on to AEP as the
6 ongoing operator, because some conditions may in fact
7 be operating conditions well after AT has raised the
8 project.

9 And I just wanted to shed a little bit of light in
10 terms of NRCB's past experience, because this comes up
11 often, and we've issued conditions in the past when
12 projects have been approved; and if you could just
13 maybe add to that in terms of how we deal with it.

14 MR. KENNEDY: So if the question is, will those
15 conditions carry forward to future custodians of the
16 ownership of the project, absolutely. Those conditions
17 flow with the project.

18 And it's pretty common, both with public projects,
19 which typically are advanced, in this case, by
20 Alberta Transportation and will move to
21 Alberta Environment, or with private sector projects
22 where there's a change in ownership that takes place
23 sometime post-NRCB approval.

24 MR. FITCH: Mr. Chair, it's Gavin Fitch again.

25 I want to be clear that, obviously, any condition

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1 that's imposed by the NRCB in an approval will bind AEP
2 as the eventual operator. I wasn't intending to say or
3 imply anything different.

4 My comment was more directed at AT's ability to
5 commit to things which are operational, given that it
6 won't be the operator. I was just simply -- the
7 distinction, then, is between -- if it's a condition
8 that's been imposed by the NRCB, then so be it.

9 But I think my friend is going down the road of
10 asking AT to make -- would you commit to do this, would
11 you commit to do that.

12 The point is that, to the extent the commitments
13 relate to operations and AT won't be the operator,
14 they're just saying there might be -- depending on what
15 the requested commitment is, it might be difficult for
16 AT to provide that commitment. That's all I was trying
17 to say.

18 THE CHAIR: Thank you.

19 MR. SECORD: Thank you. Thank you for that
20 clarification, Mr. Chair, Mr. Kennedy, Mr. Fitch.

21 Q. Ms. Carignan, in relation to the cost of the road
22 upgrades, can you advise me what the projected costs
23 are and whether they can be added into the project
24 budget in Appendix G-2 to Exhibit 159?

25 A. MS. CARIGNAN: Mr. Chairman, that would be

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1 subject to additional engineering.

2 The investigation that's been done to date is very
3 conceptual, and the cost estimate, cost opinion, that
4 was provided in that report is at a preliminary
5 engineering stage, so it's considerably more advanced,
6 and I would not consider that to be accurate.

7 Q. Could you undertake to provide a more accurate cost of
8 the road upgrades that AT is now agreeing to implement?

9 A. MR. HEBERT: One moment, Mr. Chairman.

10 Mr. Chairman, subject to the advice of counsel,
11 Alberta Transportation will take that as an
12 undertaking.

13 Q. Thank you, Mr. Hebert.

14 **UNDERTAKING - TO PROVIDE A MORE**
15 **ACCURATE COST OF THE ROAD UPGRADES THAT**
16 **AT IS NOW AGREEING TO IMPLEMENT**

17 Q. MR. SECORD: My clients are concerned about the
18 initial filling of the dam.

19 So going to Mr. Fitch's caveat about operations,
20 my clients would like to have the capacity of the
21 reservoir restricted for a first fill and would like to
22 see the reservoir gradually increased over time, rather
23 than allowing a large flood to be a first use.

24 And I'm wondering, is that a condition that would
25 be acceptable to Alberta Transportation, that there be

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1 some, essentially, gradual breaking -- kind of breaking
2 in the SR1, rather than getting it filled, you know, up
3 to FSL in an initial flood?

4 **A. MR. HEBERT:** Mr. Chairman, I -- the
5 Transportation Panel would like to caucus, if that's
6 acceptable to you?

7 **THE CHAIR:** Yes.

8 Ms. DiPaolo is probably enjoying the pace of this
9 cross-examination. Appreciate your work, Ms. DiPaolo,
10 and Ms. Vespa, in particular given these proceedings
11 have a lot more technical information than perhaps
12 other proceedings that you record, so...

13 So we're back, Mr. Hebert.

14 **A. MR. HEBERT:** Yes, Mr. Chairman, I believe the
15 Transportation panel should be reentering the main
16 room.

17 So, to respond to the question, and I'll invite
18 Mr. Menninger to supplemental, you know, I do
19 appreciate where the -- where the question is coming
20 from. But, unfortunately, it's not an item that we can
21 consider.

22 We expect that the -- you know, should the project
23 be approved, that it will be in a position to perform
24 the function that it's intended to do, which is to
25 provide the flood mitigation on the Elbow River to

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1 the -- to the design levels, the design storage
2 capacity.

3 That -- that's assuming again that it's been built
4 to the standards required, that it's been -- it's been
5 tested, it's been commissioned, and it is in a position
6 to be -- to be used for its -- for its purpose.

7 I would invite Mr. Menninger to provide some
8 background to the Board on what would occur in the
9 event the reservoir is used on -- on first go.

10 A. MR. MENNINGER: Sure. So, Mr. Chairman, I believe
11 as we explained previously, you know, we will have a
12 first filling plan for the project with the proposed
13 operations, the proposed monitoring of instrumentation
14 during the process, the proposed observations to be
15 performed by the owner/operator and engineering teams.
16 At that time, that process will also involve management
17 and emergency response elements. The system will be
18 observed and monitored throughout that filling, and we
19 will have interventions in place as necessary or
20 appropriate to react.

21 If -- if an issue is to occur or be observed, you
22 know, the -- that would require a significant
23 intervention, we would shut off the flow to the
24 reservoir and proceed through the intervention process
25 through that manner.

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Cross-examined by Mr. Secord

1 Q. MR. SECORD: Another condition for your
2 consideration, MC1 would have protected Bragg Creek and
3 significant flow rates, future floods may impact
4 Bragg Creek's access at Balsam Avenue Bridge, which is
5 the only access point for West Bragg Creek.

6 Will the proponent provide a secondary emergency
7 access road for Bragg Creek residents on the west side
8 of Bragg Creek as a condition of an approval of SR1?

9 A. MR. HEBERT: One moment, Mr. Chairman.

10 Mr. Chairman, as referred to earlier this week,
11 the berms at Bragg Creek are delivered by the local
12 authority. Certainly, the concern regarding access
13 roads is noted, and if it's -- if it's okay,
14 Alberta Transportation could raise the concern with --
15 with Rocky View County as the local authority
16 responsible.

17 Q. The next -- the next condition actually relates to
18 Rocky View County, in particular, emergency planning
19 expenses for SR1.

20 Will the proponent be providing funding for
21 Rocky View County to have the ability to respond to a
22 dam malfunction?

23 A. MR. HEBERT: Mr. Chairman, as we've described
24 today, there is a process through which emergency
25 management planning occurs as a result of the dam.

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Cross-examined by Mr. Secord

1 I would expect that -- that Transportation where
2 AEP would be in discussions with Rocky View County
3 regarding matters that are -- that are contemplated in
4 response to that plan, I would not believe it's
5 appropriate at this time to make a financial
6 commitment, subject to discussions with the local
7 authority.

8 Q. A further condition: Will the proponents agree to
9 provide additional funding over and above the new
10 disaster recovery limitations of \$500,000 one time for
11 homeowners in Rocky View County, not limited to
12 Bragg Creek, Springbank, and Elbow Valley, considering
13 that MC1 would have provided superior flood mitigation
14 for these communities?

15 A. **MR. HEBERT:** Mr. Chairman, as was raised
16 earlier this morning, the jurisdiction of disaster
17 recovery funding sits with a different government
18 department, that being Department of Municipal Affairs.
19 Their response to disaster recovery is a matter of
20 public record, and certainly questions regarding local
21 flood mitigation are within the jurisdiction of the
22 local authority.

23 Q. Perhaps as a further condition, will the proponent
24 apply to have SR1 classified as critical infrastructure
25 to adequately address risk of terrorism, et cetera?

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Cross-examined by Mr. Secord

1 **A. MR. HEBERT:** One moment, Mr. Chairman.
2 Mr. Chairman, subject to the advice of counsel,
3 Alberta Transportation will take that as an
4 undertaking.

5 **UNDERTAKING - TO ADVISE IF THE**
6 **PROPONENT WILL APPLY TO HAVE SR1**
7 **CLASSIFIED AS CRITICAL INFRASTRUCTURE**
8 **TO ADEQUATELY ADDRESS RISK OF**
9 **TERRORISM, ET CETERA**

10 **Q. MR. SECORD:** My clients would like to ask
11 whether, as a condition of an approval of this project,
12 whether AT would retain an independent dam engineering
13 firm to conduct an independent assessment of MC1 versus
14 SR1 to perform flood mitigation effectiveness at
15 various flood rates and hydrographs and operating risk
16 assessments?

17 **A. MR. HEBERT:** Mr. Chairman, on account that
18 we're advancing the application of SR1, we're not
19 prepared to undertake that as a condition of approval.

20 **UNDERTAKING - AS A CONDITION OF**
21 **APPROVAL FOR THE SUBJECT PROJECT, TO**
22 **ADVISE WHETHER AT WOULD RETAIN AN**
23 **INDEPENDENT DAM ENGINEERING FIRM TO**
24 **CONDUCT AN INDEPENDENT ASSESSMENT OF**
25 **MC1 VERSUS SR1 TO PERFORM FLOOD**

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Cross-examined by Mr. Williams

1 **MITIGATION EFFECTIVENESS AT VARIOUS**
2 **FLOOD RATES AND HYDROGRAPHS AND**
3 **OPERATING RISK ASSESSMENTS - REFUSED**

4 MR. SECORD: Mr. Chairman, I have reached, I
5 believe, 11:30, and those are all of my questions.
6 Thank you very much.

7 THE CHAIR: Thank you, Mr. Secord.

8 Mr. Williams, I understand that you may have some
9 questions for Alberta Transportation. Are you online
10 and is that correct?

11 A. MR. WILLIAMS: That's correct.

12 THE CHAIR: Okay, please proceed.

13 MR. WILLIAMS CROSS-EXAMINES THE PANEL:

14 Q. Two questions with regards to safety and security.

15 In regards to the diversion barrier and, in the
16 time period of a flood event, is there a protocol and
17 procedure in place for debris downstream so that
18 sweepers, et cetera, do not re-divert the river
19 creating flood events somewhere else and/or to ensure
20 the channel is -- is clear to allow the flow of water
21 to go its natural course?

22 A. MR. WOOD: Mr. Chairman, this is Matt Wood.
23 I can answer that, and thank you for your question,
24 Mr. Williams.

25 The project will not increase the amount of debris

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Cross-examined by Mr. Williams

1 that comes downstream. In a flood, currently debris is
2 washed down there, and it's moved around in a rather
3 chaotic manner, as I'm sure you know, depositing in
4 different places.

5 As we mentioned, while the debris deflection
6 barrier is designed to help promote this material
7 moving downstream, it's also very likely to accumulate
8 onto it as well. So, if anything, there might be a
9 slight reduction in that debris downstream, but it
10 shouldn't have a negative impact in the manner of which
11 your concern is, which I believe is public safety,
12 things like sweepers and stuff. It should have no
13 impact on making any of that worse.

14 Q. Yeah. Just my experience of water and how it flows if
15 it -- if it piles up somewhere else further downstream,
16 I guess my question is is there policy -- or sorry,
17 protocol or procedure to clean it to ensure that the
18 flow of the river maintains its natural course?
19 That's -- so, in essence, I think you've answered that,
20 but I do think that's important. So that's the first
21 question.

22 The second question, and this is to do with
23 Mr. Menninger's presentation yesterday on safety --
24 safety and security at the site during the operation of
25 a flood event. Has the Alberta Transportation

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Cross-examined by Mr. Williams

1 considered safety and security in a non-flood event,
2 and the other period of time that the facility exists;
3 i.e. winter, people that are tobogganing down the
4 slopes, or skateboarders in the parking lot, or teens
5 breaking in at night, has there been any thought
6 process for procedures and policies in regards to the
7 non-operational safety and security?

8 **A. MR. MENNINGER: Absolutely. This is**
9 **John Menninger responding. Mr. Williams, safety -- and**
10 **I believe I mentioned this before, as with -- in the**
11 **non-operation periods for the project has been one of**
12 **the key concerns for the design team. And so one of**
13 **the tenets I think I mentioned was that we design most**
14 **of our concrete and hydraulic structures not to retain**
15 **water. So there's no drowning hazards on site, you**
16 **know, for -- you know, like an retention pond might**
17 **have or other components, because it's difficult for us**
18 **to fence things that are in the active floodway --**
19 **flood pathway, as you might imagine.**

20 Similarly, we are also mindful of the potential
21 for falls from high walls and things like that, so all
22 of our proposed walls and elements have railings and
23 other fall arrest prevention components.

24 You mentioned skateboarding. We actually have --
25 at the outlet of the channel is like a stepped spillway

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Cross-examined by Mr. Williams

1 structure that may look desirable for folks to be on a
2 bike or a skateboard or something to go down. But that
3 structure will be actually constructed of something
4 called roller compacted concrete. And a feature of
5 roller compacted concrete is that it has a rough
6 surface. It's not like the smooth concrete that you
7 would form. It's actually very rough, and you would
8 not want to skateboard on this. It would be very
9 uncomfortable and we actually thought about that as
10 well.

11 So these things are all considerations, you know.

12 I think to mention one other element. The areas
13 that, you know, of high security we have fenced with,
14 you know, chain-link fencing and gates in other
15 elements. But the realization is that it is a very big
16 project site, and so other elements -- we made these
17 concerns because we anticipate the potential access
18 from others, and we can't restrict them.

19 And so all of those elements have been
20 incorporated into the design with that consideration,
21 to make sure if those unauthorized access, you know,
22 were to utilize it for manners that we -- that the
23 design team could think of and implement.

24 Q. Excellent. I just want to ensure the unintentional
25 incidents that are being considered, so -- and that

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Cross-examined by Mr. Wagner

1 would be all my questions.

2 THE CHAIR: Thank you, Mr. Williams.

3 Mr. Wagner? I believe Mr. Wagner had -- I thought
4 he might have had questions.

5 Are you online, Mr. Wagner?

6 **MR. WAGNER CROSS-EXAMINES THE PANEL:**

7 Q. I am. I continue to research for a specific map, and I
8 kind of need Mr. Secord's help here because he was the
9 one that requested it get brought up.

10 I'm wondering if we can break a little early and I
11 can request Mr. Secord's help here.

12 MR. SECORD: Mr. Williams, do you know the --
13 can you describe the map to me?

14 MR. WAGNER: It was brought up as -- when you
15 were talking about the fingers on our property, and
16 it's a different map than I've seen before.

17 MR. SECORD: So that would be exhibit --

18 MR. WAGNER: I've literally been through
19 thousands of --

20 MR. SECORD: I agree, but I think you might
21 want to turn up Exhibit 254, PDF 114.

22 THE CHAIR: Thank you, Mr. Secord.

23 And that map you're talking, Mr. Wagner, that was
24 yesterday; is that correct.

25 MR. WAGNER: You know, Mr. Chair, I wished I

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Cross-examined by Mr. Wagner

1 could point the exact time. I've actually gone through
2 literally everything that I can think of to try and
3 find that map, and it's a unique map so.

4 MR. SECORD: Yeah, and I think if we go to PDF
5 page 115, you'll see the fingering. And Mr. Wood may
6 be able to help us because he referenced another map
7 with fingering as well.

8 So between Mr. Wood and I, I think we'll be able
9 to help you, but try Ms. Hunter's presentation, which
10 is Exhibit 254, PDF 115, and maybe we'll go from there.

11 THE CHAIR: Ms. Kaminski, if you can get that
12 one up, thank you. Page -- sorry, was that 11 you
13 said?

14 MR. SECORD: 115.

15 THE CHAIR: 115.

16 MR. WAGNER: Yeah, unfortunately, this is not
17 it, Mr. Secord. What the map actually showed was
18 something that is sticking in my brain and is the
19 difference between the 200-year flood line in front of
20 our house, and it was an expanded map, and a black line
21 that it was actually on the east side of our house.

22 MR. SECORD: Yeah, yeah. That was the one that
23 Mr. Wood brought up yesterday.

24 A. MR. HEBERT: If I can assist, Mr. Chairman.

25 I'll have Mr. Wood identify it in the effort to advance

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Cross-examined by Mr. Wagner

1 **this discussion.**

2 THE CHAIR: Thank you.

3 MR. WAGNER: I can ask a couple other
4 questions, Mr. Chair, in advance of bringing up that
5 map.

6 THE CHAIR: Let's do those first. Thank you.

7 THE COURT REPORTER: Sorry, can I have Mr. Wagner on
8 the screen, please?

9 MR. WAGNER: Oh, most certainly, although I am
10 in the country, so I apologize if it doesn't come up
11 well. Is that better?

12 THE CHAIR: Well, yeah, it doesn't look --
13 well, yeah, we've got you now. We'll see how long that
14 lasts, but, Ms. DiPaolo, he may not be moving, so it
15 may be a little tricky, but you'll hopefully have his
16 voice now between Mr. Wood and Mr. Wagner. If not,
17 just hold up your hand, I'll try to watch for you, if
18 you don't know who's speaking and we'll identify.

19 Mr. Wagner, perhaps you can do that as well. When
20 you start, just identify yourself for Ms. DiPaolo.

21 MR. WAGNER: Most certainly, Mr. Chair. This
22 is Scott Wagner.

23 THE CHAIR: Thank you.

24 Q. MR. WAGNER: My first question for the panel or
25 for the GoA is have you been in touch with the local

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Cross-examined by Mr. Wagner

1 fire departments re fire safety within the SR1
2 footprint?

3 A. MR. HEBERT: Mr. Wagner, are you speaking about
4 the construction phase of the project or the
5 operational phase of the project or both.

6 Q. I would say both?

7 A. MR. HEBERT: To date, no, but I would
8 anticipate that both, for the construction phase and
9 the operational phase, that would be one of the
10 organizations the constructor and operator will have to
11 be in contact with.

12 Q. I would like to bring forward an undertaking for the --
13 for Alberta Transport. In 2010, Bragg Creek fire
14 department was stationed in our yard, and there was a
15 grassfire west of us. And by your maps, we have a
16 boreal forest on our property.

17 By the grace of God, we got a southeast wind that
18 actually diverted that grassfire north to Highway No. 1
19 just west of our property.

20 The fire department was stationed in our yard.
21 Interestingly enough, they passed on information that
22 they will not go into the field to fight a fire, and as
23 in my submission, I am quite concerned about fires.
24 And so my undertaking would be should the NRCB approve
25 this project, would the GoA engage with local fire

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Cross-examined by Mr. Wagner

1 departments to change policy and enable grass
2 firefighting?

3 A. MR. HEBERT: Mr. Chairman, I think it would be
4 appropriate that we take that away as an undertaking,
5 to provide a written response.

6 THE CHAIR: Thank you.

7 UNDERTAKING - TO ADVISE IF THE GOA WILL
8 ENGAGE WITH LOCAL FIRE DEPARTMENTS TO
9 CHANGE POLICY AND ENABLE GRASS
10 FIREFIGHTING SHOULD THE PROJECT BE
11 APPROVED

12 Q. MR. WAGNER: If I could get Exhibit 131,
13 page 1962 brought up. It should be a map showing the
14 boreal forest or the forestry. Could I get that
15 expanded to the fingers on the map, which is our
16 property?

17 THE CHAIR: That would be the upper sort of
18 left corner.

19 Q. MR. WAGNER: Yes, thank you. It appears as
20 though we have, according to your map, the majority of
21 the forestry on this particular template of the SR1.
22 And I would like to ask the GoA, upon a flood event, it
23 is highly probable -- I'm not an expert in this area,
24 but I have seen it happen -- all the trees die. So
25 we'd be left with a standing forest in percentage of

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Cross-examined by Mr. Wagner

1 the dam footprint that would be a severe fire hazard.

2 Has the GoA considered the implications of this?

3 A. MR. WOOD: Mr. Chairman, this is Matt Wood.

4 While we have this open, if I may, I may request that

5 the document controller open up another figure that

6 actually zooms right in on this location where you can

7 see on an air photo, and it might allow me to help

8 describe. And maybe if you could keep this open in

9 case Mr. Wagner wants to reference it as well, we can

10 go back and forth.

11 The figure that I'm requesting is Exhibit 159,

12 page 244, and it is the engineering drawings. I may

13 have provided the wrong exhibit. That appears to be

14 the report. One moment, please.

15 A. MR. MENNINGER: Matt, that's correct.

16 A. MR. WOOD: Thank you, Mr. Menninger. It was

17 page 244, please. Seems to be having that scrolling

18 issue. Perhaps if you could go down and -- fully down

19 and up, it should work.

20 My apologies, perhaps if the figure is struggling,

21 we could explain it with the other one.

22 As I've described the other day to Mr. Wagner that

23 the flooding in this area is really -- up the fingers

24 is the low-lying area that is currently occupied by the

25 watercourse from the Unnamed Creek channel.

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Cross-examined by Mr. Wagner

1 The reason why I was trying to bring this figure
2 up is to show that many of the trees that Mr. Wagner
3 speaks of are not inundated. I understand in this map
4 here that was previously brought up, it shows some of
5 that dark green in that area, but what I wanted to show
6 here -- was to allow Mr. Wagner to see that many of the
7 trees themselves in this area would not be submerged in
8 a design flood event or even one that -- even up to
9 that top of dam level.

10 Q. As a follow-up question, Mr. Wood, there is a
11 significant amount of long-living, very hot-burning
12 willow, it's diamond willow here in the footprint,
13 which is in the bottom. And it probably is under the
14 same conditions; it probably won't survive flood event.

15 So has the GoA considered the fire hazard of the
16 diamond willow?

17 A. MR. WOOD: I believe this may be a question
18 for the vegetation experts on the project.

19 A. MR. BRESCIA: Mr. Chairman, it's Mr. Brescia.
20 So what we can see, if you actually go back to that
21 Exhibit 131 figure that Mr. Wagner had brought up, you
22 can see there that the black line represents the PDA,
23 which as Mr. Menninger explained previously, is the top
24 of the dam elevation.

25 So it's -- it's even further out than the designed

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Cross-examined by Mr. Wagner

1 flood elevation would be.

2 And while there is some -- some broadleaf forest
3 and some shrub land identified in there, we don't
4 expect either the water depth to be great enough or the
5 time of inundation to be long enough to create
6 substantial loss of vegetation in this area from
7 inundation.

8 So we would think that the -- the risk of those --
9 that vegetation dying would be quite low.

10 Q. I've got an undertaking for the GoA, and despite that
11 particular comment back, should the NRCB approve this
12 project, would the -- would the GoA consider options
13 for removing the call it damaged forestry after a flood
14 event? By "removing," I would say mowing, by the way,
15 don't talk about digging it out. But is -- I read
16 about other dams, and if we leave the forestry in
17 place, it has a problem; on the flip side, the forestry
18 has been removed with some other dams?

19 A. MR. HEBERT: Mr. Chairman, it's Matt Hebert. I
20 would suggest that we add this to the undertaking that
21 we're preparing for Mr. Wagner.

22 Q. Thank you, very much, Mr. Hebert. By the way, just as
23 a general comment, I'm really conflicted about this
24 Mr. Hebert. The forestry does give excellent cover for
25 the elk, and it hides the elk calving in the spring.

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Cross-examined by Mr. Wagner

1 And that may have a significant impact on hunting as
2 you can see the elk from the road.

3 So I'm a little -- I am highly conflicted on this
4 area, so I think there's other implications, as well.

5 **A. MR. HEBERT:** Mr. Chairman, if I may, you know,
6 I certainly appreciate what Mr. Wagner is saying. I
7 don't want to preempt or prejudge our response.

8 But as I've referenced before, we'd certainly
9 appreciate continued engagement with Mr. Wagner, in
10 terms of understanding his concern as it relates to the
11 impact of the project on his property.

12 **Q.** If I could get Exhibit Number 64, page 264 brought up.

13 **THE CHAIR:** Just a large file; it will be
14 loaded in a minute.

15 **MR. WAGNER:** Yes, it took me a while to load it
16 up this morning, as well, Mr. Chair.

17 **THE CHAIR:** Do you see it?

18 **MR. WAGNER:** Looked like the correct -- there
19 it is, 264. I was going to say there was a -- it was a
20 much larger file. I apologize. This is not the map
21 that I'm looking for, but I will deal with this.

22 The map that I was looking at actually had the
23 rainfall in Springbank, and it had a particular area
24 identified as a rainfall area. And if I remember
25 correctly, and I apologize if I get the facts a little

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Cross-examined by Mr. Wagner

1 bit off, but 32,000 dam cubes was the -- I believe the
2 amount of rainfall from the Glenmore Dam up to the area
3 past the SR1. So it would be the amount of water flow
4 potential that would come down.

5 And I've heard it referred to for the first -- you
6 know, first time, they call it "Unnamed Creek." In my
7 background, I think I'm showing Unnamed Creek in my
8 background.

9 Has the GoA determined how much additional flow
10 that would come into the dam from all sources around
11 the area of the SR1? And I think Unnamed Creek is one
12 of them, but there's also -- it is Springbank, and
13 there is a number of springs in the area.

14 And obviously rain flow has a big impact on that,
15 so I think that information -- some of the information
16 is available. Have you calculated that?

17 **A. MR. MENNINGER:** Mr. Chairman, this is
18 John Menninger, this is John Menninger. I can respond
19 to that.

20 Yes, Mr. Wagner, we have. And we -- and I think
21 you may have referred -- you've heard us perhaps refer
22 to the different volumes that we've added to the
23 storage reservoir for, you know, with what's required
24 for the 2013 event, what's required -- and then some
25 additional capacity for sediment and then -- but then

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Cross-examined by Mr. Wagner

1 we also added the capacity to take on a localized
2 rainfall event. And all of that is added to the number
3 that gets to that line that's shown on your drawings,
4 that 1210.75 elevation.

5 So that's all-encompassing of the 200-year event,
6 the additional volumes associated potentially with that
7 buffer, and -- and an additional volume for rainfall to
8 the reservoir.

9 So we looked at in that -- in that term to make
10 sure we understood kind of how high the water could get
11 within the reservoir, and then we've also looked at it
12 in terms of the capacity of the culvert underneath 22.
13 We've looked at it -- the capacity of the low-level
14 outlet to make sure we're not -- that it in itself is
15 not going to cause a backup from localized rainfall
16 either during construction or afterwards, as well.

17 So yes, indeed, we have looked at that as part of
18 the design.

19 Q. Thank you, John. I do have a couple of probably more
20 pointed questions coming up here.

21 So in the event, I think I heard 70 percent of the
22 rainfall would come down, as opposed to 30 percent
23 would get absorbed by the ground, if I got that
24 correctly.

25 But anyway, the long and the short of that is if

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1 the reservoir is full and in the event of 2005, we
2 saw -- and I see that in your documentation that there
3 was more flow in 2005 than in 2013 in the Unnamed
4 Creek, if I got that correctly, which would verify our
5 observation here, though, you got the reservoir full,
6 and you got water coming down from areas around the
7 reservoir, how do you deal with that and will that
8 cause a difficulty with overflow on the dam?

9 **A. MR. MENNINGER:** Sorry, this is John Menninger. So
10 a couple -- if I understood the question, the -- so the
11 capacity for the reservoir will only be exhausted, you
12 know, for that 1 in 200-year timeline that we're
13 talking about. Whether that's a one flood or a couple
14 floods, you know, we looked at the capacity for -- and
15 the probabilities of having, like 2005, when there were
16 multiple flood events on the Elbow in the same year,
17 and I'm sure that there was some significant rainfall
18 in the foothills area contributing to the location.
19 We've accounted for all that within the volume of the
20 reservoir.

21 But if the reservoir's full and there's a local
22 rainfall event, Number 1, we'll probably be lowering
23 the reservoir using the low-level outlet works to make
24 some room for it. But second, as well, is that there
25 is that emergency spillway and a very rare chance that

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1 we would have to use it, that water that comes into the
2 reservoir would then spill out that spillway. These
3 provisions, the emergency spillway has an immense
4 capacity compared to the localized rainfall.

5 So the threats for dam overtopping are well
6 accounted for in the design of that spillway system.

7 So I hope -- I hope that answered your question.

8 Q. Another follow-up question, at what level of dam
9 storage would the overflow be invoked?

10 A. MR. MENNINGER: So that is in excess of the 2013
11 flood event, like I said. So that's that 10 percent
12 excess of that and that localized inflow. So it -- the
13 elevation specifically is 1210.75.

14 Q. So with regards to that, that means that that's, in my
15 layman terms, that would be the 77,000 dam cubes?

16 A. MR. MENNINGER: That's correct, yes.

17 Q. Boy, I got one right.

18 Okay, so now I got a very personal question. I
19 only have the 200-year flood line, which has been
20 described as 35 metres from the bottom of our house
21 corner, and I do not have the high water -- and by the
22 way, the acquisition line in most of the GoA's
23 documents have the 200-year flood line and the
24 acquisition of land, I believe it's very close, if not
25 the same, in our yard, which seems to be rather unique

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1 because I could show a lot of maps where they have the
2 black line much farther out from the 200-year flood
3 line.

4 So my question is how much higher is the water
5 going to be in our yard from 70,000 dam cubes to 77,000
6 dam cubes, which appears to be the level that could be
7 reached in a difficult situation?

8 A. MR. MENNINGER: So in elevation-wise, they're
9 about -- they're about a metre apart, give or take. So
10 that depends on kind of the slope of your land from a
11 horizontal distance, but they're not far apart because
12 you can imagine just adding in that giant area, you,
13 just by increasing it by a metre, you get a lot of
14 storage.

15 And so the different between that 70 and the 77 is
16 roughly about a metre.

17 Q. Can you confirm that, because my rough calculations are
18 that the dam is -- is a certain size, and I would like
19 to have the GoA take that as an undertaking to get back
20 to me.

21 A. MR. HEBERT: Mr. Chairman, we can undertake to
22 provide that information to Mr. Wagner.

23 Q. Thank you, Mr. Hebert.

24 **UNDERTAKING - TO ADVISE HOW MUCH HIGHER**
25 **THE WATER IS GOING TO BE IN THE WAGNER**

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1 YARD FROM 70,000 DAM CUBES TO 77,000

2 DAM CUBES WHICH APPEARS TO BE THE LEVEL

3 Q. In the absence of the other map, what the other map was
4 showing was the black line on the east side of the
5 house, and I can't find that. And yesterday, I had --
6 and this is all related to this entire conversation
7 with regards to risk of flooding in our basement.

8 So it does -- it's very important to me, and the
9 impact to our house is quite a bit.

10 MR. FITCH: Mr. Chairman, it's Gavin Fitch.

11 Mr. Wagner, are you referring to the map that has the
12 black line, and then within it, there was the sort of
13 dark blue area which represented the 1 in 200-year
14 design, and then we had the 1 in 100 and the 1 in 10.

15 MR. WAGNER: Yeah.

16 MR. FITCH: Okay, I think that's in, I want to
17 say Exhibit 20. It's Volume 1 I think is the project
18 description, I'm not -- I can't recall the PDF page
19 number but...

20 MR. SECORD: I think it might be Exhibit 20,
21 PDF page 75.

22 MR. FITCH: That sounds right.

23 MR. WAGNER: And I deeply apologize to the
24 panel. I've been looking all morning for that. Thank
25 you, Mr. Fitch.

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1 MR. SECORD: Yeah, I think Mr. Wood referred it
2 to me yesterday at page 785 of the transcript.

3 MR. WAGNER: So are we calling that up now
4 then.

5 THE CHAIR: Sorry, I think she's just getting
6 that up now.

7 MR. WAGNER: And I apologize, Mr. Chair, I
8 think I've gone over my time.

9 THE CHAIR: I think this was -- was this your
10 last question on this map?

11 MR. WAGNER: It is related question, but it is
12 my last question.

13 THE CHAIR: Okay, thank you.

14 MS. FRIEND: Which page, sorry?

15 MR. SECORD: 75, it's 75.

16 MR. WAGNER: This doesn't appear to be the map,
17 Mr. Chair, unfortunately, because it was very explicit
18 with regards to where my -- our house is. And it has
19 been brought up over the last number of days, so I'm
20 not sure if that was an undertaking by another party or
21 whether it was AT that did -- what brought the map up.
22 So I apologize.

23 THE CHAIR: Are the various houses identified
24 with either a little triangle or circle?

25 MR. WAGNER: Yeah, no, there's lots of those,

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Cross-examined by Mr. Wagner

1 and none of them showed the detail of this one. It
2 actually was under a discussion that Mr. Secord was
3 having about the black lines covering some of our
4 access road, as well, and our two houses were shown as
5 being within the black line.

6 MR. SECORD: Was that the map which had the two
7 properties split?

8 MR. WAGNER: I'm not sure.

9 THE CHAIR: Could I suggest under the water
10 section, which is going to deal with some other
11 hydrology questions and that, and Mr. Wagner, I notice
12 you have time under Topic Area 4, perhaps we could
13 have -- Mr. Wagner, you could identify, look for that
14 map, identify and perhaps have it ready under the next
15 topic.

16 MR. WAGNER: Mr. Chair, I don't actually have
17 time allocated in that area. So I guess if you're
18 asking if I could be available, that would be fine.

19 THE CHAIR: Okay, so Mr. Kennedy, I've got --
20 I thought you provided this to Mr. Kennedy, Topic 4
21 you've got 15 minutes request for cross-examine time.
22 But regardless, it seems like it'd be a relatively
23 quick question, so we do have you allocated.

24 MR. WAGNER: Most certainly.

25 THE CHAIR: If you wait for Topic 4. But in

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Cross-examined by Mr. Wagner

1 the meantime, find the exhibit and the page numbers,
2 that would be appreciated.

3 MR. WAGNER: That'd be really great, thank you,
4 Mr. Chair. I have no further questions.

5 THE CHAIR: Okay, thank you. So panel, if you
6 could be ready after lunch, we could get back at one
7 o'clock for lunch or after lunch, sorry, take about a
8 55-minute break, and the NRCB staff and Panel do have a
9 few questions.

10 So if that's agreeable, we'll break for lunch now,
11 and see you at 1:00.

12 (PROCEEDINGS ADJOURNED AT 12:03 P.M.)

13 _____

14 PROCEEDINGS ADJOURNED TO 1:00 P.M.

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ALBERTA TRANSPORTATION TOPIC #3 PANEL

Cross-examined by Mr. Wagner

1 Volume 5

2 March 26, 2021

3 P.M. Session

4

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

6 THE CHAIR: It's 1:00. If possible to get
7 started, Alberta Transportation. Mr. Wiebe.

8 And, Ms. Vespa, are you taking over this
9 afternoon, court reporting?

10 COURT REPORTER: Yes, I am, Chair.

11 MR. SECORD: And I had one preliminary matter.
12 It's Richard Secord speaking.

13 THE CHAIR: Mm-hmm, yes.

14 MR. SECORD: So looking at this afternoon, we
15 have obviously cross -- or questions from the Board and
16 then the City of Calgary, and we have the SCLG panel
17 that's ready for this afternoon as well.

18 Dr. Fennell had arranged for an appointment today
19 at 3:00, and it's also come to my attention that
20 Roger Austin from Austin Engineering has to be on a dam
21 site on Monday.

22 So what I was going to propose is to have
23 Dr. Fennell give all of his evidence during the water
24 topic block in the hope that we could get Mr. Austin,
25 at least his cross-examination completed today.

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Cross-examined by Mr. Wagner

1 Because there was a climate change component in both
2 Topic Blocks 3 and 4, we had put Dr. Fennell in both.

3 We had a similar situation in Grassy Mountain, and
4 we ended up just putting Dr. Fennell in one topic
5 block.

6 So subject to what my friend Mr. Kruhlak or
7 Mr. Fitch have to say, and subject to your direction, I
8 wonder whether we might let Dr. Fennell go?

9 He has actually an appointment to give blood at
10 3:00, so it would be nice if we could let him go this
11 afternoon and have him maybe come back on Tuesday and
12 be dealt with then.

13 And that would probably end up shortening our day.
14 It may not be a short day, but it, at least, takes one
15 witness out of the equation.

16 THE CHAIR: And it might depend on panel
17 availability with Alberta Transportation. So
18 Mr. Kruhlak, Mr. Fitch, Mr. Hebert?

19 MR. FITCH: It's Mr. Fitch.

20 We are fine if Mr. Fennell -- is it Mr. or Dr. I
21 can't recall.

22 MR. SECORD: Jon Fennell.

23 MR. FITCH: Jon Fennell -- he can go over to
24 Topic Session 4, fine with us.

25 THE CHAIR: Okay. Great.

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Kennedy

1 MR. SECORD: So if Dr. Fennell is listening, he
2 can go. Thank you.

3 THE CHAIR: Thank you.

4 MR. SECORD: Thank you, sir.

5 THE CHAIR: Any other matters?

6 Okay. So let's get started with questions from
7 Board staff and panel.

8

9 M. HEBERT, M. SVENSON, W. SPELLER, D. BRESCIA, M. WOOD,
10 Y. CARIGNAN, D. BACK, D. LUZI, D. YOSHISAKA (For Alberta
11 Transportation), previously sworn/affirmed

12 THE CHAIR: Mr. Kennedy.

13 MR. KENNEDY: Thank you, Mr. Chair. I have a
14 couple of questions.

15 MR. KENNEDY QUESTIONS THE PANEL:

16 Q. And the first one is simply a matter of clarification,
17 and I think for you, Mr. Wood. It relates to answers
18 to questions that you gave I think in both instances to
19 Mr. Secord. And I thought I heard a different answer
20 today than what I heard on Tuesday, and it relates to
21 the flood forecasting done and the data set used.

22 I thought I heard on Tuesday that the data set was
23 1908 to current time. And I thought I heard this
24 morning that the earlier floods, the 1902, 1898, and I
25 think there was a third one, were factored into the

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Kennedy

1 flood frequency forecast. Can you just clarify whether
2 the pre-1908 values were or were not included?

3 **A. MR. WOOD:** Those pre-1908 values were not
4 included in Stantec's assessment and the assessment
5 used for SR1. They were included in the recent
6 evidence submitted by SCLG, the Golder estimates, and
7 that's why you see those discrepancies.

8 **Q.** And when you say that, the Golder work was the work
9 that was tendered both by SCLG and the City of Calgary?

10 **A. MR. WOOD:** I'm aware of the work. You know,
11 I could maybe speak to it a little bit. It was
12 tendered by AEP, Alberta Environment and Parks, for
13 part of their flood hazard mapping. Back in
14 December they posted it online in draft for public
15 consultation, and I believe that's where it
16 was -- that's how it ended up into evidence here.

17 **Q.** Okay. That's helpful. Thank you.

18 And then the other question I have, and I'm not
19 sure who this would be for, but it just relates to the
20 dam classification, whether it's -- the consequence
21 rating is extreme or high.

22 And as I understand it, as the builder of the dam,
23 you do the initial rating. Is that the way the dam
24 safety guidelines work?

25 **A. MR. WOOD:** Yes, it is. And perhaps I

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Kennedy

1 could -- Mr. Menninger if you could please explain.

2 A. MR. MENNINGER: Absolutely. This is
3 John Menninger.

4 Mr. Kennedy, so the way that that works is that
5 you -- we propose --

6 My apologies, I think my video cut out.

7 THE CHAIR: Mr. Menninger -- there you go.

8 Okay, we've got you -- perfect. Thank you. Proceed.

9 A. MR. MENNINGER: So the way that it works is that
10 the proponent proposes a hazard classification. In
11 this case, that's what we have done, and we've proposed
12 it to Alberta Environment and Parks and their dam
13 safety group for review, and they will make the
14 ultimate decision on the classification.

15 So we provided them the information and what we
16 recommend as what makes sense, and then they will make
17 the determination.

18 Q. And my next question was going to be whether they'd
19 done that yet, and I gather they have not. When do you
20 expect that?

21 A. MR. MENNINGER: I don't know if I'm -- they
22 haven't given us a timeline on that official
23 designation. We've had discussions with them on it and
24 what we've proposed and presented.

25 Our results didn't seem to have much kickback, but

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Kennedy

1 that doesn't say that they won't have a comment on it.
2 But it will be part of this initial review of the
3 documents that we've given them.

4 Q. And the consequences of them not accepting it, does it
5 change the project at all?

6 A. MR. MENNINGER: Sure. That's a very good
7 question. The dam? No.

8 And I don't think -- there's nothing beyond
9 "extreme," so it's -- I think we're all pretty well set
10 that it's going to be an extreme consequence structure
11 and everything is designed accordingly.

12 On the floodplain berm and service spillway
13 structure, if that consequence rating was increased, we
14 may have to add slightly to the freeboard of the
15 floodplain berm.

16 I wouldn't anticipate a significant change,
17 though, in the project develop. It's rather minor, if
18 anything.

19 Q. And how quickly will you get that pronouncement from
20 the dam safety director?

21 A. MR. MENNINGER: I do not know.

22 Q. Prior to the commencement of construction?

23 A. MR. MENNINGER: Yes.

24 Q. Thank you.

25 A. MR. HEBERT: Mr. Kennedy, Mr. Speller, our

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Heaney

1 regulatory lead, might have some guidance that will be
2 useful to your question.

3 A. MR. SPELLER: Mr. Kennedy, it's Wayne Speller.
4 So the information from the dam safety review team --
5 pardon me, I was going to sneeze -- is
6 currently -- goes through the same process at the same
7 time as the *Water Act* review. And so they review the
8 *Water Act*, they're also reviewing the application,
9 they're also reviewing the dam preliminary design
10 information as part of that.

11 If the project were to be approved, the hope is
12 that those activities and those decisions will be made
13 through the remainder of this year.

14 Q. Thank you.

15 Thank you, panel. Thank you, Chair. Those are my
16 questions.

17 THE CHAIR: Thank you, Mr. Kennedy.

18 Ms. Vance?

19 MS. VANCE: I don't have any questions,
20 Mr. Chair. Thank you.

21 THE CHAIR: Dr. Heaney?

22 MR. HEANEY: Thank you, Mr. Chair.

23 MR. HEANEY QUESTIONS THE PANEL:

24 Q. Dan Heaney. Just a couple of quick questions.

25 Like, during the review -- it came up this morning

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Heaney

1 that you have to look at cascading effects during your
2 risk analysis of any downstream structures like the
3 Glenmore Dam.

4 The question I had for you is, during your review
5 of risk, did you look at cumulative risk of having
6 multiple extreme structures on the Bow watershed
7 upstream of Calgary?

8 So did you look beyond the Elbow at some of those
9 other structures and, you know, what the cumulative
10 risk would be? I think that Mr. Wood mentioned that
11 there's three or four of them on the Bow.

12 **A. MR. MENNINGER: We did not. This is**
13 **John Menninger speaking. We solely looked at the**
14 **structures on the Elbow River.**

15 **Q.** Okay. And, then, the other question that I -- and I
16 think this is Mr. Menninger again -- you talked about
17 various -- you know, various safety attributes of the
18 various structures. The one I want to know is, you
19 know, it's almost inevitable that some kayaker or tuber
20 is going to try to go through the spillway, and, you
21 know, whether they have -- so just under normal
22 operation or dry operation, can -- you know, can
23 boaters, tubers, canoers, if they get into trouble,
24 will they pass over the spillway safely, or is it going
25 to form a hydraulic at the bottom of it that if they

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Heaney

1 capsized, they trap them?

2 A. MR. MENNINGER: Sure. I think I'd be happy to
3 answer, but I think Matt Wood would be a great one to
4 respond to this question. He's actually been
5 coordinating with some of the White Water Association
6 folks and others about this issue.

7 A. MR. WOOD: Thank you, Mr. Menninger. Thank
8 you, Dr. Heaney.

9 Yes, while I mentioned about the portage
10 structure, the portage structure is really a
11 redundancy, encouraging people to not pass through the
12 diversion structure, but it has been designed to be
13 inherently safe. I use that word obviously cautiously
14 because everything has some element of risk, but the
15 hydraulics do not create rollers, trapping rollers.
16 The water is concentrated to that low flow channel
17 where the fish passage mitigations are so that folks
18 can actually -- it actually facilitates movement
19 through there. I know a lot of the Elbow can get quite
20 shallow.

21 And, as Mr. Menninger mentioned, we have been
22 working with the Alberta White Water Association and
23 received some feedback on them -- from them on the
24 design and incorporated it in there, specifically some
25 refugia for groups coming through.

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Heaney

1 It seemed to be their interest was, for example,
2 if you had a group of kayakers, one person could pass
3 through, rest behind the boulder, and watch the others
4 come through the gated spillway.

5 Q. So then, like, the spillway under normal dry operations
6 is built so that its river passage is maintained?

7 A. MR. MENNINGER: Correct, yeah. It's flat to the
8 bed of the river. Even the stilling basin on the
9 downstream side, a lot of times stilling basins would
10 have -- they would call them baffle blocks or chutes
11 that dissipate energy. We designed this without any
12 baffle blocks. We just extended it so that there's no
13 obstructions if somebody would -- for impact.

14 In fact, we're proposing to backfill it with
15 native materials so it, in essence, functions as a
16 better river.

17 MR. HEANEY: Okay. Thank you, that's my
18 questions.

19 A. MR. MENNINGER: You're welcome.

20 THE CHAIR: Thank you, Dr. Heaney.

21 Ms. Roberts?

22 MS. ROBERTS: I have no questions.

23 THE CHAIR: Thank you. Mr. Ceroici?

24 MR. CEROICI: Yes, thank you, Mr. Chairman.

25 I've got a couple of questions.

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Ceroici

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

2 Q. What one is to do when water is released via the
3 low-level outlet in the Unnamed Creek through the
4 Elbow, at the confluence of the Elbow, you have 27
5 cubic metres per second coming in during the time the
6 outlet is active, which I imagine there would be some
7 scouring and turbulent water, et cetera. What action
8 is being taken there to reduce any risks there at the
9 confluence with the Elbow?

10 A. MR. WOOD: Mr. Chairman, Mr. Ceroici, I can
11 answer that question.

12 There is proposed a small amount of riprap at that
13 confluence. There's some existing riprap on the left
14 bank of the Unnamed Creek and the left bank of the
15 Elbow River. And so where the creek comes down and
16 enters the Elbow, we are extending that riprap a little
17 bit upstream of the Unnamed Creek to ensure that any
18 erosion that occurs there keeps the creek in its
19 alignment at the confluence.

20 Q. Okay, thanks.

21 And my next question relates to the emergency
22 spillway, when it is active, if there's a flood greater
23 than a design flood, can you describe what that flow
24 from that emergency spillway, what it looks like on its
25 way to the Elbow River? Is it a channel flow? Is it

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Ceroici

1 overland flow?

2 A. MR. MENNINGER: Sure. So this is John Menninger.
3 And just to make sure that we're all on the same page,
4 you know, the proposal here is that it should not ever
5 flow, that the gates should be closed and that it would
6 prevent overfilling and spilling of the spillway. So
7 the intent is that the water stays in the river.

8 In the unforeseen condition, that water would
9 overtop the emergency spillway. There is an excavated
10 channel from the spillway that takes it about
11 500 metres away from the structure.

12 Okay, so that's basically -- so in that segment,
13 it's about 180 metres wide, and it would be -- and at
14 that absolute worst-case scenario of the probable
15 maximum flood, no gates closed ever, no obstructions,
16 you'd get about a metre of water running in that
17 width.

18 And then it would basically transition to overland
19 flow once you're beyond 500-plus metres from the
20 structure, and it would spread out and then enter the
21 Elbow River floodplain at that point.

22 Q. Okay. Thank you. That's all my questions.

23 A. MR. MENNINGER: You're welcome.

24 THE CHAIR: Dr. Heaney, I believe you have
25 another question?

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by Mr. Heaney

1 **MR. HEANEY QUESTIONS THE PANEL:**

2 Q. Yeah, Dan Heaney. Yeah, just the question I had was
3 when the -- when the SR1 is being operated in a flood
4 situation and if something untoward were to happen,
5 where does the authority rest to basically shut down
6 diversion? Is that with the local people or the local
7 operators on site, or is it -- I mean and what's the
8 typical situation in dam safety sort of for that? Do
9 you understand the question?

10 A. MR. MENNINGER: I do. We're taking one second to
11 make sure we get you the right person to answer.

12 A. MR. HEBERT: Just bear with us, Dr. Heaney. Go
13 ahead, Yvonne.

14 A. MS. CARIGNAN: Sorry about that.

15 THE CHAIR: Who will be speaking?

16 A. MR. HEBERT: Oh, sorry, Mr. Chairman, it's
17 Yvonne Carignan from Alberta Transportation that will
18 respond.

19 THE CHAIR: Thank you.

20 A. MS. CARIGNAN: My apologies. My video kicked out
21 again.

22 Thank you, Dr. Heaney. I want to make sure that
23 I've understood your question correctly here, so please
24 correct me if I've missed something.

25 With respect to if we needed to close those gates

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by The Chair

1 during operation because there was something unforeseen
2 happening, first of all, the operators, my
3 understanding, would be contacting their manager within
4 Alberta Environment. And what's important to note that
5 all this would be developed as part of their emergency
6 management plan if something were going wrong with the
7 facility.

8 So there would be a cascade of decision-makers
9 that would be contacted very rapidly, and they would
10 confirm what their next steps needed to be, whether
11 they were monitoring, whether they were taking action.

12 MR. HEANEY: Okay. That's it.

13 THE CHAIR: Okay, no further questions. Thank
14 you. Thank you, Ms. Carignan.

15 THE CHAIR QUESTIONS THE PANEL:

16 Q. I have a couple of questions. Mr. Menninger, I forget
17 if you provided AS an example or if it was a direct
18 question, and I think I have this right, but it had to
19 do with multiple floods which has come up quite a bit.

20 So you indicated I think that you stated that two
21 1 in 100-year floods in the same year, has I think you
22 characterized it as less probability than a 1 in
23 200-year event. So by that, did you mean that there is
24 a higher probability of having two 1 in 100 floods in
25 the same year than only one 1 in 200 or the other way

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by The Chair

1 around?

2 A. MR. MENNINGER: The other way around, yeah. So
3 the individual probabilities would be a 1 percent
4 chance of occurring having one occur in a given year.
5 So having a second greater than 1 percent chance in a
6 given year would be -- there's -- the probability -- I
7 can't split that out exactly, but they're less than
8 having a, yeah, 1 in 200-year.

9 Q. Okay. Thank you.

10 And there was also a fair amount of discussion
11 with -- doesn't need to be brought up, I think it was
12 the Figure 83, the 2013 hydrograph and the peak flows,
13 and my understanding is from, you know, the discussion
14 so far and the evidence that we have is that, you know,
15 every flood event will have a different hydrograph;
16 they're all unique.

17 I guess I'm wondering two things, one is do they
18 all typically follow the same sort of pattern? I mean,
19 you get a peak, but the 2013 flood seems to be a very
20 dramatic and short-lived peak. And my follow-up
21 question from that is does it matter from the
22 perspective of operating the dam once, you exceed the
23 160, will you continue -- is the operating procedure
24 still to divert as much water as needed until you reach
25 the maximum diversion capability until it's full,

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by The Chair

1 regardless of what you might know is coming down the
2 river ahead of time, the duration of what you think the
3 storm might be, that's the operating procedure, there's
4 no accounting for what you might know ahead of time,
5 just divert until you're full and then stop?

6 **A. MR. MENNINGER:** That's a good question.

7 So I guess to start off with, you're right. The
8 2013 looks different than some of the other hydrographs
9 that -- from the historic record that we have from the
10 Elbow, but it is -- it had a very dramatic peak in the
11 front, but it also had a very long receding kind of
12 base to it, as well. So it had a lot of volume.

13 So actually if you characterize it either by total
14 volume or by peak, either one of them I would have
15 characterized it as a 1 in 200-year flood. We looked
16 at a seven-day occurrence of volume or peak.

17 With regards to operations, the simplest, I guess
18 the most basic way to explain it is that when it
19 exceeds 160, you divert up until a point, and
20 then -- until you reached the maximum capacity to
21 divert. That's based off of what our understanding of
22 kind of what we anticipate today to be the -- the state
23 of play, I guess, for those operators.

24 That's not saying in the future we don't have much
25 more sophisticated forecasting models and capabilities

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by The Chair

1 that may improve that going forward. But yeah, sitting
2 here today, I think that would be the understanding,
3 most likely. But there is flexibility for the
4 operators if need be.

5 Q. And, again, you know, we heard quite a bit still some
6 downstream effects, downstream of SR1, upstream of
7 Glenmore because of the maximum diversion capability of
8 600, and part of that I believe is from elevation,
9 there's only so much going through the channel and take
10 advantage of the natural landscape. Was there ever
11 thought given to doubling or tripling the width of the
12 channel, as an example, and which might -- I'm not sure
13 if that would equate to exact doubling or tripling of
14 volume to account for an even a bigger potential or
15 taking a potential bigger diversion of removing more of
16 potential peaks off of extreme storms. And if it was,
17 what did that lead you to conclude and why was the
18 conclusion then to size it the way it is?

19 A. **MR. MENNINGER:** Sure. So the -- we did look at
20 some alternate options in the early concept phases of
21 the project where we looked at almost doubling, it was
22 up to over a thousand cubic metres per second
23 diversion.

24 Ultimately, it didn't -- the net benefit was not
25 there for operation of the structure to meet our goals

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by The Chair

1 for the project of that downstream flood risk
2 downstream of Calgary.

3 So the 1,000 cubic metres per second required as
4 you said on a much larger channel, much larger
5 environmental impact, much larger gate structure at the
6 inlet of the channel.

7 So we -- upon after that initial concepts review,
8 the -- the benefits associated with that, while we
9 recognize that it could have prevented some flooding
10 potential in the downstream of the project, the
11 ultimate drawbacks were larger than the perceived
12 benefit.

13 Q. So it's fair to say, then, that the objective was sort
14 of calculated first, which was the flow rate downstream
15 of Glenmore, and then the design was to provide that
16 flow rate, as opposed to an overall capture rate? Is
17 that overly simplistic, or is that a fair
18 characterization?

19 A. MR. MENNINGER: I think that's a fair
20 characterization.

21 Q. Okay. Thank you. And the last on emergency response,
22 and again, part of my question is driven by sort of the
23 attention, some of the questions and answers that have
24 come before it. But on evacuation, I'm not familiar
25 totally with the provincial government's alert system

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by The Chair

1 which was tested, I don't know if you folks remember, I
2 think it was last year or the year before, cell phone
3 alert systems often are used for personal situations
4 where, you know, for non-disaster reasons.

5 But does anyone know, is that available for the
6 purposes of providing notice -- or evacuation, say, if
7 there's a dam failure scenario or a diversion is going
8 to take place and you wanted to notify people. Is that
9 system available?

10 **A. MS. CARIGNAN:** Mr. Chairman, it's Yvonne
11 **Carignan. We're not exactly sure if that's available,**
12 **but we could take that as an undertaking to find out**
13 **for you.**

14 If it were available, it would get incorporated
15 **into any emergency response plans that Alberta**
16 **Environment would put together.**

17 **Q.** Right. And you know, in the past, and the question
18 came up before, you know, if there is a decision to
19 approve this project, as an example, often the Board
20 does have conditions in, and we've had in the past
21 emergency response plans as part of the conditions or
22 elements of those.

23 So as an undertaking, I would appreciate that, if
24 that potential is available, if you could find that out
25 ahead of the close of hearing, that would be

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Questioned by The Chair

1 appreciated, thank you.

2 A. MR. HEBERT: Mr. Chairman, we can undertake
3 that absolutely.

4 A. MS. CARIGNAN: Mr. Chairman, could I just get one
5 point of clarification on that?

6 THE CHAIR: Mmm.

7 A. MS. CARIGNAN: I'm curious, if I can phrase this
8 as a question, when you're talking about that emergency
9 notification, I just want to make sure that I'm
10 understanding what you're asking.

11 Are you asking that, when we go into operation
12 that is a notification, or if there's something wrong
13 with the dam, how would we notify?

14 Q. So my question really is if there's a reason to notify
15 the public of something, whether you feel that the
16 operation of the dam, there needs to be notification,
17 or, you know, I guess in a worst-case scenario, if
18 there's potential issues with a diversion, it's not
19 operating as you expected or if there's an issue with
20 the dam itself, there may be reason to be giving
21 downstream users notice.

22 So my question is is that cell phone alert system
23 that we've seen tested over the last -- I don't recall
24 the timing of it, but would that system be available to
25 the dam safety folks who are in the emergency response

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Re-examined by Mr. Fitch

1 plan?

2 A. MS. CARIGNAN: Thank you. I appreciate the
3 clarification.

4 Q. Thank you.

5 UNDERTAKING - TO MAKE ENQUIRIES ADVISE
6 WHETHER THE CELL PHONE ALERT SYSTEM
7 COULD BE MADE AVAILABLE TO THE DAM
8 SAFETY MEMBERS WHO ARE IN THE EMERGENCY
9 RESPONSE PLAN

10 THE CHAIR: And those are all my questions.

11 So thank you to the panel. There is an
12 opportunity, and there may be some other work for you
13 yet in terms of redirect.

14 Mr. Fitch, does Alberta Transportation have any
15 redirect?

16 MR. FITCH: Yes, Mr. Chairman just a couple of
17 questions. And they relate to a map that we were all
18 looking at, and I just thought some clarity about the
19 map might be useful.

20 MR. FITCH RE-EXAMINES THE PANEL:

21 Q. So it's Exhibit 131, PDF 565. You will recognize the
22 map when we get it called up.

23 And I think I'll probably direct the questions to
24 Mr. Wood once we get the map up.

25 THE CHAIR: And I think Ms. Taylor is on this

ALBERTA TRANSPORTATION TOPIC #3 PANEL

Re-examined by Mr. Fitch

1 afternoon, so thank you, Ms. Taylor. Do I have that
2 right?

3 MR. FITCH: Oh, no, that's not -- yeah, here
4 it is.

5 Q. So, Mr. Wood, can you confirm, am I correct in looking
6 at this map that the squares are quarter sections?

7 A. MR. WOOD: Mr. Chairman, I can say that
8 Mr. Fitch is correct. Those are quarter sections.

9 Q. Okay. And then looking at the quarter section that has
10 the floodplain berm in it, what quarter section is
11 that? Like what legal description?

12 A. MR. WOOD: Mr. Chair, one moment, please.

13 A. MR. HEBERT: Mr. Fitch, I believe you referred
14 to NE 3-24-4 West of 5.

15 Q. Okay. Thank you. And then the -- and that quarter
16 section, I believe, is owned by Ms. Robinson and her
17 sister Ms. Hawes; is that correct?

18 A. MR. HEBERT: Mr. Chairman, that is correct.

19 Q. Mr. Hebert, I guess I'll just stick with you.

20 The quarter section south of that and west, so in
21 other words, kitty-corner, which quarter section is
22 that?

23 A. MR. HEBERT: If my information is correct, that
24 is the SW of 3-24-4 west of 5.

25 Q. Is that the quarter section owned by Ms. Robinson in

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1 her name alone?

2 A. MR. HEBERT: Yes, it is.

3 Q. And is that the quarter section where Ms. Robinson has
4 her residence and her riding arena?

5 A. MR. HEBERT: Yes, it is.

6 Q. Thank you. Those are all my questions, Mr. Chair.

7 THE CHAIR: Thank you. Once again, thanks to
8 Alberta Transportation and the panel. Thank you very
9 much.

10 (PANEL STANDS DOWN)

11 THE CHAIR: Ms. Senek and Ms. Munkittrick,
12 City of Calgary, are you ready to provide direct
13 evidence?

14 MS. SENEK: We are, Mr. Chair, although
15 Mr. Frigo was having some computer issues. So are you
16 there, Mr. Frigo?

17 MR. FRIGO: I am. Are you able to hear me?

18 MS. SENEK: We can hear you, but I -- I can't
19 see you personally. I'm not sure --

20 THE CHAIR: Just give Mr. Wiebe just one
21 chance to see if he can locate him.

22 MS. SENEK: You're there now.

23 THE CHAIR: Looks like it's working. Okay.

24 So, Ms. Senek.

25

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1 **FRANK FRIGO** (For The City of Calgary), previously sworn

2 **MS. SENEK EXAMINES THE WITNESS:**

3 Q. Perfect. So Mr. Frigo, I just am going to ask you to
4 confirm that you're still under oath?

5 A. Yes, I understand I'm still under oath.

6 Q. Perfect. And I understand you have a presentation and
7 that would be the PowerPoint that was submitted as
8 Exhibit 351, I believe, document manager?

9 A. Yes.

10 Q. And we will have to start at slide 16.

11 A. Thank you.

12 Q. Okay. Mr. Frigo, go ahead, please. Thank you.

13 A. Thanks, document manager. Can we advance to the next
14 slide?

15 Good afternoon, Mr. Chairman, and good afternoon,
16 all. Perhaps I may start by commenting on a few key
17 aspects of the SR1 design which are also highlighted in
18 the City's written submission Exhibit 229 that are
19 relevant to Topic Area 3.

20 Unlike Calgary's Glenmore Dam and Reservoir, SR1
21 incorporates features which are primarily above ground
22 and will only rarely be wet. As a dam operator, the
23 City understands that this will facilitate
24 surveillance, operational testing at gates and controls
25 among other capital maintenance or dam safety

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1 activities.

2 The off-stream nature also means that SR1 won't
3 appreciably alter river flows other than during flood
4 operations, nor will the reservoir store appreciable
5 water other than during and for a few weeks after
6 significant floods. This will limit the time during
7 which SR1 is susceptible to what is referred to as
8 fair-weather failure.

9 We also recognize that significant design
10 investigation of debris management has supported the
11 design. That included hydraulic modelling, physical
12 scale testing, and inclusion of a debris deflector.
13 The City recognizes this is an important element in
14 ensuring diversion will function to meet the intended
15 diversion rates.

16 We also recognize that SR1 has a large storage
17 volume relative to the scale of the basin upstream.
18 The 77 million cubic metres of storage lies downstream
19 of the basin in the order of about a thousand square
20 kilometres, yielding over 700 cubic metres per hectare
21 of catchment area service.

22 By comparison, Glenmore and the Ghost reservoirs
23 offer in the range of 200 and 140 cubic metres per
24 hectare of storage respectively, so less than a third
25 of SR1 normalized to the catchment areas upstream.

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1 We understand that this relatively high capacity
2 is extensive enough to store the diverted flow from two
3 1 in 100 severity events separated by only days.

4 I did have a reference to Exhibit 93, page 95,
5 though the questions immediately preceding this
6 presentation absolutely addressed that. That reference
7 does recognize that back-to-back 100-year events, so
8 two 1 in 100-year events, as Mr. Menninger explained,
9 which are much more rare than the single 1 in 200,
10 could be stored within the capacity.

11 This amount of storage relative to basin size is
12 large, and it simply means more security and more
13 latitude of operational performance is afforded in SR1
14 than many, if not most, existing regional reservoirs.

15 As reported in our Topic 1 presentation materials
16 in Exhibit 351, and written submission, Exhibit 229,
17 analyses show that this degree of storage, working with
18 the incremental 20 million cubic metres at Glenmore
19 with the expanded gates, can significantly attenuate
20 peak flow rates for events even more severe than the
21 design event.

22 And perhaps I can remind that according to our
23 more recent baseline flood damage calculations, and as
24 according to representations made for Topic 1, SR1
25 represents a stark reduction in net damage and safety

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1 risk for communities downstream.

2 Presently, the remaining annual average damages in
3 Calgary are around the \$75 million per year mark of
4 which 40 percent accrues to the Elbow River. SR1 will
5 reduce 27.7 million per year of that, most of which,
6 20 million per year, is on the Elbow; the remainder,
7 the 7.7 million remainder, on the Bow.

8 After SR1, potential damages are around
9 \$43 million per year, most of which -- 85 percent of
10 which would be on the Bow.

11 In some ways, Mr. Chairman, if I liken the
12 Elbow River Basin to a car, I think of Glenmore like
13 the seatbelt. You use it all the time and it's very
14 effective to mitigate small and medium impacts, where
15 as, perhaps, SR1 is like the airbag. It's not used as
16 often, but it is configured specifically for deployment
17 in higher risk scenarios and it works very much with
18 the seat belt.

19 Relative to dam safety, this is important since
20 SR1 is expressly engineered with factors of safety, as
21 we heard this morning, safeguards and redundancies,
22 like an airbag, to function specifically under unusual
23 conditions.

24 Another important consideration around safety of
25 major infrastructure is what the City's emergency

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1 management professionals would refer to as situational
2 awareness. For our water management infrastructure, we
3 recognize that operational decisions need to be made on
4 the basis of understanding of what is happening in the
5 dynamic basins that we're part of.

6 Just as the City collaborates with other water
7 managers and licence holders on the Bow River through
8 weekly participation with Alberta Environment and
9 Parks' weekly major water users meetings, we expect and
10 understand that the City and other water management
11 stakeholders will be engaged by SR1's operator, AEP, to
12 ensure that seasonal readiness, flood forecasting and
13 communication protocols are clearly set and
14 coordinated.

15 For management of many types of incidents,
16 including flood and water quality events, optimizing
17 environmental outcomes and collaboratively meeting all
18 water licensees' requirements, collaboration has been
19 key.

20 The City understands and expects, from the
21 descriptions of the operational protocols provided by
22 Alberta Transportation, that the City will remain
23 engaged in aspects of operations, forecasting, and
24 response through annual, seasonal, and event-based
25 mechanisms.

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1 Again, since we do this now with AEP and
2 stakeholders on the Bow Basin, we are confident that
3 similar processes and participation will be implemented
4 for SR1 should it proceed.

5 Next slide, please, document manager.

6 Turning more specifically to dam safety. I note
7 that the City itself owns, operates and maintains 13
8 dam structures listed with AEP. These include the
9 Glenmore Reservoir, which, like existing hydro power
10 facilities on the Bow River, classifies within the
11 Canadian Dam Association's extreme consequence
12 category. Glenmore is designed, maintained, and
13 operated in this context.

14 Like SR1, Glenmore is designed to safely pass the
15 PMF over its spillway with factors of safety embedded
16 in the structural assessments of the stabilizing versus
17 destabilizing forces.

18 As Mr. Menninger noted earlier, the PMF is a
19 theoretical flood event which represents the maximum
20 amount of moisture that the atmosphere can hold,
21 dropping onto the basin to produce the largest flood
22 event physically possible. As Mr. Menninger noted,
23 probabilities of such an event are estimated at 1 to
24 100,000 to 1 to 1 million range.

25 The City understand that the province, the

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1 provincial *Water Act* and Alberta's Dam Safety Directive
2 of 2018 will apply to SR1 and that Alberta
3 Transportation also understands this and has directed
4 design with this recognition.

5 So, SR1, like Glenmore, and the hydro power
6 structures on the Bow River is engineered and will be
7 instrumented, regularly assessed, tested, maintained
8 and operated to the standard.

9 An important distinction between SR1 as an
10 off-stream structure operating for periods of up to
11 40 days following a major flood is that it will not,
12 unlike Glenmore and the hydropower structures on the
13 Bow, hold significant volumes and height of water
14 continuously. Those structures are subject to what dam
15 safety engineering practice refer to as fair-weather
16 failure since failure is theoretically possible,
17 although a vanishingly remote probability.

18 As I noted, speaking to the preceding slide, this
19 also means that SR1's primarily above ground and rarely
20 inundated major features can readily be accessed,
21 maintained, and tested all the more readily than for a
22 typical wet or online dam.

23 Next slide, please, document manager.

24 Notwithstanding both the extreme conditions
25 embedded in the engineering protocols and operations

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1 and the extremely remote probability of a breach, the
2 City maintains emergency response plans and processes
3 for regulated dam structures within its flood emergency
4 reference manual. This manual forms an annex to the
5 City's municipal emergency plan. Should SR1 proceed,
6 similar plans, despite the remote probability of
7 failure, would be included for it as well.

8 Mr. Chairman, again, I want to bring attention to
9 the scale of the storage that SR1 offers relative to
10 the basin that it would service. At over 700 cubic
11 metres per hectare, unlike many dams, including
12 Glenmore, SR1 will have flood attenuation and peak time
13 delay effects for extreme events all the way up to the
14 PMF.

15 From both Stantec's analysis, Exhibit 327, and our
16 own hydrograph routing work on floods as large as the 1
17 in 1,000-year event, we expect that in a rare event of
18 a PMF, SR1 would delay and reduce peak flows to
19 Glenmore. This would reduce the expected water level
20 and forces at Glenmore, increasing the PMF factors of
21 safety for Glenmore. Importantly, the onset of higher
22 flows would also be delayed for as long as SR1 would be
23 diverting, offering more time for areas within river
24 valleys to be evacuated.

25 With these elements in mind, the City of Calgary

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Cross-examined by Mr. Secord

1 finds that SR1 is likely to have a positive effect on
2 safety risk during flood events even those more severe
3 than the designed 2013 or 1 in 200-year design event
4 and all the way up to floods as improbable as the PMF.
5 Thank you.

6 MS. SENEK: And that completes our direct
7 evidence. Thank you.

8 THE CHAIR: Thank you, Mr. Frigo and
9 Ms. Senek.

10 So Mr. Cusano, did you have any questions?

11 MR. CUSANO: No questions, thank you, sir.

12 THE CHAIR: Mr. Fitch or Mr. Kruhlak?

13 MR. KRUHLAK: I can perhaps speak, it's
14 Mr. Kruhlak. We would not have any questions.

15 THE CHAIR: Thank you. Ms. Louden or Mr. Rae?
16 I'm not sure who's on today.

17 MS. LOUDEN: This is Sara Louden, sir, and no,
18 we do not have any questions.

19 THE CHAIR: No questions? Thank you.
20 Mr. Secord?

21 MR. SECORD: Thank you.

22 **MR. SECORD CROSS-EXAMINES THE WITNESS:**

23 Q. Mr. Frigo, my name is Richard Secord. I'm counsel for
24 the SCLG Group.

25 I enjoyed your presentation earlier in the week,

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Cross-examined by Mr. Secord

1 and I guess we get to see you again in the next water
2 topic block as well; correct?

3 **A. Good afternoon, Mr. Secord. Yeah, you get to see me**
4 **again in Topic Block 4.**

5 **Q. Just calling up my -- my notes here.**

6 I think some of this has been covered in your
7 slides, but just a couple of general propositions. You
8 would agree that water is a limited resource, and
9 Calgary's water supply is changing due to climate
10 change and a growing population?

11 **A. Yes, I would agree.**

12 **Q. And I believe you confirmed that the Elbow River is the**
13 **source of approximately 40 percent of Calgary's water**
14 **supply, and the Elbow Valley watershed covers an area**
15 **of about 1227 square kilometers and drains into the**
16 **Glenmore Dam?**

17 **A. Correct.**

18 **Q. And the Bow River watershed covers an area of**
19 **7700 square kilometres, so many times larger than the**
20 **Elbow watershed; correct?**

21 **A. Correct.**

22 **Q. And the Bow River supplies the Bearspaw water treatment**
23 **plant, and it is the source of nearly 60 percent of**
24 **Calgary's water supply?**

25 **A. Correct.**

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Cross-examined by Mr. Secord

1 Q. And in the 2013 flood, can you tell me, I was in
2 Calgary, actually, and at an AUC hearing when the rain
3 started in that week of June, June 18th, June 19th. At
4 its peak, how high was the Bow River, in terms of its
5 flow through the city of Calgary?

6 A. Through the city of Calgary, upstream of the confluence
7 with the Elbow River, the Bow River flowed at
8 approximately 1840 cubic metres per second, which would
9 place it somewhere in the 80-year-return period.
10 Downstream of the confluence, the two flows were
11 additive.

12 And so the attenuation effect, there was
13 1240 cubic metres per second that came into the
14 Glenmore Reservoir. Operations at Glenmore didn't
15 quite cut that in half but dropped that 1240 cubic
16 metres per second peak to around 710.

17 The 710 going downstream added to provide not
18 exactly coincident peaks, but a peak flow downstream of
19 the confluence in the order of 2400 cubic metres per
20 second, again in approximately the 80-, 90-year return
21 period range.

22 Q. So the Bow River was barreling along you said at about
23 800 metres per second as it hit the confluence of the
24 Elbow and Bow?

25 A. About 710 was our understanding of it.

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Cross-examined by Mr. Secord

1 Q. I thought you said that the Elbow was 710 as it hit the
2 confluence?

3 A. Sorry, the Bow was 1800, 1840 roughly.

4 Q. I'm sorry, I just heard 800.

5 So the Bow River was zooming along at 1800 cubic
6 metres per second, and the Elbow was running at
7 710 cubic metres per second as the two rivers hit the
8 confluence, and then downstream of the confluence the
9 rate was 2400 cubic metres per second. Do I have that
10 right?

11 A. Correct, that's our understanding.

12 Q. And I remember when I was one of the last people to get
13 out of Calgary over the bridge, the river, the Bow was
14 extremely high. Can you tell me how many metres above
15 the sort of normal range was that river on, you know,
16 let's say the 20th of June, 2013? How many metres was
17 it above normal range?

18 A. Very similar. Rivers are amazing self-replicating, and
19 though the Elbow River is about 1/6th the size, the
20 morphology and hydraulics contribute to very similar
21 response.

22 So both the Bow and the Elbow on average were
23 between about 4 and 5 metres higher than their normal
24 summer values in elevation, and obviously that would
25 vary from location to location, depending on

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Cross-examined by Mr. Secord

1 hydraulics.

2 Q. So one of the things -- and the other thing, this is
3 one of the things I've been wondering about, not as
4 being a hydrologist, but you're a hydrologist. So I've
5 got the man to answer these questions.

6 As I understand it, the Bow River flood event in
7 June of 2013 was not as extreme an event as the Elbow
8 event; is that correct?

9 A. Fundamentally, yes. The precipitation that fell, the
10 centroid of precipitation that fell was very much
11 centered over the Elbow, Sheep, Highwood, and some of
12 the southern tributaries to the Bow.

13 So the strongest precipitation, and we talked
14 earlier about the unique attributes of the hydrograph
15 from the 2013 flood on the Elbow, that very strong
16 initial response was driven by an upslope mechanism, a
17 meteorologic mechanism where the rainfall was being, if
18 you will, pushed against the front ranges of the
19 Rocky Mountains. So much of the upper Bow catchment
20 did not contribute at the same intensity.

21 So areas north and west of, for instance, Lake
22 Louise, they certainly did get rain but not at the same
23 intensities, and the runoff response was not nearly at
24 the same intensities as it was for the areas hit by the
25 centroid of the heaviest rainfall, which again was the

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 **Bow, Elbow, Highwood, Sheep, and some of the southern**
2 **tributaries to the Bow.**

3 Q. What I was interested in, Mr. Frigo, was the 2013 flood
4 on the Elbow was let's say a 1 in 200, 1 in 210-year
5 flood, whatever. What was the flood on the Bow?

6 A. **On its smallest tributary -- so, again, some of the**
7 **small tributaries close to Canmore, as high as that**
8 **200-year level.**

9 But in Calgary, as I mentioned earlier, somewhere
10 in the order of the 80-year return period.

11 Q. That's what I was getting at.

12 So the Calgary flood of 2013, at 1800 cubic metres
13 per second, with an increased river height of 4 to
14 5 metres was a 1 in 80 flood; correct?

15 A. **Correct.**

16 Q. Okay. So here's the question for you that's bothering
17 me, bugging me: You get SR1 built, and you've got a
18 flood event coming down the Elbow and the Bow River.
19 And SR1 is doing a wonderful job. And the
20 Glenmore Reservoir is turning out through Elbow Park
21 and those lucky people who are downstream of the
22 reservoir. They see the Elbow going by at 1600 -- they
23 see the Elbow going by at 160 cubic metres per second,
24 and all is well.

25 Meanwhile, coming down the Bow is not a 1 in 80,

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Cross-examined by Mr. Secord

1 but let's say it's a 1 in 200-year flood?

2 **A. Yes.**

3 **Q.** And the river is even higher than 5 metres, and I don't
4 even know what the cubic metres per second would be,
5 you probably do -- it's probably in your chart, Slide
6 11 -- hits the confluence of the Elbow and the Bow, and
7 presumably the Elbow is at a much lower elevation, a
8 much lower flow rate.

9 So, as a hydrologist, are you going to see in that
10 situation the Bow inundating the Elbow River?

11 **A. Only, Mr. Secord, for a very short distance upstream of**
12 **the confluence. Recall that both the Bow and the**
13 **Elbow River are fundamentally mountain-fed streams and**
14 **they have what we would hydraulically refer to as**
15 **relatively steep slopes. They don't sound steep when I**
16 **describe them mathematically because they're**
17 **.2 percent, but for rivers, this is relatively steep.**

18 What this means that the Elbow River is sloping at
19 a steep enough gradient that that degree of backwater
20 would only come a couple of hundred metres upstream
21 from the confluence.

22 Again, imagine two eavestroughs, both are sloping,
23 that backwater effect simply can't make it back very
24 far into Calgary because of the hydraulic and
25 geographic parameters that describe the Elbow River.

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Cross-examined by Mr. Secord

1 Q. Have you done an inundation map to look at what would
2 happen if you had a 1 in 200-year flood coming down the
3 Elbow River and what -- sorry, a 1 in 200-year flood
4 coming down the Bow River and what impact that would
5 have on the communities downstream of the -- upstream
6 of the confluence?

7 A. We don't have maps of that type available, but as a
8 very regular component of training and working with the
9 flood response team that I oversee, we look at
10 scenarios exactly like that, Mr. Secord.

11 In general, the hydraulics are pretty
12 straightforward in that we can take the water
13 elevations predicted for the flow rate in the Bow River
14 and translate those upstream with hydraulic models.

15 We don't have mapping directly available for that,
16 but we do know that that would more or less create a
17 flat gradient. Slightly more sloping than flat because
18 of course there has to be a gradient for flow to occur,
19 but fundamentally the elevations in the Bow at the
20 confluence would map as the contour elevation of that
21 respective water level up the Elbow.

22 We have analyzed that in many cases, but we don't
23 have mapping directly available for that combination of
24 scenarios.

25 Q. And can you tell me, in relation to the Bow, what would

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Cross-examined by Mr. Secord

1 be the elevation of the river at the confluence at a
2 rate of 160 cubic metres per second in comparison to
3 the Bow in 2013, which would have been 4 to 5 metres
4 higher than normal? Would it be a 4- to 5-metre
5 difference, then, just in the 1 in 80-year return
6 period?

7 **A. Yes, it would.**

8 Q. Okay.

9 **A. Roughly.**

10 Q. So if we could turn up Exhibit 345, I just had a few
11 questions for that. And that's the "One Calgary One
12 Water" document, Zoom host.

13 If we could turn to PDF 3, I guess it's PDF 3, I
14 think. It's odd the way it works. Actually, it looks
15 like -- yeah, that's it. It's funny, on mine it shows
16 as PDF page 1, but I don't know.

17 So I take it you're familiar with this document,
18 Mr. Frigo?

19 **A. Yes.**

20 Q. And in the first paragraph, it says: (as read)

21 "In southern Alberta, water is already a
22 limited resource, and the City of
23 Calgary is working on addressing water
24 resource challenges."

25 And then over in the second column, it says: (as read)

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Cross-examined by Mr. Secord

1 "Our water supply is changing river
2 flows, and water quality seen in the
3 past will be very different in the
4 future because of a changing climate."

5 And then if we could turn to PDF 7, it says that -- it
6 identifies three water security risks. It says:
7 (as read)

8 "Calgary's water security is challenged
9 by three main risks that must be managed
10 in the short and long term: Climate
11 change, water licence limits and
12 population and growth. While additional
13 socioeconomic and environmental risks do
14 exist, these three main risks have the
15 most significant impact to future water
16 security."

17 Which would you say is the greatest of these three
18 risks?

19 **A. I would say the three are interlinked, and I would say**
20 **that the science of climate change continues to adapt.**
21 **So though it may be a very significant risk, it's quite**
22 **difficult to quantify it in concrete terms today.**

23 I would say all three of the risks are, as the
24 diagram suggests, important considerations.

25 **Q. Now, on the next page under "Climate Change," it says**

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Cross-examined by Mr. Secord

1 in the first column, it states: (as read)
2 "Climate impacts now and in the future
3 are uncertain, but alterations in the
4 timing of river flows are expected.
5 Mountain snowpack will melt earlier in
6 the year; precipitation will be more
7 intense. Summers will be hotter, drier,
8 and longer. Rising temperatures will
9 cause snow to melt earlier in the year,
10 leading to a longer, hotter outdoor
11 water use season making it more
12 difficult for our reservoirs to satisfy
13 water demands. Southern Alberta is an
14 arid region inherently susceptible to
15 drought. Severe multiyear droughts
16 observed in the past include those
17 between 1858 and 1872..."

18 So that would be a, what, 14-year drought? 1930 to '41,
19 that would be an 11-year drought: (as read)

20 "...and dry conditions in the early
21 2000s."

22 And it talks about tree ring evidence suggests that even
23 more severe droughts hit the region in the 1400, 1500s,
24 and 1700s, and that's shown in Figure 1.

25 Would you agree, Mr. Frigo, that SR1 does nothing

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1 for Calgary in relation to alleviating water shortages
2 as a result of drought?

3 A. No, I would disagree in that, though it is a subtle
4 effect, having additional flood mitigation in place by
5 way of SR1 would mean that seasonal operations at
6 Glenmore Reservoir, which are very flood sensitive,
7 could be altered and optimized so that instead of
8 drawing water levels as low as we need to be able to
9 effect the type of flood mitigation potential required
10 now, we may be able to offset that slightly.

11 This is a relatively small effect because, again,
12 when we talk about the Elbow and the Bow and the
13 distribution of their current proportion of the current
14 city's demand, we're talking in average terms.

15 And so it's very much recognized, both within this
16 plan, all the capital infrastructure planning within
17 the city, that the Bow Basin is, as you mentioned, the
18 approximately six times larger basin.

19 Not only that, it is the basin that has the larger
20 proportion of high elevation mountain terrain that
21 sustains both glacier and permanent snowfield that
22 become increasingly important to water supply under low
23 precipitation conditions.

24 So no, Mr. Secord, I would disagree, though I
25 would qualify that that effect is a relatively modest

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Cross-examined by Mr. Secord

1 effect.

2 Q. So let's put some numbers on it. What does the
3 Glenmore Reservoir hold?

4 A. With the expanded gates for flood storage, it has the
5 capacity of 20 million cubic metres, but at its full
6 supply level, it would generally have 10 million cubic
7 metres of available active storage.

8 Q. So I'm confused. You say it holds 10 million cubic
9 metres at FSL?

10 A. Yeah. Actually, it's somewhere in the order of about
11 16, at 16 million cubic metres at FSL.

12 So dam crest at Glenmore is 1075.33 metres above
13 sea level. A metre and a half above that is the full
14 supply level, and then above that is an area that is
15 only utilized for flood storage, and the gates
16 obviously -- the gates are 2.5 metres high, so 1 metre
17 of the gate height goes into that flood storage level,
18 which is beyond the normal full supply.

19 Q. And so in terms of the operation of the
20 Glenmore Reservoir, is there always a certain amount of
21 water left in it for recreational use?

22 A. Not necessarily for recreational use. The very lowest
23 levels in Glenmore really have to do with the physical
24 capacity of the intake structures, though obviously
25 we're always trying to balance a number of water

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1 resources outcomes, one of which is recreation, but
2 importantly also, our downstream environmental flows
3 and environmental management.

4 So always, water supply, flood, environmental, and
5 recreation are major objectives when we're managing
6 reservoir level at Glenmore.

7 Q. And you're saying the intake is limited in terms of the
8 amount of water that you can divert into the reservoir?

9 A. For a number of reasons, yeah, there's a minimum level
10 below which we would only consider drawing down to
11 under very unusual circumstances, and that's about
12 three and a half metres below the 1075.33 dam crest I
13 mentioned earlier.

14 Q. Now, on this page, it says: (as read)
15 "Temperature increases for Calgary
16 region are expected to be higher than
17 the rest of the globe."

18 Would you agree with that statement?

19 A. Yes. That's the finding of some of the global
20 circulation models.

21 Q. And it says: (as read)
22 "The risk of drought occurrence in
23 summer and early fall, in particular,
24 when demand tends to peak is likely to
25 increase."

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 Do you agree with that statement?

2 A. Yes.

3 Q. : (as read)

4 "Water management for both extreme flood
5 and drought are priorities."

6 Do you agree with that statement?

7 A. Yes.

8 Q. And then in relation to PDF page 18, one more page.

9 MR. SECORD: Mr. Chair, we're having problems
10 with the quality of the document display.

11 THE CHAIR: Yes. I'm not sure if it's a
12 memory issue. There's a lot of exhibits up there. I
13 saw that message come up earlier.

14 MR. SECORD: It might be better to get rid of
15 some of the -- might be easier to get rid of some of
16 the exhibits.

17 It's 345, document host.

18 THE CHAIR: Do you know offhand for sure which
19 ones we won't need.

20 MR. SECORD: It seems to have disappeared,
21 Mr. Chair, from the list. There it is. You've got it.
22 There it is. So PDF 18 just use the arrow. There we
23 go. But we're not on 18. What I have here is page 20
24 of 22. There we go.

25 I'm sorry, document host, it's PDF 18, for some

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 reason, on my laptop. It's PDF 20 on the Board's
2 document.

3 Q. So under -- on this page. Priority actions, it says:
4 (as read)

5 "Advocate for a new upstream reservoir
6 on the Bow River."

7 And I understand that's currently underway, Mr. Frigo.

8 A. Yes. The City's been participating with Alberta
9 Environment and Parks' Bow River reservoir options.
10 Actually many of the groups that have been
11 participating in this proceeding have also been a party
12 to that ongoing work.

13 That work is in its second phase of looking at
14 alternatives where additional storage might be added to
15 the basin for the benefit of both water supply and
16 flood mitigation.

17 Q. And let's say as a hypothetical as a result of
18 opposition from First Nations, or for environmental
19 reasons, you're unable to get another dam on the
20 Bow River, would you consider advocating for a new
21 upstream reservoir on the Elbow River?

22 A. Very, very unlikely -- pardon me.

23 Q. So if you couldn't get one on the Bow, given what we've
24 just read about Calgary's temperature being one of the
25 hottest city's in the world, would you consider

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 advocating for a new upstream reservoir on the Elbow.

2 A. Very, very unlikely, Mr. Secord.

3 Again, the scale of the basin and the hydrology
4 and meteorology of the basin, the Elbow basin, do not
5 make it a prime candidate for that kind of investment.

6 Again, the Bow would be six times larger
7 catchment, much more area, 5,000 square kilometres of
8 mountain -- high elevation mountain terrain along the
9 continental divide, glacier, permanent snowfield,
10 higher precipitation make it a much stronger candidate
11 for that type of investment and that type of
12 consideration.

13 I would add, as well, that with the Glenmore
14 gates, the gates that we have now, the water licence
15 capability of the Elbow is maximize -- just perhaps the
16 wrong word, but close to optimized; that is, the
17 Elbow is only so large of a roof.

18 If you put a bucket at the end of that roof,
19 you're only going to get so much water off of it,
20 especially in times that are more, if you will,
21 "droughty." Mr. Secord, if you'll allow me to use that
22 word.

23 So, absolutely, the City of Calgary's long-term
24 plans anticipate that population growth and changes in
25 demand would likely be met through incremental

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 infrastructure investment and licence considerations
2 along the Bow River.

3 Again, it is, by far, the more secure, more
4 reliable, less seasonally variable source. In addition
5 to that, there's already a larger component of
6 controlled storage on the Bow. And as I mentioned in
7 the presentation, City of Calgary works with all of the
8 water licence holders, irrigation districts,
9 hydropower, downstream municipalities, upstream
10 municipalities to try to make sure that we are
11 stewarding the resource in a very collaborative manner.

12 Q. But do you understand that McLean Creek, it holds
13 70,000 dam cubed?

14 A. Understood, yes. Obviously, at full flood charge, yes.

15 Q. And I take it the Glenmore Reservoir holds 20,000 dam
16 cubed?

17 A. Correct.

18 Q. On page 20, there's an item Number 6 which says:
19 (as read)

20 "Finalize the source water protection
21 plan and policy."

22 It says: (as read)

23 "Source water protection is critical for
24 water security. The City's source water
25 protection plan identifies contamination

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 from wildfires and storm water runoff
2 from land development as the top risk to
3 the quality of Calgary's water supply."

4 Can you tell me, how does contamination from wildfires
5 factor into the water quality?

6 **A. Evidence from events around Alberta have suggested that**
7 **organic carbon content in runoff can change post**
8 **wildfire. So it is one of the components that is a**
9 **consideration in terms of water quality.**

10 Q. And do you understand that McLean Creek would have
11 provided an option for firefighting in the Elbow River
12 catchment area?

13 **A. I am not certain of the -- I'm not certain McLean Creek**
14 **had facility for that. That is, I understand water**
15 **would be stored there; I'm not clear on how that water**
16 **could be extracted for firefighting. That hasn't been**
17 **part of any analysis that I've understood.**

18 Q. Okay. I take it you haven't then examined whether MC1
19 could have been used to -- as a source for firefighting
20 in the Elbow River catchment area?

21 **A. Pardon me, I missed the first part of that, Mr. Secord,**
22 **apologies.**

23 Q. I take it you haven't looked at whether any of the
24 700,000 dam cubed that could have been stored at MC1,
25 whether any of that water could have been used for

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 firefighting in the event there was a fire in the
2 Elbow River catchment area?

3 **A. No, no. Our understanding is that the permanent pool**
4 **that would be required for MC1 was primarily because**
5 **the bedload and wash load, that is the sediment that**
6 **the Elbow River would normally transport to support its**
7 **typical morphology would be completely blocking outlets**
8 **from MC1, the permanent pool we understood existed**
9 **primarily to halt the progress of that bedload sediment**
10 **toward the reservoir, not so much that the pool was**
11 **intended for any kind of multiwater resources objective**
12 **use.**

13 **Q.** And then one of the things I wondered about from a
14 water security point of view, and I don't know, were
15 you following along today my questions of Alberta
16 Transportation?

17 **A. Yes, I was.**

18 **Q.** And we looked at various hydrographs, and I think you
19 would agree that it shows that SR1 would capture
20 perhaps half of the peak of a flood of record.

21 We looked at that hydrograph from Bragg Creek, for
22 instance, and it looked like, depending upon whether
23 the gates were letting in 480 or 600 cubic metres per
24 second, anywhere from, you know 700 to 600 cubic metres
25 per second that the peak would be passed downstream?

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Cross-examined by Mr. Secord

1 And my understanding is, in the last flood, there
2 was -- there were various instances of contaminated
3 water going over private property and lands, and I'm
4 just wondering, is there any water security risk for
5 Glenmore, for the Glenmore Reservoir and the water
6 treatment plant from flooding that would obviously be
7 occurring upstream of the Glenmore Reservoir in the
8 event of another flood of record coming down the Elbow?

9 **A. Very -- very limited, Mr. Secord. Of course, during a**
10 **major event like that, of course anything could happen.**

11 But what we did see in 2013, both at Glenmore and
12 at Bearspaw, we were able to treat water incoming to
13 the plant to drinking water standards throughout the
14 event. There was a brief period at Glenmore where we
15 had to, if you will, treat it twice before we could put
16 it into our distribution system.

17 But no, I wouldn't expect significant impacts,
18 though under the duress of a major event, again, when
19 we're talking about something in the 2 to 500-year,
20 virtually, you know, a number of things could happen.

21 I would suggest that the kind of contamination
22 would be -- the risk of contamination would be more
23 acute downstream in the urban environment in the urban,
24 fabric where pipelines, utilities, construction
25 materials, et cetera, almost necessarily are.

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Cross-examined by Mr. Secord

1 And so very much part of the consideration around
2 flood mitigation for the City of Calgary is to try to
3 prevent that, that is, to prevent floodwaters from
4 mixing from sanitary sewer flows, et cetera, certainly
5 within the city and recognizing that the city could
6 become a source for that, that is, you know, beyond
7 life safety and economic impacts, one of the
8 significant drivers why flood resilience in a wholistic
9 plan has been something that the City of Calgary
10 pursued for both the Elbow and the Bow Rivers.

11 Q. Now, you mentioned I think in your presentation earlier
12 in the week about health impacts in the 2013 flood;
13 correct?

14 A. Yes.

15 Q. And do you see the City of Calgary transferring health
16 impacts to the citizens of Springbank and their
17 children immediately downwind of the SR1 facility as a
18 result of decreased air quality?

19 A. My understanding, Mr. Secord, is that the dust
20 abatement protocols that have been identified,
21 application of tackifiers, reseeded, wetting of
22 sediments, are very much part of the plan. And
23 therefore my reading is that, no, I would expect that
24 that would be a very important element that Alberta
25 Transportation and the eventual operator, Alberta

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 Environment and Parks, would be paying very specific
2 attention to.

3 Q. Can you tell me, in what years has the
4 Glenmore Reservoir been drawn down in anticipation of
5 the spring for shed and not refilled, other than when
6 the dam gates were reconstructed recently?

7 A. I wouldn't have a full history off the top of my head
8 unfortunately, Mr. Secord, but in the 14 years that
9 I've been with the City, we've always been able to
10 refill at least partially.

11 Q. What does that mean, Mr. Frigo?

12 A. That is, not to the full supply level, but to some
13 elevation close to the full supply level. Again, that
14 full supply level being 1.5 metres above the concrete
15 crest of the dam at 1075.33.

16 Q. Can you tell me what 1075.33 is?

17 A. Sure.

18 Q. I've got 16,000 cubic metres for --

19 A. Apologies, it's just the vertical elevation, the number
20 of metres above mean sea level that would represent
21 what a surveyor would identify as the top of the dam,
22 the dam crest elevation.

23 Again, it is that crest elevation upon which the
24 2.5-metre-high gates that we've spoken about at
25 Glenmore would normally close to and then during flood

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 events would open to control flows downstream.

2 Q. And what is FSL?

3 A. Full supply level is the --

4 Q. No, what's the number if you usually --

5 A. 76.83. 1076.83.

6 Q. 1076.83. And then the 20,000 cubic metre storage level
7 is what?

8 A. 1077.83. Oh, pardon me, yes, I believe that's correct.

9 Q. I just --

10 A. That may be subject to check.

11 Q. That's okay. We're not going to go there. I just
12 wanted to be working with -- I've had some of my
13 numbers in, you know, cubic metres, and then you've got
14 this elevation. So I just wanted to be speaking the
15 same language with you, Mr. Frigo.

16 THE COURT REPORTER: Excuse me, when you're saying
17 "10-77-83," is that a point 83?

18 A. Yes, yes, it is. So 1,000 -- yeah, 1075.33 would be
19 the 1075.33.

20 Q. And that's metres above sea level?

21 A. Correct.

22 Q. So the question was how -- in what years was the
23 Glenmore Reservoir drawn down in anticipation of the
24 spring for shed and not refilled. Are you drawing it
25 down to 1075.33, or are you drawing it down below that

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Cross-examined by Mr. Secord

1 number for the spring for shed?

2 A. Below 1075.33. So, typically, between 2 and 3 metres
3 below that 1075.33.

4 Q. So anywhere from 1072.33 to 1073.33 would be the
5 drawdown?

6 A. Yes. And very much seasonally dependent based on
7 forecasting inputs from both the City of Calgary's
8 hydrometric forecasting team as well as the Alberta
9 Environment river forecast centre out of Edmonton. We
10 utilize those estimates to be able to set those values,
11 yes.

12 Q. And you say in the last 14 years, there have been very
13 few years where you haven't been able to essentially
14 replace the drawdown with waters coming in from the
15 Elbow?

16 A. Yes. And that's correct, in part, because the way the
17 City of Calgary has engineered the two plants -- so the
18 Glenmore water treatment plant on the Elbow River and
19 the Bearspaw water treatment plant on the Bow River --
20 is that we do have the flexibility to supply all of our
21 pressure zones from either of the two.

22 So what we are able to do is very carefully manage
23 to be able to utilize or supply demand out of the
24 Glenmore treatment plant less so, rely more heavily on
25 Bearspaw, or vice versa as conditions require, so that

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Cross-examined by Mr. Secord

1 we can rebuild that storage and still pass the
2 environmental flows downstream required to maintain
3 environmental performance downstream.

4 So, yes, I would mention, yeah, it's a continual
5 game of numbers. There's continual analysis feeding
6 into the analysis of both the demands and the supply to
7 be able to try to optimize that -- those water
8 resources outcomes we talked about earlier -- water
9 supply, environmental performance, flood mitigation,
10 and recreation.

11 Q. When you say you, in the last 14 years, have been able
12 to replace the amount that's drawn down, would I
13 understand, then, that the amount -- the replacement
14 amount would take it back up to 1075.33, or would it be
15 something higher?

16 A. After flood season has passed, and prior to the new
17 gates, there was a system of stop logs that could be
18 implemented to take us close to full supply level.
19 With the new gates we're able to do that a little more
20 readily.

21 Because the old stop log system couldn't be in
22 place and altered in a rapid sequence - it took a
23 couple of days to do that -- it wasn't possible to
24 leave those gates in during flood season. Pardon me,
25 long answer.

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Cross-examined by Mr. Secord

1 But no, we can come all the way to the full supply
2 level which is a metre and a half above the 1075.33 and
3 1076.83, we can come that high. In the past we
4 couldn't do that until after flood season had passed.

5 It's another aspect of the Glenmore gates offering
6 more flexibility on both the flood mitigation side as
7 well as the water supply side.

8 Q. So then why is -- how is SR1 then enhancing water
9 security?

10 A. Well, in that Glenmore -- still to be able to -- so
11 presently, SR1 does not exist. If a flood event
12 happens this year, and actually, this is what my team
13 and I are doing, you know, right now, in this part of
14 the season, is preparing to set those levels, to help
15 our water treatment operations and our water supply
16 operations set those levels.

17 And so what we're doing is looking at how does
18 snow pack look, what are we expecting from a
19 meteorologic standpoint, what's going with the
20 Pacific Ocean, and then we would set those levels
21 accordingly.

22 Normally, to be able to achieve the maximum impact
23 downstream, we do have to be sitting I'll call it
24 within striking distance of the minimum operating level
25 so that when a flood comes, like it did in 2013, again

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Cross-examined by Mr. Secord

1 that terrible 1240 cubic metre per second, and maybe
2 that's a great example.

3 We recognized three days before the event occurred
4 that a large synoptic event was progressing across the
5 Pacific, was likely to make it through to us. We
6 didn't have a great sense of the magnitude, but what we
7 were able to do was draw the reservoir down to the
8 minimum operating level so the optimum -- the maximum
9 storage so that we got all of the utility for flood
10 attenuation out of Glenmore that we could have.

11 We talked about the unique nature of the
12 hydrograph in 2013. In some ways, that unique nature
13 was very much a blessing in that that very high peak
14 was captured. That was on the very front of the
15 hydrograph. Glenmore was as low as we could have it,
16 as empty as we could have it, and, therefore, we were
17 able to take that first peak and attenuate that 1200
18 down to 700.

19 Had Glenmore not been drawn down, we estimate that
20 water levels downstream would have been up to a metre,
21 metre and a half higher, would have likely outflanked
22 many of the emergency operations we put in place and
23 damaged, we estimate, somewhere in the order of 5 to
24 600 additional buildings that were not damaged in 2013.
25 So very much that need to optimize and maximize the

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Cross-examined by Mr. Secord

1 storage that would be required for peak flood
2 attenuation potential.

3 Then if an event doesn't materialize, if that
4 large synoptic event shifts to the north and hits the
5 Red Deer Basin, or shifts to the south and ends up in
6 Montana, we can go from the scenario where we're
7 expecting hundreds of cubic metres per second to
8 literally expecting tens, if not single sets of cubic
9 metres per second, 3, 5, 7 cubic metre per second.
10 This is part of the -- riding the wild bucking bronco
11 that is hydrology in southern Alberta. That is very
12 much part of my job.

13 Q. So I think my hour allocation is coming to a close, Mr.
14 Frigo. I have to say I really appreciate, enjoy
15 questioning you. I should have asked for more time.

16 Can you tell me, were you aware, and by "you," the
17 City, I don't know whether you can speak for that, but
18 was the City aware of the 2017 OPUS report on MC1
19 that's Exhibit 101, and I'd refer to PDF page 46?

20 It shows that MC1 could reduce flow rates in a 1
21 in a thousand-year flood to 830 cubic metres per second
22 versus the 1400 cubic metres per second from SR1.

23 And the rates in a design flood to 212 cubic
24 metres per second at MC1 versus SR1's 640 cubic metres
25 per second? Were you aware of that document when it

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Cross-examined by Mr. Secord

1 came out in 2017?

2 A. I'm not sure whether it was right in 2017, but I am
3 aware of the document now. I certainly don't remember
4 when precisely I became aware of it.

5 Q. And would you say that MC1 would have provided superior
6 flood mitigation outcomes for the City of Calgary, had
7 it been chosen?

8 A. Not necessarily, and this largely stems from analysis
9 that the City has done on the 2005 event that several
10 of the participants have mentioned.

11 In 2005, we had precipitation that was centered
12 more down-basin, so not as high in the catchment as in
13 2013. So, in 2013, very much alpine in the mountains
14 was where the heavy precipitation occurred.

15 In 2005 primarily, the precipitation was a little
16 more down-basin, that is, the centroids of
17 precipitation were closer to Bragg Creek and further
18 downstream.

19 The position of MC1 higher in the catchment would
20 make it less able to be able to deal with rainfall and
21 capture rainfall that would occur lower down in the
22 basin.

23 And so, in general, there would be very much a
24 tradeoff, Mr. Secord, between the two because of the
25 relative catchment areas.

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Cross-examined by Mr. Secord

1 And, again, that was based on analysis internally
2 that we've done, looking at 2005 trying to calibrate
3 our hydrologic models to capture, again, events like
4 2005, which are longer, slower, more down-basin
5 precipitation, versus 2013's which was much more
6 centered in the alpine portion of the catchment.

7 Q. So are you saying, then, that a 1 in a 1,000-year flood
8 with a flow of 830 cubic metres per second is worse
9 than a flow of 1400 cubic metres per second from SR1?

10 A. Very much dependent on the -- again, the hydrograph
11 shape because again, we can use that 20 million cubic
12 metres in the same way we can use the 70 million either
13 at MC1 or SR1 dependent on that hydrograph shape.

14 So if we were going to have a higher flow but it
15 sustained longer, that could be more problematic than
16 having a sharp peak like we did in 2013 and were able
17 to capture.

18 So very much dependent on the event, and that's
19 precisely why I tried to qualify my previous answer
20 around there's very much a tradeoff, and the relative
21 position of storage in the catchment is very important
22 factor to how effective it would be.

23 On the Bow, a similar analogy would be Upper and
24 Lower Kananaskis Reservoirs most people are familiar
25 with, they sit so high in the catchment that they're

CITY OF CALGARY TOPIC #3 WITNESS

Cross-examined by Mr. Secord

1 not terribly useful for flood mitigation from the
2 standpoint that they don't capture enough area to
3 actually have a strong influence on a peak. They're
4 much more useful for resupplying, if you will, Ghost
5 reservoir and other reservoirs downstream on the Bow
6 system afterwards.

7 So very much that position in the catchment has a
8 lot to do, as well as the storage size, as well as the
9 capacity of the various outlets, all contribute to the
10 factor of benefit or choice relative to different
11 locations.

12 Q. And have you -- have you actually looked -- have you
13 looked at any studies to determine how much of the
14 Elbow River catchment MC1 captures? If I suggested to
15 you that MC1 captures 96 percent of the Elbow River
16 catchment area, would you disagree with that or do you
17 have a comment on the percentage?

18 A. I would have to check that number. That doesn't seem
19 correct because my recollection is that at MC1, we're
20 well below a thousand square kilometres, but I would
21 need to check that, Mr. Secord.

22 Q. Would you undertake to check for me the percentage of
23 the catchment area that MC1 would capture and provide
24 that in due course? Is that agreeable?

25 A. Sure, subject to check with counsel.

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Cross-examined by Mr. Secord

1 UNDERTAKING - TO ADVISE THE PERCENTAGE
2 OF THE CATCHMENT AREA THAT MC1 WOULD
3 CAPTURE SUBJECT TO CHECK WITH COUNSEL

4 Q. MR. SECORD: All right. I think, Mr. Chair, my
5 time is up. Am I correct?

6 THE CHAIR: You're not. While I've been maybe
7 a drill sergeant when coming up to your time. I think
8 it's only reasonable to say, according to my watch, I
9 think you're at 1:45, and you asked for an hour. So
10 that takes you to 2:45, another ten minutes.

11 MR. SECORD: Okay. I just want to make sure
12 I'm not --

13 THE CHAIR: All good.

14 MR. SECORD: -- out of line here. I think I'm
15 pretty much done, so I'm just going to check my notes.

16 THE CHAIR: Sounds like somebody --

17 MR. KRUHLAK: Sounds like an alarm.

18 MR. SECORD: It's somebody phoning me,
19 Mr. Kruhlak, sorry, but I had the ringer off.

20 THE CHAIR: All good.

21 MR. SECORD: Let me just go to my notes here,
22 and sorry to --

23 Thank you very much, Mr. Frigo. Those are all my
24 questions.

25 Thank you very much, Mr. Chair.

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Cross-examined by Mr. Williams

1 THE CHAIR: Thank you, Mr. Frigo. Thank you.

2 We may have questions I think from Mr. Williams from

3 Calalta. Mr. Williams, are you online?

4 MR. WILLIAMS: Yes. Can you hear me?

5 THE CHAIR: We can. Video, as well. There we

6 go. Thank you, Mr. Wiebe. Please proceed.

7 **MR. WILLIAMS CROSS-EXAMINES THE WITNESS:**

8 Q. Thank you. Thank you for the presentation, Mr. Frigo.

9 I just have a few questions with regards to --

10 could you repeat the short version of the process of
11 managing the Bow on a weekly basis?

12 You talked about stakeholders upstream managing
13 this process on the Bow River?

14 A. Yes.

15 Q. And is that just during flood mitigation, like a flood
16 event period or is that weekly on a monthly basis for a
17 complete 365-day year?

18 A. It's weekly, and it's typically weekly through the open
19 water season so from around April through to around
20 October because water management obviously becomes a
21 little more -- less dynamic in the wintertime; there's
22 not weekly meetings.

23 The forum I mentioned is set up and operated, run,
24 chaired by Alberta Environment and Parks, their Bow
25 operations group. They invite major water users so

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Cross-examined by Mr. Williams

1 city of Calgary, TransAlta, irrigation districts, a
2 number of other participants. We meet each week. We
3 talk about demands. We talk about supply. We talk
4 about hydrometric conditions. And then we ensure that
5 we time and work with each other to make sure
6 everyone's demands can be met.

7 That process my team has been involved with for
8 several years, yes.

9 Q. Okay. And are you indicating that the SR1 dam would
10 then stimulate this same process for the -- all the
11 stakeholders on the Elbow River?

12 A. Perhaps not identical process, but what I was trying to
13 point out in my presentation is that because we, as a
14 City of Calgary, need to operate the
15 Glenmore Reservoir, both for water supply,
16 environmental, and flood mitigation, we would need to
17 have very close working relationships. We fully
18 understand that.

19 And very much part of our diligence, in terms of
20 understanding what's coming down the river, we have our
21 own monitoring programs that we would want to then
22 synergize with everyone else's monitoring programs. We
23 share our information and vice versa.

24 So this is, you know, I was trying to use the
25 example of what's happening on the Bow presently to

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Cross-examined by Mr. Williams

1 provide an indication of what our expectation is we
2 would need to be involved with SR1.

3 With SR1 being primarily focused on flood
4 mitigation, we would expect that we would -- and with
5 our responsibilities around dam safety for Glenmore, we
6 would be especially interested in any elements that
7 would relate to dam safety, maintenance and checking of
8 gates, all of the geotechnical components around
9 evaluating settlement, other aspects around the dam
10 safety issue.

11 So it would likely be a different forum because
12 we're talking a different basin and obviously different
13 infrastructure but perhaps something of that nature.
14 And obviously we would expect that it would be Alberta
15 Environment and Parks as the operator to sort of take
16 the lead and prescribe, if you will, the boundaries and
17 the mechanism for that forum.

18 The City would very gladly participate and would
19 expect that we would need to participate in something
20 of that nature.

21 Q. In all the information that's collected within this
22 forum or within this group, does it stay within the
23 group or does the City of Calgary use that information
24 within other agencies, i.e. within the City, the growth
25 management board, et cetera? Would that information

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Cross-examined by Mr. Williams

1 ever move to other areas of the City?

2 **A. Virtually, all the information is public.**

3 So primarily, for instance, hydrometric
4 information that we're utilizing is primarily published
5 on Alberta Environment and Parks' river app that shows
6 real-time information. Similarly, the City of Calgary
7 has various public information.

8 There is some information, of course, that is
9 proprietary. So for instance, I mentioned TransAlta is
10 an important water stakeholder on the Bow. Some of the
11 information that TransAlta has is obviously governed by
12 rules because of their involvement in the hydropower
13 industry.

14 **Q.** And so I guess my next question, then, we're in
15 agreement that the managing and the regulations with
16 regards to water licence is the jurisdiction of Alberta
17 Environment and not with the City of Calgary; correct?

18 **A. Absolutely, yes.**

19 **Q.** Okay. And then the only other thing that -- and the
20 reason I bring this up is because we have a third party
21 operator for our plant, and if we're then drawn into
22 reporting and managing, you know, information provided
23 on a weekly basis and it was caused by SR1, that would
24 grow our costs with our third party operator obviously,
25 and obviously we'd be sensitive to that or we would

CITY OF CALGARY TOPIC #3 WITNESS

Questioned by The Chair

1 have to have a discussion with AT in regards to that.

2 And I believe that is all the information I had or
3 questions I have. Thank you very much.

4 THE CHAIR: Thank you, Mr. Williams.

5 Mr. Wagner, did you have questions for Mr. Frigo?

6 MR. WAGNER: No questions, Mr. Chair.

7 THE CHAIR: Okay. Thank you. Board staff,
8 counsel and Panel members. Mr. Kennedy?

9 MR. KENNEDY: I have no questions for the City
10 of Calgary. Thank you.

11 THE CHAIR: Ms. Vance?

12 MS. VANCE: I do not have questions. Thank
13 you.

14 THE CHAIR: Ms. Roberts?

15 MS. ROBERTS: I don't have any questions.

16 THE CHAIR: Mr. Ceroici?

17 MR. CEROICI: I don't have any questions, thank
18 you.

19 THE CHAIR: Dr. Heaney?

20 MR. HEANEY: No questions. Thank you,
21 Mr. Frigo.

22 THE CHAIR: I just have one clarification.

23 **THE CHAIR QUESTIONS THE WITNESS:**

24 Q. It seems to me I heard Mr. Secord talk about Calgary
25 temperatures under climate change regimes in up to

CITY OF CALGARY TOPIC #3 WITNESS

Questioned by The Chair

1 2080, and I think at one point or twice mentioned
2 Calgary will be, if I have it right, among the highest
3 temperatures in the world.

4 Did that not -- did the report not refer to the
5 potential increase due to climate change is going to be
6 highest in the world as opposed to actual ambient
7 temperatures? Because the way it sounded by Mr.
8 Secord, may be referring to the actual temperature, as
9 opposed to increase in temperature. Which is it?

10 **A. It's increase. And my understanding was that**
11 **Mr. Secord indicated it was increase.**

12 **Q. Increase. Thank you. And if that's the case,**
13 **Mr. Secord, I apologize. I just wanted to make sure I**
14 **had that clear for the transcript.**

15 That's all I had, Mr. Frigo. Thank you very much.

16 Ms. Senek, did you have any redirect?

17 **MS. SENEK:** No redirect. Thank you,
18 Mr. Chair.

19 **THE CHAIR:** Okay. Well, we're at quarter
20 to 3 --

21 **MR. SECORD:** Shall we take a brief break now
22 and then we can sit the SCLG panel?

23 **THE CHAIR:** That's exactly what I was going to
24 do, Mr. Secord. Thank you. I'll hire you as a
25 right-hand man, I guess.

1 MR. SECORD: And my partner Ms. Okoye will be
2 doing the direct.

3 THE CHAIR: So, at 3:00, we'll return for
4 SCLG. Thank you.

5 And just before we do that, I understand that
6 Mr. Cusano and Ms. Louden did not have any direct in
7 this area. I just want to confirm that?

8 MR. CUSANO: It's Lou Cusano. That is correct.

9 THE CHAIR: Thank you. And Ms. Louden?

10 MS. LOUDEN: Yes, Mr. Chairman, that is
11 correct, we do not have any direct on this topic.

12 THE CHAIR: Thank you. We'll see you back at
13 3:00.

14 MR. SECORD: Thank you.

15 (ADJOURNMENT)

16 THE CHAIR: Mr. Secord, are you and your panel
17 ready?

18 MS. OKOYE: Yes, Mr. Chair, the panel is
19 ready.

20 THE CHAIR: I'm sorry. Ms. Okoye, yes.
21 Mr. Secord had mentioned you're doing it. I'm
22 sorry, yeah.

23 MS. OKOYE: Yes, he's been at it for a while,
24 so he's getting tired.

25 THE CHAIR: All right. Well, welcome and

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 take it away.

2 MS. OKOYE: Thank you. Good afternoon.

3 So we'll start off first with Roger.

4 I'll just introduce -- I'm sorry -- oh, I'm sorry,
5 my picture wasn't on.

6 So I'll start off first by introducing our
7 witnesses.

8 We have Roger Austin, Ruth Keyes, both from
9 Austin Engineering Limited; Dave Klepacki, and
10 Ian Dowsett.

11 If Madam Court Reporter could, please, either
12 swear or affirm them.

13

14 R. AUSTIN, R. KEYES, D. KLEPACKI, I. DOWSETT (For SCLG
15 Panel), sworn/affirmed

16 MS. OKOYE EXAMINES THE PANEL:

17 MS. OKOYE: Thank you, Madam Court Reporter.

18 Q. So we'll start off with Mr. Austin and Ms. Keyes. I'm
19 referring both of you to your CV filed as Exhibit 257,
20 your report filed as Exhibit 256, and your opening
21 statement.

22 Were these documents prepared by you under your
23 direction or control?

24 A. MR. AUSTIN: Yes, they were.

25 A. MS. KEYES: Yes, they were.

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 Q. The documents are true to the best of your knowledge
2 and belief?

3 A. MR. AUSTIN: Yes, they are.

4 A. MS. KEYES: Yes, that's correct.

5 Q. Do you adopt them as part of your evidence in this
6 proceeding?

7 A. MR. AUSTIN: Yes, I do.

8 Q. I do you both acknowledge that you have a duty to
9 provide opinion evidence to the Board that is fair,
10 objective, and non-partisan?

11 A. MR. AUSTIN: Yes, I do.

12 A. MS. KEYES: Yes.

13 Q. Perfect. Could you please explain Austin's
14 Engineering's role in this proceeding.

15 A. MR. AUSTIN: Yes. So Austin Engineering was
16 hired to review and assess the project's overall design
17 and operational risk with the view of improving dam
18 safety and reducing the risks for operational load
19 structure.

20 Q. So starting first with you, Mr. Austin, could you
21 please provide the Board with a brief summary of your
22 professional qualifications and experience.

23 A. MR. AUSTIN: Yes, I can. So I graduated with a
24 bachelor of civil engineering in 2003. I began my
25 career by building earth structures for water retention

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Examined by Ms. Okoye

1 and conveyance for Fisheries and Oceans Canada.

2 I then moved into heavy civil construction where I
3 joined the construction team that installed the world's
4 largest post-sanction anchors at Seven Mile Dam. We
5 followed that with upgrades to spillway at Seven Mile
6 Dam.

7 And a few years later, I was involved in the
8 Revelstoke Unit 5 upgrade where I was the project
9 engineer for Unit 5 installing a 530-megawatt
10 generator.

11 I left Kiewit and heavy civil construction and was
12 employed by FortisBC. Throughout my career with
13 Fortis, I ended as manager of generation engineering
14 for FortisBC, and also dam safety. In that role, we
15 covered FortisBC, FortisOntario, Fortis Generation East
16 and Fortis US.

17 Following my employment with FortisBC, I started
18 Austin Engineering. Austin Engineering has been in
19 existence for seven, just about seven years now. And
20 we specialize in dam safety and dam safety-related
21 projects, and have completed in excess of 100 projects
22 over the last seven years relating to dam safety.

23 Q. Thank you, Mr. Austin.

24 Ms. Keyes, would you please provide the Board with
25 a brief summary of your professional qualifications and

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 experience?

2 **A. MS. KEYES:** Yes. So I graduated with a
3 bachelor of engineering, civil and environmental in
4 2005.

5 I have over 16 years of engineering experience
6 working predominantly as a consultant on hydraulic
7 design, hydrotechnical analysis, hydrological analysis
8 and erosion protection design.

9 I've previously been registered as a professional
10 engineer with APEGA, and I'm currently registered as a
11 professional engineer with EGBC.

12 **Q.** Thank you, Ms. Keyes.

13 Document manager, would you please pull up Austin
14 Engineering PowerPoint presentation.

15 **COURT REPORTER:** So I'm just going to remind the
16 parties that I need to write what you're saying, so I'm
17 going to ask that you speak slowly and clearly.

18 **A. MR. AUSTIN:** Thank you.

19 **MS. OKOYE:** Thank you.

20 **Q.** Could you please proceed in giving an overview of your
21 findings in this matter.

22 **MR. FITCH:** Mr. Chairman, it's Gavin Fitch.
23 Just before the witnesses begin. I have no
24 recollection of receiving the PowerPoint presentation.
25 If I did, I must have somehow overlooked it.

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Examined by Ms. Okoye

1 That said, you know, let's let the witnesses go
2 ahead, but I'm just -- I'm confessing this is the first
3 time I've seen this document.

4 But as I said, let's proceed and we'll see how it
5 goes.

6 THE CHAIR: Okay. Thank you, Mr. Fitch.

7 Ms. Okoye, have you not forwarded that? I don't
8 believe I've seen it either actually.

9 MS. OKOYE: It was submitted to Ms. Friend
10 yesterday. So I'm not sure. Let me see. Perhaps --
11 maybe we didn't copy Mr. Fitch.

12 Well, they can proceed and I'll forward that to
13 Mr. Fitch as quickly as possible.

14 THE CHAIR: I expect this is the information
15 that has been driven out of the report that was --

16 MS. OKOYE: Yes --

17 THE CHAIR: -- previously?

18 MS. OKOYE: Yes.

19 THE CHAIR: Thank you.

20 Q. MS. OKOYE: Ms. Keyes or Mr. Austin, you can
21 proceed.

22 A. MS. KEYES: Just for the court reporter, this
23 is Ruth Keyes talking for the first half.

24 Document manager, can I please have Slide
25 Number 2.

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Examined by Ms. Okoye

1 Austin Engineering is a consulting company with
2 extensive experience in dam safety projects. As
3 Roger Austin mentioned previously, our objective on
4 this project was to identify risks with the engineering
5 -- with the engineered design and operation of the SR1
6 project, and provide recommendations to improve the dam
7 safety aspects of the project and prevent long-term dam
8 safety non-conformances or deficiencies that could
9 negatively affect downstream residents, landowners and
10 infrastructure or have detrimental ecological impacts.

11 Slide 3, please, document manager.

12 Our main references through the course of our
13 design review was the government of Alberta, Alberta
14 Dam and Safety Directive, and the Canadian Dam
15 Association Dam and Safety Guidelines 2007 (2013
16 Edition).

17 Slide 4, please, document manager.

18 Our review of the SR1 project and design included
19 a background information review; the downstream
20 inundation from dam break analysis; consequence
21 classification of the storage dam and diversion
22 structure; a review of hydrotechnical considerations; a
23 review of geotechnical considerations; operation,
24 maintenance and surveillance considerations; emergency
25 planning and response; dam commissioning; dam

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Examined by Ms. Okoye

1 dewatering; dam safety management; and environmental
2 considerations.

3 Next slide, please.

4 This is slide 5. Our design review considered
5 hydrotechnical considerations including a review of the
6 hydrological analysis and the inflow design flood or
7 IDF determination; a review of the discharge capacity
8 of the diversion inlet, service spillway, auxiliary
9 spillway, emergency spillway, and storage dam low-level
10 outlet works.

11 The service spillway operation is characterized by
12 six rating curves as shown in Exhibit 174, page 391.

13 The six rating curves represent different
14 operational settings of the service spillway over the
15 Obermeyer weir. The operator moves from one rating
16 curve to another by changing the Obermeyer setting,
17 depending on the Elbow River flow upstream of the
18 diversion structure.

19 Based on that same flow, the operator opens and
20 closes the diversion inlet gates in conjunction with a
21 review of the off-stream storage reservoir level, the
22 Glenmore Reservoir level, and the results of monitoring
23 instrumentation within the storage dam.

24 The diversion structure operation -- operational
25 decisions are also impacted by the flow increment in

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1 the Elbow River upstream of the diversion structure;
2 for example, 0 to 160 metres cubed per second, 160 to
3 760 metres cubed per second, 760 to 1600 metres cubed
4 per second, 1600 and 2200 metres cubed per second, and
5 2200 to 2700 metres cubed per second.

6 The operator must also be aware of developing
7 public safety issues, impacts that occur within the
8 off-stream reservoir area, and forecasted changes to
9 the Elbow River flows in order to try and divert the
10 peak flow of the flood event hydrograph.

11 A design review also considered freeboard
12 requirements, erosion protection, and impacts between
13 the service spillway and the Glenmore Reservoir.

14 Next slide, please.

15 THE CHAIR: Ms. Keyes, there's some
16 interference coming. I think Ms. Vespa, our court
17 reporter, is getting it, but I'm not sure if there's
18 other paper rustling close to your microphone or
19 something, but it is kind of cutting overtop of your
20 voice a bit.

21 A. MS. KEYES: Hopefully it's better. I can move
22 my paper.

23 THE CHAIR: Better. Thank you.

24 A. MS. KEYES: A review and analysis also
25 considered geotechnical considerations. We reviewed

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1 the slope stability analysis of both the storage dam
2 and the floodplain berm for various scenarios including
3 end of construction before reservoir filling, the
4 static normal maximum reservoir level, the
5 pseudo-static scenarios, rapid draining, and rapid
6 filling.

7 We also reviewed erosion protection provisions,
8 settlement, and impacts to the low-level outlet in the
9 storage dam as well as provisions for instrumentation
10 and monitoring.

11 Next slide, please.

12 This is slide Number 7.

13 In response to our design review report, Alberta
14 Transportation provided reply submission Volume 1 of 2,
15 which is Exhibit 327. I'll just check if you can hear
16 me okay now.

17 THE CHAIR: Yes, thank you.

18 Ms. Vespa, that's good?

19 A. MS. KEYES: So Figure 1 on page 27 of
20 Exhibit 327 indicated a constant diversion maintained
21 at 480 metres cubed per second based on incremental
22 closing of the gates of the diversion inlet gates.

23 A review of reservoir routing scenarios in
24 Exhibit 159, which is section 10.1.3, page 173 to 177,
25 indicate that none of the scenarios presented in this

SCLG TOPIC #3 PANEL

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1 section have the diversion channel discharging at
2 design flow of 600 metres cubed per second.

3 Plots in Figure 2 on page 28 of Exhibit 327 have
4 been developed to demonstrate the emergency spillway
5 can discharge the IDF, taking into account the routing
6 effects of the reservoir, without infringing on the
7 minimum freeboard requirements. However, the routing
8 analysis should be started with the IDF entering the
9 reservoir when the reservoir is already at the full
10 service level, or FSL, of 1210.75 metres and then
11 routed up to the minimum freeboard level of 1212
12 metres.

13 Plots in Figure 2 on page 28 of Exhibit 327 have
14 been developed based on three assumptions: That there
15 is a loss of diversion control after seven hours of
16 diversion, but before loss of diversion control occurs,
17 the diversion rate was set at 480 metres cubed per
18 second based on the operational scenario of incremental
19 diversion gate closing before the PMF; and that routing
20 with the IDF started with storage reservoir at an
21 elevation of 1196.6 metres, rather than at FSL.

22 The mechanism of loss of diversion control was not
23 stated in Exhibit 327, but we are assuming the most
24 likely form of loss of diversion control would be
25 through a structural loss, such as the loss of the

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1 middle pier between the diversion inlet bays. This is
2 based on the placement of the access bridge across the
3 diversion inlet blocking flow between elevations of
4 1215.5 metres and 1219 metres.

5 I now hand over to Roger Austin to discuss the
6 responses we received to our 24 recommendations.

7 A. MR. AUSTIN: Thank you very much. Roger Austin
8 speaking.

9 So before we continue with our review of our
10 recommendations, we would like to indicate that Stantec
11 provided a response in Exhibit 327 of Appendix E. And
12 we find the following responses to our recommendations
13 to be acceptable, and as such, we are not going to
14 discuss them further during our presentation.

15 Recommendation Number 3, Points 2 and 4,
16 Recommendation Number 4, paragraph 1 and 2;
17 Recommendation Number 5, paragraph 2; Recommendation
18 Number 6; Recommendation Number 7; Recommendation
19 Number 9; Recommendation Number 12; Recommendation
20 Number 13; Recommendation Number 16; Recommendation
21 Number 18, paragraph 2 only; Recommendation 21 through
22 24 inclusive.

23 Next slide, please.

24 A. MS. KEYES: So our Number 1 recommendation was
25 that the diversion inlet maximum discharge capacity be

1 reviewed and modelled with the access bridge in place.
2 Between the draft and final preliminary designs, an
3 access bridge has been added over the diversion inlet
4 with a bottom elevation of 1215.5 metres.

5 Section 8.2.4 of Exhibit 159 indicates the
6 hydraulic performance of the diversion inlet design was
7 evaluated using the physical model discussed in
8 Section 4.2. However, Section 4.2 references the 2016
9 physical 3D model, which was developed without the
10 access bridge in place. Section 8.2.4.2 of Exhibit 159
11 includes the diversion inlet rating curve.

12 Our next slide compares the inlet rating curve
13 between the final design and the draft design. The
14 diversion inlet rating curve for the final preliminary
15 design is given on the left-hand side with the access
16 bridge over the diversion inlet; the figure on the
17 right-hand side is taken from the draft preliminary
18 design without the access bridge over the diversion
19 inlet.

20 Now, a reminder that the diversion inlet bridge
21 was from an elevation of 1215.5 metres to 1219 metres,
22 but what this comparison shows is that at an elevation
23 of one surface elevation of 1216 metres, the diversion
24 inlet flow is the same at 641 metres cubed per second.

25 So without the access bridge at an elevation of

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1 1216, it was 641, and with the access bridge at an
2 elevation of 1216, it's 641. That access bridge should
3 have caused a reduction in the flow at an elevation of
4 1216.

5 When water hits a bridge, the friction from that
6 impact reduces the total flow.

7 Next slide, please, slide Number 10.

8 Our Recommendation Number 2 was that the emergency
9 spillway maximum discharge capacity is less than the
10 diversion channel design flow.

11 As the storage dam is an extreme consequence dam,
12 the emergency spillway should be capable of discharging
13 the IDF, taking into account the routing effect of the
14 reservoir without infringing on the minimum freeboard
15 requirements. Spillway sizing should be based on the
16 reservoir routing started with the IDF entering the
17 reservoir when the reservoir is at full service level
18 and routed up to the minimum freeboard level.

19 A reassessment of the emergency spillway should be
20 considered to increase the discharge capacity.

21 Next slide, please.

22 We have accepted Recommendations 3, Points 2 and
23 4. Point 1 we've discussed. Point 3, more information
24 should be provided on the diversion structure rating
25 curve with various operation combinations of the

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 diversion inlet, service spillway, and auxiliary
2 spillway.

3 A. MR. AUSTIN: Roger Austin speaking. So to
4 clarify, Stantec's response to Point Number 3 was
5 hydraulic information, including rating curves for the
6 full operational range of critical design loadings and
7 conditions for the diversion inlet service spillway and
8 auxiliary spillway are presented in the Preliminary
9 Design Report.

10 Additional operating conditions can be constructed
11 utilizing the data presented for the three rating
12 curves. This logic will be developed with the design
13 of the control system.

14 Austin Engineering simply stresses that simplicity
15 is of paramount importance. The operators will not
16 have the familiarity of operating the structure under
17 flood conditions, and therefore a simple operating
18 procedure needs to be established for regulating the
19 inflow into the structure and managing the diversion
20 outflow spillways.

21 Next slide, please.

22 A. MS. KEYES: The response to Recommendation
23 Number 4, paragraph 1, was accepted. Paragraph 2, an
24 allowance for forest fire and climate change should be
25 included in the flood flow determination.

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 And paragraph 3, an allowance to account for these
2 uncertainties be included within the design flood prior
3 to completing final design of the diversion structure
4 components and sizing of the diversion inlet gates and
5 final sizing of the emergency spillway.

6 A. MR. AUSTIN: To clarify, with regard to Point
7 Number 2 or paragraph number 2, we accept that neither
8 climate change or forest fire is typically added to the
9 PMF analysis. However, we note that floods from 1879,
10 1897, and 1902 do not appear to be in the dataset and
11 should form a basis for review of the overall size and
12 magnitude of the flood.

13 With regard to paragraph Number 3, Stantec's
14 response is: (as read)

15 "The proposed operations for the project
16 are to close the diversion inlet gates
17 to restrict flows to the diversion
18 channel to 600 cubic metres per second
19 and prevent overflowing of the
20 reservoir. The emergency spillway has
21 been designed to convey the required
22 discharge from an uncontrolled PMF. It
23 is our opinion that this assumption
24 incorporates sufficient conservatism
25 into the design."

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 Austin Engineering's concern here is that the operations
2 to restrict flows to 600 cubic metres as indicated in
3 this response; however the sizing of the spillway
4 appears to be based on routing of the 480 cubic metres
5 per second flow through into the reservoir to size the
6 overall spillway. We recommend that during final
7 design, the design of the reservoir emergency spillway
8 consider routing of a 600 cubic metre per second intake
9 flow as opposed to the 480 cubic metre per second intake
10 flow.

11 Next slide, please.

12 A. MS. KEYES: Recommendation, the response to
13 Recommendation Number 5 was accepted.

14 A. MR. AUSTIN: However, we have the following
15 comments with regard to the stop logs. We note
16 Stantec's response that: (as read)

17 "The diversion inlet sill elevation is
18 positioned one and a half metres above
19 the bed of the Elbow River, and the sill
20 elevation corresponds to a discharge in
21 the Elbow River with a recurrence
22 interval of one to two years. The
23 diversion inlet gates can be tested
24 during low seasonal flows without risk
25 of discharge to the channel and fish

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 stranding. Stop logs are therefore not
2 required."

3 We note that this design assumption would not allow for
4 future major maintenance of the gates. The addition of
5 stop log slots at this point of the project would be a
6 minor change to the overall design and would allow for
7 future maintenance of these gates without requiring the
8 installation of cofferdams and the disturbances they
9 would cause and therefore recommend their inclusion in
10 the final design.

11 Next slide, please.

12 Recommendations Number 6 and 7, Austin Engineering
13 accepts Stantec's response.

14 Next slide, please.

15 Recommendation Number 8: "Flood Protection Between
16 the Service Spillway and the Glenmore Dam," to which
17 Stantec responded: (as read)

18 "SR1 will reduce downstream flooding
19 during operation. Residual flooding may
20 still occur downstream but will be
21 substantially less than the current
22 flood risk."

23 Austin Engineering acknowledges this reduction; however,
24 we still recommend that flood maps should be created
25 regardless to establish future construction elevations

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 downstream of SR1 as they will be subject to change once
2 the SR1 reservoir goes into operation.

3 Next slide, please.

4 Recommendation Number 9, "Control Building
5 Location." Austin Engineering accepts Stantec's
6 response.

7 Next slide, please.

8 Recommendation Number 10: "Factor of safety of the
9 storage dam and floodplain berm under pseudo-static
10 loading."

11 Austin Engineering accepts Stantec's response.
12 However, we note a fluvial deposit is located at
13 Station 23 plus 175 in the area of the Unnamed Creek,
14 and final design should likely include a check on the
15 liquefaction settlement resulting from this particular
16 formation.

17 Next slide, please. That is next slide, as well,
18 please.

19 Recommendation Number 11, "Fracking Exclusion
20 Zone." To this, Stantec's response includes: (as read)

21 "An exclusion zone was presented as a
22 possible risk management strategy.

23 However, the design of the dam is not
24 contingent upon the establishment of an
25 exclusion zone."

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 Austin Engineering accepts this response, however notes
2 that Stantec has included an acceleration-based analysis
3 which covers the hazards relating to seismically induced
4 accelerations from fracking.

5 With regard to settlement triggered fracking, which
6 could occur if fracking was conducted in close proximity
7 to the dam, this risk will still be a residual risk.

8 Next slide, please.

9 With regard to Recommendation Number 12,
10 Austin Engineering accepts Stantec's response.

11 Next slide, please.

12 With regard to Recommendation Number 13, Austin
13 Engineering also accepts Stantec's response.

14 Next slide, please.

15 With regard to Recommendation Number 14, Springbank
16 Road acting as a dam, Austin Engineering accepts
17 Stantec's response.

18 For Recommendation Number 15, Stantec has responded
19 that: (as read)

20 "As discussed in Section 10.4.2 of the
21 Preliminary Design Report, the low-level
22 works design capacity was selected based
23 on the industry standards for evacuation
24 times for the reservoir. No basis for
25 increased capacity has been provided."

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 Austin Engineering accepts this response, though we note
2 that there is no secondary means for draining the
3 reservoir should a failure of the low-level outlet
4 occur. And a significant reduction in the risk and
5 operation to the structure can be realized from the
6 addition of a second low-level outlet.

7 It is typical of dams to have a conduit for water
8 supply and conveyance along with a low-level outlet for
9 utilization during emergency, and we recommend the
10 consideration for a second water conduit or low-level
11 outlet be given during the final design.

12 Next slide please.

13 With regard to Recommendation 16: "Intake Screen
14 on the Design Low-Level Outlet," Austin Engineering
15 accepts Stantec's response.

16 Next slide please.

17 With regard to Recommendation Number 17, "Riprap on
18 the Upstream Face of the Dam," Stantec has responded:
19 (as read)

20 "The upstream face of the dam is subject
21 to varying reservoir levels during
22 filling and draining. This varying
23 level will reduce the risks associated
24 with progressive erosion from
25 wind-driven events. The combination of

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 cohesive clays and vegetation will
2 provide sufficient mitigation during the
3 short exposure periods."

4 We accept this response; however, we caution that riprap
5 along the crest of the dam would function during an
6 event where water would be required to be stored within
7 the reservoir at full service level or full supply level
8 for a period of time during passage of a major flood.
9 Riprap would still provide a benefit in this instance.

10 Next slide, please.

11 Recommendation Number 18: "Differential Settlement
12 of the Dam," to which Stantec has responded: (as read)

13 "Differential settlement along the
14 low-level conduit is addressed in
15 Section 10.4.6.3 of the Preliminary
16 Design Report. The final design will
17 address estimated settlement and
18 elongation along the conduits. Total
19 settlement and camber will be used to
20 design appropriate joint spacing in
21 conduits and select the types of joint
22 collars used."

23 We note that the current design includes a concrete
24 low-level outlet works. Concrete does not typically
25 perform well with large settlements, and we suggest

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 consideration for a more flexible conduit such as an
2 HDPE pipe be considered during final design.

3 Next slide, please.

4 Recommendation Number 19: "Silt Removal Within the
5 Off-Stream Reservoir," to which Stantec responded:

6 (as read)

7 "Removal of silt from the reservoir is
8 not proposed. Introduction of roads and
9 drainage ditches within the reservoir
10 may aid in dewatering; however, the
11 additional disturbance would cause a
12 further loss of available habitat and
13 plant communities which, in our opinion,
14 would outweigh the value."

15 We agree that there will be additional disturbance
16 caused; however, the benefits with regard to fish
17 salvage and future sediment removal of designing the
18 roads and access within the reservoir and constructing
19 in the dry we believe will provide significant reduction
20 in fish salvage times once the reservoir goes into
21 operation.

22 Next slide, please.

23 Recommendation Number 20: "Dam Commissioning." We
24 accept Stantec's response but note that a careful review
25 should be undertaken by the Regulator as this reservoir

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1 is planned to under go first fill without the design
2 engineers necessarily on site.

3 Next slide, please.

4 We can -- two more slides to Recommendation 21.
5 With regard to Recommendation 21, "Safety Management
6 Plan," Austin Engineering accepts Stantec's response.

7 With regard to Recommendation 22, emergency "Plans
8 and Response," Austin Engineering accepts Stantec's
9 response.

10 And next slide, please.

11 With regard to Recommendation 23, "Dam Break
12 Inundation Mapping," Austin Engineering accepts
13 Stantec's response.

14 And next slide.

15 With regard to the operation, maintenance, and
16 surveillance documentation, Austin Engineering accepts
17 Stantec's response.

18 We may move to the end of the presentation.

19 Thank you very much.

20 Q. Thank you, Ms. Keyes. Thank you, Mr. Austin.

21 All right. So we'll go next to Dave Klepacki.

22 A. MR. KLEPACKI: Hello?

23 Q. Are you there?

24 A. MR. KLEPACKI: I am here. Can you hear me?

25 Q. I can hear you.

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1 **A. MR. KLEPACKI:** **Thank you.**

2 **Q.** Dr. Klepacki, I'm referring you to your CV filed as
3 Exhibits 263, your reports filed as Exhibits 263 and
4 264. Were these documents prepared by you or under
5 your direction or control?

6 **A. MR. KLEPACKI:** **Yes, they were.**

7 **Q.** Are the documents accurate to the best of your
8 knowledge and belief?

9 **A. MR. KLEPACKI:** **Yes, they are.**

10 **Q.** And do you adopt them as your evidence in this
11 proceeding?

12 **A. MR. KLEPACKI:** **Yes, I do.**

13 **Q.** Dr. Klepacki, your CV, Exhibit 263, PDF 17, suggests
14 that you're a resident of Bragg Creek; is that correct?

15 **A. MR. KLEPACKI:** **Yes, I am.**

16 **Q.** How long have you lived in Bragg Creek?

17 **A. MR. KLEPACKI:** **31.6 years, while we're using**
18 **points.**

19 **Q.** What do you do in Bragg Creek?

20 **A. MR. KLEPACKI:** **What do I do? I have raised six**
21 **children here with my wife Amarin Dawn who owns The**
22 **Heart cafe and yoga studio here with my stepdaughter.**
23 **I'm actually here because the Wi-Fi is better in the**
24 **cafe.**

25 **All of our students attended Bragg Creek and**

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1 Springbank schools in their educational paths and were
2 involved in youth sports in the Bragg Creek,
3 Redwood Meadows, Springbank, and Calgary communities.

4 Amarin and I have been and continue to be deeply
5 involved with the Bragg Creek, Redwood Meadows, and
6 Springbank communities.

7 I have been involved in with the Bragg Creek
8 Chamber of Commerce, the greater Bragg Creek Trails
9 Association, Junior Forest Wardens, the Bragg Creek
10 Community Church, and with very many community events
11 and fundraising initiatives over the years.

12 Q. Thank you. Your CV also indicates that you have a PhD
13 in geological sciences from the Massachusetts Institute
14 of Technology; is that correct?

15 A. MR. KLEPACKI: That is correct.

16 Q. And you obtained your PhD in 1987; is that correct?

17 A. MR. KLEPACKI: That is correct.

18 Q. Your CV also indicates that you have worked as a
19 geologist in various roles and position up to 2017; is
20 that correct?

21 A. MR. KLEPACKI: That is correct, although the
22 majority of my 32-year career in the oil and gas
23 industry was as a geophysicist executing and
24 interpreting seismic and potential field studies and as
25 an executive in junior oil and gas companies.

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1 Q. Can you give a brief overview of your professional
2 experience?

3 A. MR. KLEPACKI: Yes, I can. I started my career
4 within academia as an employee of the United States
5 Geological Survey and following two years as an
6 employee of Geotex Consultants of Vancouver. I was
7 employed by the Geological Survey of Canada while
8 pursuing my PhD at MIT from 1981 to 1985. I accrued 10
9 seasons of geological field studies during these years.

10 Following my academic studies, I worked for Exxon
11 Production Research Company on various exploration and
12 production projects around the world before being
13 transferred to Esso Canada in 1989.

14 I was then employed by PanCanadian Petroleum,
15 which was the precursor to Encana.

16 In 1998 I left the majors for a career with
17 various junior and oil and gas companies as a
18 consulting geophysicist and executive until retirement
19 in 2017.

20 In the course of my career, I was responsible for
21 technical projects, exploration and development plans,
22 employees, budgets, contracting, service industries,
23 regulatory approvals and government relations, both
24 domestically and internationally. I also developed an
25 interest in full-cycle resources economics and

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1 environmental impacts, which led me to my current
2 avocation in environmental studies.

3 Q. So since 2017, you've been working in your company
4 called Essential Earth Mentoring LP; is that correct?

5 A. MR. KLEPACKI: Yes, that is.

6 Q. What does your company do and what's your role in it?

7 A. MR. KLEPACKI: I founded Essential Earth
8 Mentoring as a sole proprietorship in 2017 when I
9 retired. And this company was for consulting and
10 mentoring on resource and conservation projects, the
11 latest being the construction and operation of a local
12 1300-square-foot food-producing greenhouse, which was
13 fun.

14 In 2018, my wife and I started a not-for-profit
15 environmental awareness company called the Experience
16 Journeys. One focus of the Experience Journeys are
17 citizens science environmental studies involving local
18 youth and residents that I currently supervise.

19 My work on the Elbow River has been voluntary and
20 aside from each of these companies.

21 Q. Thank you, Dr. Klepacki. So your evidence on this
22 topic block was presented in Exhibit 264, PDF 126.
23 Would you please provide the Board an overview of your
24 concerns?

25 A. MR. KLEPACKI: Yes, I will.

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1 My report pertinent to Topic Block 3 is in
2 Exhibit 264, PDF 1 through 6, and it's entitled
3 "Erosion and River Bed Integrity At the Low-Level
4 Outlet For the Springbank Off-Stream Reservoir
5 Project." My report is about erosion of the Unnamed
6 Creek downstream from the low-level outlet and into the
7 Elbow River below the confluence.

8 Can I go ahead and have the document manager?

9 Q. Yes, please.

10 A. MR. KLEPACKI: Okay, thanks.

11 Q. You want, perfect, 264.

12 A. MR. KLEPACKI: That's correct.

13 First of all, I'd like to thank the Board,
14 Mr. Chairman, and -- and Panel members and all of the
15 other interested parties here for the opportunity to
16 talk about the Elbow River and the impacts of the
17 Springbank Off-Stream Reservoir Project upon the
18 Elbow River.

19 This particular report, which is one of three that
20 I've submitted, is actually pretty straightforward, I
21 would say, and Mr. Ceroici actually covered some of the
22 points that I'm interested in.

23 If we can go to page 2 of this report, here is a
24 diagram taken from Drawing 73396A-111 in the Stantec
25 general reservoir overview which was the report of

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1 December 2020. And this shows the eastern side of the
2 dam with the low-level outlet features that lead into
3 the Unnamed Creek on the right-hand side of this image.

4 Can we go to the next, the following page, please,
5 which is page 3? That's right.

6 The drawing in the upper image is a Google Earth
7 image that shows the low-level outlet. The reservoir
8 side, of course, is in the upper left-hand corner of
9 the brown earthen dam structure, and the outlet works
10 are between the two blue lines in the central part of
11 the picture.

12 I put a couple of numbers in there, Numbers 1 and
13 2, that basically show the Unnamed Creek valley.

14 Picture Number 1, looking to the south is the
15 picture that you see below the upper -- the upper
16 picture. So, document manager, if you can just scroll
17 down just a smidgen. That's it. Yeah.

18 So this is looking on the bank, looking south with
19 the Unnamed Creek in the woods that you can see in the
20 background.

21 Can we go to PDF page 4, please.

22 Yeah, photograph 2, again, is from up on the
23 embankment looking to the southwest where the
24 Unnamed Creek leads into the Elbow River in the
25 background. We'll come back to other pictures of the

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1 Unnamed Creek in a little bit.

2 If we go to the bottom, we can see that kind of
3 snake-like creature coming -- or structure coming out
4 of the dam and cutting through the field and leading
5 into -- into the Unnamed Creek bed.

6 Now, if we can go to the next page, please, PDF
7 Number 5, I believe. No, this is correct, I'm sorry,
8 this is correct.

9 One of the concerns that I have is the volume that
10 is going to be released in, you know, a 30- or 40-day
11 period of the draining of the reservoir after a flow
12 event. Again that's dependent upon the volume of water
13 that's within the reservoir, but when I looked at the
14 various flow scenarios, the highest that the low-level
15 peak can do is 27 cubic metres per second which is that
16 red line that you can see on the hydrograph.

17 But in reviewing some of the -- some of the other
18 documentation, it looked like most of the discharges
19 were aimed at somewhere around 12 cubic metres per
20 second and towards the end of the 30- or 40-day period,
21 tapering off down to, you know, two or three, with a
22 relatively steep taper in the last few days.

23 My point with this diagram is that, even 12 cubic
24 metres per second is a significant component of the
25 total flow of the Elbow River. The hydrographs you see

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1 in front of you are taken at the Highway 22 -- sorry,
2 at Bragg Creek, and this is from Breyer Manuel 2006
3 master's thesis at the University of Calgary.

4 As you know, and as we've discussed, most of the
5 flow does come from Bragg Creek and upstream so the
6 flow at the area of discharge, if it's 12 cubic metres
7 or 10 cubic metres, I mean that's almost going to be an
8 additional Elbow River flow that's coming in to the
9 Elbow River at that time, which will be in later
10 July and August, given, again, a month or month and a
11 half discharge.

12 So we can go to the next page, please.

13 You can see that -- on this diagram where the
14 outlet works end, which is the blue lines, and where
15 overland flow will begin, which is at the top of that
16 arrow. That flow will run down the Unnamed Creek into
17 the Elbow River, presumably doubling at least the size
18 of the Elbow River downstream from the confluence.

19 Next, document handler, could you please bring up
20 Exhibit 20, PDF page 79.

21 This is from the March 2018 project description by
22 Stantec. In the lower part, you can see the mechanism
23 for release of the low-level outlet and some energy
24 dispersion structures.

25 If we can then go to Exhibit 10 and PDF page 2.

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1 Here are some pictures that were taken in
2 2016 -- I've just got to check myself on that. I'm
3 pretty sure that's the date -- and it shows the
4 low-level creek down by the confluence with the
5 Elbow River.

6 Now, Mr. Wood had mentioned earlier today that
7 there is some riprap down by that confluence. But the
8 purpose of my speaking right now is, I'm concerned that
9 at 12 cubic metres per second or even worse if it was
10 coming out at 27 cubic metres per second, that that
11 riprap would not be sufficient to -- to prevent erosion
12 and sending a significant amount of sediment and woody
13 debris downstream.

14 I'm sorry, document handler, but if we could go
15 back to my original diagram, which was 264, page 6.
16 Yes. That's the one. And maybe just enlarge that
17 diagram a bit.

18 So the concern I have is the erosion in the first
19 half of that red arrow coming out of the outlet works,
20 you know, with a lack of significant riprap, and then
21 that water volume will have some inertia, and it
22 will -- although I haven't done neither a hydrologic or
23 a hydraulic model, but concerned about continued scour
24 from the combined flows that would lead to that
25 southern bluff that you can see in the middle part of

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1 this picture and then continued down -- downstream.

2 We have questioned -- the Springbank's Concerned
3 Landowners Group, I think, has questioned riprapping
4 along the outlet -- the low-level outlet and the
5 stream, and the purpose of this presentation is just to
6 reinforce that need for erosion control along this
7 lower segment of the Unnamed Creek.

8 That is my piece for this afternoon. Thank you.

9 Q. Thank you, Dr. Klepacki. And now we can go on to
10 Mr. Dowsett.

11 Are you there? Mr. Dowsett? He was here before.
12 There we go.

13 A. MR. DOWSETT: I was pushing Roger Austin's
14 buttons.

15 Q. Mr. Dowsett, I'm referring you to your CV, Exhibit 260;
16 your reports, Exhibit 259; and your opening statement.
17 Were these documents prepared by you or under your
18 direction or control?

19 A. MR. DOWSETT: Yes.

20 Q. Thank you. Are there any changes you would like to
21 make to the document at this time?

22 A. MR. DOWSETT: Yes, I would.

23 Stantec noted in a March 10th reply response that
24 the guidelines for emergency preparedness for flood
25 emergencies, Alberta Environment 2003 had been

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1 superseded by Alberta Dam and Canal Safety Directive
2 2018. I appreciate the correction.

3 I've reviewed these documents and I wish to
4 indicate that, in my opinion, the directive is
5 comprehensive and does represent best practice.

6 In support of this opinion, I can tell the panel
7 that in 2012, in the consulting role, I was retained by
8 ERCB, now ANCAP, to review emergency management systems
9 implemented in major industrial countries, define gaps
10 and make recommendations supporting best practice
11 across Canadian jurisdictions. And as I'm out of date
12 on the current requirements and, as a result, I
13 included a summary of those components based on my
14 experience in pages 9 and 10 of my report for the
15 purpose of asking questions to ensure that appropriate
16 EMS was in place.

17 In looking at the directive, it checks all the
18 boxes for me, and I find the materials in my report are
19 redundant.

20 Q. Okay. All right. So other than those changes,
21 everything that you have presented, are they accurate
22 to the best of your knowledge?

23 A. MR. DOWSETT: The only other thing I would
24 suggest is that, when you look at inundation maps, the
25 inundation maps represent the land contours at the time

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1 they were prepared. And in looking at the City of
2 Calgary, I think there was a comment with respect to
3 the fact that the properties in Calgary have undergone
4 some berms and changes. And the inundation maps, when
5 I overlay them, they show water around homes. And if
6 protection or contours have changed in that area, I was
7 unaware of those and I would suggest that the City of
8 Calgary may be -- that those properties may not
9 actually be impacted during flooding.

10 Q. Okay.

11 A. MR. DOWSETT: But further to that, with respect
12 to the residents of my concern, are those directly
13 below the dam, and no measures have been in place
14 there. And so I think those inundation maps provided
15 by AEP are representative.

16 Q. All right. Thank you.

17 COURT REPORTER: Are what?

18 A. MR. DOWSETT: Representative.

19 THE CHAIR: Ms. Vespa, did you get that?

20 COURT REPORTER: I did. Thank you.

21 Q. MS. OKOYE: All right, Mr. Dowsett. So your
22 CV, Exhibit 260, it indicates that you're a resident of
23 Rocky View County; is that correct?

24 A. MR. DOWSETT: Yes, I am.

25 Q. And how long have you lived in Rocky View County? A

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1 rough figure.

2 A. MR. DOWSETT: Over 30 years.

3 Q. Okay. Thank you. Could you please provide the Board
4 with an overview of your professional experience and
5 qualifications.

6 A. MR. DOWSETT: Well, I mean, quite frankly, I'm
7 retired. And I did put together a fairly lengthy
8 thing, a resume.

9 But I am a graduate of three-year program --
10 engineering technology program from Northern Alberta
11 Institute of Technology, and I've taken a couple of
12 years, two years of engineering, and I have gained a
13 lot of experience.

14 I spent ten years working for Canadian Western
15 Natural Gas, now ATCO. I spent about 16 and a half
16 years working for the ERCB, now AER as a -- and I ended
17 up my career there as a senior advisor on public
18 safety, at which time I went into consulting and worked
19 for a few companies, and was doing air dispersion
20 modelling and risk assessment and then I started my own
21 company. And I was building emergency response plans
22 for many of the major oil and gas companies in Calgary.
23 And I was doing a lot of regulatory hearing work at
24 that time.

25 And I actually have to say, I told myself that I'd

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1 have nothing -- the stress of these things, and I
2 thought -- I was kind of hoping to stay away from any
3 more regulatory hearings. And subsequent to that, I
4 sold my company to a company that specialized in
5 pipeline inspection and integrity programs. And I've
6 been retired ever since.

7 Q. Okay. Thank you, Mr. Dowsett.

8 Document manager, could you please pull up the
9 PowerPoint presentation for Mr. Dowsett.

10 A. MR. DOWSETT: I don't believe I have one, so I
11 would like to make a statement. There is no
12 PowerPoint.

13 Q. You submitted one -- but that's fine. You can make
14 your statement, that is fine.

15 A. MR. DOWSETT: Yeah, no, I thought that that had
16 been pulled.

17 First, I would like to say I am not a member of
18 the SCLG. I do reside north of Highway 1, and I am
19 above the Bow River.

20 While I worked extensively in safety, my
21 background is not in dam safety, and I've prepared
22 these materials on a voluntary basis. They're really
23 for guidance for the community and I was asked to
24 submit a report, and my report does not represent my
25 testimony.

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1 Translated, that means if you ask me questions, I
2 will only answer nice questions.

3 An individual active in the Springbank Community
4 Association, my wife, let the SCLG know that I had been
5 involved in many regulatory hearings, and I was invited
6 to SCLG meeting to provide advice on what a hearing
7 would entail, and advise on finding accredited
8 qualified people.

9 Ms. Hunter asked if I would look at Volume 1
10 project description. And after a quick review, it was
11 clear to me that, for the design flood of 2013, SR1
12 would capture less than half the flood peak.

13 It was also clear that for a range of larger
14 floods, I mean smaller than the design flood but of a
15 larger size, even with mitigation by SR1, some flooding
16 would continue to occur downstream of this dam.

17 In listening to discussion yesterday and, in
18 review response provided by Stantec, it's clear that
19 the applicant is also aware that continued flooding can
20 occur.

21 It also seems to be the case that if problems
22 occur during reservoir operations, the operational
23 response will simply be to stop operations and flow the
24 peak downstream.

25 The thing that struck me was that members of the

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1 SCLG had a general view that SR1 would protect them
2 from flooding. There seemed to be no awareness that
3 some degree of flooding would continue after the dam
4 was completed.

5 It seems that this technical understanding that we
6 as people who have been working in reading charts and
7 graphs and so on have had -- get from the technical
8 side, had not really been adequately conveyed into the
9 public arena.

10 Additionally, I was informed by Ms. Hunter that at
11 about the time that the Board panel toured the site,
12 she visited a number of residents below the dam, and
13 they also indicated that they were unaware that some
14 additional reoccurring flooding could occur.

15 The purpose of my report is primarily to ensure
16 that this understanding is known and is in the record,
17 and I think that that is the case now.

18 Those residents, the residents of concern for me
19 are those directly below the dam and some other
20 Springbank properties that are located downstream. A
21 rough estimate of flood levels below SR1 associated
22 with expected mitigated flows during flood operations
23 suggest that for a 1 in 100-year flood that's upstream
24 of the dam, mitigated downstream flows would reach
25 levels of approximately 240 metres cubed per second

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1 equivalent to levels associated with a 1 in 20-year
2 flood. And for a 1 in 200-year flood, mitigated
3 downstream flows would reach levels approximately 540
4 metres cubed per second which is equivalent to a 1 in
5 50-year flood.

6 So without looking any farther at larger releases,
7 we are seeing the potential for flooding. It should be
8 remembered that the driving force here, the driving
9 frequency is the upstream frequency, and the numbers I
10 was giving you are representative of the depth of
11 the -- representative of the impingement inundation on
12 the land.

13 In looking at peak flows, return frequencies, and
14 AEP inundation maps, it appears and I believe supported
15 by the applicant, that anticipated floods would result
16 primarily in property damage.

17 Just change gears really quickly here.

18 I was able to catch just a very small portion of
19 the comments made by the lady representing homeowners
20 along the Elbow River in Calgary, and from the limited
21 time that I listened to her, she expressed a very high
22 level of anxiety about reoccurring floods.

23 From my perspective, from the perspective of
24 looking at this operation from the perspective of
25 societal risk, a dam, either an in-stream dam or

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1 diversion dam located on the Elbow River, will provide
2 significant social benefits to Calgary.

3 From the perspective of individuals along our
4 river and their risk, it should be -- if this dam
5 should be approved, I would really like to see a
6 dialogue opened between the residents of the community
7 and AT, and I believe they may be directly adversely
8 affected under the current arrangement. And I think
9 they need to be offered some alternatives that would
10 allow them to enjoy their lives and properties without
11 fear and anxiety of reoccurring floods.

12 And really what that comes down to is I would like
13 to see these residents be provided a similar level of
14 protection as those residents within Calgary. And that
15 could be any number of ways to address that, and I
16 think that -- and it's always been my view that when
17 we're talking about individual risks and relationships
18 to industrial projects, that that dialogue should take
19 place between the residents and the project. I do not
20 suggest that we just impose berms on them; I think it's
21 something that needs to be discussed.

22 If we were just simply looking at this dam from
23 the perspective of safety, it certainly would make my
24 life a lot easier if it was just an in-stream dam that
25 could capture all of the stream flows without being

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1 able to look at whether we're capturing half or
2 quarter. But that's not the case here, and I think we
3 need to find reasonable solutions that will protect the
4 public in these areas.

5 And I could go through the report; the only other
6 major concern -- the math is very simple when you look
7 at tracking the diversion rate from peak flow. You
8 basically get the downstream peak, and I think there's
9 agreement on that.

10 But when you start to look at the details of how
11 this thing operates or performs under pressure, I did
12 write a small Excel, very simple Excel spreadsheet that
13 tracks rates and volumes, and there are some
14 interesting things that come out of that. And we could
15 look at the report briefly just to get a look at some
16 of that, and if we could bring up the report, that
17 would be great.

18 MS. OKOYE: So that would be Exhibit 259,
19 please. Thank you.

20 A. MR. DOWSETT: If you go to page 3 of 14, so I
21 apologize, I have the actual report page. So it will
22 probably be 5.

23 Q. So PDF 5?

24 A. No, just page, the actual page number of the report,
25 rather than the PDF page. If you just go down -- no,

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1 my apologies.

2 Q. Are you looking for the hydrographs, Mr. Dowsett?

3 A. MR. DOWSETT: There's the first one. So the
4 model, the Excel sheet that I have just to indicate, it
5 does -- it's not a hydraulic model by anything -- by
6 any means, but it does just track those volumes and
7 inflows, time versus rate versus flow.

8 So it behaves in a very similar fashion. I had
9 digitized -- because I did not have the real data, I
10 had to digitize the values off the stuff, and I built a
11 model that looks at every -- the 2005 and whatever
12 hydrographs they had.

13 And you can see here that the model behaves in a
14 very similar fashion, and it was pointed out by Stantec
15 that the figure on the left, A3 in their report, is
16 from Bragg Creek. The Figure 2 that I have is my
17 representation of the same materials but at SR1. And
18 you can see the peak rate's 1240, and if you go to the
19 next page, please.

20 THE CHAIR: Ms. Vespa, are you getting this?

21 A. MR. DOWSETT: Am I going too fast? I apologize.
22 I'll try and be a little more descriptive, sir.

23 THE COURT REPORTER: It's just you're breaking up
24 sometimes, but I believe I'm getting what you're
25 saying. I thought you said that you compared to the

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1 Stantec report.

2 A. MR. DOWSETT: Yes.

3 THE CHAIR: Thank you, proceed, please.

4 A. MR. DOWSETT: Our reception here is -- our speed
5 out here is a little bit rough. I think my wife is
6 probably taking up some of the bandwidth, so anyway.

7 So if we can just scroll down the page here a bit.

8 So this graph shows -- so what I did was I mainly
9 built the model a little bit so I could look at some
10 sensitivity of how the rates affect the downstream
11 hydrograph.

12 And I also built -- so this has two figures on it.
13 Figure 3 shows the flood diversion hydrograph at SR1
14 for the 2013 flood, and Figure 4 provides the -- what I
15 believe was the flows at Glenmore.

16 So you can see the peak at Glenmore is the same as
17 the downstream peak line, and the top graph represents
18 the dotted orange line in the -- that's the same pink
19 line in the bottom graph. Because the -- in
20 conjunction with each other, they are able to manage
21 the flow.

22 So if you just then go to the next page, there are
23 two hydrographs on there. And I just took a look at
24 what level of increase in peak flow would we need
25 before we start to see the flows below Glenmore. And

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1 on the right-hand Figure 6, you will see on the pink
2 line a little tiny bump up, and when we get to an
3 18 percent increase in the -- in the hydrograph peak,
4 we will -- that is the first instance at which we
5 expect to see a small -- the flow exceed 160 for
6 Glenmore.

7 So to me, in looking at all of the data, I think
8 that some sensitivity, in terms of the -- in terms of
9 the flows that can handle -- that can be handled in
10 this would be worthwhile taking a look at.

11 But otherwise, if we know that we are only going
12 to have flows that represent the flood on record, then
13 I believe the system will function.

14 If we increase that by about 18 percent, then I
15 think things -- we start to reach that third operating
16 set of parameters that Stantec had indicated.

17 So from my perspective, I would say that it's a
18 very simple report. I am also concerned a little bit
19 about the -- just one moment here, the commissioning.
20 And there is a figure, if you go ahead two more pages,
21 one moment -- and one more, no, back one. Right there,
22 right there, 2.5 commissioning.

23 So I did take had a look at what happens on the
24 little tiny figure on the right indicates the storage
25 volume that the dam is filled to at a given time, and

SCLG TOPIC #3 PANEL

Examined by Ms. Okoye

1 on the left is the peak flow that would go downstream.

2 So in other words, what this is saying is that if
3 we have the dam, we have about 40 million cubic metres
4 of fluid in the dam, and we start to see operational
5 issues. Then the peak, if you just go to the left and
6 it will tell you that the peak at 40 million will be
7 approximately 700 cubic metres per second.

8 So if this dam during the filling, and it seems to
9 be the default position on operation, if there are
10 problems with this dam, that the operator will simply
11 stop the -- stop diversion, and the peak will go
12 downstream. And at the point at which they stop
13 diversion, those floods could go up, and they would go
14 up quite rapidly.

15 With respect to the emergency response planning,
16 one of the -- and I know that they will be done after
17 the fact in dealing with sour gas, which is the time
18 frames are a lot more condensed, and things happen a
19 lot more rapidly. And there is a little bit more lead
20 time here, but for water that is -- if they stop
21 operations and we get a large piece of water coming
22 down the river, there is very, very little time to
23 respond to those people directly below the dam.

24 One of the questions strikes me as it may seem
25 like a silly question, but how long does it take for a

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1 rubber duck to float from Bragg Creek to SR1. And if
2 we have good monitors at Bragg Creek and we do have the
3 SCADA system, the supervisory control and data
4 acquisition system, running, that we could have a
5 little lead time to know what is coming at us. Simply
6 looking down at the water at the station doesn't give
7 us a lot of lead time, and I think the operational --
8 as indicated by Stantec, if we know that the water is
9 going to remain fairly flat for a while, we may divert
10 at a lower rate, but if we miss that peak, I think we
11 get into trouble.

12 So I'm just raising this. There is some concern
13 about having a SCADA system and a data acquisition
14 system and knowing what's coming a little earlier and
15 being able to respond in time to communicate with those
16 folks located below the dam in a responsive fashion and
17 in a responsive and meaningful fashion.

18 I believe that the emergency management system
19 that was outlined by AEP is extremely sound.

20 The only other thing I might add with respect to
21 emergency management is, I would like to see -- I don't
22 really know what resources reside with the MD of
23 Rocky View, and I would like to see what's called
24 "unified command" between Rocky View and the City of
25 Calgary with respect to managing flood emergencies.

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Examined by Ms. Okoye

1 And that, sir, is about my full input, and I'll
2 leave it up to you on the weight you put on that.

3 MS. OKOYE: Thank you.

4 THE CHAIR: Thank you, Mr. Dowsett.

5 MS. OKOYE: Thank you, Mr. Dowsett. So they
6 are available for cross, Mr. Chair. Thank you.

7 THE CHAIR: What's our order here? So we're
8 just about 4:30.

9 We've got Stoney Nakoda, Calalta, Mr. Wagner. I
10 don't expect that you have cross-exam; is that correct,
11 Ms. Louden?

12 MS. LOUDEN: Yes, Mr. Chair, that's correct.
13 We do not have any questions.

14 THE CHAIR: And Mr. Williams? He may not be
15 online. Mr. Wagner.

16 MR. WAGNER: I have no cross.

17 THE CHAIR: Ms. Senek, do you have cross?

18 MS. SENEK: No, no cross, Mr. Chair, thank
19 you.

20 THE CHAIR: And Mr. Cusano with Calgary River
21 Communities Action Group?

22 MR. CUSANO: I do not, sir. Thank you very
23 much.

24 THE CHAIR: So we do know that Mr. Fitch and
25 Mr. Kruhlak Alberta Transportation, do have cross, and

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1 I think you're allocated -- you asked for and been
2 approved for 240 minutes if I have it right, which
3 obviously would take us to the point where people might
4 be annoyed with me going into the weekend.

5 So if -- I guess -- if there's one of the panel
6 members in particular that you wanted to spend a few
7 minutes with, we could do that now, or we could wait
8 and begin your cross with Alberta Transportation on
9 Monday morning.

10 MR. FITCH: Thank you, Mr. Chair. It's
11 Gavin Fitch. Sorry, Ms. Okoye.

12 So Ms. Okoye confirmed for me that she had,
13 obviously by oversight, neglected to provide me with a
14 copy of the Austin Engineering PowerPoint presentation
15 and actually, as well, Mr. Dowsett's, although now it's
16 unclear whether he has one or not.

17 But in any event, normally, sometimes, anyways, it
18 doesn't really matter because what you see in the
19 PowerPoint presentation is just a condensed form of
20 what you see in the main report.

21 In this case, though, that's not the case because,
22 as you know, Mr. Chair, part of Alberta
23 Transportation's reply submission was sort of a
24 point-by-point response to the various recommendations
25 by Austin Engineering who have now provided their own

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1 response point by point. And so there's actually new
2 material in the Austin report that we haven't seen
3 before.

4 So we are not prepared to commence our
5 cross-examination of Austin, and frankly, given that
6 it's 4:20 on Friday, and it's been a long week, our
7 preference is just to begin Monday morning.

8 And I know my friend Ms. Okoye is going to say
9 that Mr. Austin is supposed to be on some dam site in
10 B.C., and, in our submission, you know, the hearing is
11 scheduled, it's SCLG's responsibility for having
12 witnesses available. But it shouldn't really matter
13 because the author of the report was Ms. Keyes. I
14 haven't heard that she won't be available on Monday,
15 and so I can just simply conduct my cross-examination
16 on Ms. Keyes.

17 So -- and with regard to Mr. Klepacki, we were
18 just going to deal with him on Topic Session 4, so
19 there's not much left to do today, from our
20 perspective.

21 THE CHAIR: I would agree, Mr. Fitch.

22 Ms. Okoye, we are ahead. I hadn't expected to
23 rightly have gotten this far anyway by today or by this
24 hour. So while I appreciate Mr. Austin is not
25 available, I had fully expected that he was going to be

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Examined by Ms. Okoye

1 up Monday anyway, so I would agree with Mr. Fitch.

2 We will -- sorry.

3 MR. SECORD: Just one thing here. It's
4 Richard Secord. I think it's not that Mr. Austin is
5 not available, Mr. Chair. It's just that he's on a dam
6 site and will likely have to phone in. He may not be
7 on Zoom, but I do believe he may be able to phone in,
8 depending upon how the cell coverage is.

9 A. MR. AUSTIN: Yes, that's correct. I'll be able
10 to call in, but we won't have video likely.

11 MR. SECORD: I just wanted to clarify that.

12 THE CHAIR: Thank you, Mr. Secord. And
13 depending on your reception, cell phones do provide
14 Zoom video. You can maybe try to set that up. But
15 Mr. Fitch, I assume that voice only would be
16 acceptable?

17 MR. FITCH: Absolutely. No problem.

18 THE CHAIR: Okay. Thank you. I would agree.
19 I mean, it's been a long week, but I would -- I would
20 like to think that you'd agree that it's been a good
21 week.

22 I've been impressed with the submissions, the
23 panel members, the questioning. It's been
24 professional. It's been very helpful for the Panel,
25 and we do appreciate it.

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Examined by Ms. Okoye

1 I would like to, at the end of the first week,
2 given the complexities of running a hearing of this
3 size via virtual, thank Mr. Wiebe and MNP for a job
4 well done getting speakers up while getting this all
5 together in a hurry and also having our speaker views
6 done properly, plus the document management folks with
7 the NRCB -- today was Ms. Kaminski, who has done quite
8 a bit of this, and Ms. Taylor, but also we've had
9 Ms. Gagnon, Ms. Cundliffe, Ms. Decosemo at the helm as
10 well. So I really appreciate all the work done by the
11 document management folks.

12 So I think for today, that is it. Although, and
13 also, given the virtual world, it's probably a little
14 bit tricky, but, Ms. Vespa, thank you very much, and
15 also Ms. DiPaolo.

16 MS. OKOYE: Mr. Chair --

17 THE CHAIR: Who was speaking?

18 MS. OKOYE: Just before we round up, I know
19 that we got Mr. Austin and Ms. Keyes and adopt their
20 presentation. And if we could get that marked as an
21 exhibit, and Mr. Fitch is welcome to cross-examine them
22 on that on Monday.

23 THE CHAIR: Yes. In fact, Ms. Friend,
24 Mr. Kennedy, perhaps I think we had two other
25 presentations; is that right, that were not marked yet

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Examined by Ms. Okoye

1 as well?

2 MR. KENNEDY: I have to say, we're following a
3 practice or we seem to have adopted a practice that's
4 rather new to me where documents seem to be filed and
5 then marked as exhibits or documents to the proceeding
6 without kind of formally coming in through the record.
7 And it's unusual, at least to me; it's kind of outside
8 of what I've experienced in proceedings.

9 That said, everybody gets notified every evening
10 about the documents that are tabled. They form part of
11 the record. And I am assuming that parties, if they
12 took exception to the documents that were coming in,
13 that we would hear about it early the next day.

14 Now, some documents are filed; I'm not quite sure
15 when these PowerPoints came in, and -- but it sounds
16 like we're managing that on the fly.

17 THE CHAIR: I would agree, Mr. Kennedy.

18 Ms. Okoye, would those --

19 MR. SECORD: One point, sir, I think
20 the -- what's arisen is the requirement in one of the
21 Board's letters that documents be pre-loaded. And so I
22 think that's the origin of the issue is that Ms. Friend
23 needs to pre-load the exhibits and anything that we're
24 referring to. So I think that's how these PowerPoints
25 get to be sent to the NRCB.

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Examined by Ms. Okoye

1 But just with respect to the PowerPoints, as I
2 understand it, there were three in total, and one of
3 them deals with Dr. Fennell. So that certainly doesn't
4 need to be dealt with today; that would be dealt with
5 next week.

6 Mr. Fitch mentioned something about Mr. Dowsett's
7 PowerPoint, but he clearly decided he didn't need to
8 refer to it. So it seems to me that's a non-issue.

9 So the only matter to be discussed is the
10 PowerPoint by Austin Engineering.

11 MR. KRUHLAK: It's Ron Kruhlak. I wasn't sure
12 whether Mr. Frigo's PowerPoint was marked. I may have
13 missed that.

14 MR. SECORD: It was. It was marked as
15 Exhibit 351.

16 MR. KRUHLAK: Thank you, Mr. Secord.

17 THE CHAIR: Mr. Kennedy?

18 MR. KENNEDY: Yeah, again, it's a little unusual
19 what -- normally during a live proceeding, I would be
20 kind of marking down exhibits as they were entered into
21 the proceeding and we'd start the day with entering any
22 new exhibits or, you know, at various times during the
23 day entering them. Whereas we seem to, when I started
24 to do that for this proceeding, what I found was
25 exhibits seemed to be growing and being entered without

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Examined by Ms. Okoye

1 that happening on the live record, you know, the
2 virtual hearing.

3 And, again, I think it's manageable, but I think
4 it's incumbent then on parties if they take exception
5 with a document that seems to be coming into the
6 record, that they raise it as Mr. Fitch raised the
7 concern today so that a discussion can take place.

8 THE CHAIR: And I would say, you know, I think
9 probably best practice is for counsels to be sending
10 those to each other, rather than just waiting for
11 someone to see it on the exhibit list which might help.
12 I don't know if that's what happened on this one or
13 not, but that would be helpful I would expect.

14 MS. OKOYE: Mr. Chair, the document has
15 actually not been marked as exhibits.

16 So, like Mr. Secord pointed out, there's already
17 pre-loaded stuff, so when you send it in to Ms. Friend,
18 she would say, well, she will pre-load it, but not
19 really mark it as an exhibit.

20 So really, they haven't been marked, that's why
21 I'm asking for them to be marked.

22 THE CHAIR: Well, yes, but then they'd be
23 entered, they're still being entered on the fly then.

24 MR. KENNEDY: I think that cat's out of the bag.
25 I think we might as well mark the Exhibits. I mean

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Examined by Ms. Okoye

1 they're on the record; I don't know whether those have
2 been posted to the website yet.

3 And I don't know, frankly, that I heard from
4 Mr. Fitch or Mr. Kruhlak that they objected to the
5 documents being marked. I think they did say -- I
6 think Mr. Fitch made it clear that he would like some
7 time and that there was some new evidence there, but...

8 MR. FITCH: Well, okay, it's Mr. Fitch again.
9 I -- Mr. Chair, you asked or you suggested that best
10 practice would be for counsel to just make sure when
11 they want to provide a document to the NRCB for the
12 next day's proceeding, that they provide a copy
13 directly to counsel. And we have been doing that; this
14 was just I'm sure an oversight. It's not, that's all
15 that happened.

16 And I have no problem with the Austin PowerPoint
17 being marked as an exhibit; in fact, it's now been
18 spoken to by the two witnesses from Austin.

19 So, you know, I'm not objecting to it being marked
20 as an exhibit; I was just simply objecting to the fact
21 that due to oversight, we hadn't seen it previously,
22 and it does contain some new information that we just
23 need a bit of time over the weekend to review and
24 figure out how we want to deal with it.

25 THE CHAIR: Okay. So I think -- good

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Examined by Ms. Okoye

1 discussion folks. I think we've cleared the air. And
2 Mr. Kennedy, it looks like you have another point to
3 make, though.

4 MR. KENNEDY: Well, and it's only this is to
5 avoid the kind of challenge that Mr. Fitch has
6 identified in terms of being able to prepare his cross.
7 If there are further PowerPoints that are prepared for
8 further topic areas, let's get them in early and get
9 them circulated to counsel, even if they're not --

10 I mean it would be nice if they were provided at
11 least to Board counsel, it might be that there's a
12 delay in getting them to Ms. Friend but at least
13 circulated to other counsel so counsel isn't caught
14 flatfooted when those documents are tabled.

15 MS. FRIEND: Okay, the Austin PowerPoint will
16 be Exhibit 370.

EXHIBIT 370 - AUSTIN POWERPOINT

18 THE CHAIR: Thank you, Ms. Friend.

19 MR. SECORD: And Ms. Friend, the other two
20 PowerPoints that were sent to you you can delete
21 because they're not being referred to. And my
22 understanding is that Dr. Fennell I think is going
23 to -- will send -- will combine his two sessions into
24 one, and we will get that over to Mr. Fitch or Kruhlak;
25 as we usually do, we copy everybody. I don't know what

1 happened.

2 So we'll get that off to all of the parties well
3 before Dr. Fennell shows up, whenever that might be
4 next week. And I think that will be -- then Mr. Wallis
5 will have a PowerPoint. He always does, so we'll get
6 that off as soon as we can.

7 And Allan Locke will not have a PowerPoint. So
8 we'll make sure that everybody's got it well in
9 advance, and if there's any issues, Mr. Fitch and
10 Mr. Kruhlak and I have a long history, and I'm sure
11 they'll let us know, and we can work things out.

12 THE CHAIR: Okay. Thank you everyone. Thanks
13 for understanding, much appreciated.

14 Once again great week, have a good weekend. We'll
15 see you Monday morning, sign-in 7:45 for 8:30 start.

16 Thank you.

17

18 PROCEEDINGS ADJOURNED TO MARCH 29, 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 1118 to 1360 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 26, 2021.

10

"Lorelee Vespa"

11

Lorelee Vespa, CSR(A) CRR RPR
Official Court Reporter

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"Deanna M. DiPaolo"

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Deanna M. DiPaolo, CSR(A)
Official Court Reporter

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EXHIBITS

EXHIBIT 370 - AUSTIN POWERPOINT 1358

UNDERTAKINGS GIVEN

UNDERTAKING - TO ADVISE WHETHER AT WOULD PROVIDE A 1197
COMMITMENT TO ENGAGE THE COMMUNITY IN A THOROUGH
WAY TO CREATE AN EARLY WARNING SYSTEM IN THE EVENT
OF SOME MALFUNCTION WITH SR1

UNDERTAKING - TO PROVIDE A MORE ACCURATE COST OF 1203
THE ROAD UPGRADES THAT AT IS NOW AGREEING TO
IMPLEMENT

UNDERTAKING - TO ADVISE IF THE PROPONENT WILL 1208
APPLY TO HAVE SR1 CLASSIFIED AS CRITICAL
INFRASTRUCTURE TO ADEQUATELY ADDRESS RISK OF
TERRORISM, ET CETERA

1 UNDERTAKING - AS A CONDITION OF APPROVAL FOR THE 1208
2 SUBJECT PROJECT, TO ADVISE WHETHER AT WOULD RETAIN
3 AN INDEPENDENT DAM ENGINEERING FIRM TO CONDUCT AN
4 INDEPENDENT ASSESSMENT OF MC1 VERSUS SR1 TO
5 PERFORM FLOOD MITIGATION EFFECTIVENESS AT VARIOUS
6 FLOOD RATES AND HYDROGRAPHS AND OPERATING RISK
7 ASSESSMENTS - REFUSED

8

9 UNDERTAKING - TO ADVISE IF THE GOA WILL ENGAGE 1217
10 WITH LOCAL FIRE DEPARTMENTS TO CHANGE POLICY AND
11 ENABLE GRASS FIREFIGHTING SHOULD THE PROJECT BE
12 APPROVED

13

14 UNDERTAKING - TO ADVISE HOW MUCH HIGHER THE WATER 1226
15 IS GOING TO BE IN THE WAGNER YARD FROM 70,000 DAM
16 CUBES TO 77,000 DAM CUBES WHICH APPEARS TO BE THE
17 LEVEL

18

19 UNDERTAKING - TO MAKE ENQUIRIES ADVISE WHETHER THE 1251
20 CELL PHONE ALERT SYSTEM COULD BE MADE AVAILABLE TO
21 THE DAM SAFETY MEMBERS WHO ARE IN THE EMERGENCY
22 RESPONSE PLAN

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1 UNDERTAKING - TO ADVISE THE PERCENTAGE OF THE 1294
2 CATCHMENT AREA THAT MC1 WOULD CAPTURE SUBJECT TO
3 CHECK WITH COUNSEL

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