



Public Hearing

Audience publique

Commissioner / Commissaire

The Honourable / L'honorable
C. William Hourigan

VOLUME 7

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100 Thomas More Private
Second Floor Courtroom
Ottawa, Ontario
K1N 1E3

Tuesday, June 21, 2022

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Ottawa, Ontario

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--- Upon commencing on Tuesday, June 21, 2022 at 8:59 a.m.

COMMISSIONER HOURIGAN: Good morning. Welcome to day seven of the hearings. The first witness is Mr. Lowell Goudge from Alstom.

Are you there, sir? Mr. Goudge, are you there, please?

Is counsel for Alstom there, please?

MR. CHARLES POWELL: Yes, Mr. Commissioner. Mr. Goudge identified that he was logging in so I'm just trying to reach out to him now to see where he is.

COMMISSIONER HOURIGAN: All right. Let's stand by.

(SHORT PAUSE)

THE REGISTRAR: Mr. Commissioner, I just talked to Mr. Goudge on the phone; he's in the process of logging in; he is having some difficulties with Zoom but he should be in in any moment, he says.

COMMISSIONER HOURIGAN: All right, thank you.

(SHORT PAUSE)

THE REGISTRAR: I can see Mr. Goudge's name now on the Zoom. Mr. Goudge, are you there?

MR. LOWELL GOUDGE: Yeah.

COMMISSIONER HOURIGAN: All right, Mr. Goudge, you're going to be examined today by several lawyers. Before we do that we're going to have you either swear an oath to tell the truth or affirm to tell the truth. It's your choice of what you'd like to do, affirm or swear; what would you prefer?

MR. LOWELL GOUDGE: I have no real preference; it can be either.

COMMISSIONER HOURIGAN: Pick one, please.

MR. LOWELL GOUDGE: Okay, swear.

COMMISSIONER HOURIGAN: All right. Go ahead.

1 **THE REGISTRAR:** The witness has been sworn in.

2 **--- MR. LOWELL GOUDGE, Sworn:**

3 **COMMISSIONER HOURIGAN:** All right. You'll be asked
4 questions first by Commission Counsel, Ms. Mainville.

5 **--- EXAMINATION IN-CHIEF BY MS. CHRISTINE MAINVILLE:**

6 **MS. CHRISTINE MAINVILLE:** Thank you, Mr. Commissioner.
7 Good morning, Mr. Goudge.

8 **MR. LOWELL GOUDGE:** Good morning.

9 **MS. CHRISTINE MAINVILLE:** You were the Senior Train System
10 Engineer on the project; correct?

11 **MR. LOWELL GOUDGE:** I did two roles; that was one role, the
12 other one was to formally conduct and approve the safety case and approve the trains
13 are safe.

14 **MS. CHRISTINE MAINVILLE:** Yes, you were also the Safety
15 Certifier for the vehicle?

16 **MR. LOWELL GOUDGE:** Yes.

17 **MS. CHRISTINE MAINVILLE:** And, of course, this is for Alstom;
18 so you were lead Engineer for Alstom on these trains; is that correct?

19 **MR. LOWELL GOUDGE:** Yes.

20 **MS. CHRISTINE MAINVILLE:** Okay. And in that capacity you
21 were overseeing all of the train system integration; correct?

22 **MR. LOWELL GOUDGE:** That's correct.

23 **MS. CHRISTINE MAINVILLE:** And in terms of your role as Safety
24 Certifier, that essentially means you had to certify the safety of the trains before they
25 were accepted by the City; correct?

26 **MR. LOWELL GOUDGE:** That's correct.

27 **MS. CHRISTINE MAINVILLE:** Which you did?

28 **MR. LOWELL GOUDGE:** Yes.

1 **MS. CHRISTINE MAINVILLE:** And you were involved since the
2 contract closed; am I right, in or around March 2013?

3 **MR. LOWELL GOUDGE:** Yes, it was the – I don't know if it was
4 closed or formal notice to proceed, but, yes.

5 **MS. CHRISTINE MAINVILLE:** Effectively once the manufacturing
6 got going and – the design and manufacturing stage got going?

7 **MR. LOWELL GOUDGE:** Yes.

8 **MS. CHRISTINE MAINVILLE:** And you were in that role full-time
9 until August 2020; is that right?

10 **MR. LOWELL GOUDGE:** Until August 2021.

11 **MS. CHRISTINE MAINVILLE:** 2021, Okay.

12 And I take it you're still with Alstom and involved in some capacity,
13 just perhaps not full-time on this project?

14 **MR. LOWELL GOUDGE:** Yes, I changed positions August 1st to a
15 role that oversees safety issues worldwide on specific product range, but also due to
16 history on Ottawa, support the Ottawa project as well.

17 **MS. CHRISTINE MAINVILLE:** Okay. And you've worked with
18 Alstom and its predecessor "GEC Canada" since 1982?

19 **MR. LOWELL GOUDGE:** That's correct.

20 **MS. CHRISTINE MAINVILLE:** Now, we've heard, Mr. Goudge, in
21 these hearings about how the Ottawa LRV is at the edge of what an LRV can do; do
22 you agree with that?

23 **MR. LOWELL GOUDGE:** In terms of what, system capacity or?

24 **MS. CHRISTINE MAINVILLE:** Capacity; we've heard about the
25 acceleration and braking rates and those – the various components such as that one
26 making it effectively the limit of the concept?

27 **MR. LOWELL GOUDGE:** I would say that's probably a fair
28 assessment. My experience with LRVs is typically they're used in the 2000 to 7000

1 passengers per hour, per direction, and the Ottawa design is quite a bit higher than that.
2 All North American LRVs are specified for the acceleration and brake rates but not
3 necessarily used full-time at those rates to attempt to meet the service schedule. The
4 rates are perhaps more applicable to a light metro vehicle to deploy at that rate all the
5 time.

6 **MS. CHRISTINE MAINVILLE:** And you'll agree with me there
7 were a few other firsts on this project, including the first time that CBTC was integrated
8 on a low-floor LRV?

9 **MR. LOWELL GOUDGE:** I think on our low-floor LRV, I can't
10 swear for the competition, but –

11 **MS. CHRISTINE MAINVILLE:** And you'll recall you had to adapt
12 the Citadis model to North American standards and some American standards; correct?

13 **MR. LOWELL GOUDGE:** Correct.

14 **MS. CHRISTINE MAINVILLE:** And so I just want to know from
15 your perspective as a lead engineer, what challenges all of these adaptations or
16 novelties would have occasioned for you?

17 **MR. LOWELL GOUDGE:** I guess the CBTC integration was the
18 largest single thing. I mean the mechanical design for standards et cetera, the Citadis
19 Dualis product that was chosen as the fundamental basis for the design was a very
20 similar vehicle structure with similar but not identical crash withstand standards but
21 close enough that it was easy to modify to achieve the North American standards. So
22 that was – I wouldn't say a challenge, it was detailed work to be done but it wasn't a
23 challenge.

24 **MS. CHRISTINE MAINVILLE:** Right.

25 **MR. LOWELL GOUDGE:** The ATC integration was the largest
26 challenge because the ATC equipment that's deployed is quite large; it takes a large
27 volume in the cab where space is a premium. So that was a challenge.

28 **MS. CHRISTINE MAINVILLE:** Right. There was a challenge in

1 finding some space on the LRV for the VOBC, in particular; correct?

2 **MR. LOWELL GOUDGE:** Yeah, that's correct.

3 **MS. CHRISTINE MAINVILLE:** And I take it from your answer as
4 well, that one implication of these design changes or standard changes is that it would
5 have effectively just take additional time to design the vehicle?

6 **MR. LOWELL GOUDGE:** Yes.

7 **MS. CHRISTINE MAINVILLE:** Okay. And what does it mean in
8 terms of how much burning-in you'd want to do at the end of the day or how you want to
9 start running the trains, the fact that this is effectively – an adaptation, but a new version
10 of a vehicle that you haven't yet run?

11 **MR. LOWELL GOUDGE:** That's hard to say. A lot of my previous
12 experience has been with metros and there's no "burning-in" period so to speak,
13 especially on an existing infrastructure. If you take the last two projects worked in New
14 York, you delivered vehicles, you went through the acceptance test and they went into
15 service. Sometimes there's a grace period where they say that – and I've seen this in
16 contracts. They say that for the first "X" thousand kilometres or miles or whatever the
17 measurement unit is, that fares would not be counted against fleet reliability as there
18 would be sort of teething problems or weeding out fares. I've seen other projects where
19 they want burn-in of vehicles. It's highly customer-dependent. I wouldn't say there is a
20 standard.

21 **MS. CHRISTINE MAINVILLE:** But from your perspective, and you
22 mentioned, you know, on an existing infrastructure you might not have it, but on a new
23 infrastructure, an entirely new system, from the perspective of the train engineer, would
24 you consider that advisable, to do more burning in or running of the trains?

25 **MR. LOWELL GOUDGE:** From a -- purely a train, no, but from a
26 system, I think you would.

27 **MS. CHRISTINE MAINVILLE:** From the system perspective, okay.

28 **MR. LOWELL GOUDGE:** From the system perspective.

1 **MS. CHRISTINE MAINVILLE:** Got it. And I understand that this
2 system typically operates at a voltage of 750 volts, but because of a peculiarity here
3 relating to potential interference with the system belonging to the NRC, which we won't
4 get into, this system operates at a voltage of 1,500 volts, correct?

5 **MR. LOWELL GOUDGE:** That's correct. Most LRVs operate at
6 750. The only other one I know of that runs at 1,500 operates in a city where the mirror
7 facility to the NRC's exists.

8 **MS. CHRISTINE MAINVILLE:** And did that have implications for
9 your work or change the designs in some way?

10 **MR. LOWELL GOUDGE:** It changed some of the sub-
11 components, but not considerably the design. Although 1,500 volts is not typical for an
12 LRV, 1,500 volts is extremely common in Europe for the Paris suburban line. Other
13 systems in Europe, a lot of them run at 1,500 volts, so it's not a question of it being a
14 new or sort of foreign technology. It's a very common voltage that's used.

15 **MS. CHRISTINE MAINVILLE:** Okay. Do I understand though that
16 it created some supply chain challenges in this case?

17 **MR. LOWELL GOUDGE:** There's really only two -- three systems
18 that run off 1,500 volts, the pantograph, which we specified as a standard to run from
19 1,500 volts, and that's a common voltage for pantographs; the train traction system that
20 provides the acceleration and dynamic brake; and the auxiliary converter system, which
21 was selected to be an architecture that could switch between 750 and 1,500 volts.

22 In principle, it should not have been a problem, but the auxiliary
23 system became problematic.

24 **MS. CHRISTINE MAINVILLE:** Okay. And just on that, am I right
25 that one of the biggest adaptations that was required for Alstom was setting up its North
26 American supply chain?

27 **MR. LOWELL GOUDGE:** Setting up a supply chain for the vehicle,
28 yes. Alstom has facilities in North America that build rail vehicles, but setting up the

1 supply chain for the specific vehicle was new.

2 **MS. CHRISTINE MAINVILLE:** Right. And you needed new
3 vendors for some components, right?

4 **MR. LOWELL GOUDGE:** We had new vendors for some
5 components or tried to go with Canadian vendors to meet Canadian content
6 requirements, et cetera.

7 **MS. CHRISTINE MAINVILLE:** Right. So in several respects, these
8 were not Alstom's known and trusted suppliers, right?

9 **MR. LOWELL GOUDGE:** In some cases, no. In other cases, they
10 were European companies that could give us a local content through their local
11 distributor. The auxiliary supplier, Adatel (phonetic) supplied through their local office in
12 Montreal, for example, even though their main technology centre was in France.

13 **MS. CHRISTINE MAINVILLE:** And for those components that
14 came from new suppliers, that may involve some design changes as well, right,
15 because the components are not necessarily fabricated the same?

16 **MR. LOWELL GOUDGE:** It's hard to say, really. I mean, we
17 worked with all the vendors to take what their standard was and adopt the way it mounts
18 to the vehicle. There's some things where you would have specific series of push
19 buttons on the dash, for example. You would standardize on one of those that was
20 locally available, et cetera.

21 But a lot of those things, we have standard component lists. It's
22 something that we manage because we do technology transfer all the time from Europe
23 into our U.S. facility.

24 **MS. CHRISTINE MAINVILLE:** Do I understand that there were
25 some challenges experienced as a result of the new supply chain, some of which had
26 an impact on the reliability of components?

27 **MR. LOWELL GOUDGE:** The one that comes in the most is the
28 reliability of the auxiliary converter. The rest of the systems are performing reasonably

1 well. The experience that I've had over 40 years is that no matter what system, doors
2 are always number 1, brakes are number 2, and that's about 85 percent of everything
3 that goes wrong on the vehicle.

4 **MS. CHRISTINE MAINVILLE:** And there were issues, am I right,
5 with the line inductors as well?

6 **MR. LOWELL GOUDGE:** We had an issue with the line inductors
7 where we had a problem with contaminated salt water running in the top of the case
8 over the inductors, and that happened over the winter of 2019-2020. And we looked at
9 that very early in 2020, came up with a short-term plan, a medium-term plan, and a
10 long-term plan, and that problem has now been rectified and gone away.

11 **MS. CHRISTINE MAINVILLE:** Okay. And am I right that that was
12 from a new supplier?

13 **MR. LOWELL GOUDGE:** No. That was from a supplier we had
14 used on projects in the U.S. in the past on metros. The problem was a combination of
15 protecting the inductor from the environment. The original equipment case allowed
16 water to run directly in on top of the windings, and this is salt water, sometimes coming
17 off of bridges, sometimes coming through the tunnel leaks, sometimes from spray from
18 the adjacent highways, combined with carbon dust from the pantograph and a top case
19 cover that allowed water just to pour in.

20 So part of the solution to the problem was to modify the case and
21 make it so that it was -- would not allow direct water to go in.

22 **MS. CHRISTINE MAINVILLE:** Okay. Just sticking with the supply
23 chain for a minute, I understand that the bogie components and bogie itself were from
24 North American suppliers?

25 **MR. LOWELL GOUDGE:** Yes. And we did have a bit of a learning
26 curve with the company that cast the main components to the bogie frame.

27 **MS. CHRISTINE MAINVILLE:** Right, which was a new supplier for
28 Alstom, or at least, in respect of the bogies?

1 **MR. LOWELL GOUDGE:** Yes.

2 **MS. CHRISTINE MAINVILLE:** Okay. And there were
3 replacements of parts that had to be done over the course of the manufacturing?

4 **MR. LOWELL GOUDGE:** Yes. We identified -- and I'm not the
5 best one to talk on that aspect -- but we identified a problem with lack of documentation
6 of corrections for cracks or anomalies during the casting process, and there was a
7 number of bogie frames that were considered scrap outright, and a number of bogie
8 frames that were considered life limited and had to be replaced within one or two years
9 at the start of revenue service.

10 **MS. CHRISTINE MAINVILLE:** Would you have expected fewer
11 issues with the components if they had originated from Alstom's usual supply chains?
12 So do you think you had more issues in this case because of new suppliers and new
13 components coming from these suppliers?

14 **MR. LOWELL GOUDGE:** I guess possibly a few more issues, but
15 the intention was to set up a supply chain in North America for the vehicle that was
16 designed for North America, and although there was a 25 percent Canadian content
17 project requirement, globally, for the project for Ottawa, the U.S. market requires 60 or
18 70 percent of all components to be manufactured in the U.S. So we were looking at this
19 as a strategic long-term investment to set up suppliers to supply this vehicle for use in
20 other cities in North America.

21 **MS. CHRISTINE MAINVILLE:** And did you understand from the
22 get go that the signalling system would be operating in automatic mode?

23 **MR. LOWELL GOUDGE:** Yes, I did.

24 **MS. CHRISTINE MAINVILLE:** Okay. And I understand that this
25 led to some of the issues the trains experienced?

26 **MR. LOWELL GOUDGE:** Well, automatic mode itself has worked
27 quite well. I've been involved with trains that run automatically since my first project in
28 Vancouver in 1982.

1 Sometimes what is problematic is automatic trains with people.

2 **MS. CHRISTINE MAINVILLE:** The combination?

3 **MR. LOWELL GOUDGE:** Yes. Switching from automatic to
4 manual mode, for example, can be a problem from time to time, and I think we found
5 that out here.

6 **MS. CHRISTINE MAINVILLE:** In respect of the doors, in
7 particular?

8 **MR. LOWELL GOUDGE:** No. We found it with respect to
9 unintended emergency brakes ---

10 **MS. CHRISTINE MAINVILLE:** Right.

11 **MR. LOWELL GOUDGE:** --- applications. Drivers would switch
12 from manual mode to automatic mode thinking that the train could park itself, more
13 precisely, but sometimes we're doing that when they were already braking the train to
14 stop at the station.

15 **MS. CHRISTINE MAINVILLE:** M'hm.

16 **MR. LOWELL GOUDGE:** And just so everybody understands, the
17 way the train goes into automatic mode, you must be in coast. So if you are braking
18 already and you put it into coast and then press the button to go automatic, it might
19 actually decide, by the time you do all of that, that you've gone too fast or too far, and it
20 will apply an emergency brake.

21 So there were some problems like that with learning how the
22 system operates and how you transition smoothly from automatic to manual mode, et
23 cetera.

24 **MS. CHRISTINE MAINVILLE:** Okay. In terms of manufacturing
25 the trains at the MSF, I just want to first understand -- because we've spoken about the
26 final assembly of the various modular components at the MSF and I just want to
27 understand how much of the trains were actually manufactured at the MSF in Ottawa.

28 **MR. LOWELL GOUDGE:** Okay. The -- all of the major fabricated

1 assemblies were done elsewhere. There was zero true fabrication done in Ottawa.
2 What was done in Ottawa was assembly using standard tools, standard fasteners.
3 There was no welding, no cutting, no drilling, no machining, no painting, so it was purely
4 mechanical assembly. If you take, say, the undercar portion of the frame, it's a large
5 welded assembly. I think they came Katowice in Poland as a complete welded
6 assembly. The roof assembly, we bought from an aluminum extruder in Quebec that
7 did all the welding and brought the roof as a flat panel with all the machining done on it.
8 So all we were doing was assembling parts. There was no -- there was no real -- true
9 manufacturing. It was simply assembly.

10 **MS. CHRISTINE MAINVILLE:** And what about the later retrofitting
11 work? Did that involve actual manufacturing on site?

12 **MR. LOWELL GOUDGE:** With one of two exceptions where we
13 may have cut a small panel to allow for an equipment foot, no. Everything, again, when
14 you -- if you did a retrofit, you brought in parts, you undid things, you put parts in place,
15 and then bolted things back together. There was very, very little -- and that was the
16 intent. We didn't want any of those other processes on Ottawa's site.

17 **MS. CHRISTINE MAINVILLE:** M'hm, because that would have
18 been a greater risk, correct?

19 **MR. LOWELL GOUDGE:** It would have been a greater risk
20 because you talk about -- for all the welding, you have to have certified welders to either
21 CSA, or the European Standards, or the American Welding Society depending on
22 where the work is done. To set up that type of regulated shop temporarily, there's no
23 value in it.

24 **MS. CHRISTINE MAINVILLE:** Okay. And in the case of Ottawa,
25 they were reliant on temp workers that were -- that was required, correct, hired to ---

26 **MR. LOWELL GOUDGE:** Yes, I don't know the exact proportion of
27 temps to employees and whatever. That's -- that was staffing and manpower, not train
28 design.

1 **MS. CHRISTINE MAINVILLE:** Okay.

2 **MR. LOWELL GOUDGE:** But yes, we did -- my understanding is
3 we did have a largely temporary base store, or I guess it's an outside company that
4 supplies man-force or whatever.

5 **MS. CHRISTINE MAINVILLE:** Right. And so the level of
6 experience of those workers was lesser than you would typically find on an Alstom
7 assembly line, correct?

8 **MR. LOWELL GOUDGE:** In one of our home factories, yes.

9 **MS. CHRISTINE MAINVILLE:** Yes. And it would entail a fairly
10 significant ramp-up process, I imagine, because they need on-the-job training?

11 **MR. LOWELL GOUDGE:** Yes. I don't know what the process
12 entailed in total, but it also led to very detailed work instructions, largely pictorial that
13 showed how the car went together, how the individual job functions went together, and
14 that was part of the process. Again, it was outside of my mandate, but ---

15 **MS. CHRISTINE MAINVILLE:** Okay. And you'll agree with me
16 that even though only the assembly was happening at the MSF, there was a greater risk
17 to be assumed than you would in a normal fabrication?

18 **MR. LOWELL GOUDGE:** I think there -- probably a greater risk of
19 simple errors, that type of thing ---

20 **MS. CHRISTINE MAINVILLE:** Okay.

21 **MR. LOWELL GOUDGE:** --- just because it's new work. And
22 again it's a question I can't answer because I don't know, for example, how much the
23 temporary workers cycled in and out or that type of thing. Any stable work staff, once
24 you get trained, it's not a problem.

25 **MS. CHRISTINE MAINVILLE:** Right. But you had also indicated in
26 your interview that temporary workers need -- their work may not lead to the same level
27 of quality if they have no future with the company, effectively.

28 **MR. LOWELL GOUDGE:** They may not have the same vested

1 interest, that's true.

2 **MS. CHRISTINE MAINVILLE:** Yeah. Would you overall attribute
3 many or most of the issues that the trains experienced to build quality as opposed to
4 actual design?

5 **MR. LOWELL GOUDGE:** I don't know if I have the data to make
6 the decision.

7 **MS. CHRISTINE MAINVILLE:** Okay. Would you say, at least, that
8 there were some issues that were experienced that resulted from the quality of some of
9 the parts of the trains or that -- and/or the quality of the manufacturing in terms of how it
10 was assembled or maintained?

11 **MR. LOWELL GOUDGE:** We did have some issues in terms of
12 either incorrect or things being done incorrectly, but -- and we also had some issues
13 that were technical that required design change. As I say, I can't tell you -- I don't have
14 the actual statistics at hand to tell you how many of each.

15 **MS. CHRISTINE MAINVILLE:** Okay. But there's a mix?

16 **MR. LOWELL GOUDGE:** There's a mix.

17 **MS. CHRISTINE MAINVILLE:** Would you expect most of the
18 quality issues to have been identified by now in terms of the quality of various parts?

19 **MR. LOWELL GOUDGE:** By now, yes.

20 **MS. CHRISTINE MAINVILLE:** And I understand from your earlier
21 evidence that the MSF became a bigger problem after the trains started running such
22 that you then had to do maintenance out of the same facility as the assembly work was
23 being done.

24 **MR. LOWELL GOUDGE:** That's correct.

25 **MS. CHRISTINE MAINVILLE:** Okay. And so at that time, and
26 before RSA, when trains began running, you still needed the facility as an assembly
27 facility but now you also had maintenance who needed access to support the trains?

28 **MR. LOWELL GOUDGE:** Yes.

1 **MS. CHRISTINE MAINVILLE:** Okay. And your view is, as I
2 understand it from your earlier interview, that you didn't believe there had been
3 sufficient planning for that?

4 **MR. LOWELL GOUDGE:** Yeah, I wasn't in charge of the planning
5 of it, but it seemed that that was a sort of a gap in terms of the logic between continuing
6 production plus running trains.

7 **MS. CHRISTINE MAINVILLE:** Right. Okay. In your position as
8 the lead engineer, you were not, as I understand it, concerned about the schedule,
9 correct?

10 **MR. LOWELL GOUDGE:** Not in specific terms. My mandate was
11 not part of the schedule adherence and delivery. I was aware, to some extent, of
12 schedule, and some of things that people would ask you to look at were based on what
13 their perception of schedule was, et cetera, but I wasn't -- I wasn't involved in the
14 schedule or the planning. Generally, the only time I would be involved in schedule
15 discussions is if there was a technical input to be made with respect to how to get back
16 on schedule or to change processes such that we could get back on schedule.

17 **MS. CHRISTINE MAINVILLE:** Okay. And I won't get into the
18 reasons for various delays, but am I right, ultimately, that the dynamic validation testing
19 was very late?

20 **MR. LOWELL GOUDGE:** Yes, it was late.

21 **MS. CHRISTINE MAINVILLE:** And this led to a very large retrofit,
22 correct, to be done in a pretty compressed timeframe?

23 **MR. LOWELL GOUDGE:** Yes, we -- to maintain the production
24 schedule, the project decided that it was worth continuing production even if validation
25 wasn't complete on the basis that it was a faster way to get to the end post than wait
26 until you had everything 100 percent validated and then cycle up production. So that
27 was a considered risk that was taken.

28 **MS. CHRISTINE MAINVILLE:** Which materialized to the extent

1 that there were then a number of retrofits that were identified and had to be ---

2 **MR. LOWELL GOUDGE:** That's correct.

3 **MS. CHRISTINE MAINVILLE:** --- implemented? And that
4 included, am I right, adjustments to the speed profile as well as the braking profile?

5 **MR. LOWELL GOUDGE:** We -- yes, we had -- those retrofits
6 weren't -- those were software, so they're not -- it's not the same amount of work as,
7 obviously, changing physical parts on the car.

8 **MS. CHRISTINE MAINVILLE:** Okay.

9 **MR. LOWELL GOUDGE:** But we spent quite some time getting
10 the performance profiles as we wanted them.

11 **MS. CHRISTINE MAINVILLE:** Okay. And so what were the bigger
12 retrofits that resulted from the late validation testing.

13 **MR. LOWELL GOUDGE:** The biggest retrofits that we had, the
14 most intrusive retrofits we had were related to the finalization of the ATC interface which
15 was quite late and we'd already committed a large number of cars to production by the
16 time that interface was known and finalized.

17 **MS. CHRISTINE MAINVILLE:** The Thales interface.

18 **MR. LOWELL GOUDGE:** The Thales interface. Another one that
19 we had was a retrofit with respect to the design requirements to pass the floor fire test
20 where we had to put fire barriers on the low floor section of the vehicle. That was a very
21 interest of retrofit. We had to remove side panels, insert fire barriers at the side of the
22 floor, reinstall the side panels. So that was quite intrusive in terms of time and vehicle
23 utilization. Those were, to my knowledge, probably the two most intrusive retrofits we
24 had.

25 **MS. CHRISTINE MAINVILLE:** Okay, thank you.

26 In terms of testing and commissioning, there was as a result of the
27 various delays there was concurrent testing happening on different vehicles, correct?
28 So not sequential testing as you would normally have it?

1 **MR. LOWELL GOUDGE:** What we did, the original plan as I
2 remember it was that we were going to have two vehicles as the pilot vehicles that
3 would have all the qualification testing done. That became -- how would I put it? --
4 problematic in terms of doing dynamic testing while wanting to do climate room testing
5 while wanting to do static testing for validating other parts of the system. So ultimately
6 there were four or five vehicles selected to do different parts of the testing such that we
7 could do it concurrently.

8 And it was easier to add test staff to perform the testing than it was
9 to try and accelerate all the testing on just two vehicles.

10 **MS. CHRISTINE MAINVILLE:** Okay. And did that have any
11 implications? Because I take it ideally normally you would do it in the way it was
12 planned, correct?

13 **MR. LOWELL GOUDGE:** Well, again, it was a way to get back on
14 schedule.

15 **MS. CHRISTINE MAINVILLE:** Did it have any implications
16 though?

17 **MR. LOWELL GOUDGE:** Probably if it had an implication it would
18 have been positive. It brought the schedule forward.

19 **MS. CHRISTINE MAINVILLE:** Okay, from an engineering
20 perspective or ---

21 **MR. LOWELL GOUDGE:** Yeah.

22 **MS. CHRISTINE MAINVILLE:** --- a retrofitting manufacturing
23 perspective you didn't -- it didn't lead to complications?

24 **MR. LOWELL GOUDGE:** We would have had the same number of
25 changes irrespective of whether we did two cars or four cars or five cars for performing
26 the validation test. This allowed us to get there faster.

27 **MS. CHRISTINE MAINVILLE:** Okay. And the problem was simply
28 that various trains had been built and had to be changed?

1 **MR. LOWELL GOUDGE:** Correct.

2 **MS. CHRISTINE MAINVILLE:** And the full integration testing, as I
3 understand it, was in the summer of 2019, right?

4 **MR. LOWELL GOUDGE:** Yes.

5 **MS. CHRISTINE MAINVILLE:** And so quite late as well?

6 **MR. LOWELL GOUDGE:** Yes. The original -- to my knowledge,
7 the original sort of handover date of the system was supposed to be something like May
8 2018.

9 **MS. CHRISTINE MAINVILLE:** Right.

10 **MR. LOWELL GOUDGE:** The tunnel wasn't even open until
11 September 2018.

12 **MS. CHRISTINE MAINVILLE:** M'hm.

13 **MR. LOWELL GOUDGE:** So full integration was clearly late. And
14 from recollection somewhere in the, I think, June July timeframe is when we started
15 running more than one vehicle at a time on the mainline. We might have had 12 or 13
16 vehicles available or more, but it was only starting at that point in time where they
17 started to run multiple trains and do any kind of simulations.

18 **MS. CHRISTINE MAINVILLE:** And that also led to issues being
19 identified and modifications being required, correct?

20 **MR. LOWELL GOUDGE:** There might have been but I think by
21 that time it was largely software. I don't think there were many true physical
22 modifications to the vehicle by that time.

23 **MS. CHRISTINE MAINVILLE:** Okay. And I understood from your
24 earlier evidence that the bigger concern from your perspective in terms of issues that
25 arose later on during service was how little time there was to run the full system in
26 advance of revenue service. Do you agree?

27 **MR. LOWELL GOUDGE:** Yes.

28 **MS. CHRISTINE MAINVILLE:** And as you indicated I think you

1 only started running more than one train on the full line around -- in or around May
2 2019?

3 **MR. LOWELL GOUDGE:** Yeah, somewhere in that time. I'd have
4 -- at one point I actually had a schedule of it but somewhere between May and July of
5 2019 is when they started cycling up. But prior to that, generally it was single cars
6 going out either doing their own testing or one very small aspect of an integration test.
7 But there was never more than one or two trains out on the mainline at any time. And it
8 was only as we approached the summer of 2019 that we started running multiple trains.

9 **MS. CHRISTINE MAINVILLE:** Which, to your mind, provided very
10 little time to bring the system up to full speed, correct?

11 **MR. LOWELL GOUDGE:** It seemed rather compressed, yes.

12 **MS. CHRISTINE MAINVILLE:** Okay, And am I right that that's
13 problematic because there is a very high failure rate when you start running a new
14 system, the full system?

15 **MR. LOWELL GOUDGE:** There's -- in any manufacturing process
16 there's what they call infant mortality for lack of a better word, where you do have some
17 early on failures. Also, when you have that little time to respond you have issues that
18 may arise as you run the full system that you never saw before. And there's issues that
19 might happen infrequently and running a single vehicle at a time; you may not see them
20 but when you start running 12 or 14 two-car trains you might see them at a frequency
21 that makes them appear to be a problem.

22 So you miss things as well. The more things you have running and
23 moving and working, the more probability you have with discovering problems.

24 **MS. CHRISTINE MAINVILLE:** Got it. And could you speak about
25 the bathtub curve phenomenon which I think is what you're discussing?

26 **MR. LOWELL GOUDGE:** Yeah. It's whether you call it a bathtub
27 curve or infant mortality, statistically most electro-mechanical systems have a curve that
28 it you plot the failure rate versus time you start with a higher failure rate. The failure rate

1 drops. It then stays at a relatively constant failure rate. And at the end -- so that's at
2 the left. You start with Time Zero on the left and it's a high failure rate. It drops fairly
3 quickly.

4 You then stabilize over a period of time and then as you move to
5 the right in terms of time and service you -- depending on the parts, you may get to
6 what's called a wear-out mode. And the curve then goes up again. So it looks like the
7 cross-section of a bathtub.

8 **MS. CHRISTINE MAINVILLE:** Right.

9 **MR. LOWELL GOUDGE:** That's why they call it a bathtub curve.

10 **MS. CHRISTINE MAINVILLE:** And you want this period of
11 reliability growth to make the system more reliable.

12 **MR. LOWELL GOUDGE:** Yes. You want to bring the early failures
13 down. If they're are design corrections or just teething problems, whatever, you want to
14 get those out of the way early and then you operate for a very long period in a stable
15 reliability.

16 **MS. CHRISTINE MAINVILLE:** And am I right then that from your
17 perspective -- and I'll quote. I think I'm quoting you from your interview. You said as a
18 result, you don't go boom on Day 1 without having run the trains for some time.

19 **MR. LOWELL GOUDGE:** That's right. If you haven't run the trains
20 for some time and sorted it all out, you will have problems on Day 1.

21 **MS. CHRISTINE MAINVILLE:** And am I right that that --- without
22 suggesting there were problems on Day 1, literally, that happened in this case, that the
23 system started up quickly, promptly, the full system, in a way that to your mind was
24 perhaps not advisable?

25 **MR. LOWELL GOUDGE:** It made it difficult. It made it difficult to
26 sustain fleet because people were wanting to run the full fleet on Day 1. And without
27 the time in advance to get things done or even if you notice something in the preceding
28 week or months, or a month in trial running, by the time you can do design changes,

1 you don't have time to get those resolved before you start service. It left very little time.
2 So we started with known issues.

3 **MS. CHRISTINE MAINVILLE:** Right. And that's where I was going
4 to go next. At the end of the day there were upgrades and retrofit items that were
5 deferred, first of all until after substantial completion, correct?

6 **MR. LOWELL GOUDGE:** Yes.

7 **MS. CHRISTINE MAINVILLE:** And there were some that were not
8 completed ahead of revenue service availability either, correct?

9 **MR. LOWELL GOUDGE:** That's correct.

10 **MS. CHRISTINE MAINVILLE:** And that was pursuant to an
11 agreement between the City and RTG to defer these items because effectively there
12 was no time to address them ahead of RSA to your understanding?

13 **MR. LOWELL GOUDGE:** Yeah. To my understanding, they were
14 not -- the items that were deferred were not necessary to operate the trains although
15 they might have either hurt reliability or whatever. There were several items that were
16 deferred that we had to do a safety assessment on to make sure that the trains were
17 safe.

18 **MS. CHRISTINE MAINVILLE:** M'hm.

19 **MR. LOWELL GOUDGE:** All of those assessments we passed
20 back and forth between us, RTG, and the City and everybody accepted those and knew
21 those. There were mitigation plans in place for all of the items or it was not perceived
22 as a risk at this phase in the project so it was allowed to go ahead.

23 **MS. CHRISTINE MAINVILLE:** And many of these, or all of these
24 weren't on the -- I think what's call the "Minor Deficiencies List"; right?

25 **MR. LOWELL GOUDGE:** That's correct.

26 **MS. CHRISTINE MAINVILLE:** And am I right that you would have
27 had reviewed and considered this list in your role as Safety Certifier for the trains? At
28 least as it related to the vehicles, the LRVs?

1 **MR. LOWELL GOUDGE:** As it related to safety issues on the LRV,
2 yes.

3 **MS. CHRISTINE MAINVILLE:** Right.

4 **MR. LOWELL GOUDGE:** For example, the minor deficiency list
5 included the inspection snag sheet on every week. Clearly I did not deal with scratches
6 on paint or – you know, that type of thing, but there were some functional deficiencies or
7 things not done that could give – or could lead to potential safety issues if left
8 unmitigated, so we had to demonstrate that there was mitigation in place and manage
9 those things until they were correct.

10 **MR. LOWELL GOUDGE:** Okay. And so there were different
11 categories devised, as I understand it, some – and this is – I'm speaking of at the time
12 of substantial completion, there were deferred retrofits that were functionally necessary
13 for revenue service availability or that could impact safety. And so while those weren't
14 completed at the time of substantial completion, they had to be done for RSA; right?

15 **MR. LOWELL GOUDGE:** The safety ones, there were I think nine
16 waivers that carried forward into RSA and those were clearly stated in the safety case.
17 As I say, those were the nine that we put through to the City and everybody knew going
18 in that those concerns were there.

19 But those, as I say, we had to analyze those and do a justification
20 to show that mitigation could deal with it et cetera to be allowed to go into service with
21 those. The remainder purely functional ones that would stop, RSA had to be done
22 beforehand. Other ones that only impacted reliability, some may not have been done.
23 There was a list of what the minimum to meet RSA was; the rest were deferred.

24 **MS. CHRISTINE MAINVILLE:** Right. And at the time, that was
25 the other category I think you had previously described for me, the ones that might
26 impact reliability or were, as you said, nice to have but deemed not to impact safety or –

27 **MR. LOWELL GOUDGE:** Correct.

28 **MS. CHRISTINE MAINVILLE:** Those could be deferred?

1 **MR. LOWELL GOUDGE:** Yes.

2 **MS. CHRISTINE MAINVILLE:** Now in terms of the nine items you
3 just referenced that were waived into RSA, what would those have been or some of
4 those have been, to your recollection?

5 **MR. LOWELL GOUDGE:** Okay, I don't know if they're in any
6 specific order but one issue we had was the cab light dimmer could not be returned all
7 the way to off; it could only go down to 10 per cent light output, and that left a problem
8 with glare in the cab at night and a visibility problem for the drivers. So the mitigation for
9 that simply was to turn the ceiling light off until the dimmer control was replaced.

10 That one I think was closed out in three or four months. There was
11 a concern raised by the drivers that – either the City or the drivers, I forget which – that
12 the cab door lock was something that you could purchase on Amazon and therefore the
13 drivers felt somewhat insecure. And we felt that that was not an immediate threat to the
14 driver because to purchase the key before you go on the train implies some form of pre-
15 meditation and we committed to change those when we changed the cab door. The
16 cab door itself had a problem with the original glass door, that it would crack. So we
17 replaced that in the short term with an acrylic door. The acrylic door does not meet the
18 flammability requirements so that was a short-term measure. We explained what the
19 risk was and it was accepted to go forward with an acrylic door, again until the whole
20 cab door was changed.

21 **MS. CHRISTINE MAINVILLE:** Okay.

22 **MR. LOWELL GOUDGE:** It was those kinds of things.

23 **MS. CHRISTINE MAINVILLE:** Got it. Okay. And in your role you
24 were specifically concerned about the ones where safety was in issue?

25 **MR. LOWELL GOUDGE:** That's correct.

26 **MS. CHRISTINE MAINVILLE:** Or where there was non-
27 compliance related to a safety requirement and how, as you've explained, those would
28 be managed?

1 **MR. LOWELL GOUDGE:** That's correct.

2 **MS. CHRISTINE MAINVILLE:** Okay. And you said in terms of
3 when the trains commenced service there were outstanding items that might impact
4 reliability and just to give one example, am I right that there was, for instance, an
5 updated door software that had not yet been implemented?

6 **MR. LOWELL GOUDGE:** Yes, we had identified an issue with the
7 door system and the door software requires a certification for safety because it controls
8 safety functions directly. That certification process is a – depending on depth of change
9 et cetera, can be two to three months. So we had the software but we didn't have the
10 certification.

11 So what we chose to do is roll the software back to the past
12 certified version, even though there were reliability issues because it was certified as
13 safe.

14 **MS. CHRISTINE MAINVILLE:** And speaking about reliability,
15 you've previously explained to the Commission that if a train doesn't move, it's safe;
16 right?

17 **MR. LOWELL GOUDGE:** Yes.

18 **MS. CHRISTINE MAINVILLE:** Which makes sense?

19 **MR. LOWELL GOUDGE:** Yes.

20 **MS. CHRISTINE MAINVILLE:** So am I right that it was not your
21 concern if the train effectively couldn't move, there was something that might cause the
22 train to stop because it wouldn't be – it wouldn't raise a safety concern?

23 **MR. LOWELL GOUDGE:** At the level of the train, that's correct.
24 There is – the system level – a potential concern anytime a train stops unintentionally
25 because you have to control the passengers and make sure they stay on the train, but –
26 and that's where you get into the system level and mitigation, because the idea is, you
27 want to be able to, if a train is going to stop, always stop as best you can at a station.

28 **MS. CHRISTINE MAINVILLE:** Right. Okay. And the system

1 level, am I right, that that wouldn't have been part of your scope or concerns?

2 **MR. LOWELL GOUDGE:** No, that would be OLRTC and the City.

3 **MS. CHRISTINE MAINVILLE:** And do you recall whether there
4 was any item relating to the auxiliary power unit on the minor deficiencies' list?

5 **MR. LOWELL GOUDGE:** I would have to say it should have been
6 there; I don't recall if it was; it should have been because by that point in time it was a
7 known issue. We knew we had a problem with them. We hadn't – through trial running
8 we had an unacceptable failure rate and we were having trouble getting technical
9 support from the vendor.

10 **MS. CHRISTINE MAINVILLE:** And was that an item that, to your
11 mind, stood out on the minor deficiencies' list?

12 **MR. LOWELL GOUDGE:** Again, it was more on the functional side
13 so I wasn't concerned with my safety role. As I say, if it wasn't there, it should have
14 been, but I think it probably was on the list.

15 **MS. CHRISTINE MAINVILLE:** And what kind of implications
16 would that have, what was outstanding or problematic about it at that point in time?

17 **MR. LOWELL GOUDGE:** It basically had too high a failure rate
18 and the loss of – there's two redundant auxiliary systems on the vehicle. It can run
19 reasonably well with one except you'd have degraded heating and air-conditioning
20 because you obviously only have half the power.

21 But the vehicle can run reasonably well on one but it would lead to
22 a large number of train removals unnecessarily due to the failures.

23 **MS. CHRISTINE MAINVILLE:** Okay. So that was the risk going
24 into service, that there could be –

25 **MR. LOWELL GOUDGE:** Yes.

26 **MS. CHRISTINE MAINVILLE:** - that might impact effectively the
27 availability of the trains?

28 **MR. LOWELL GOUDGE:** The availability of the trains or would

1 result in lost kilometres which is, I think, how it was measured.

2 **MS. CHRISTINE MAINVILLE:** Right, okay. Now between these
3 deferred items and the compressed amount of time that there was to run the full system
4 prior to revenue service, as the lead engineer for the trains would you identify those
5 elements as being the crux of the reason or an important reason why the traveling
6 public experienced many or some of the issues that they did in terms of performance
7 and reliability after the trains went into service?

8 **MR. LOWELL GOUDGE:** I'm sure that there's – some of that is
9 directly linked. Again, I don't have the statistics to say how many of them – how many
10 of the early failures were things that were known retrofits, et cetera, but it would give
11 some of it, especially for the first month or so, or two months, I guess, the door software
12 where you had more door faults than you would want. The auxiliary system which we're
13 in the process of now qualifying a new supplier completely and replacing has been an
14 ongoing problem that leads to some train delays. So, yes.

15 **MS. CHRISTINE MAINVILLE:** And so these elements, they may
16 not have eliminated all the issues that were encountered or later arose, but there would,
17 to your mind, have been fewer, which I'm going to suggest could have made a
18 difference in terms of the loss of confidence that there was in the system by some?

19 **MR. LOWELL GOUDGE:** Yeah.

20 **MS. CHRISTINE MAINVILLE:** In terms of the later breakdowns
21 and derailments, if we could move to that, we're going to largely address the various
22 breakdowns that occurred with Yang Liu, who is Alstom's Project Engineering Manager
23 for maintenance. But I do want to touch on the two derailments on the main line with
24 you.

25 **MR. LOWELL GOUDGE:** Okay.

26 **MS. CHRISTINE MAINVILLE:** So first of all, if I could ask you
27 about derailments generally, how common are derailments in the rail industry?

28 **MR. LOWELL GOUDGE:** In rapid transit, they're generally not that

1 common. I think the most common cause of derailments is somebody moving a switch
2 when the train is over it, which is never a good idea, but they're generally not that
3 common.

4 **MS. CHRISTINE MAINVILLE:** But they're common in non-rapid --
5 on non-rapid lines? What's the distinction you're making?

6 **MR. LOWELL GOUDGE:** Well, okay. If you take mainline freight
7 and passenger service on federal railways, and if you take rapid transit systems,
8 metros, et cetera, to my knowledge, there's not that many derailments on rapid transit
9 systems.

10 **MS. CHRISTINE MAINVILLE:** Which this is, the other one?

11 **MR. LOWELL GOUDGE:** Which this is, yes.

12 **MS. CHRISTINE MAINVILLE:** Okay. We understood from other
13 witnesses that they're quite common in terms of the number of derailments that might
14 occur on any given day throughout the world, but is the distinction to be made then that
15 that wouldn't be the case for rapid transit?

16 **MR. LOWELL GOUDGE:** I haven't done a statistical analysis.

17 **MS. CHRISTINE MAINVILLE:** Okay.

18 **MR. LOWELL GOUDGE:** I couldn't really say.

19 **MS. CHRISTINE MAINVILLE:** Fair enough. In terms of the first
20 derailment that occurred on August 8th, 2021, this has already been referenced in this
21 inquiry, but Alstom recently produced a preliminary investigative report and made
22 preliminary findings in relation to that derailment, correct?

23 **MR. LOWELL GOUDGE:** Yes.

24 **MS. CHRISTINE MAINVILLE:** And this is a report that you verified
25 and signed?

26 **MR. LOWELL GOUDGE:** Yes. I reviewed it, had some back and
27 forth with the authors, and signed as approved at the end.

28 **MS. CHRISTINE MAINVILLE:** And in what capacity did you sign

1 and approve it?

2 **MR. LOWELL GOUDGE:** I believe as Train System Engineer. I'd
3 have to go back and look at the document to see what title was put on it.

4 **MS. CHRISTINE MAINVILLE:** Yes, and I'll bring it up in a minute.

5 **MR. LOWELL GOUDGE:** Yeah.

6 **MS. CHRISTINE MAINVILLE:** But I don't believe it says your role
7 on it.

8 Now, this was conducted internally by Alstom engineers and
9 Texalis (phonetic) representatives, correct?

10 **MR. LOWELL GOUDGE:** Yes. It was done -- the bulk of the work
11 was done by the engineers in our factory in Le Creusot, France, which is our centre of
12 excellence for bogies, and the supplier of the axle beam which is Texalis.

13 **MS. CHRISTINE MAINVILLE:** Yes, they're the supplier of the
14 axles.

15 And in terms of what we or the public knew previously before this
16 report, if we could start there, what we knew is that an axle hub had failed, leading to
17 the wheel assembly separating from the axle, correct?

18 **MR. LOWELL GOUDGE:** Correct.

19 **MS. CHRISTINE MAINVILLE:** And so effectively, the train lost its
20 wheel?

21 **MR. LOWELL GOUDGE:** Yes.

22 **MS. CHRISTINE MAINVILLE:** Which led to the derailment? And
23 there was significant heat and abrasion to those parts, right?

24 **MR. LOWELL GOUDGE:** There was some heat and abrasion.
25 Significant, I don't know how you qualify that as to the parts themselves that failed or
26 observable from the outside world.

27 **MS. CHRISTINE MAINVILLE:** Okay. Fair enough. And then in
28 terms of the root cause of the bearing failure, that was still unknown, right, until more

1 recently?

2 **MR. LOWELL GOUDGE:** Yes. In terms of why the whole thing
3 started, yes.

4 **MS. CHRISTINE MAINVILLE:** Right. And before I get to Alstom's
5 root cause analysis, first of all, can you speak to the usefulness of heat detectors in
6 respect of this issue? So we understand that the TSB, the Transportation Safety Board
7 of Canada, and others have pointed to the possibility of using heat detectors to detect
8 failings such as this one. And I understand that Alstom disagrees with the effectiveness
9 of such a solution, so could you speak to that?

10 **MR. LOWELL GOUDGE:** Yes. The -- first of all, the traditional
11 heat detectors which are track mounted require that the heat detector can literally see
12 part of the bearing. And in this case, the bearing is enclosed in a complete assembly
13 and then surrounded by a casting. So the casting itself shields the parts that are
14 actually getting hot and damaged from the heat detectors. So you would not see it.

15 And from the forensic evidence that was left behind, there were
16 some thermoplastic plugs that are used to fill blank holes in the casting. Those plugs
17 melt at 110 degrees Centigrade, and they had just started to droop.

18 So it's questionable whether a traditional heat detector would have
19 seen it, and if it had seen it, it would likely have been so late that the derailment was
20 inevitable.

21 The normal operating mode for when you use heat detectors is you
22 slow down and take the train out of -- and go at slower speed until you can take the train
23 out of service at your convenience.

24 This, from what we understand of the timeline, from where the heat
25 would have been detectable until the derailment, was five kilometres, and therefore, the
26 derailment, by the time the heat detector would have seen it, was inevitable. So we
27 don't believe that it would have stopped the derailment.

28 **MS. CHRISTINE MAINVILLE:** And so that would be the case as

1 well if there was an onboard heating detecting -- a heat detecting system, so not just, as
2 you've explained, the traditional wayside heat detectors, but even if there was an
3 onboard heat detecting system, you would -- you still believe that would be of limited
4 use?

5 **MR. LOWELL GOUDGE:** I think it would still be of very limited use.
6 It would require considerable development to tune it for a specific mode, et cetera, so I
7 don't know whether it would provide any real benefit. Again, there's -- and for me,
8 something that can detect within five minutes or five kilometres of a derailment is not
9 protection. It's a -- it might give somebody a placebo effect of thinking they're safe, but
10 it doesn't really do what you need it to do.

11 **MS. CHRISTINE MAINVILLE:** Okay. Now, we have, as I
12 mentioned, Alstom's preliminary report, which endeavours to shed some light on the
13 root cause of this issue. And I will allow you to clarify or add to my explanation if I don't
14 get it right, but I'd like to try my hand at it to see if I've got it right in the simplest terms,
15 okay, if you'll allow me to go step by step?

16 **MR. LOWELL GOUDGE:** Go for it. It's an extremely technically
17 based report, so go for it.

18 **MS. CHRISTINE MAINVILLE:** Okay. So first of all, there's been
19 excessive fretting under the bearing of the axle, right?

20 **MR. LOWELL GOUDGE:** Yes.

21 **MS. CHRISTINE MAINVILLE:** And this is so because excessive
22 transversal loads or forces were being brought to bear on the axle assembly in
23 particular, in particular where there are curves in the alignment?

24 **MR. LOWELL GOUDGE:** Correct.

25 **MS. CHRISTINE MAINVILLE:** And this would be due to the
26 configuration of the track, such that there are significant curves in the alignment, right?

27 **MR. LOWELL GOUDGE:** It's a combination of the track, the wheel
28 rail interface, the operating profile. It's, as I say, it's a very complicated mechanism ---

1 **MS. CHRISTINE MAINVILLE:** Right.

2 **MR. LOWELL GOUDGE:** --- but what they found was that the
3 loads and the stress on the components -- and fretting is the microscopic movement of
4 two meeting surfaces. So it's ---

5 **MS. CHRISTINE MAINVILLE:** Rubbing?

6 **MR. LOWELL GOUDGE:** --- the fact -- it's rubbing back and forth.
7 So what they noticed was that that was predominant in, I believe, three specific curves
8 on the alignment.

9 **MS. CHRISTINE MAINVILLE:** Okay. And the vibrations contribute
10 to these increased loads, which cause fretting, right?

11 **MR. LOWELL GOUDGE:** They do, but it's -- they couldn't -- we
12 had hoped they'd be able to get a correlation between vibration and the fretting, but they
13 could not. It's logical to assume that they would increase the loads, but we could not
14 get a direct relationship.

15 **MS. CHRISTINE MAINVILLE:** Okay. As I understand it though,
16 there was a relationship with rail corrugation in the curves which ---

17 **MR. LOWELL GOUDGE:** And vibration, yes.

18 **MS. CHRISTINE MAINVILLE:** --- caused -- yes, vibrations.

19 **MR. LOWELL GOUDGE:** Yes.

20 **MS. CHRISTINE MAINVILLE:** Okay. And what causes rail
21 corrugation?

22 **MR. LOWELL GOUDGE:** Rail corrugation, to my understanding --
23 and again, I'm not a super expert on the wheel rail interface -- it comes from the
24 repetitive slipping and sliding of the wheels. So as you go around a curve, you're going
25 -- you have a solid axle so both wheels are turning at the same speed. You want the
26 wheels to go without sliding so they must move on the wheel profile to a different spot
27 such that they can go around the curve without sliding. If you have significant sliding on
28 one side or the other, you will get corrugation.

1 **MS. CHRISTINE MAINVILLE:** And that can be reduced, am I right,
2 by grinding the track?

3 **MR. LOWELL GOUDGE:** It can be -- the corrugation can be
4 removed by grinding the track at the expense of life of the track. Obviously, when you
5 remove metal, you reduce it's service life.

6 **MS. CHRISTINE MAINVILLE:** Right, okay. Can you explain what
7 grinding is?

8 **MR. LOWELL GOUDGE:** Grinding can be done in one of a bunch
9 of different ways. When we did the grinding program -- and Yang Liu can describe this
10 better, but when we did the program with our subcontractor in June of 2021, they come
11 with a machine that can regrind in three dimensions and re-establish the wheel rail -- or
12 the rail profile back to what it should be, or as close to what it could be as possible given
13 the wear that it's exposed to.

14 There's also grinding that might be done only on the surface of the
15 rail. And when our subcontractor came and did a survey of the rail, they gave us a
16 report that indicated that the condition of the rail was in a state that could never have
17 been achieved naturally, i.e., by the passage of trains, implying that somebody at some
18 point in time had done only a surface grind, not to -- not restoring the profile but just
19 grinding the top flat.

20 **MS. CHRISTINE MAINVILLE:** Which subcontractor are you
21 referring to?

22 **MR. LOWELL GOUDGE:** I don't know the name off the top of my
23 head.

24 **MS. CHRISTINE MAINVILLE:** Okay, not a main subcontractor,
25 someone employed to grind the tracks?

26 **MR. LOWELL GOUDGE:** Yes, it was a company that we went to
27 to grind the track and they started by doing a survey, issues a report, and then they did
28 the grinding. And that was in ---

1 **MS. CHRISTINE MAINVILLE:** So this ---

2 **MR. LOWELL GOUDGE:** --- June ---

3 **MS. CHRISTINE MAINVILLE:** Yes, this is the grinding you're
4 referencing in June 2021?

5 **MR. LOWELL GOUDGE:** Correct.

6 **MS. CHRISTINE MAINVILLE:** And there was a marked
7 improvement from that point on, correct?

8 **MR. LOWELL GOUDGE:** Yes.

9 **MS. CHRISTINE MAINVILLE:** And so, just to be clear, had that
10 not been done before or sufficiently, this grinding of the tracks?

11 **MR. LOWELL GOUDGE:** There had been some spot. Again, I
12 can't speak to what the maintenance was doing totally because that was outside of my
13 domain. I think there had been some short-term work done in maybe the fall of 2020,
14 and I believe there was some work done to a portion of the alignment before the start of
15 revenue service. But I don't know who did that work.

16 **MS. CHRISTINE MAINVILLE:** Okay.

17 **MR. LOWELL GOUDGE:** It's part of the maintenance contract, so
18 something that I wouldn't know, per se.

19 **MS. CHRISTINE MAINVILLE:** M'hm.

20 **MR. LOWELL GOUDGE:** I was aware of some of the activities but
21 that's all.

22 **MS. CHRISTINE MAINVILLE:** Okay. Do you know how much
23 grinding this track requires, how frequent?

24 **MR. LOWELL GOUDGE:** No.

25 **MS. CHRISTINE MAINVILLE:** No? And then in terms of the
26 configuration of the track, in the preliminary -- the preliminary report also indicates that
27 the actual as-built track is not in line with the design as stated in the wheel-rail interface
28 specifications agreed to by OLRTC. Do you recall that?

1 **MR. LOWELL GOUDGE:** Yes.

2 **MS. CHRISTINE MAINVILLE:** Okay, can you explain what's
3 meant by that?

4 **MR. LOWELL GOUDGE:** There were two things, one that we were
5 quite surprised by, and it was first reported in the investigations of one of the yard
6 derailments where we had a derailment on one of the very sharp curves in the yard.
7 We looked at the track profile and had thought that the track had appeared in profile to
8 be a little flatter than what the -- what the design should have been, or what the design
9 should have been.

10 So we did some measurements on unused track that was in the
11 yard that had been bought at the same time as the main rails, and we also looked at -- I
12 believe at Blair Station, behind the end-of-line buffer on a piece of track that had never
13 seen a vehicle. And we had a laser device that we use to measure the track profile and
14 wheel profiles and it suggested that the track was not to the specification that was in the
15 track interface spec.

16 **MS. CHRISTINE MAINVILLE:** So is not that the -- it's not -- the
17 issue is not a different alignment than what was designed, but it is flatter?

18 **MR. LOWELL GOUDGE:** The rail itself. The rail itself has a flatter
19 profile.

20 **MS. CHRISTINE MAINVILLE:** Okay.

21 **MR. LOWELL GOUDGE:** I don't know what the impact of that
22 would be but it was -- it was something that we found.

23 **MS. CHRISTINE MAINVILLE:** Got it. Okay. And so what you're
24 saying, or the report suggests, is that the problem is not with the original design itself,
25 correct?

26 **MR. LOWELL GOUDGE:** What we've -- we find -- what we found
27 is we found that we were getting forces from the track that we weren't expecting. We
28 found that was happening in curves. We found, as well, from previous work that the

1 track -- we knew that the rails were not, at least dimensionally, what we thought they
2 were. We don't have all of the impacts of how to assess that. And the other thing that
3 we also have some knowledge of is that the track was installed to a narrower gauge
4 than what was in the specification but, again, we don't have the -- how to put all that
5 together to draw a full conclusion. The only conclusion we could really draw absolute
6 was that we were taking excessive loads in the curves.

7 **MS. CHRISTINE MAINVILLE:** Got it. Could it -- the issue have to
8 do with the rail specifications in the Project Agreement requiring that the rail be
9 compliant with the AREMA Standards which are commonly used in relation to freight
10 trains so point to a harder rail? And sorry, just to complete -- and that not being aligned
11 with the Citadis' wheel profile?

12 **MR. LOWELL GOUDGE:** To be honest, we raised the fact that the
13 OLRTC might want to look at hardening of the rails because the wheel is harder than
14 the rails presently. And in -- I understand that the -- if I interpret correctly your question,
15 I understand the Project Agreement requires us to use "AREMA rails" and I think they're
16 also supposed to built in compliance with ASTM A-1, which is a standard for steels for
17 rails. That doesn't preclude that rail. And those standards are only talking about the
18 rail. It doesn't preclude that rail from being used on either light-rail vehicles, or used for
19 light-rail systems, or for mainline freight systems. It's only specifying the steel.

20 In the track specification from OLRTC, there was reference to
21 another US Federal Transport Agency report, which was TCRP 155, which is the
22 guideline for light-rail transit track work which defines the geometry, what you're
23 supposed to do, et cetera, and the AREMA Standard rails are referenced in that. So it
24 doesn't preclude. And even in TCRP 155, it talks about, to avoid corrugation, going to
25 rails that are much harder than what were installed.

26 So I don't know where the question of "the rails were too hard" is
27 coming from because my expectation is they should have been harder -- or could have
28 been harder.

1 **MS. CHRISTINE MAINVILLE:** Are you aware of concerns about
2 that being raised by SEMP?

3 **MR. LOWELL GOUDGE:** As of yesterday, yes, but prior to that,
4 no.

5 **MS. CHRISTINE MAINVILLE:** Okay.

6 **MR. LOWELL GOUDGE:** I'd never seen that report.

7 **MS. CHRISTINE MAINVILLE:** Okay. And would Alstom take the
8 rail specifications or design into account in its train design, or is that something that's up
9 to the designer or the integrator?

10 **MR. LOWELL GOUDGE:** We would largely look at the -- at the
11 cross-section of the rail, the way it's installed. And "by the way it's installed", I mean the
12 cant of the rail. The rails are actually set up sloping in at 1:40 ratio to help distribute
13 load from the train. We would take that into account. We would take the gauge into
14 account. We would take the -- as you go into curves, the banking into account, those
15 types of things. And that would all be considered in our design.

16 **MS. CHRISTINE MAINVILLE:** But the issues that have been
17 identified recently, as you've pointed out, for instance, the gauge being narrower than
18 the specifications, these were not things that were identified previously by Alstom?

19 **MR. LOWELL GOUDGE:** We were aware that the gauge was tight
20 I think almost instantly because we were -- as part of the completion of the eastern end
21 of the system, especially from the MSF through to Blair Station when the track was in
22 such that it was available we asked for a survey of the track just to review and found
23 that the track gauge was so narrow that we couldn't even run the vehicles until they put
24 remedial action in to widen the gauge.

25 **MS. CHRISTINE MAINVILLE:** And once they did there were no
26 longer concerns at that point in time?

27 **MR. LOWELL GOUDGE:** There were still concerns but it was
28 sufficient that we could operate the vehicles safely. Our concern was we wanted to at

1 least be able to operate the vehicles safely. It may not have been an optimum solution
2 but it would not lead to a problem immediately.

3 **MS. CHRISTINE MAINVILLE:** Okay. In terms of future mitigation
4 measures, we can bring up the report which is at COM0010118. Again for the Court
5 Operator, it is COM0010118. We can go down just a little bit so we see the title and the
6 names on the report. Go down a little bit. Thank you.

7 **--- EXHIBIT No 091:**

8 COM0010118 – LRV 1119 derailment investigation report 10
9 may 2022

10 **MS. CHRISTINE MAINVILLE:** So you recognize that as the report -
11 --

12 **MR. LOWELL GOUDGE:** Yeah.

13 **MS. CHRISTINE MAINVILLE:** --- we've been discussing?

14 **MR. LOWELL GOUDGE:** Yes.

15 **MS. CHRISTINE MAINVILLE:** Yes. And your name there, signing
16 off on it?

17 **MR. LOWELL GOUDGE:** Yeah.

18 **MS. CHRISTINE MAINVILLE:** Okay. And then so if we could go
19 to page 6. And towards the bottom of the page where you have different -- thank you ---
20 actions that can be taken to help correct the situation that's identified in the report or the
21 preliminary report.

22 So first of all, the -- as short term solutions the report identifies the
23 reduction of rail corrugation through maintenance, right?

24 **MR. LOWELL GOUDGE:** Yes.

25 **MS. CHRISTINE MAINVILLE:** And what kind of maintenance
26 would that imply?

27 **MR. LOWELL GOUDGE:** That would be inspection and re-
28 grinding at a more frequent level such that if corrugations appear they get addressed

1 quickly.

2 **MS. CHRISTINE MAINVILLE:** M'hm. And number 2 says,
3 "Increased track greasing." Do I understand that to relate to grinding as well?

4 **MR. LOWELL GOUDGE:** No. Track greasing is something that is
5 done through two means. One is it can be done by the vehicle, providing we have a
6 very specific profile. And on the vehicle it is largely done as a noise mitigation to stop
7 any squealing in curves. There are other track greasing strategies that install fixed
8 lubricators ahead of curves. On the inside track of a curve it puts an adhesion modifier
9 on the tread of the wheel and on the outside rail of the curve it applies lubrication to the
10 flange of the wheel. So it guarantees that you put lubrication to modify the way that the
11 wheels will adhere and slip and slide as it goes through the corner. And those are done
12 -- usually those positions are preplanned in the infrastructure before the system is built.

13 **MS. CHRISTINE MAINVILLE:** And there was some greasing and
14 lubrication happening, just not frequently enough; is that ---

15 **MR. LOWELL GOUDGE:** The vehicle wheel flange lubricator --
16 because we don't have an explicit lubrication schedule and the only time somebody
17 said, "Well, maybe just lubricate all the curves", well, that would have implied four and a
18 half kilometres of the 12 and a half kilometre track because that's how much of the track
19 is curved which is not a credible solution.

20 So we have a system that applies grease to the wheel flange
21 periodically and then transfers that grease to the track when there's contact with the
22 flange. That was running, I think, six seconds every -- I think it was 120 or 180
23 seconds. I forget which at the beginning. And we have increased that frequency to now
24 8 seconds every 60 seconds, so much more frequently.

25 **MS. CHRISTINE MAINVILLE:** Okay.

26 **MR. LOWELL GOUDGE:** But again, that's really not meant to
27 lubricate the track from the perspective of track wear; it's meant to stop the squeal of
28 the wheels.

1 **MS. CHRISTINE MAINVILLE:** Right. And the third short-term
2 solution is lowering the speed profile, correct?

3 **MR. LOWELL GOUDGE:** In specific areas. And I've challenged
4 the team in Le Creusot to come up with the actual speed recommendations because
5 temporary speed restrictions are something that can be implemented easily in the ATC
6 without software change, just as an operating procedure in the control centre. So it can
7 be done fairly easily, once we identify the speeds we want to give us the margins we
8 need.

9 **MS. CHRISTINE MAINVILLE:** And so have the curves then been
10 taken at too high a speed up to now?

11 **MR. LOWELL GOUDGE:** I don't know if the speed is too high. I
12 know that the speeds that we're running at are producing loads that are greater than we
13 expected. Too high -- I don't know if I can say that.

14 **MS. CHRISTINE MAINVILLE:** Okay.

15 **MR. LOWELL GOUDGE:** But clearly, if we can reduce the speed
16 and reduce the stress, it improves the situation.

17 **MS. CHRISTINE MAINVILLE:** Okay. And the other thing that can
18 be done is modifying the wheel profile to better sustain those forces?

19 **MR. LOWELL GOUDGE:** Yes. We picked a profile that we had in
20 our catalogue just to try. It wasn't qualified for the vehicle. We've not done a lot of the
21 other deliverables like ride quality, et cetera. But we took the profile to try it just as a
22 "what happens if" and we could then measure the difference in the loading. So it gave
23 us a good starting point to show that, yes there are other profiles that can also change
24 the load that the axle sees.

25 **MS. CHRISTINE MAINVILLE:** So do you know -- you mentioned,
26 for instance, the greasing has increased. So in terms of these short-term preventative
27 measures, some of those have been implemented?

28 **MR. LOWELL GOUDGE:** I don't know if there has been any

1 further grinding. There are no -- I believe they've implemented one trial fixed rail
2 greaser but it's not been activated because my understanding is they're waiting for the
3 track to be reground first. Why, I don't know, but that's what I heard.

4 So other than what we've done on the vehicle there's been nothing
5 done on the track side. As I said, we're in the process of trying to determine what the
6 recommended speeds will be in the curves of concern now and I've asked for that as to
7 a schedule and when that's going to be done.

8 And I've also asked for a schedule which would be more sort of
9 medium term of a modified wheel profile because that will require some studies. We
10 have to redo some contractual deliverables and calculation notes. We would have to
11 repeat the ride quality test and the stability test before we could go with the final wheel
12 profile. That's all part of what was done initially with the current profile.

13 **MS. CHRISTINE MAINVILLE:** Right. And in the interim though we
14 still what we had prior to this report which is mitigation by way of an inspection
15 happening every 7.5 thousand kilometres, correct?

16 **MR. LOWELL GOUDGE:** Yes. And the desire is once we start
17 getting the short-term things done, we will start to assess whether the dropout rate from
18 the 7,500 kilometre inspection remains the same or goes down -- obviously the hope is
19 it will go down. And if the dropout rate goes down we would then be able to propose
20 perhaps a longer maintenance interval that is much easier to do, obviously, than every
21 7500 kilometres.

22 **MS. CHRISTINE MAINVILLE:** Right. It's labour intensive.

23 **MR. LOWELL GOUDGE:** So it's labour intensive and it puts some
24 restrictions on vehicle utilization. And if we could alleviate that with evidence that what
25 we're doing is working, and do it in a safe manner, then we would like to extend the
26 interval, but only when we're confident that we have achieved our goals.

27 **MS. CHRISTINE MAINVILLE:** Okay. And then in terms of long-
28 term solutions, this -- well, they're still under investigation but they suggest -- the report

1 suggests additional track reprofiling? What does that mean?

2 **MR. LOWELL GOUDGE:** I think we'd need to look at -- if the track
3 stays as it is, it would need to be reprofiled more than what people had planned. So it's
4 more the frequency of reprofiling and the frequency of maintenance activity might be
5 more than what was planned ---

6 **MS. CHRISTINE MAINVILLE:** What ---

7 **MR. LOWELL GOUDGE:** --- maybe not the whole track, but in
8 certain areas of the track.

9 **MS. CHRISTINE MAINVILLE:** But what's the reprofiling in respect
10 -- as it relates to the ---

11 **MR. LOWELL GOUDGE:** The grinding -- grinding.

12 **MS. CHRISTINE MAINVILLE:** Oh, I see, okay. So again, addition
13 grinding. Okay.

14 **MR. LOWELL GOUDGE:** Additional grinding, either the whole
15 system -- I don't think so -- but maybe spot parts that are prone to wear. And again,
16 that would be something that, depending on the effectiveness of the first four bullets,
17 you would have to re-assess.

18 **MS. CHRISTINE MAINVILLE:** Okay. And then last long-term
19 solution would be the enhancement of the axle design?

20 **MR. LOWELL GOUDGE:** Yes, if the other things don't lead to a
21 solution that's secure, then yes, that's a possibility.

22 **MS. CHRISTINE MAINVILLE:** Okay. We can take this down. I
23 take it, Mr. Goudge, you'd be familiar with Operational Restrictions document?

24 **MR. LOWELL GOUDGE:** Not at all.

25 **MS. CHRISTINE MAINVILLE:** No?

26 **MR. LOWELL GOUDGE:** I saw it yesterday for the first time.

27 **MS. CHRISTINE MAINVILLE:** Okay. Okay, let's bring it up
28 because I do have a few questions for you on it. This COW0466007. I take it you

1 understand the concept of an operational restrictions document?

2 **--- EXHIBIT No. 092**

3 COW0466007 – Ottawa Confederation Line Phase 1
4 Operational Restrictions Document 13 September 2019

5 **MR. LOWELL GOUDGE:** M'hm.

6 **MS. CHRISTINE MAINVILLE:** Yes. Just for the record, yes?

7 **MR. LOWELL GOUDGE:** Just for the record, yes.

8 **MS. CHRISTINE MAINVILLE:** And these are restrictions that are
9 to be observed by the operator and/or maintainer during the operation of the system in
10 order to ensure its safety, correct?

11 **MR. LOWELL GOUDGE:** As I understand it, yes.

12 **MS. CHRISTINE MAINVILLE:** And the operational restrictions --
13 thank you -- ensure the validity of the engineering safety and assurance case, right?

14 **MR. LOWELL GOUDGE:** Yes.

15 **MS. CHRISTINE MAINVILLE:** Basically, the safety certification of
16 a system?

17 **MR. LOWELL GOUDGE:** Yeah.

18 **MS. CHRISTINE MAINVILLE:** And so you see here, this was
19 prepared by SEMP, primarily on behalf of OLRTC, and the date of it is just -- it's just
20 before revenue service, September 13th, 2019, correct?

21 **MR. LOWELL GOUDGE:** That's the day before the start.

22 **MS. CHRISTINE MAINVILLE:** Exactly, the day before the start.

23 So this is basically what has to be in place for safety to be certified -- the safety of the
24 system to be certified, is your understanding?

25 **MR. LOWELL GOUDGE:** I guess this was part of the overall
26 system safety case. As I say, I had not seen this until yesterday, so ---

27 **MS. CHRISTINE MAINVILLE:** Okay. Would you expect to see it
28 as the train-safety certifier?

1 **MR. LOWELL GOUDGE:** I think if it had things that were
2 pertaining to the train itself, perhaps. If it only referred to following maintenance out, for
3 example, as per the schedule, and inspections as per the plan, perhaps not.

4 **MS. CHRISTINE MAINVILLE:** Okay. Well, let's got down to page
5 29 and Section 6.4, so it may be further down because it's page 29 of the document as
6 opposed to the PDF at Section 6.4.1. Okay, right here, actually, at the bottom. So this
7 speaks to wheel and rail wear. Do you see that?

8 **MR. LOWELL GOUDGE:** Yes.

9 **MS. CHRISTINE MAINVILLE:** And I'll just -- I'll allow you to take a
10 moment to review that section just on this page. You tell me when you're done.

11 **MR. LOWELL GOUDGE:** Okay, I've read what's there.

12 **MS. CHRISTINE MAINVILLE:** Okay, so you'll agree with me
13 there's a recommendation to establish a working group to monitor the wheel and rail-
14 wear data?

15 **MR. LOWELL GOUDGE:** Yes.

16 **MS. CHRISTINE MAINVILLE:** And then the -- it explains that the
17 remit of this working group would be to cover increasing rail-wear visual inspections on
18 all sharp curves to measure side-wear rates?

19 **MR. LOWELL GOUDGE:** Yes.

20 **MS. CHRISTINE MAINVILLE:** And then, if we could just go to the
21 next page, it speaks to ultrasonic testing, and visual rail inspection results, and
22 monitoring the wheel profile wear rates, right, though increased visual inspection?

23 **MR. LOWELL GOUDGE:** Yes.

24 **MS. CHRISTINE MAINVILLE:** So I wonder -- let me pause. Do
25 you know whether any such working group was implemented?

26 **MR. LOWELL GOUDGE:** To my knowledge, there was never such
27 a working group.

28 **MS. CHRISTINE MAINVILLE:** Okay. And do you know whether

1 there was, for instance, increased visual inspections of the rail wear resulting from the
2 sharp curves?

3 **MR. LOWELL GOUDGE:** Not to my knowledge. But again, that's
4 on the maintenance side, so ---

5 **MS. CHRISTINE MAINVILLE:** Possible?

6 **MR. LOWELL GOUDGE:** I -- if it went on -- let's put it this way. If
7 it went on, I wasn't aware of it. But because I'm not a resident on site, I may not see
8 everything.

9 **MS. CHRISTINE MAINVILLE:** Okay. And that would have been
10 done either through RTM or Alstom maintenance, correct?

11 **MR. LOWELL GOUDGE:** Correct.

12 **MS. CHRISTINE MAINVILLE:** And then bullet no. 4, or the second
13 to last one, is:

14 "Monitoring the effectiveness of LRV mounted
15 lubricator performance linked to rail wear locations
16 and evaluate the potential to install rail-mounted
17 lubricators and friction modifiers increase the
18 preventative rail-grinding frequency across the whole
19 system to reduce the risk of rolling contact fatigue
20 growth in the harder 310 Brinell Rail."

21 So you'll agree with me there, it's speaks to increasing the
22 frequency of preventative rail grinding?

23 **MR. LOWELL GOUDGE:** Yes.

24 **MS. CHRISTINE MAINVILLE:** Which related to some of what
25 we've been discussing, right? It's connected?

26 **MR. LOWELL GOUDGE:** Right.

27 **MS. CHRISTINE MAINVILLE:** And so acknowledging that you had
28 not previously seen this document, I do query and wonder if you can assist us, then, Mr.

1 Goudge, with why we ended up with the derailment -- the first derailment of August
2 2021 if these preventive measure, which effectively address, in many respects, the risks
3 recently identified by Alstom, and which overlap to some extent with Alrom's interim
4 recommendations, why, if these were already required to be in place?

5 **MR. LOWELL GOUDGE:** I honestly can't answer. As I say, this is
6 something that I think needs to be addressed with RTM and the maintenance team
7 because, as I say, I had not seen until yesterday. This makes sense. It's consistent
8 with some of our recommendations, but I can't answer as to why nothing was done.

9 **MS. CHRISTINE MAINVILLE:** To you knowledge.

10 **MR. LOWELL GOUDGE:** Yes, to -- obviously, everything is
11 qualified to my knowledge. I was not aware that any of this activity was ongoing.

12 **MS. CHRISTINE MAINVILLE:** Okay. And if it was, we would have
13 some questions about why this failure occurred, some lingering questions?

14 **MR. LOWELL GOUDGE:** Yeah.

15 **MS. CHRISTINE MAINVILLE:** Okay. And thank you, we can take
16 this down. I ---

17 **COMMISSIONER HOURIGAN:** Counsel, sorry to interrupt. We'll
18 take the morning break now.

19 **MS. CHRISTINE MAINVILLE:** Sure, thank you, Mr. Commissioner.

20 **THE REGISTRAR:** Order, all rise. The Commission will recess for
21 15 minutes.

22 --- Upon recessing at 10:28 a.m.

23 --- Upon resuming at 10:52 a.m.

24 **COMMISSIONER HOURIGAN:** All right, please proceed.

25 **MS. CHRISTINE MAINVILLE:** Thank you. Mr. Goudge, you can
26 still hear me?

27 **MR. LOWELL GOUDGE:** I can hear you fine, thank you.

28 **MS. CHRISTINE MAINVILLE:** I just want to ask you briefly about

1 other potential causes of the first derailment. Are you aware of a pre-existing plan to
2 replace the axels on the vehicles?

3 **MR. LOWELL GOUDGE:** Yes, I am.

4 **MS. CHRISTINE MAINVILLE:** Okay. And that was further to a
5 study done recommending that they be replaced because of some wear of the splines?

6 **MR. LOWELL GOUDGE:** Yes, the plan was to replace the axels
7 because the hubs on each wheel are independent and they're connected by a shaft that
8 goes across the vehicle. And the connection spline that transfers the torque from one
9 wheel to another was wearing at an unacceptable rate for the expected life of the
10 components.

11 **MS. CHRISTINE MAINVILLE:** So is this a possible factor as well,
12 the quality of the splines – sorry, of the axels?

13 **MR. LOWELL GOUDGE:** We've looked at that in a lot of detail and
14 our belief is, no, that it's not a cause of the bearing issue; it's independent of the bearing
15 issue; it presents itself much faster and appears to wear to a stable position which,
16 although it's a little too close to the margins for durability for us to want to leave them in
17 service, but from our assessment it's not part of the cost of the derailment.

18 **MS. CHRISTINE MAINVILLE:** And you say "we" or "our
19 assessment", who are you referencing?

20 **MR. LOWELL GOUDGE:** Alstom, Alstom and Texelis

21 **MS. CHRISTINE MAINVILLE:** Right. But this, am I right, this
22 potential cause is not referenced in the report that we looked at?

23 **MR. LOWELL GOUDGE:** ... No, the report does not explain the
24 full investigation that we've done; it explains what we were doing. Basically it takes the
25 output of the investigation we've done so far and investigates where we've seen
26 reasons to look at problems and then what we found in doing the measurements. But it
27 doesn't explain the full investigation. It's a bit of a shortcoming in that respect.

28 **MS. CHRISTINE MAINVILLE:** Right.

1 **MR. LOWELL GOUDGE:** Because it leaves points like this not
2 properly addressed.

3 **MS. CHRISTINE MAINVILLE:** But your understanding this was
4 considered in the course of the investigation?

5 **MR. LOWELL GOUDGE:** Yes, my understanding is that it's wholly
6 independent. The only dependence actually goes the other way. If the bearings
7 develop play, it accelerates the rate of wear of the spline but the wear of the spline does
8 not lead to a problem within the bearings.

9 **MS. CHRISTINE MAINVILLE:** And this, as you've indicated, was
10 an investigation that was performed however by Alstom who built the trains and the
11 supplier of the axels that failed?

12 **MR. LOWELL GOUDGE:** Yes, that's correct.

13 **MS. CHRISTINE MAINVILLE:** Would the bogies, could those
14 have been a factor as well given some issues in relation to the bogies

15 **MR. LOWELL GOUDGE:** I don't believe so; I think the – the
16 testing campaign that we did demonstrated that what we're seeing is loads in a curve
17 and I don't believe that there's any correlation to the bogie itself and what we're seeing.

18 **MS. CHRISTINE MAINVILLE:** Do you know whether that
19 considered or investigated?

20 **MR. LOWELL GOUDGE:** In what respect? Like when you say the
21 "bogies", it's kind of a general term so where are we going with his?

22 **MS. CHRISTINE MAINVILLE:** Well, you're the engineer so I can't
23 purport to be – but there were issues, as I understand, that the bogie is not coping well
24 with some of the stress and so I wonder that, given the location of where the failure
25 occurred, that could have contributed or at least whether that was taken into account
26 and considered.

27 **MR. LOWELL GOUDGE:** No, I think the issues with the bogies
28 and the stresses, that is one that is very clearly related to the rail corrugation and the

1 loads we're seeing, because we have done measurement campaigns over two or three
2 different periods and found that the vibration levels on the bogie were much higher than
3 expected and higher than what normally would occur and be seen for -- in international
4 standards for equipment mounted on the bogie.

5 And we've had some failures, fatigue failures from brackets, et
6 cetera, due to the corrugations and condition of the rail. And we've had to re-design
7 several components on the bogie to cope with the higher stresses as a result.

8 **MS. CHRISTINE MAINVILLE:** So just so I'm clear, was -- could
9 that have potentially contributed to this failure on the derailment, the first derailment?

10 **MR. LOWELL GOUDGE:** As I said at the beginning, the vibration,
11 logically, the more vibration and stresses you put, obviously, it's logical to assume it
12 could lead to a failure.

13 The problem with the vibration from corrugation is that it happens
14 somewhat transiently and randomly with respect to the rotation of the wheel. And the
15 analysis that we did, it's what they call a quasi-static analysis that looks at things as a
16 function of turns of the wheel. So if things are happening at different frequencies than
17 the turn of the wheel, they don't show up as a direct relation.

18 So that's why we couldn't tie the measured vibrations that we had
19 seen previously directly to loads on the axle.

20 It doesn't say they didn't exist. We just couldn't get a relationship to
21 demonstrate it. But the vibration led to re-design of several components, leads to
22 higher stress in general. But the re-design of those components themselves wouldn't
23 contribute to the derailment.

24 **MS. CHRISTINE MAINVILLE:** Okay. You had indicated in your
25 Commission interview that the first derailment was a one-off, and was not seen as a risk
26 of reoccurring. And I'm wondering whether you still hold the same view, having now
27 more information in hand about the track and what we've discussed?

28 **MR. LOWELL GOUDGE:** I think it was -- clearly, it's the first one

1 we've ever seen, so yes, it's a one-off. I think there's not a risk of reoccurring with the
2 mitigation we have in place. And again, we've discussed we could change that
3 mitigation if we can improve the conditions elsewhere, but at this point, if it's managed
4 effectively, it's not a risk, and I think we've demonstrated that.

5 **MS. CHRISTINE MAINVILLE:** And as I understand it, there was a
6 similar failure on the TTNG in France, but not at the same rate; is that the distinction?

7 **MR. LOWELL GOUDGE:** My understanding on the TTNG in
8 France is that there was a perceived quality issue at the time where the nut was
9 physically coming undone because it was not properly attached and set in place. And
10 that quality issue was addressed when we did the first bogie retrofit, so that was
11 removed.

12 Now, they did have one nut come off about the same amount or
13 develop what we perceive as the same amount of play in the hub, but it did not have the
14 end result that we had. It was found in maintenance and taken out before it got to that
15 point.

16 **MS. CHRISTINE MAINVILLE:** Okay. And so as I understand it,
17 this -- what occurred in Ottawa on this derailment was not seen as a risk at the outset at
18 all?

19 **MR. LOWELL GOUDGE:** No.

20 **MS. CHRISTINE MAINVILLE:** And so it was not a part of the
21 consolidated safety file that documented potential hazards, correct?

22 **MR. LOWELL GOUDGE:** No. It was in the -- in the deep down in
23 the analysis in the Failure Modes and Effects analysis in the bogie, it goes through the
24 calculations that were done to ensure that it was adequate, and that closed the point
25 without carrying it forward as a hazard at that point in time.

26 **MS. CHRISTINE MAINVILLE:** And so you don't think anything was
27 missing in terms of the potential hazards identified at the outset?

28 **MR. LOWELL GOUDGE:** That's correct.

1 **MS. CHRISTINE MAINVILLE:** Okay. Just briefly on the second
2 derailment, this was due to a quality assurance error within Alstom's maintenance team,
3 correct?

4 **MR. LOWELL GOUDGE:** Yes. I don't think you could put it any
5 other way.

6 **MS. CHRISTINE MAINVILLE:** And it was connected to the work
7 being done subsequent to the first derailment, right?

8 **MR. LOWELL GOUDGE:** Yes. What we'd had was after the first
9 derailment, we put the program in place to do the checks on the axles every 7,500
10 kilometres, and in one of the subsequent tests, one hub had exceeded its allowable limit
11 so it had to be replaced. And in the process of putting the vehicle back together -- and I
12 don't know all the details, because it was much more of a quality than train design -- my
13 understanding is that there was -- the work was partially done, then a shift change, and
14 status of work was not well enough controlled at the shift change, and this step was
15 missed. That's my understanding of it.

16 **MS. CHRISTINE MAINVILLE:** The root cause being human error?

17 **MR. LOWELL GOUDGE:** Yes.

18 **MS. CHRISTINE MAINVILLE:** Okay. And you had mentioned in
19 your interview that one factor that may have contributed to this slip up, if you want to call
20 it that, was that at the time, Alstom was under some pressure, given that (audio glitch)
21 whole thing up. It was returning the fleet from -- to 11 trains from 7, which had been
22 running during the earlier days of the Covid pandemic?

23 **MR. LOWELL GOUDGE:** What we had -- when we came up with
24 the original mitigation plan, we recognized that it was very labour intensive and a real,
25 sustainable fleet was most likely something like 10 coupled LRVs or 20 LRVs with a
26 three-week cycle, 7 trains in service every day, 1 on hot standby, 1 in breakdown
27 maintenance, 1 in inspection kind of cycle.

28 And after the first derailment, that's how we re-established service.

1 There was pressure to bring that service level up to 11 trains, which was the baseline --
2 my understanding, was the baseline Covid fleet, so to speak. And that put increased
3 pressure on the maintenance to turn more trains around because obviously, as you're
4 cycling up more trains and running more trains, you have to do more of these
5 inspections, and these inspections are fairly labour and time intensive.

6 **MS. CHRISTINE MAINVILLE:** Okay. And pressure to increase the
7 fleet, I take it that would be a City requirement?

8 **MR. LOWELL GOUDGE:** Yes.

9 **MS. CHRISTINE MAINVILLE:** I understand improvements have
10 been made since this error occurred to Alstom's processes?

11 **MR. LOWELL GOUDGE:** Yes.

12 **MS. CHRISTINE MAINVILLE:** Checks and balances are in place,
13 you think, that addresses the drastic concerns?

14 **MR. LOWELL GOUDGE:** There's a lot more checks and balances
15 in place. Our Quality Director could speak better to everything that was put in place,
16 clearly, because he ran the program.

17 But also, the proper recording from automated tools such that you
18 can actually get a hard copy of what the tool did in terms of number of bolts tightened,
19 validate that against the work so that yes, you can see it's all been done.

20 **MS. CHRISTINE MAINVILLE:** And I understand that the fact that
21 Alstom bought Bombardier has been to Ottawa's advantage in this regard in terms of
22 Alstom gaining access to additional local resources with expertise in Ottawa?

23 **MR. LOWELL GOUDGE:** There's no doubt in North America,
24 Bombardier has a larger footprint than Alstom, especially in Canada, so we have a
25 much bigger industrial base to draw from, yes.

26 **MS. CHRISTINE MAINVILLE:** Okay. Neither Alstom nor, as I
27 understand it, RTM have been able to speak to the operator or obtain the operator's
28 statement in respect of the second derailment, correct?

1 **MR. LOWELL GOUDGE:** I have not -- personally, I have not seen
2 anything from that, either video from it or the operator's statements.

3 **MS. CHRISTINE MAINVILLE:** Is this a problem, from Alstom's
4 perspective?

5 **MR. LOWELL GOUDGE:** It's unusual. On the first derailment, we
6 saw the operator's statement. In fact, we worked with the City and went through the
7 timeline based on the electronic records, and largely confirmed the operator's statement
8 from their observations with what we saw in the event recorder.

9 This time around, we saw nothing. I was surprised. I don't know
10 what led to us not having that information.

11 **MS. CHRISTINE MAINVILLE:** Okay. And it's understood -- I
12 believe you're aware that the operator did not notice anything prior to the derailment,
13 correct?

14 **MR. LOWELL GOUDGE:** My understanding is that the operator
15 didn't notice anything, and it was actually the signalling system got to a point where it
16 had such a large error in terms of what it was asking the vehicle to do compared to what
17 it was seeing the vehicle doing that it just stopped. And that was about, I think, 45
18 seconds and 500 metres after the station, and it derailed before it arrived at the station.

19 **MS. CHRISTINE MAINVILLE:** And what do you make of the fact
20 that the operator would not have noticed any signs prior to the derailment?

21 **MR. LOWELL GOUDGE:** Visually I'm surprised because part of
22 the operator's job at the station is to -- using the side view monitoring system, look at
23 the side of the train and make sure that it's clear of all passengers and obstructions
24 before he departs. I haven't seen the video so I can't say whether it was possible to
25 determine if something was wrong or not at that point. I would have though he would
26 have seen something.

27 In terms of the operator being unaware of what's going on on the
28 train, I think part of that is because the train is automatic. He's not driving the train

1 himself. He pushes a button. If he was driving the train, asking for power, and seeing
2 that the train wasn't doing something, like when you're driving a car. If you step on the
3 gas and the car doesn't go, something is wrong. He may have had more engagement
4 and awareness if he was physically driving the train. It's a guess, but the fact that he's
5 not driving the train, clearly he would be less aware of the train's response.

6 **MS. CHRISTINE MAINVILLE:** Okay. And I understand it's
7 somewhat surprising that the train went as far as it did?

8 **MR. LOWELL GOUDGE:** Yes.

9 **MS. CHRISTINE MAINVILLE:** And why is that?

10 **MR. LOWELL GOUDGE:** I just would have thought somebody
11 would have noticed something before that time.

12 **MS. CHRISTINE MAINVILLE:** And could have stopped the train
13 earlier, you mean?

14 **MR. LOWELL GOUDGE:** Oh yes.

15 **MS. CHRISTINE MAINVILLE:** You, as we have discussed, were
16 responsible for providing the safety certification for the trains. And I wonder, how did
17 the wheel rail interface factor into your assessment if at all?

18 **MR. LOWELL GOUDGE:** Okay. The wheel rail interface -- that
19 aspect of it requires us to deliver contractual calculation notes that look at the forces on
20 the rail, the forces that we impact on the rail, the possibility of rail -- and the possibility of
21 the rail overturning, and also the possibility of wheel climb on the rails. And those were
22 documents that were delivered, I think, around 2015 or 1026. And that's part of the
23 scope of work that would have to be done again if we do a new wheel rail interface
24 because obviously if we're changing something we have to redo the calculations that
25 we've done previously.

26 **MS. CHRISTINE MAINVILLE:** Okay. But they were considered as
27 they were and deemed to be safe, correct?

28 **MR. LOWELL GOUDGE:** Yes. In terms of -- they would -- the

1 specific studies that are done are largely due to wheel climb so it wouldn't -- I'm not sure
2 that those studies would find the loads that we would see on the curves in the track. I'm
3 not sure that that aspect would be in there. But the larger body of work is to deal with
4 wheel climb because that's the major cause of derailments.

5 **MS. CHRISTINE MAINVILLE:** Okay. And as we discussed, there
6 were lingering performance and reliability concerns when the trains went into service,
7 right ---

8 **MR. LOWELL GOUDGE:** Yes.

9 **MS. CHRISTINE MAINVILLE:** --- as a result of the minor
10 deficiencies list. And we can just pull that up so we can identify what that is. And it
11 looks like it's AGG0000317? AGG0000317. And it's a lengthy -- effectively a lengthy
12 Excel spreadsheet, correct, listing every deficiency, Mr. Goudge?

13 **--- EXHIBIT No. 093:**

14 ADG0000317 – Ottawa LRT – Project – Minor Deficiencies
15 List 26 July 2019

16 **MR. LOWELL GOUDGE:** As I understand it, it's every deficiency
17 on the system. Deficiencies pertaining to the vehicle, I believe are prefixed LRV. So
18 when you see something that says, "LRV001" that's not the first train; that is just the first
19 item that is picked up against LRVs.

20 **MS. CHRISTINE MAINVILLE:** Okay. And it is, as we see here, a
21 98-page document listing all the minor deficiencies that were outstanding at the time of
22 this document, July 2019? July 26th, 2019?

23 **MR. LOWELL GOUDGE:** Yeah. Can you make it bigger? I can't
24 really read it.

25 **MS. CHRISTINE MAINVILLE:** Sure. I'm not going to ask you
26 specific questions about it.

27 **MR. LOWELL GOUDGE:** Okay.

28 **MS. CHRISTINE MAINVILLE:** And so this is what you're familiar

1 with in terms of being the minor deficiencies list, the one issued at the time of
2 substantial completion, I believe.

3 **MR. LOWELL GOUDGE:** Yes.

4 **MS. CHRISTINE MAINVILLE:** Okay. Thank you. And as we have
5 indicated though, despite the reliability concerns resulting from some of these items,
6 you had no safety concerns about the trains being ready when they were handed over
7 to the City and ultimately went into service, correct?

8 **MR. LOWELL GOUDGE:** As I say, there were nine items on the
9 minor deficiency list that we had safety concerns, that we had to do risk assessment
10 and demonstrate it was safe.

11 **MS. CHRISTINE MAINVILLE:** And so ultimately they -- sorry.
12 Ultimately the assumption was it was safe?

13 **MR. LOWELL GOUDGE:** That's correct. And those nine items
14 were listed in the safety case.

15 **MS. CHRISTINE MAINVILLE:** Okay. yes, and if we could take this
16 down, and I just want to bring OLRTC's engineering safety and assurance case at
17 ALS0084164. ALS008164.

18 Do you know whether you would have reviewed this as the safety
19 certifier for the trains? And you can wait until we bring it up to identify it.

20 **--- EXHIBIT No. 094:**

21 ALS0084164 – Ottawa Light Rail Transit Project
22 Confederation Line Phase 1 Engineering Safety and
23 Assurance Case 16 August 2019

24 **MR. LOWELL GOUDGE:** I don't believe I've ever seen their safety
25 case.

26 **MS. CHRISTINE MAINVILLE:** Okay. So it's not something you
27 would typically see?

28 **MR. LOWELL GOUDGE:** No. The only parts of their safety case

1 that I saw were the hazard analysis for the mainline and the hazard analysis for the
2 MSF, and those were exchanged between myself and Brian McDonald who was the
3 safety engineer at the time, to review actions that may have been transferred from
4 others onto Alstom and what our response was as to whether we accepted those or not.
5 So we reviewed the hazard analysis because people -- sometimes if you don't do that
6 then people sometimes might put that Alstom is going to mitigate it, but we have not got
7 it in our plan. So it's just to close that loop to make sure that we deal with the hazards.

8 But other than passing the hazard analysis back and forth, I don't
9 believe I ever saw the engineering safety case.

10 **MS. CHRISTINE MAINVILLE:** Okay, which we have here dated
11 August 16th, 2019? You see at the bottom there?

12 **MR. LOWELL GOUDGE:** Yeah.

13 **MS. CHRISTINE MAINVILLE:** And I just want to go to page 4 and
14 ask you a couple of questions. You'll see here at the top it says:

15 "This engineering safety and assurance case sets out
16 to determine that the Confederation line phase 1 is fit
17 for operation." (As read)

18 Do you see that?

19 **MR. LOWELL GOUDGE:** M'hm. Yes, I see it.

20 **MS. CHRISTINE MAINVILLE:** Okay, and if you go down a little bit
21 to where you have the bullet points. Okay. You see that:

22 "The ESAC [so the Engineering Safety and
23 Assurance Case] and the arguments it presents are
24 only valid for revenue service if the following caveats
25 are satisfied." (As read)

26 And I just want to ask you about the -- in particular the first two
27 bullet points.

28 "They are satisfied if all remedial works to resolve

1 identified deficiencies that have been designated as
2 prior to substantial completion that have been
3 determined to be safety related to the system's
4 engineering and the systems (inaudible) must have
5 been completed." (As read)

6 As this applies to your scope, I take it that was done?

7 **MR. LOWELL GOUDGE:** As I say, with the exception of the nine
8 specific items in our case, yes.

9 **MS. CHRISTINE MAINVILLE:** Right. Okay. And similarly for the
10 second bullet:

11 "All remedial works to resolve identified deficiencies
12 that have been designated as prior to revenue service
13 availability that have been determined to be safety
14 related by the systems engineering and systems
15 assurance team must have been completed." (As
16 read)

17 So the same answer?

18 **MR. LOWELL GOUDGE:** Same answer, yes.

19 **MS. CHRISTINE MAINVILLE:** And just the third to last bullet point:

20 "Confirmation that no safety related events occurred
21 during the trial running period as a result of the
22 infrastructure/LRV." (As read)

23 Are you aware of, or are you able to say whether there were any
24 safety related events that occurred during trial running?

25 **MR. LOWELL GOUDGE:** To my knowledge there were not.

26 **MS. CHRISTINE MAINVILLE:** Okay. Thank you. And in terms of
27 whether to run the trains despite reliability concerns -- so as opposed to safety concerns
28 -- that is a decision that was up to the City to make, correct?

1 **MR. LOWELL GOUDGE:** That was something that was up to the
2 City and the different project companies and my mandate there was, “Is this train safe if
3 we run it? Yes or no.”

4 **MS. CHRISTINE MAINVILLE:** Right. Can we take this down,
5 please? Thank you.

6 And so I just want to give you, Mr. Goudge, an opportunity to
7 indicate as the lead train engineer for Alstom and the safety certifier for the vehicles,
8 what can you tell the public about whether these trains are safe to ride or not?

9 **MR. LOWELL GOUDGE:** The trains are safe to ride. I would not
10 have signed the safety certificate if I did not believe the trains were safe to ride and I’ve
11 been involved in the dual role since the beginning of the project so I’ve seen the
12 evolution throughout; it’s not just that I came in at the end and said, okay, here’s a
13 document, check the box, yes, it fits the – you know, we’ve got a requirement for that
14 document. I reviewed and approved all the safety documents, all the test procedures,
15 all the test reports and was satisfied that to the best of our ability, that we had done
16 what we had intended to do and proved that the design was safe.

17 **MS. CHRISTINE MAINVILLE:** Thank. Those are my questions.

18 **COMMISSIONER HOURIGAN:** All right. Thank you. First up
19 participant’s counsel; the City of Ottawa.

20 **--- CROSS-EXAMINATION BY MR. JESSE GARDNER:**

21 **MR. JESSE GARDNER:** Good morning.

22 **MR. LOWELL GOUDGE:** Good morning.

23 **MR. JESSE GARDNER:** Hi, Mr. Goudge. My name is Jesse
24 Gardner, G-A-R-D-N-E-R. I’m counsel for the City of Ottawa. I’m going to ask you
25 some questions about your involvement in the project. In your interview with
26 Commission counsel you said that the Citadis Spirit is very closely aligned in its physical
27 structure, the vehicle, bogies et cetera, to the Citadis Dualis; do you recall that?

28 **MR. LOWELL GOUDGE:** Yes.

1 **MR. JESSE GARDNER:** And you also stated that the electrical
2 architecture and systems integration is largely similar across all Citadis vehicles; is that
3 right?

4 **MR. LOWELL GOUDGE:** That's correct.

5 **MR. JESSE GARDNER:** And you'd agree with me if the City
6 wanted a service-proven solution and you would agree that all of the elements of the
7 vehicle were service-proven; is that right?

8 **MR. LOWELL GOUDGE:** Yes.

9 **MR. JESSE GARDNER:** So every component of the vehicle could
10 be tracked back to individual elements that were proven on other systems; right?

11 **MR. LOWELL GOUDGE:** The components or similar – there's
12 always modifications to design; I would think the largest piece that was – or the largest
13 difference was probably the auxiliary converter which has been a problem and which
14 we're in the process of replacing as a sub-system, but the general train, structurally you
15 can't – unless you look at the detailed design you can't see any significant difference,
16 for example, between the Dualis structure and the Ottawa LRV. The bogies are similar;
17 again there were some modifications made to cope with the track requirements in terms
18 of some of the finer details of North American tracks, but they're largely the same; the
19 axels are the same basic arrangement.

20 **MR. JESSE GARDNER:** Sorry, I'm not actually asking about any
21 of that; just a high level –

22 **MR. LOWELL GOUDGE:** At a high level it's largely the same as
23 other projects.

24 **MR. JESSE GARDNER:** Okay. The City was looking for a
25 service-proven solution –

26 **MR. LOWELL GOUDGE:** Yeah.

27 **MR. JESSE GARDNER:** – and this was a service-proven solution
28 given that all the elements and components had been proven on other systems?

1 **MR. LOWELL GOUDGE:** Yes.

2 **MR. JESSE GARDNER:** Okay. Thank you.

3 And you told the Commission counsel that most – 70 per cent low
4 floor vehicle – or low floor LRVs would suit this City’s application; is that correct?

5 **MR. JESSE GARDNER:** Yes, most LRVs in North American are
6 70 per cent low floor. And in a different arrangement of train make-up they would also
7 suit the application.

8 **MR. JESSE GARDNER:** Thank you. And the low floor
9 requirement being desirable because it’s much easier to walk on to the LRV without
10 steps and it’s more accessible to the public; right?

11 **MR. LOWELL GOUDGE:** The low floor was driven, from my
12 understanding through design review, the desire at some point a future extension may
13 be required to run in City streets. For the purpose of phase 1 and phase 2, there is no
14 need for low floor because everything is done with vehicle platforms. It could have been
15 at any height.

16 **MR. JESSE GARDNER:** So you’d agree with me that Alstom told
17 the City that it could provide a vehicle with a minimum of 70 per cent low floor; is that
18 right?

19 **MR. LOWELL GOUDGE:** Yes.

20 **MR. JESSE GARDNER:** Okay. And in relation to the 100km
21 maximum speed requirement from the City, this is a common maximum speed in North
22 America; is that right?

23 **MR. LOWELL GOUDGE:** That’s right.

24 **MR. JESSE GARDNER:** It’s not unusual that you saw this
25 requirement on this project?

26 **MR. LOWELL GOUDGE:** Nope.

27 **MR. JESSE GARDNER:** Okay. So you’d agree with me then that
28 the City chose Alstom’s solution because it was a service-proven solution that would

1 meet the City's needs; is that right?

2 **MR. LOWELL GOUDGE:** That's my understanding. I was not
3 involved at the bid phase so I – I did not make any of the presentations to the City and
4 did not review any of the documents, but it's my understanding, yes.

5 **MR. JESSE GARDNER:** And when revenue service availability
6 was achieved and the system was launched, the system had provided a product to the
7 City that met its requirements and was ready for service; would you agree with that?

8 **MR. LOWELL GOUDGE:** Largely we had some failings as has
9 been stated earlier on reliability but, yes, the general system was meeting the
10 requirements of the City.

11 **MR. JESSE GARDNER:** You would agree with me that all of the
12 components of the Citadis Spirit, which needed to be final in the winter, were tested to
13 minus 40; is that correct?

14 **MR. LOWELL GOUDGE:** Yes.

15 **MR. JESSE GARDNER:** And you would agree with me that
16 Alstom supplied vehicles with these sort of winterized components in other places,
17 Sweden, Finland, Russia, Kazakhstan; is that right?

18 **MR. LOWELL GOUDGE:** Yes.

19 **MR. JESSE GARDNER:** And obviously all of those locations
20 have cold weather?

21 **MR. LOWELL GOUDGE:** As far as I know.

22 **MR. JESSE GARDNER:** So it's normal course for Alstom to
23 adjust materials that are being used on a vehicle based on the temperature ranges for
24 the service; isn't that right?

25 **MR. LOWELL GOUDGE:** That's correct.

26 **MR. JESSE GARDNER:** That Alstom was offering and the City
27 was choosing a vehicle solution that was appropriate for Ottawa's climate; right?

28 **MR. LOWELL GOUDGE:** That's correct.

1 **MR. JESSE GARDNER:** So it would be inaccurate to suggest that
2 Alstom, RTG and the City chose to proceed with a vehicle that wasn't ready for
3 Ottawa's climate; is that fair?

4 **MR. LOWELL GOUDGE:** That's fair.

5 **MR. JESSE GARDNER:** Alstom conducted testing of the vehicles
6 during winter; is that right?

7 **MR. LOWELL GOUDGE:** We started our testing – actually the first
8 vehicle movement in Ottawa was in November 2016; we conducted testing in January,
9 February, through the winter of 2017 and again through 2018 through the winter before
10 the start of revenue service, yes.

11 **MR. JESSE GARDNER:** And you'd agree with me that there was
12 this testing simulation facility, the "NRC" I think it's referred to, and Alstom ran trains, or
13 undertook testing at that facility; is that right?

14 **MR. LOWELL GOUDGE:** We undertook testing; there was no
15 "train operation"; it was a static test and it was on one-half of the LRV. Because the
16 whole LRV would not fit in their facility.

17 **MR. JESSE GARDNER:** Okay. I would like to show you a
18 document; it's COW0082357, so 82357. And, Mr. Goudge, this is the Citadis Spirit type
19 test; it's a report on the testing, the climate testing of the vehicle.

20 **COMMISSIONER HOURIGAN:** Sorry, just repeat the number
21 again, please.

22 **MR. JESSE GARDNER:** It's COW0082357.

23 **--- EXHIBIT No. 095:**

24 COW0082357 – ADD0000939180 TS10 – Climate Comfort
25 TS24 – Climactic Conditions 25 February 2019

26 **COMMISSIONER HOURIGAN:** Just stand by.

27 **MR. LOWELL GOUDGE:** Okay.

28 **MR. JESSE GARDNER:** Okay, thank you. So if we scroll down

1 just a bit, you've seen this document. Is that correct, Mr. Goudge?

2 **MR. LOWELL GOUDGE:** That's correct.

3 **MR. JESSE GARDNER:** Okay. So if we scroll down just a bit, we
4 can see the signatures. It's dated February 25th, 2019, and you signed it?

5 **MR. LOWELL GOUDGE:** That's correct.

6 **MR. JESSE GARDNER:** I'd like to go to page 40 of the document,
7 of the PDF. If we scroll down to "General Conclusions" -- so can you scroll down just a
8 bit? Thank you. "General Conclusions" states that:

9 "Light-rail vehicle generally demonstrated that it can
10 withstand Ottawa's most sever weather conditions
11 and provide a safe and comfortable ride to its
12 passengers." (As read).

13 Do you see that?

14 **MR. LOWELL GOUDGE:** Yes.

15 **MR. JESSE GARDNER:** Was that your general conclusion after
16 this testing?

17 **MR. LOWELL GOUDGE:** That's correct.

18 **MR. JESSE GARDNER:** Okay, thank you. And we can take this
19 down. So when RSA was achieved and the system was launched, you were confident
20 that Alstom had provided the City with a vehicle solution that could handle the Ottawa
21 winters, is that right?

22 **MR. LOWELL GOUDGE:** That's correct.

23 **MR. JESSE GARDNER:** Okay. I'd like to talk about a term that's
24 been referenced a few times, "the design book". So in relation to the term "design
25 book", I'm going to suggest to you that nowhere in the Project Agreement between the
26 City and RTG or the Construction Agreement between RTG and OLRTC is there a
27 requirement for the City to provide a response to a "design book". That term "design
28 book" does not come up in those documents. Are you aware of that?

1 **MR. LOWELL GOUDGE:** No, I am not.

2 **MR. JESSE GARDNER:** Would you agree with me that that term
3 does not come up in those agreements?

4 **MR. LOWELL GOUDGE:** I haven't read all of the contract
5 documents in terms of the Project Agreement so I can't tell you whether the "design
6 book" itself was in there. I do know that the exterior design and design and styling was
7 within our subcontract with OLRTC, and I know that there were some conditions with
8 respect to the choice of design and style of the exterior that involved using an industrial
9 designer to propose different exterior views and livery of the vehicle as well as selection
10 of interior colours, and that that was a milestone in our contract with OLRTC as a
11 deliverable.

12 **MR. JESSE GARDNER:** Okay. So you would agree with me that
13 the design book, as you understand it to mean, is relating to interior and exterior
14 appearance components, is that right?

15 **MR. LOWELL GOUDGE:** That's correct.

16 **MR. JESSE GARDNER:** Okay. And are you aware that the
17 independent certifier issued a determination in relation to RTG's Alstom design claim,
18 and that the independent certifier entirely rejected RTG's claim that that City's alleged
19 late decisions in relation to the design book cause 15 months of the delay to the
20 vehicles? Are you aware of that?

21 **MR. LOWELL GOUDGE:** I know there was a claim. I don't know
22 of the decision and the process, but I know there was a claim because there was a
23 lengthy time spent getting the design book approved, more than we had anticipated.

24 **MR. JESSE GARDNER:** Right. And are you aware that the
25 independent certifier found that that did not delay the vehicles?

26 **MR. LOWELL GOUDGE:** I wasn't of that decision, no.

27 **MR. JESSE GARDNER:** Okay. You stated in your interview with
28 Commission counsel that RTG never really acknowledged that the system was going to

1 be late until it was actually late. Do you recall saying that?

2 **MR. LOWELL GOUDGE:** Yes.

3 **MR. JESSE GARDNER:** And you'd agree that that included not
4 acknowledging the delay to the City, right?

5 **MR. LOWELL GOUDGE:** My understanding is that nobody wanted
6 to formally acknowledge that there were delays.

7 **MR. JESSE GARDNER:** I'd like to talk to you about safety
8 certification. I'd like to show you document COW0593678. So it's 0593678. So Mr.
9 Goudge, this is the fleet safety certificate. Okay, Mr. Goudge, do you recognize this
10 document? And we'll give you an opportunity to look at it.

11 **--- EXHIBIT No. 096:**

12 COW0593678 – Fleet Safety Certificate 11 September 2019

13 **MR. LOWELL GOUDGE:** Yes, I do.

14 **MR. JESSE GARDNER:** Okay, and we'll scroll down just a little bit.
15 Okay. So you see that on September 11th of 2019, you signed and stamped this
16 document.

17 **MR. LOWELL GOUDGE:** That's correct.

18 **MR. JESSE GARDNER:** And if we scroll, the certificate states that
19 -- just scroll up. Thank you.

20 "This certifies that the Citadis Spirit vehicle designed
21 and delivered under Subcontract..."

22 And that's referring to the OLRTC/Alstom contract:

23 "...as compliant to the Project Agreement with respect
24 to the safety of the vehicle and is fit for its intended
25 use." (As read).

26 So that was your position at the time of signing this document ---

27 **MR. LOWELL GOUDGE:** That's correct.

28 **MR. JESSE GARDNER:** --- that the vehicle was designed and

1 delivered, and it was fit for its intended use, and it was safe?

2 **MR. LOWELL GOUDGE:** That's correct.

3 **MR. JESSE GARDNER:** Okay. And you signed as your capacity
4 as a professional engineer certified in Ontario?

5 **MR. LOWELL GOUDGE:** That's correct.

6 **MR. JESSE GARDNER:** So you'd agree with me, then, that when
7 the fleet went into service, when it was launched, it was your professional view that the
8 vehicles were fit for use, and they were safe, and had met the PA requirements, is that
9 right?

10 **MR. LOWELL GOUDGE:** That's correct, yes.

11 **MR. JESSE GARDNER:** Okay. And are you familiar with the
12 consolidated safety file?

13 **MR. LOWELL GOUDGE:** Yes, I am. It's the file that provides all
14 the evidence for this statement.

15 **MR. JESSE GARDNER:** Okay. And I'd like to just bring that up
16 briefly. It's COW0556787 -- 0556787. Okay. So we'll scroll down. You recognize this
17 as the consolidated safety file?

18 **--- EXHIBIT No. 097:**

19 COW0556787 – OLRT Ottawa LRV Project Consolidated
20 Safety File 27 August 2019

21 **MR. LOWELL GOUDGE:** That's correct.

22 **MR. JESSE GARDNER:** And if we look at the signatures, this is
23 dated August 27th, 2019, and you see your signature there, sir?

24 **MR. LOWELL GOUDGE:** Yes.

25 **MR. JESSE GARDNER:** Okay. And I'd like to take you to the
26 conclusion of this document on page 157 of the PDF. Please scroll down. It states:

27 "As evidenced within this report, and subject to the
28 above-noted waivers, the rolling stock is safe and

1 suitable for its intended use in revenue service.” (As
2 read).

3 Is that correct?

4 **MR. LOWELL GOUDGE:** That’s correct.

5 **MR. JESSE GARDNER:** And that was your -- that was your
6 professional opinion at the time of signing this document at the end of August 2019,
7 correct?

8 **MR. LOWELL GOUDGE:** That’s correct.

9 **MR. JESSE GARDNER:** Okay, we can take the document down.
10 I’d like to talk to you just briefly about the deferred work that you discussed earlier this
11 morning with Commission counsel in relation to the retrofits. So I think we established
12 this morning that there was a line drawn in terms of what would be deferred and not,
13 and that retrofits that related to the functionality of the system and the safety were
14 addressed or mitigated prior to RSA, is that right?

15 **MR. LOWELL GOUDGE:** That’s correct.

16 **MR. JESSE GARDNER:** And then outstanding retrofits that were
17 “nice to haves”, I think you referred to it at one point, were deferred until after RSA.

18 **MR. LOWELL GOUDGE:** That’s correct.

19 **MR. JESSE GARDNER:** Okay.

20 **MR. LOWELL GOUDGE:** And Alstom had requested that the City
21 waive certain requirements for a period of time on the condition that adequate safety
22 mitigations were put in place. And I think you referenced, I think, nine items earlier this
23 morning, correct?

24 **MR. JESSE GARDNER:** Yes, and it was the same nine items that
25 were referenced in the conclusion of the safety report. As the waivers highlighted
26 above, those items were the ones that were under specific mitigation with corrective
27 plans to rectify.

28 **MR. LOWELL GOUDGE:** Okay. And I think I understood this

1 morning, but I want to confirm that the mitigation measure that were put in place, you
2 were satisfied that those were safe measures and that the vehicles could be put into
3 service and there wouldn't be a safety concern related to those mitigation measures; is
4 that right?

5 **MR. LOWELL GOUDGE:** That's correct. That's correct.

6 **MR. JESSE GARDNER:** Okay, thank you.

7 So you also indicated to Commission counsel in your interview that
8 the schedule -- this was the schedule for testing the vehicles and then launch -- was
9 accelerated to go right into service. Do you recall saying that?

10 **MR. LOWELL GOUDGE:** Yes.

11 **MR. JESSE GARDNER:** But Mr. Goudge, I'd put it to you that after
12 trial running was completed, there were two additional weeks of drills and tests that
13 were run on the vehicles before the launch of the system on September 14th; is that
14 correct?

15 **MR. LOWELL GOUDGE:** There was some. I don't know the exact
16 duration, but I understand there was some running prior to the revenue service. I don't
17 know what all was being conducted in that period in time, but yes.

18 **MR. JESSE GARDNER:** So you don't have direct knowledge as to
19 what the City was doing in terms of its testing, its drills, its exercises ---

20 **MR. LOWELL GOUDGE:** No.

21 **MR. JESSE GARDNER:** --- failure scenarios during that period?

22 **MR. LOWELL GOUDGE:** No, I don't.

23 **MR. JESSE GARDNER:** Okay. And are you aware that the City
24 could have contractually decided to open the system the day after RSA was achieved,
25 but it didn't so that it could do that additional testing?

26 **MR. LOWELL GOUDGE:** I'm not aware of what the City could or
27 could not have done at the system level. There was never -- to my understanding, there
28 was never any definitive opening date after RSA. There was no -- there was nothing

1 definitive in the contract, to my knowledge, of what would happen after RSA.

2 **MR. JESSE GARDNER:** Understood. So if I suggested to you that
3 the City and RTG were aware of an opening date and had been working towards that
4 opening date, you don't have details as to that; is that right?

5 **MR. LOWELL GOUDGE:** The opening date became apparent at
6 some point. I don't know when, but it wasn't -- that wasn't my contractual concern. My
7 concern was making sure that the safety case was done and that we had all the
8 documents to stand behind that the vehicles were safe.

9 As I say, I was aware that at some point in time, there was a date
10 set, but ---

11 **MR. JESSE GARDNER:** Okay.

12 **MR. LOWELL GOUDGE:** --- that wasn't -- it wasn't my
13 responsibility to manage to that date.

14 **MR. JESSE GARDNER:** Understood. Thank you.

15 So you'd agree with me -- and I think you spoke about this in your
16 Commission interview -- in an existing system, it's always a soft start because you're
17 delivering trains gradually; is that correct?

18 **MR. LOWELL GOUDGE:** That's correct.

19 **MR. JESSE GARDNER:** And on a new system like the
20 Confederation Line, it's a much harder, much sharper start? You start from nothing and
21 then you launch a new system, right?

22 **MR. LOWELL GOUDGE:** Yes.

23 **MR. JESSE GARDNER:** And that's -- that is normal; is that right?

24 **MR. LOWELL GOUDGE:** Yeah. I don't know if you launch at 100
25 percent capacity right away, but you launch with some level of service and it's not
26 introducing trains at -- one or two trains at a time, that's correct.

27 **MR. JESSE GARDNER:** Okay. So you'd agree with me that it
28 would be unusual for a brand-new service to have a soft start where just a few trains

1 were running on a section of track; is that right?

2 **MR. LOWELL GOUDGE:** I guess the question is that whether you
3 start at 100 percent capacity or not?

4 **MR. JESSE GARDNER:** Well, I'm going to get to the capacity
5 issue in a moment, but I just wanted to understand your evidence, and I think you've
6 said that it's not usual for -- to have a soft start on a new system and that this wouldn't
7 make sense because the public would want to -- wouldn't want to use the system with
8 just a few trains?

9 **MR. LOWELL GOUDGE:** That's correct.

10 **MR. JESSE GARDNER:** They're not stopping at every station. It's
11 not -- it doesn't make sense for transit riders, right?

12 **MR. LOWELL GOUDGE:** That's correct.

13 **MR. JESSE GARDNER:** Okay. You spoke this morning with the
14 Commission -- with Commission counsel about the fleet that was launched, and I'm just
15 going to paraphrase, but you said you did not think that the full fleet should have been
16 launched.

17 Mr. Goudge, are you aware that the full fleet was not launched and
18 only 13 trains were launched rather than 15 for RSA?

19 **MR. LOWELL GOUDGE:** Yes. Yes, I am.

20 **MR. JESSE GARDNER:** Okay. I'd like to talk to you briefly about
21 the derailments, which Commission counsel covered with you this morning.

22 So we can agree that the cause of the first derailment -- and I'm
23 speaking generally -- was the bearing assembly that holds the wheel bearing failed; is
24 that fair?

25 **MR. LOWELL GOUDGE:** Yeah.

26 **MR. JESSE GARDNER:** Now, I understand that the underlying
27 cause of that is being debated between Alstom and OLRTC, but you'd agree with me
28 that this issue was not something that was apparent when RSA was achieved; is that

1 right?

2 **MR. LOWELL GOUDGE:** That's correct.

3 **MR. JESSE GARDNER:** And if RTG, OLRTC, Alstom, had known
4 about this at the time before RSA, they -- it would have been addressed, right?

5 **MR. LOWELL GOUDGE:** If we had known about this at the time,
6 yes, we would have -- something would have been done, whether that was a delay of
7 RSA or whatever, but this is something that we were not aware of at the time.

8 **MR. JESSE GARDNER:** Right. And you'd agree with me that
9 more days of trial running, say an additional week of trial running -- wouldn't have
10 identified this issue that caused the first derailment; is that right?

11 **MR. LOWELL GOUDGE:** That's correct. That's correct.

12 **MR. JESSE GARDNER:** Okay. And in relation to derailment 2, the
13 cause of the second derailment was a human error, maintenance technician failed to
14 bolt and torque a gearbox; is that right?

15 **MR. LOWELL GOUDGE:** That's correct.

16 **MR. JESSE GARDNER:** Okay. And that failure, that human error,
17 doesn't mean that the system wasn't ready to launch for revenue service; is that fair?

18 **MR. LOWELL GOUDGE:** That's correct.

19 **MR. JESSE GARDNER:** Okay. So you'd agree with me that there
20 were performance issues with respect to maintenance, generally; is that right, an
21 example being the technician's failure to bolt and torque a gearbox causing a derailment
22 as a maintenance failure?

23 **MR. LOWELL GOUDGE:** That was a maintenance failure, yes.

24 **MR. JESSE GARDNER:** Right. And you'd agree with me,
25 generally speaking, that there had been other maintenance issues that have been
26 addressed with the City; is that fair?

27 **MR. LOWELL GOUDGE:** Yes, that's fair.

28 **MR. JESSE GARDNER:** Okay. Now, I just have a few more

1 questions for you. You stated in your interview that an obstacle to getting the retrofits
2 done was the lack of vehicles available for retrofit because of the requirements to
3 support a large service fleet, even throughout the pandemic.

4 So this was surprising to hear, because the City and RTG agreed
5 on March 10th, 2021, to reduce the service during the pandemic to 11 vehicles, and this
6 lasted -- was to last until August 3rd, 2021. Are you aware of that?

7 **MR. LOWELL GOUDGE:** I'm aware at some point that we cut the
8 service down, but March 2021 is an entire year after the Covid epidemic began and shut
9 down started. There was a whole year where there was time lost. And also, the ability
10 to do retrofits was not just during the Covid period, but we didn't have the fleet even
11 after the RSA and the start of service to do some of the retrofits that we wanted to do
12 because of demands on vehicles for service.

13 But anyway, yes. The fundamental issue is, there was a very high
14 utilization of vehicles when the ridership, at least in my perception, was not supporting
15 that use of the vehicles.

16 **MR. JESSE GARDNER:** But sir, you'd agree that when RTG
17 requested that there be a reduction of service in the pandemic, the City gave that to
18 RTG? The City agreed and reduced service; is that right?

19 **MR. LOWELL GOUDGE:** My understanding is that an agreement
20 was made, but again, I'm not in Operations and Service so I only see the end result, and
21 we could have done -- we could have run a lot less vehicles to meet the service. That's
22 the point.

23 **MR. JESSE GARDNER:** Commission counsel asked you about
24 the second derailment, and you gave some answers regarding the operator's role and
25 the lack of information to Alstom.

26 You said something to the effect -- and again, I'm paraphrasing --
27 you were surprised that no one noticed the derailment. Do you recall saying that?

28 **MR. LOWELL GOUDGE:** Yes.

1 **MR. JESSE GARDNER:** And specifically, you meant the operator?

2 **MR. LOWELL GOUDGE:** That's correct.

3 **MR. JESSE GARDNER:** Are you aware that Mr. -- that Steve
4 Nadon, the RTM Maintenance Director, wasn't that -- on the actual train that had
5 derailed and entered the station? Were you aware that he was on the car and had
6 gotten onto the platform?

7 **MR. LOWELL GOUDGE:** I think I heard that in the last week, but I
8 wasn't aware of that actually before.

9 **MR. JESSE GARDNER:** There's footage, and I'm going to suggest
10 to you or put to you that Mr. Nadon exits the vehicle and looks at the train and pulls out
11 his phone once he's off the train. Has -- are you aware of that? '

12 **MR. LOWELL GOUDGE:** No. As I say, I have not seen any of the
13 video or I have not seen statements from the derailment, so ---

14 **MR. JESSE GARDNER:** But you'd agree with me that the
15 passenger emergency intercom was not triggered, Mr. Nadon didn't put his foot in the
16 door to stop the train when he got off because he knows there was a problem,
17 emergency intercom wasn't used, none of that happened; are you aware of that?

18 **MR. LOWELL GOUDGE:** Yes. I did review the event recorders
19 from the vehicle and there were no door release operations, there was no emergency
20 intercom use, there was nothing recorded that indicated anybody had attempted to
21 contact through the normal means on the train to the driver that there was a problem.
22 That was clear from the electronic record.

23 **MR. JESSE GARDNER:** So earlier when you said that you're
24 surprised the operator hadn't noticed anything. Are you also surprised that
25 maintenance director was on the vehicle that had an issue got off and didn't trigger the
26 emergency intercom or stop the train by putting his foot in the door?

27 **MR. LOWELL GOUDGE:** I hadn't given it a thought because, as I
28 say, I only became aware of that fact in the last week or so, so that's something that, as

1 I say, is new information to me.

2 **MR. JESSE GARDNER:** Okay, thank you. Those are my
3 questions.

4 **COMMISSIONER HOURIGAN:** All right, thank you, Counsel.
5 Next is RTG.

6 **--- CROSS-EXAMINATION BY MR. JEAN-CLAUDE KILLEY:**

7 **MR. JEAN-CLAUDE KILLEY:** Good morning, Mr. Goudge.

8 **MR. LOWELL GOUDGE:** Good morning.

9 **MR. JEAN-CLAUDE KILLEY:** I'm Jean-Claude Killey, counsel for
10 RTG. In your evidence with Commission counsel earlier this morning, he mentioned a
11 burning-in period and you were asked a few questions about burning-in period. I just
12 want to understand what you're talking about when you're talking about a "burning-in
13 period". Is that the same thing as a partial opening, or a soft launch, or is that a
14 different thing?

15 **MR. LOWELL GOUDGE:** No, it's a different thing. A "burning-in
16 period" is a period where you would run the vehicles for a set number of kilometres,
17 hours, whatever the metric is, and you would have to achieve either no failures or rectify
18 any failures that you did have such that they would then put the vehicle into general
19 service. And it's something that is highly variable contract to contract.

20 As I said this morning, some metro operators will -- they'll take the
21 train after it's completed its test and go straight into service, but they won't count the
22 first X thousand miles of failures on the basis that those are the left-hand-side of the
23 bathtub curve or the infant mortality. It's working the bugs out, whatever. And then they
24 just run from there.

25 Other operators insist on doing so many kilometres without
26 passengers before they go into service, that kind of thing. It's very random, very
27 variable system to system.

28 **MR. JEAN-CLAUDE KILLEY:** What was the mileage on these

1 vehicles when they entered revenue service, appreciating it was likely different vehicle
2 to vehicle, but can you give a range?

3 **MR. LOWELL GOUDGE:** I don't really know. I think the highest
4 mileage was something like 25,000 kilometres on one or two vehicles, but I don't have
5 the actual mileage data.

6 **MR. JEAN-CLAUDE KILLEY:** Okay.

7 **MR. LOWELL GOUDGE:** I'm sure we could look it up, but I don't
8 have it on -- easily available.

9 **MR. JEAN-CLAUDE KILLEY:** That's fair enough, and the actual
10 specific detail number by vehicle don't really matter. I'm just trying to get a sense of
11 how much they had been run by the time they entered revenue service. So if you think
12 about 25,000 kilometres as a kind of average -- or no, you said that you think that was
13 the highest one.

14 **MR. LOWELL GOUDGE:** I think it was the highest. Again, that's
15 just from a random number I seem to recall, but I don't have the actual fleet mileage at
16 the start of revenue service.

17 **MR. JEAN-CLAUDE KILLEY:** That's -- that's very fair. So on the
18 challenges you described in building the supply chain, you described this vehicle as a
19 development project for Alstom in your evidence -- your earlier evidence, your interview
20 with Commission counsel. Is that ---

21 **MR. LOWELL GOUDGE:** Yes.

22 **MR. JEAN-CLAUDE KILLEY:** Is that still fair?

23 **MR. LOWELL GOUDGE:** Yes, the intention was -- and again, it
24 was before I became involved. I believe the intention was that they wanted to take to
25 the Citadis Dualis vehicle, or what's called TTNG, because that was the vehicle platform
26 that met the -- or closest met the structural requirements, performance requirements,
27 speed requirements of a North American LRT, and they wanted to bring that to North
28 America as a North American LRV as a part of a strategic product package, along with

1 signalling and whatever, as a complete turnkey solution.

2 **MR. JEAN-CLAUDE KILLEY:** So, in terms of sourcing the supply
3 chain, just if I understand the evidence you gave earlier, that meant that Alstom was
4 building that supply chain with a view to -- not just the Canadian content requirement --
5 or suppliers who could meet the Canadian content requirements on this project, but with
6 a preference for those who could also meet US content requirements as well. Am I
7 understanding correctly?

8 **MR. LOWELL GOUDGE:** That's correct. We were tracking where
9 we were in the supply chain both in terms of the Canadian content and the US content,
10 and the metrics are different so it -- it's a bookkeeping function. I wasn't involved
11 directly in doing it, but I'm aware it was going on. People were watching suppliers,
12 where they were based, what the content was, to make sure that if our next project after
13 Ottawa was in the US, we were geared to have the US content requirement.

14 **MR. JEAN-CLAUDE KILLEY:** You described Commission counsel
15 some of the specific challenges that arose as a result of supply chain challenges. I'm
16 not going to go through them all again with. The question I want to ask you I think is
17 fairly simple. In executing this project, compared to what it had originally planned,
18 Alstom was delayed in meeting its production schedule. I'm not talking about testing
19 now, just the production of the vehicles. Alstom was behind its original schedule. Is
20 that fair?

21 **MR. LOWELL GOUDGE:** My understanding is yes. Again, I
22 wasn't the scheduler or looking at meeting the schedule milestones, but my
23 understanding is yes, the project was delayed.

24 **MR. JEAN-CLAUDE KILLEY:** Thanks. I would like to show you a
25 document. It is document no. COMH0000009. So I don't know, Mr. Goudge, if you've
26 ever seen this before or not, and so that's going to be my first question for you. What I
27 understand this is what's known as a dropdown term sheet, and the parties to it are
28 RTM and Alstom. Have you ever seen this before?

1 **--- EXHIBIT No. 098:**

2 COMH0000009 – City of Ottawa LRT Project Commitment
3 Letter 30 August 2019

4 **MR. LOWELL GOUDGE:** I might have been given this in the last
5 week as something that I might be questioned on, but it's not pertaining to the vehicles
6 but the maintenance contract, which I'm not part of.

7 **MR. JEAN-CLAUDE KILLEY:** Okay. So this doesn't really have
8 anything to do with you?

9 **MR. LOWELL GOUDGE:** No.

10 **MR. JEAN-CLAUDE KILLEY:** Just on -- we can take the
11 document down, then. I don't have anymore questions for you about it if you've never
12 seen it before last week. On the subject Alstom supplier/Alstom maintainer, it's one
13 single corporation, I believe, right? There aren't two separate entities doing that?

14 **MR. LOWELL GOUDGE:** My understanding is, all of it ultimately
15 goes back to Alstom Canada, but it's two separate contracts. I know that much. In fact,
16 I think there might be three separate contracts because my understanding is we had a
17 contract to supply the vehicles. We had a contract very early on to provide the
18 maintenance on the vehicles. And I believe we took an additional contract to the
19 maintenance on the rest of the infrastructure. So there might actually be three separate
20 contracts.

21 **MR. JEAN-CLAUDE KILLEY:** But in terms -- you don't have any
22 involvement in maintenance?

23 **MR. LOWELL GOUDGE:** The only involvement that I have in
24 maintenance, obviously, when it comes back to questions of, if they have a technical
25 issue, people still know who I am and come and call me. If there are failures or
26 anomalies, I'll get involved. Part of that is with my new role in independent product
27 safety is I assist in overseeing issues on multiple fleets, Ottawa being one of them. So I
28 provide technical support in that respect and I still have some hand-holding, so to

1 speak, with the vehicle group, even though I've left the project officially.

2 **MR. JEAN-CLAUDE KILLEY:** Okay. I want to ask you a bit about
3 minor deficiencies now. So for that there's going to be two documents and I will refer
4 you to the first one is AGG0000317. You've seen this already today.

5 Okay. So if we can skip ahead to page 46. And scrolling down to
6 the bottom. We can't see both the text and the whole page at the same time. It's too
7 small. But that view is fine, I think.

8 This is where it appears to me the LRV and deficiencies start. LRV
9 ones are the ones that are related to the vehicles, I think you said That's right?

10 **MR. LOWELL GOUDGE:** Yes.

11 **MR. JEAN-CLAUDE KILLEY:** Now, scrolling over to the right just
12 so we can see the columns to the right all the way, there's a date there, January 22nd,
13 2020. And the heading of that column is "Required a completion date". Was that the
14 idea, that these were supposed to be completed by January 22nd, 2020?

15 **MR. LOWELL GOUDGE:** I'm not 100 percent sure of the
16 contractual aspects of the minor deficiency list. My own understanding was that it was
17 supposed to be things that were either six or nine months after the start of revenue
18 service but again, my job wasn't managing the list per se. The only reason that I'm
19 aware of the list existing is because of the nine items that were on the list that pertain to
20 safety that I was aware of in terms of the safety case and the mitigations for those
21 items.

22 **MR. JEAN-CLAUDE KILLEY:** I see. I understand. If I suggest or
23 ask you whether the completing or closing minor deficiencies, that's a job for the vehicle
24 supplier as opposed to the maintainer; fixing minor deficiencies is not a maintenance
25 job. Do you have any understanding of that?

26 **MR. LOWELL GOUDGE:** That would be my understanding is it
27 was a supplier obligation, not a maintainer obligation.

28 **MR. JEAN-CLAUDE KILLEY:** Okay.

1 **MR. LOWELL GOUDGE:** But again, as I say, I wasn't involved in
2 the implementation of close-out of all those points.

3 **MR. JEAN-CLAUDE KILLEY:** Okay.

4 **MR. LOWELL GOUDGE:** For the safety case items it was the
5 project quality that was responsible to track their completion and close them out.

6 **MR. JEAN-CLAUDE KILLEY:** And do you have involvement today
7 or ongoing involvement in minor efficiencies and closing them out?

8 **MR. LOWELL GOUDGE:** Only trying to make sure that they're all
9 closed out. I believe the safety ones are virtually all closed out now. Again, I'm not the
10 one doing the work or monitoring the process. In the safety case, that was clearly
11 stated as it would be done by project quality in track to close out.

12 **MR. JEAN-CLAUDE KILLEY:** Do you know how many of minor
13 deficiencies that were on this list are still open?

14 **MR. LOWELL GOUDGE:** No, I don't.

15 **MR. JEAN-CLAUDE KILLEY:** If I told you it was 65, you have no
16 information one way or the other?

17 **MR. LOWELL GOUDGE:** No, I would not.

18 **MR. JEAN-CLAUDE KILLEY:** Okay.

19 **MR. LOWELL GOUDGE:** As I say, my sole interest in this was
20 nine items.

21 **MR. JEAN-CLAUDE KILLEY:** I understand that.

22 Okay. Those are all the questions I have for you, Mr. Goudge.

23 Thank you.

24 **MR. LOWELL GOUDGE:** Thank you.

25 **COMMISSIONER HOURIGAN:** All right. Thank you, Counsel.

26 Next is Thales.

27 **MS. JENNIFER McALEER:** Good morning, Mr. Commissioner.

28 Good morning, Mr. Goudge.

1 My name is Jennifer McAleer. I'm one of the lawyers acting for
2 Thales and I have no questions for you this morning.

3 **COMMISSIONER HOURIGAN:** All right. STV...?

4 **MR. THEO MILOSEVIC:** Good morning. This is Theo Milosevic
5 for STV. STV has no questions either for this witness.

6 **COMMISSIONER HOURIGAN:** All right. Transportation Action
7 Canada?

8 **MR. DAVID JEANES:** Yes, thank you. David Jeanes for Transport
9 Action Canada. Hello, Mr. Goudge. I have 10 minutes so I have a few questions.

10 **---- CROSS-EXAMINATION BY MR. DAVID JEANES:**

11 **MR. DAVID JEANES:** First about the bogie, which I believe is
12 called IPONAM and the differences from the bogie that was in use on the Citadis Dualis.
13 We heard earlier from Mr. Declercq a number of things, for example, that the rubber
14 suspension used on the Dualis had been replaced by a metal spring suspension
15 because of climate differences; that's correct?

16 **MR. LOWELL GOUDGE:** Yeah. There's actually two
17 suspensions. There's what's called primary suspension which on Citadis Dualis was a
18 rubber string and rubber, as everybody knows, gets quite hard when its cold.

19 **MR. DAVID JEANES:** Yes.

20 **MR. LOWELL GOUDGE:** So the suspension becomes
21 inconsistent.

22 **MR. DAVID JEANES:** Okay.

23 **MR. LOWELL GOUDGE:** And as I said -- okay.

24 **MR. DAVID JEANES:** Yeah, no. I just wanted to identify that there
25 were some differences. He also mentioned the pneumatic levelling system which was
26 required for platform levelling by Ottawa which wasn't -- didn't exist on the Dualis.

27 **MR. LOWELL GOUDGE:** That's correct.

28 **MR. DAVID JEANES:** And you've already discussed that the bogie

1 frames, though maybe not a significantly different design, were at least a new
2 manufacturer from Dualis.

3 **MR. LOWELL GOUDGE:** That's correct.

4 **MR. DAVID JEANES:** And also, Mr. Declercq said that a higher
5 power motor was substituted compared to the one used on the Dualis?

6 **MR. LOWELL GOUDGE:** Yes. The performance requirements on
7 the Ottawa LRV and all North American LRVs are approximately 30 percent higher.

8 **MR. DAVID JEANES:** Okay. No, that's fine. And then the last
9 thing, he mentioned that the design of the bogie was intended to flex more than the
10 bogie on the Dualis, perhaps because of curvature requirements?

11 **MR. LOWELL GOUDGE:** Yeah. The design of the bogie is what's
12 called an articulated bogie. So there's two half frames and bushings between the half
13 frames. And that allows them to sort of walk over anomalies in the rail and flex.

14 **MR. DAVID JEANES:** Yeah, okay. So now, Mr. Declercq also
15 confirmed that the bogies were assembled at your plant in Sorel, Quebec so that that's
16 somewhat different from the assembly of the rest of the vehicle which you have
17 described that was done at the MSF in Ottawa?

18 **MR. LOWELL GOUDGE:** That's correct. We had established a
19 facility in Sorel, Quebec to build bogies for the Montreal Metro.

20 **MR. DAVID JEANES:** Yeah. So did the bogies come to Ottawa
21 complete, completely assembled and tested with all those components -- brakes, axles,
22 motors, gears, et cetera?

23 **MR. LOWELL GOUDGE:** I think barring material hiccups in the
24 supply chain, yes.

25 **MR. DAVID JEANES:** Okay. Now, was bogie testing done prior to
26 their coming to Ottawa in Sorel, for example, or did you do any bogie testing back at
27 your Le Creusot facility in France?

28 **MR. LOWELL GOUDGE:** We did. In Le Creusot we did some --

1 we did the qualification testing or I'm not sure if it was done in the Le Creusot facility or
2 laboratories associated with the Le Creusot facility. But we did all the qualification
3 testing for the bogie. And that gets into more of the fatigue and endurance capabilities
4 of the bogie.

5 **MR. DAVID JEANES:** Right.

6 **MR. LOWELL GOUDGE:** The bogie is itself functionally -- there's
7 not much to test. It has four wheels and it rolls.

8 **MR. DAVID JEANES:** Yeah.

9 **MR. LOWELL GOUDGE:** The testing is more when it's integrated
10 into the vehicle as a complete system.

11 **MR. DAVID JEANES:** Okay, but you would not have had a
12 concern that the bogies with all those components that are mounted on the bogie were
13 a significant risk in this project?

14 **MR. LOWELL GOUDGE:** At the time, no.

15 **MR. DAVID JEANES:** Okay. Now, the next question that I have
16 that I have is a specific thing that hasn't been talked about which relates to the wheel
17 crack problems and the fact that the jacking bolts had not been removed from the
18 wheels. Was this something that would have normally been done in Sorrel or was that
19 a problem that occurred in Ottawa?

20 **MR. LOWELL GOUDGE:** The jacking bolts -- first of all, the jacking
21 bolts would not normally have been removed; the purpose of the jacking bolts is to
22 provide the facility to push the wheel off the hub because it's a very close fit and the
23 design requirement to the wheel supplier was very clear that the jacking bolts were to
24 be recessed from the interface of the wheel. In fact when they arrived some of them
25 were not. So that when you torqued the wheel, it put a distortion in the flange of the
26 wheel and that's what led to the wheel cracks.

27 The reason the jacking bolts are left in place is to prevent corrosion
28 in the thread holes.

1 **MR. DAVID JEANES:** But that problem didn't occur in Ottawa;
2 that was probably already a problem when the bogies were delivered to Ottawa with the
3 wheels already on them.

4 **MR. LOWELL GOUDGE:** That problem occurred at the wheel
5 suppliers' factory.

6 **MR. DAVID JEANES:** Okay. All right. I'll leave that one. You
7 talked quite a bit about the problems of operating on curves; one thing – and you talked
8 about the importance of the conical wheel profile for adjusting the relative speed of the
9 inner and outer wheel when you're on a curve.

10 **MR. LOWELL GOUDGE:** I'm implying it but you seem to have
11 related –

12 **MR. DAVID JEANES:** Yeah, one thing you didn't talk about at all
13 was the presence of check rails that are very tight on the inside rail trail of most of the
14 curves and I'm wondering if those check rails which do – the trains are very noisy; every
15 time they hit the check rail section and it sounds as though the wheel is actually in
16 contact with the check rail. I can't swear to whether that's the case or not, but my
17 question to you, is whether those check rails may in fact prevent the wheels from
18 adjusting to the differential diameters that you described.

19 **MR. LOWELL GOUDGE:** I haven't looked at that geometry myself.
20 My understanding – excuse me, sorry. My understanding is that the check rails were
21 supposed to be replaced at a distance that was adequate that they do not come into
22 contact. They are there only to catch the wheel – or the inside wheel if you're in a
23 derailment.

24 **MR. DAVID JEANES:** Well, those would be guard rails but these
25 are actually check rails which have a very narrow gap between the check rail and the
26 running rail and it definitely – you know, if there is contact there, then it's different from
27 what you described when you talked about lubrication because it's the outside of the
28 flange which comes in contact with that check rail and not the inside. And the train

1 doesn't have to derail for that to happen.

2 **MR. LOWELL GOUDGE:** Well, my understanding in the Ottawa
3 system, is they're not supposed to be in contact. In fact there is no lubricator on the
4 opposite side of the wheel to the tread to lubricate the back of the wheel for contact with
5 a check rail. And it was not – the provision is there that one could be added but the
6 design was intended that the check rails are not in contact.

7 **MR. DAVID JEANES:** Okay.

8 **MR. LOWELL GOUDGE:** That's my understanding of the design
9 and the design spec. I can't say what's happening in practice, but that is the intention.

10 **MR. DAVID JEANES:** Now, one last thing related to that, you
11 talked about the gauge being very tight when you started testing the trains; would a tight
12 gauge also have limited the ability of the train to adjust itself on curves and take
13 advantage of the conical wheel profile?

14 **MR. LOWELL GOUDGE:** That's correct.

15 **MR. DAVID JEANES:** Now, the next point was, you were
16 questioned by the City of Ottawa lawyer about the soft launch and there was
17 considerable discussion of "soft launch" versus "hard launch" earlier on. And my
18 understanding is that although a soft launch may involve fewer trains or fewer station
19 stops – for example, we were told that the Elizabeth Line in London is being launched
20 without a number of the stations, particularly one of the main central London stations on
21 Bond Street and there may be lower frequency, there may be less or no operation
22 outside, you know, the main service hours, reduced weekend operation, et cetera. But
23 the other key thing which wasn't mentioned by the City of Ottawa, was the parallel bus
24 service. Because one thing about the soft launch in Ottawa's case that was
25 emphasized, was that the parallel bus service was cut off quite early after little more
26 than a week and that caused a rather massive transfer of ridership to the system. And
27 that was a key element of – would you think that that's a factor where a new transit
28 system is not just an addition to the existing network but is replacing part of the existing

1 network?

2 **MR. LOWELL GOUDGE:** Well, my understanding of this network
3 is that it was to replace a large portion of the existing bus network because, again, from
4 my understanding, the existing bus network was being choked, especially in the
5 downtown core with vehicle traffic on the streets and this was to remove all of the bus
6 traffic that was in the City core by providing the LRT.

7 **MR. DAVID JEANES:** Okay. Thank you. I just have one more
8 question – I think I have enough time.

9 You were talking about North American low floor LRVs, the fact that
10 70 per cent low floor is common. Previous testimony at this inquiry has suggested that
11 there aren't in fact many cases of 100 per cent LRVs, 100 per cent low floor LRVs in
12 North American – sorry, 100km per hour LRVs that predominantly the systems
13 operating in North America right have vehicles in the 70 to 80km per hour range. Would
14 you agree with that?

15 **MR. LOWELL GOUDGE:** I'd have to go back and look at all of my
16 old specifications, but I've seen LRVs typically specified to 90 to 100kms an hour.
17 Houston is – sorry, Dallas is 105kms an hour; Houston is 106 because Dallas is 105 in
18 that they have to be better.

19 **MR. DAVID JEANES:** All right.

20 **MR. LOWELL GOUDGE:** So there's a wide range of speeds
21 typically in the 90 to 100 km an hour range.

22 **MR. DAVID JEANES:** Okay. Because Declercq had suggested
23 that the 100kms per hour was an innovation. Well, that's all my questions. Thank you
24 very much, Mr. Goudge.

25 **COMMISSIONER HOURIGAN:** Thank you, Mr. Goudge. Next is
26 the witness counsel, counsel from Alstom.

27 **--- CROSS-EXAMINATION BY MR. JACOB McCLELLAND:**

28 **MR. JACOB McCLELLAND:** Good afternoon, Mr. Commissioner;

1 my name is Jacob McClelland, counsel for Alstom. Good afternoon, Mr. Goudge.

2 **MR. LOWELL GOUDGE:** Good afternoon.

3 **MR. JACOB McCLELLAND:** I just have a couple of questions.

4 During your formal interview with Commission counsel, you talked a bit about wheel
5 flats on the system; do you recall that?

6 **MR. LOWELL GOUDGE:** Yes.

7 **MR. JACOB McCLELLAND:** And as I understand that high
8 occurrence of wheel flats eventually led to the establishment of a wheel flats task force;
9 is that right?

10 **MR. LOWELL GOUDGE:** That's right.

11 **MR. JACOB McCLELLAND:** And you were a part of that task
12 force?

13 **MR. LOWELL GOUDGE:** That's right.

14 **MR. JACOB McCLELLAND:** And in addition to you there were
15 others, specifically from a company called "JBA"; is that right?

16 **MR. LOWELL GOUDGE:** Yes, I believe the key player was a
17 gentleman named Peter Percival.

18 **MR. JACOB McCLELLAND:** Okay. And in addition to Mr.
19 Percival, there were also individuals from RTM and Thales; is that right?

20 **MR. LOWELL GOUDGE:** Yes, RTM, routinely Thales when we
21 needed to discuss with them but not routinely.

22 **MR. JACOB McCLELLAND:** Okay. And with respect to JBA and
23 you had mentioned Mr. Percival, he was brought in as an independent consultant to
24 lead the investigation and prepare a report; is that right?

25 **MR. LOWELL GOUDGE:** That's my understanding, yes.

26 **MR. JACOB McCLELLAND:** I'd like to pull up a document and
27 have it put on the screen, please, and thank you. It's ALS0013433.

28 **--- EXHIBIT No. 099:**

1 ALS0013433 – OLRT Confederation Line Wheel Flats

2 Report 4 June 2020

3 **MR. JACOB McCLELLAND:** So if we could just zoom out a little bit
4 so we can see most of the first page of the document. Thank you.

5 So this is a report entitled “Confederation Line – Wheel Flats’
6 Report” dated June 4th, 2020; do you see that, Mr. Goudge?

7 **MR. LOWELL GOUDGE:** Yes, I do.

8 **MR. JACOB McCLELLAND:** And I take it you’re familiar with this
9 report?

10 **MR. LOWELL GOUDGE:** Yes, I am.

11 **MR. JACOB McCLELLAND:** And it says here that the report is
12 authored by an individual listed, and that’s Mr. Percival that you were referring to
13 previously, is that right?

14 **MR. LOWELL GOUDGE:** That’s right.

15 **MR. JACOB McCLELLAND:** Okay. And as I understand, that is in
16 reference to Mr. Percival who, at least at the time of this report, was with JVA. You
17 already confirmed that, right?

18 **MR. LOWELL GOUDGE:** Yeah.

19 **MR. JACOB McCLELLAND:** Okay. If we could just go to page 51
20 of this report. It’s the last page. You’ll see here that this section is entitled -- this
21 section is entitled “Conclusion”. Do you see that, Mr. Goudge?

22 **MR. LOWELL GOUDGE:** Yes, I do.

23 **MR. JACOB McCLELLAND:** And you can you just briefly describe
24 some of the findings and conclusions in this report?

25 **MR. LOWELL GOUDGE:** Okay, so what we found in looking for
26 the causes of wheel flats, the major contributor of causes to the wheel flats are
27 emergency brake events on the system because emergency brake events, although
28 that provide a -- the highest level of guaranteed application of brake, it’s not highest

1 actual brake rate we provide, and it also does not have the spin-slide control or anti-lock
2 brake function activated, so it has a possibility -- it has a very high possibility of locking
3 the wheels during an emergency brake. And we came to the conclusion that that was
4 the principal cause of wheel flats was emergency brake events.

5 We then further went into it and said, "Okay. Well, what causes
6 emergency brake events?" And there a number of things that caused emergency brake
7 events. One of them was the guideway intrusion detection system, or GIDS, because
8 anytime you had a guideway intrusion, you -- if the train was in the zone of a guideway
9 intrusion, you automatically applied emergency brake.

10 Along with that, we had ATCs and overspeed -- or ATC control
11 problems and over-speeds, and that was a software problem within the automatic train
12 control system. I don't know all of the details of the software problem itself, but they
13 were -- as they went through different portions of the alignment, would apparently come
14 into unexpected speed restrictions where they would have to apply emergency brake.

15 We had problems with the -- somewhat related to GIDs but with
16 manual operation of the vehicle where when there were problems with the GIDS
17 system, the driver would go into what they call "ATPM mode", which is he's driving
18 manually but the Thales system is still ensuring train position, and they would -- when
19 they would transfer from ATPM to ATO, if they didn't do that in the correct sequence
20 and in the correct operating conditions, it could lead to over-speeds and EB events.

21 So we found a large number of things. We also found that wheel
22 flats and the locking of wheels was dependent on temperature and dependent on
23 climate conditions. The colder it got, the more there was a tendency to lock the wheels.
24 Obviously, when it's raining or snowing, there's a tendency to lock the wheels. We also
25 found that there was another problem where when they were driving automatically, the
26 City was not, at the onset, adjusting the motoring and braking rates for the weather
27 conditions. They were always driving in all-out performance.

28 And if the weather conditions didn't support that level of motoring or

1 braking, you would get a large number of spins and slides. If you're braking, you could
2 get emergency brake events because you're sliding trying to meet the normal braking.
3 You would get an over-speed and then it would bring the emergency break on. So we
4 found a lot of different reasons why we're getting emergency brakes applications.

5 **MR. JACOB McCLELLAND:** Okay. And based on those
6 conclusions, what sort of solutions or mitigation steps were proposed by the task force?

7 **MR. LOWELL GOUDGE:** Well, there several mitigation steps
8 proposed. Obviously, the problems with the GIDS system had to be resolved because
9 there were a large number of false activations due to, from my understanding, software,
10 where it was interpreting snowflakes, literally, as solid bodies, or the detectors were low
11 enough to the ground that snow could accumulate above them. So those issues were
12 resolved.

13 The ATC system had the software corrected for the unintentional
14 over-speeds. We recommended and, ultimately, some time in mid-winter of 20 -- let me
15 think -- 2020/2021, implemented a regime where they started changing the vehicle
16 performance -- or the system performance as a function of weather conditions in
17 anticipation of it as opposed to if they ever did it reactively.

18 And we also looked at possibilities of doing modifications to the
19 vehicle to change the way it braked to make better use of things to try and avoid over-
20 speeds. We also proposed changing the braking rate on dry track such that it would
21 have less chance of locking up. But those last two modifications were never followed
22 up on.

23 **MR. JACOB McCLELLAND:** Okay. And when you say that they
24 were never followed up on, who wasn't following up on them?

25 **MR. LOWELL GOUDGE:** We had a meeting this year, I think in
26 March or April time-frame, where the City decided -- or had reviewed things and
27 decided that the operation was significantly better, that those would be put on the shelf
28 for the moment and not followed up on. I don't know if it was the City or RTM or

1 OLRTC. I don't know where the decision was made, but it was basically that they
2 believed it was good enough that we didn't need to follow up with modifications to the
3 vehicle.

4 **MR. JACOB McCLELLAND:** Okay, thank you. Those are all my
5 questions.

6 **COMMISSIONER HOURIGAN:** All right, re-examination.

7 **MS. CHRISTINE MAINVILLE:** No further questions. Thank you,
8 Mr. Commissioner.

9 **COMMISSIONER HOURIGAN:** All right, sir. You're excused.
10 Thank you for coming and testifying today.

11 **MR. LOWELL GOUDGE:** Okay, thank you.

12 **COMMISSIONER HOURIGAN:** We're done until two o'clock.

13 **THE REGISTRAR:** Order, all rise. The Commission will adjourn
14 until two o'clock.

15 --- Upon recessing at 12:24 p.m.

16 --- Upon resuming at 1:58 p.m.

17 **THE REGISTRAR:** The hearing has resumed.

18 **COMMISSIONER HOURIGAN:** All right, good afternoon. Our next
19 witness is Jacques Bergeron from OLRTC.

20 Are you there, sir?

21 **MR. JACQUES BERGERON:** Yes, I am.

22 **COMMISSIONER HOURIGAN:** All right. Very good.

23 Sir, you'll be examined by a number of witnesses for the parties and
24 the Commission, but before we do that, you have a choice either to swear to tell the
25 truth or to affirm to tell the truth. Which do you prefer?

26 **MR. JACQUES BERGERON:** I can swear to tell the truth, please.

27 **COMMISSIONER HOURIGAN:** All right. Stand by.

28 **--- MR. JACQUES BERGERON, Sworn:**

1 **THE REGISTRAR:** The witness has been sworn in.

2 **COMMISSIONER HOURIGAN:** All right. Thank you. The
3 Commission counsel will start with some questions.

4 **--- EXAMINATION IN-CHIEF BY MR. ANTHONY IMBESI:**

5 **MR. ANTHONY IMBESI:** Yes. Good afternoon, Mr. Bergeron.
6 My name's Anthony Imbesi. I am Commission counsel.

7 **MR. JACQUES BERGERON:** Good afternoon.

8 **MR. ANTHONY IMBESI:** So as I understand it, you were involved
9 in this project as the Director of Integration for Ottawa Light Rail Transit Constructors or
10 OLRTC?

11 **MR. JACQUES BERGERON:** That's correct.

12 **MR. ANTHONY IMBESI:** And as I understand it from your previous
13 interview with Commission counsel, you began that role in either January -- late January
14 or early February 2014?

15 **MR. JACQUES BERGERON:** That's correct.

16 **MR. ANTHONY IMBESI:** And you remained in that role until
17 August of 2018; is that right?

18 **MR. JACQUES BERGERON:** Yes, 31st of August, 2018.

19 **MR. ANTHONY IMBESI:** And following that point in time, you
20 retired; is that correct?

21 **MR. JACQUES BERGERON:** That's correct.

22 **MR. ANTHONY IMBESI:** And then we'll turn to this a little bit later
23 on, but as I understand it, you also became involved in the project again after August of
24 2018?

25 **MR. JACQUES BERGERON:** Yes, I did.

26 **MR. ANTHONY IMBESI:** In a more limited role?

27 **MR. JACQUES BERGERON:** Very limited, yes.

28 **MR. ANTHONY IMBESI:** And during this point in time where you

1 were the Director of Integration, you were employed by SNC-Lavalin?

2 **MR. JACQUES BERGERON:** That's correct.

3 **MR. ANTHONY IMBESI:** And so when we're speaking about the
4 Director of Integration, the role that you held, would you agree with me, sir, that that's a
5 crucial role for projects of this nature?

6 **MR. JACQUES BERGERON:** Yes, it is.

7 **MR. ANTHONY IMBESI:** And when we're speaking about
8 integration activities -- and I'll take you a little bit through some of this in more detail --
9 but you know, as a high level, the integration activities, they begin during the design
10 phase of the project and continue throughout construction?

11 **MR. JACQUES BERGERON:** That's correct.

12 **MR. ANTHONY IMBESI:** And so you became involved late
13 January, early February 2014. That was approximately one year into the project; is that
14 correct?

15 **MR. JACQUES BERGERON:** Approximately. I think it's more
16 precisely nine months, but yes, it's in that neighbourhood.

17 **MR. ANTHONY IMBESI:** Right. And so as I understand it, the
18 Project Agreement was signed in February of 2013, and so until you joined in January
19 or February of 2014, as I understand it, there was no one before you in the role of
20 Director of Integration?

21 **MR. JACQUES BERGERON:** From what I understand, no, there
22 wasn't, but I wasn't there, so I'm not sure.

23 **MR. ANTHONY IMBESI:** Right. And so after you became involved
24 -- and we'll operate on the assumption that there was no one in that role before you --
25 who had been responsible to that point in time in managing the systems integration
26 activity?

27 **MR. JACQUES BERGERON:** I don't think there was anybody, per
28 se, but -- and I wasn't there, so I cannot really say.

1 **MR. ANTHONY IMBESI:** Right. So when you started in January or
2 February 2014, you weren't able to determine then who had been undertaking those
3 roles before your involvement?

4 **MR. JACQUES BERGERON:** No, I wasn't.

5 **MR. ANTHONY IMBESI:** Okay. And as I understand it from your
6 prior evidence, your primary focus and responsibility was in respect of managing the
7 integration between the Alstom vehicles and the Thales train control system?

8 **MR. JACQUES BERGERON:** That's correct.

9 **MR. ANTHONY IMBESI:** And can you just explain for us what that
10 entailed, what your responsibilities were in that particular role?

11 **MR. JACQUES BERGERON:** Well, just to make sure that the, you
12 know, physical integration and functional integration on both parties worked correctly.

13 **MR. ANTHONY IMBESI:** That's just when you -- I'm sorry,
14 continue, sir.

15 **MR. JACQUES BERGERON:** I said in a nutshell, you know, not to
16 give a two-page description, but it's make sure that physically and functionally they both
17 work in harmony together.

18 **MR. ANTHONY IMBESI:** And so can you just break that down for
19 us in a bit more detail? So when you speak about physical and functional, I take it
20 physical is making sure the actual physical components come together in a way that
21 allows the system to function?

22 **MR. JACQUES BERGERON:** That's correct.

23 **MR. ANTHONY IMBESI:** And can you just explain for us then what
24 the functional component of integration is?

25 **MR. JACQUES BERGERON:** Well, the functional component is to
26 make sure that if you -- as an example, if you accelerate the vehicle, that the interaction
27 between the VOBC, which is the vehicle on board computer commands to through the
28 TCMS, which is the train monitoring system of the train, controls the proper signal in

1 those respective systems so that everything is flawless and you -- you know, when the
2 command is given that it's actually received by the system who has been commanded.

3 **MR. ANTHONY IMBESI:** And so when we speak about systems
4 integration, you have indicated to us your primary responsibility was for -- was the
5 managing of the integration between the Alstom vehicles and the Thales train control
6 system, but as I understand it, the systems integration more broadly goes beyond just
7 the vehicle and signalling interfaces, correct?

8 **MR. JACQUES BERGERON:** Yes, it does, because you know, all
9 the systems in the train, the railway system, are basically kind of intertwined in
10 functions. They do not work alone in silo.

11 So yes, there is messages and commands that are exchanged
12 between systems and they have to be integrated to make sure that the communication
13 protocols at the time that it's sent, and so on, so forth is compatible with the function that
14 we want to achieve.

15 **MR. ANTHONY IMBESI:** And so in dealing then with the
16 integration of those other systems, would those have fallen under your scope of work as
17 well, or were you limited specifically to the actual vehicle signalling interface?

18 **MR. JACQUES BERGERON:** Well, it was not my primary
19 responsibility, but because they do interface or with the vehicle or with the Thales
20 system, I had to -- I'm going to say put my fingers into it and verify that everything was
21 done according to either party's, you know, needs and functions being properly
22 assessed and work performed correctly.

23 **MR. ANTHONY IMBESI:** So is it fair to say then that -- so you
24 broadly had experience and involvement in dealing with systems integration on the
25 project as a whole, but your primary focus was in respect of the train and signalling
26 system?

27 **MR. JACQUES BERGERON:** Yes, it is.

28 **MR. ANTHONY IMBESI:** Okay. And I understand you reported to

1 the Project Director? That was your direct report on this project?

2 **MR. JACQUES BERGERON:** Yes.

3 **MR. ANTHONY IMBESI:** And I also understand that OLRTC had a
4 technical director by the name of Roger Schmidt; is that correct?

5 **MR. JACQUES BERGERON:** That's correct.

6 **MR. ANTHONY IMBESI:** And so what was the distinction then
7 between these two roles, yourself as the Director of Integration and Mr. Schmidt as the
8 technical director?

9 **MR. JACQUES BERGERON:** Well, Mr. Schmidt was mostly in
10 charge of the -- all the civil engineering. We're talking about track work, we're talking
11 about tunnels, we're talking about stations. And on the systems side, that was me and
12 you know, a great part of the systems were done by EJV, the Engineering Joint
13 Venture.

14 **MR. ANTHONY IMBESI:** Okay. So his focus was more on the civil
15 side of things; yours was on the system side?

16 **MR. JACQUES BERGERON:** That's correct.

17 **MR. ANTHONY IMBESI:** Okay. And would you agree with me, sir,
18 that under the construction contract with RTG, OLRTC had the overall responsibility for
19 systems integration on the project?

20 **MR. JACQUES BERGERON:** Yes, I would agree.

21 **MR. ANTHONY IMBESI:** And you had just given reference to the
22 EJV or the Engineering Joint Venture, and that's the RTG EJV?

23 **MR. JACQUES BERGERON:** Yes, that's correct.

24 **MR. ANTHONY IMBESI:** Okay. And so what was EJV's
25 responsibility then with respect to the overall systems integration?

26 **MR. JACQUES BERGERON:** Well, basically, they did the design
27 or design specifications for all the systems except the vehicle and the signalling system.
28 So basically, it was in their responsibility to define the specification performance of all

1 the systems surrounding the -- well, the tramw2ay system, except for the vehicles and
2 the Thales systems.

3 **MR. ANTHONY IMBESI:** Okay, So the EJV on the one hand, was
4 dealing with all of the systems except for signalling and vehicles, and on the other hand,
5 that was OLRTC dropped down to Thales doing the signalling work and Alstom doing
6 the vehicle work; is that right?

7 **MR. JACQUES BERGERON:** That's correct.

8 **MR. ANTHONY IMBESI:** And then so how did your role interact
9 with the EJV? So if you're overseeing the interface between Alstom and Thales, how
10 did that interact with the EJV's role in doing the balance of the systems integration?

11 **MR. JACQUES BERGERON:** Well, in my role, like I said, I wasn't
12 there to design the system, which is completely different, but when they do specific --
13 because those systems are usually, you know, purchased from different suppliers, I
14 would review their preliminary specifications and to make sure that the requirement for
15 interface was present in their specification.

16 **MR. ANTHONY IMBESI:** Right. And sorry, just to clarify then,
17 when you're speaking about these other vendors, are you talking about those other than
18 Thales and Alstom?

19 **MR. JACQUES BERGERON:** Yes, I do.

20 **MR. ANTHONY IMBESI:** Okay. So you would review all that to
21 make sure it broadly works together but you weren't responsible for the design of those
22 systems?

23 **MR. JACQUES BERGERON:** That's correct.

24 **MR. ANTHONY IMBESI:** Okay. And as I understand it, there's an
25 overarching concept of systems engineering which deals with the processes used to
26 organize and manage the development of systems and sub-systems and their interfaces;
27 is that correct?

28 **MR. JACQUES BERGERON:** Yes, that's correct.

1 **MR. ANTHONY IMBESI:** Okay. And as part of systems
2 engineering, one has to develop and track the system interfaces throughout the design
3 and the construction process?

4 **MR. JACQUES BERGERON:** Well, you know, the systems
5 engineering is basically in two parts. You have the system design and you do have the
6 system integration. And in this case the system integration, whatever related to Alstom
7 and Thales, was not taken by EJV. Everything else was.

8 **MR. ANTHONY IMBESI:** Right. But as I understand it, systems
9 engineering includes a process where, you know, the traceability of the different
10 interfaces so that you can ensure that the systems are designed and built in accordance
11 with the actual design?

12 **MR. JACQUES BERGERON:** Yes.

13 **MR. ANTHONY IMBESI:** Okay. And so how did that interplay
14 work then when you're speaking about Thales and Alstom on the one hand the EJV on
15 the other?

16 **MR. JACQUES BERGERON:** Well, you know, as a very simple
17 exercise, you know, the interface between EJV and let's say Alstom, we have to know
18 and transfer the information to EJV for the physical size of the vehicle so they can plan
19 the platform, the tunnel size and whatever that might interfere, you know, the power
20 distribution. So it is one information among others that you know, we share between my
21 group and the EJV group.

22 **MR. ANTHONY IMBESI:** And then when we're speaking about
23 systems engineering and systems integration, as I understand it, both of those are
24 necessary components to provide the overall safety case for the project prior to the
25 commencement of revenue service?

26 **MR. JACQUES BERGERON:** That's correct.

27 **MR. ANTHONY IMBESI:** And so properly performed and proven
28 systems engineering and integration are both a prerequisite for a project's overall safety

1 certification?

2 **MR. JACQUES BERGERON:** Yeah, that's correct.

3 **MR. ANTHONY IMBESI:** Okay. And so did you have a role in
4 overall systems engineering as we've just been discussing it?

5 **MR. JACQUES BERGERON:** Well, other than, you know, the
6 interfaces between the Thales and signalling and basically the running of the vehicles, I
7 didn't have a lot of things to do about that. I was aware of the thing but not really my
8 responsibility.

9 **MR. ANTHONY IMBESI:** So is it fair then to say that your
10 understanding of how that was to proceed was that the EJV was responsible for
11 systems engineering. And with respect to the train and signalling interfaces, those
12 would be dealt with under your responsibility; and then that would be passed along to
13 the EJV to incorporate into the overall systems engineering for the project?

14 **MR. JACQUES BERGERON:** Well, not to incorporate in the
15 overall systems engineering but to share information that was relevant for EJV's design
16 basically.

17 **MR. ANTHONY IMBESI:** Okay. And so you had just mentioned
18 that system engineering, systems integration, they underpinned the project's safety
19 case, so you would agree with me, sir, that systems engineering and system integration
20 are both critical components of the delivery of rail transit systems like this one?

21 **MR. JACQUES BERGERON:** Yes, it is.

22 **MR. ANTHONY IMBESI:** And as we talked about, they begin early
23 in the design phase and continue throughout construction?

24 **MR. JACQUES BERGERON:** Yes.

25 **MR. ANTHONY IMBESI:** And is it fair to say that systems
26 integration is always a risk in any rail project?

27 **MR. JACQUES BERGERON:** It is, yes. It is a risk.

28 **MR. ANTHONY IMBESI:** Right. And so is it also fair then to say

1 that that risk can be higher or lower on any given project depending on a number of
2 factors including, you know, whether specific systems are proven, whether you're
3 dealing with suppliers who have interfaced before in the past?

4 **MR. JACQUES BERGERON:** Yes, that's correct.

5 **MR. ANTHONY IMBESI:** So it's essentially a sliding scale of risk
6 depending on certain factors?

7 **MR. JACQUES BERGERON:** Yeah. Well, you know, if you have
8 brand new suppliers, brand new systems, it is a higher risk than, let's say, than a
9 system that has been used on two or three or four different projects and, you know, his
10 track record is correct and it's been deemed as a proven system.

11 **MR. ANTHONY IMBESI:** And so I'd like to show you a document,
12 sir. If we could pull up Document RJV15040. And just to situate you, Mr. Bergeron, this
13 will be the system integration program plan from the project.

14 Okay. Can you see the document there, sir?

15 **--- EXHIBIT No. 100:**

16 RJV0015040 – Ottawa Light Rail Project System Integration
17 Program Plan 17 May 2017

18 **MR. JACQUES BERGERON:** Yes, I can see it. If we can make it
19 maybe a little bit bigger?

20 **MR. ANTHONY IMBESI:** You need it bigger than what you see on
21 the screen currently?

22 **MR. JACQUES BERGERON:** Hold on. Yes, a little bit, please.

23 **MR. ANTHONY IMBESI:** Okay. Is that ---

24 **MR. JACQUES BERGERON:** That's fine. Thank you.

25 **MR. ANTHONY IMBESI:** Okay. So as you see there, this is the
26 system integration program plan; do you recognize this document?

27 **MR. JACQUES BERGERON:** Yes, I do.

28 **MR. ANTHONY IMBESI:** And as it indicates there, this was

1 prepared by yourself in your role as systems integration director?

2 **MR. JACQUES BERGERON:** That's correct.

3 **MR. ANTHONY IMBESI:** And if we scroll down just slightly, you'll
4 see that it looks like this document was prepared June 1st, 2016? Is that right?

5 **MR. JACQUES BERGERON:** Yes, it is.

6 **MR. ANTHONY IMBESI:** Okay. And so broadly speaking, so the
7 systems integration plan -- is it fair to say that sets out the roles and responsibilities of
8 the various parties including in particular the EJV, Alstom, and Thales and others for
9 systems integration?

10 **MR. JACQUES BERGERON:** That's correct.

11 **MR. ANTHONY IMBESI:** And this was prepared by yourself on
12 behalf of OLRTC because OLRTC was the party that was responsible for overall
13 systems integration?

14 **MR. JACQUES BERGERON:** That's correct.

15 **MR. ANTHONY IMBESI:** And is it -- speaking generally, is it a
16 requirement or a best practice to develop a systems integration plan such as this for a
17 systems integration on the project?

18 **MR. JACQUES BERGERON:** It's a best practice.

19 **MR. ANTHONY IMBESI:** Best practice, okay. And one of the
20 important functions of this document is to establish the roles and responsibilities early in
21 the proejct to ensure a smooth integration process?

22 **MR. JACQUES BERGERON:** Correct.

23 **MR. ANTHONY IMBESI:** Okay. And is it fair to say that this plan
24 in particular that we're looking at here, it deals primarily, if not exclusively, with the
25 integration of the vehicles and the train control system?

26 **MR. JACQUES BERGERON:** That's correct.

27 **MR. ANTHONY IMBESI:** And that's because that was your focus
28 on this project?

1 **MR. JACQUES BERGERON:** You're absolutely correct.

2 **MR. ANTHONY IMBESI:** Okay. And would you expect similar
3 plans to be developed for the integration of the other systems?

4 **MR. JACQUES BERGERON:** Yes, I do.

5 **MR. ANTHONY IMBESI:** And do you know if those were prepared
6 on this project?

7 **MR. JACQUES BERGERON:** Actually, I don't know that if EJV
8 had a system integration plan. Personally I never saw it so -- but I'm not sure if it exists.
9 EJV produced over 55,000 documents so I couldn't look at all of them.

10 **MR. ANTHONY IMBESI:** Right. Okay. But there's nothing that
11 you recall seeing during your time on the project?

12 **MR. JACQUES BERGERON:** No, it doesn't.

13 **MR. ANTHONY IMBESI:** Okay. And so if we turn to page 4 of this
14 document, and if we scroll down a bit to the third paragraph. That's good.

15 And so you see there, sir, it says:

16 "The system used to move passengers controlled the
17 line and interface with its users are developed based
18 on industry best practices as well as definitive
19 requirements contained in the Project Agreement.
20 The systems are based on existing technologies.
21 Overall, the system should have known elements to
22 integrate with those having readily available interface
23 and standard functions. Some components of the
24 system are new, predominantly a new-to-North
25 America vehicle and this project being the first time
26 that vehicle has been automatically controlled." (As
27 read)

28 And so, my question firstly on this project we're dealing with the

1 Citadis Spirit vehicle, correct?

2 **MR. JACQUES BERGERON:** That's correct.

3 **MR. ANTHONY IMBESI:** And if we can describe it in my words,
4 that's an evolution of Alstom's European Citadis Dualis model?

5 **MR. JACQUES BERGERON:** That's correct.

6 **MR. ANTHONY IMBESI:** And when you reference here this project
7 being the first time that vehicle has been automatically controlled, are you referring to
8 the Citadis Spirit or the Citadis model generally?

9 **MR. JACQUES BERGERON:** If, you know, if my memory serves
10 me right, it is the first time that the Citadis Spirit or the Dualis has been controlled
11 automatically by a moveable lock system. All trains have what we call ATC which
12 varies in complexities. But an ATC which is Automatic Train Control usually controls the
13 acceleration and braking of those vehicles in a way that if a vehicle comes into a fixed
14 block area, that it's not supposed to be in, the vehicle will stop.

15 But that is not supposed to be in, the vehicle will stop. But the
16 Thales system that we have here is the movable block system. So it is much more
17 complex because the ATS, which is the "automatic training system" part of Thales
18 wayside equipment, calculates everywhere – where all the trains are, what are their
19 speeds, what are their safe braking distance so they can basically control the
20 acceleration and braking so there's actually no chance of collision.

21 **MR. ANTHONY IMBESI:** Right. And that also allows for less
22 headway between the vehicles; right?

23 **MR. JACQUES BERGERON:** You're absolutely correct.

24 **MR. ANTHONY IMBESI:** Okay. So instead of having a system,
25 say for example, with six blocks and if the train enters the second block it's going to shut
26 off because it's getting too close to another train. In this case there's essentially a
27 movable block in between the trains as they move throughout the line?

28 **MR. JACQUES BERGERON:** That's correct.

1 Just to specify, we usually talk about head ways in seconds.

2 **MR. ANTHONY IMBESI:** Right.

3 **MR. JACQUES BERGERON:** You know, a fixed block system
4 might have 4, 5, 7 minutes in between them as a movable block system in a very
5 efficient way can go down to 90 seconds. So basically what that gives you, is that you
6 have more frequent passage of trains so you don't need as bigger train as a fixed block
7 system, which economically makes sense.

8 **MR. ANTHONY IMBESI:** Okay. And just so I'm clear then, so
9 what you're referring to in that sentence that I just read to you is the fact that the entire
10 Citadis line – in the entire Citadis line this was the first Citadis model vehicle that had
11 been a movable block?

12 **MR. JACQUES BERGERON:** My understanding is that, yes.

13 **MR. ANTHONY IMBESI:** Okay, all right. Thank you.

14 And in your previous evidence with Commission counsel you had
15 indicated that in your view the Citadis Spirit was about 75 per cent proven as a vehicle,
16 that it was a proven system with significant adaptations; do you recall that?

17 **MR. JACQUES BERGERON:** Yes, I do.

18 **MR. ANTHONY IMBESI:** And that's an accurate statement?

19 **MR. JACQUES BERGERON:** As far as I'm concerned, yes.

20 **MR. ANTHONY IMBESI:** And your previous evidence as well was
21 that this was the first time that Thales and Alstom were integrating their systems for an
22 LRV type vehicle? I believe the witness may have frozen.

23 **COMMISSIONER HOURIGAN:** All right, just standby, we're
24 having a technical issue. Let's just see if his video unfreezes.

25 **(SHORT PAUSE)**

26 **MS. JESSE WRIGHT:** This is Jesse Wright, counsel, I'll just give
27 him a call. Give me one second.

28 **COMMISSIONER HOURIGAN:** All right. Thank you.

1 (SHORT PAUSE)

2 THE REGISTRAR: Order, all rise. The Commission will recess
3 for a brief period.

4 --- Upon recessing at 2:23 p.m.

5 --- Upon resuming at 2:24 p.m.

6 COMMISSIONER HOURIGAN: Go ahead, counsel.

7 --- MR. JACQUES BERGERON, Resumed

8 --- EXAMINATION IN-CHIEF BY MR. ANTHONY IMBESI(Cont'd):

9 MR. ANTHONY IMBESI: Thank you, Mr. Bergeron, so just to
10 briefly recap what we were just talking about to make sure that you had heard correctly
11 right before we had the technical issue.

12 So you'd agree with me you had indicated before you felt that the
13 Citadis Spirit was about 75 per cent service-proven system with significant adaptations;
14 and I believe my question then to you was to ask you to confirm that as well the
15 previous evidence that you had given was that to your understanding is this was the first
16 time that Thales and Alstom were integrating their systems for an LRV type vehicle; is
17 that correct?

18 MR. JACQUES BERGERON: That's correct, to my knowledge
19 anyway.

20 MR. ANTHONY IMBESI: To your knowledge, yes.

21 And to your knowledge as well, was this the first time that a CBTC
22 system had been integrated with a low floor LRV?

23 MR. JACQUES BERGERON: I cannot say the first time; I don't
24 have the facts, you know, throughout the world who – which LRV has been equipped
25 with a movable block, the "OBC" system. Maybe that would be – I think Thales might
26 be the one to answer this because they have over 100 systems installed around the
27 world, so I don't know which – exactly which type of vehicles they have controlled.

28 MR. ANTHONY IMBESI: Okay. And that's fine. So you had

1 indicated that this was a significantly adapted vehicle, this particular vehicle had never
2 been controlled automatically in this way and now we're dealing with two suppliers that
3 had never integrated their systems for an LRV. So just turning back to that sliding scale
4 of integration risk that I had referred you to a few minutes ago, would you agree with
5 me, sir, that this was on the higher end of integration risk, this project?

6 **MR. JACQUES BERGERON:** It was a critical risk, yes.

7 **MR. ANTHONY IMBESI:** It was a critical risk for this project?

8 **MR. JACQUES BERGERON:** Yes.

9 **MR. ANTHONY IMBESI:** And so if we could turn to page five of
10 the document, in particular section 1.1.2, if you'd scroll a bit more. There you go. You
11 can stop there; thank you.

12 So you'll see here under "purpose", sir, it says: "The purpose of
13 this document is to clearly communicate an overarching plan for system integration,
14 including responsibilities that will apply throughout the design, testing and
15 commissioning period through to revenue service.

16 So just taking us back, and you had indicated that you weren't sure
17 who was performing any type of integration role prior to your involvement in the project.
18 But when you started on the project in early 2014, is it fair to say the design process for
19 the project was well under way? I believe we may have a further technical issue.

20 **(SHORT PAUSE)**

21 **MS. JESSE WRIGHT:** This is Jesse Wright again, I'm just going
22 to give him a minute and hope he just comes back and then I'll try calling him if he
23 doesn't.

24 **COMMISSIONER HOURIGAN:** Please give me a call; thanks.

25 **MS. JESSE WRIGHT:** All right.

26 **(SHORT PAUSE)**

27 **COMMISSIONER HOURIGAN:** Okay, we're back on. Go ahead.

28 **MR. ANTHONY IMBESI:** Thank you, Mr. Bergeron; and so I'll

1 repeat my question and you can give your answer because we didn't hear what you had
2 to say with respect to that. So my question was, when you started on the project in
3 2014. Is it fair to say the design process was well underway, including the development
4 of the Alstom and Thales interface?

5 **MR. JACQUES BERGERON:** I don't think so. They had some
6 interface documents kind of exchange, but this is start of each design work and that
7 takes some times before it materialized to go down to, I'm going to say, the exchange
8 details.

9 **MR. ANTHONY IMBESI:** Okay. So they -- they had started the
10 design process?

11 **MR. JACQUES BERGERON:** You're right.

12 **MR. ANTHONY IMBESI:** Okay. And -- so looking at the section
13 that I just took you to in this document, it indicates that the plan is to apply through the
14 design, testing, and commissioning phase. And we'd looked at the front page of the
15 document and the date was in June of 2016. So my question for you, sir, why was this
16 plan prepared three and a half years into the project as opposed to the outset of the
17 design processes?

18 **MR. JACQUES BERGERON:** Because it wasn't there, actually.
19 And by the time I got to know the process of both EJV and OLRT, like I said, it's a good
20 practice and we have to go back and decide what was our, basically, you know, base
21 assumptions and documents that would direct and help the integration of those two
22 systems.

23 **MR. ANTHONY IMBESI:** Okay. So was it not until about this time,
24 so June of 2016, that you had a fulsome understanding, then, as to who was
25 responsible for what? I'm just trying to understand your statement.

26 **MR. JACQUES BERGERON:** No, but, you know, there was quite
27 a lot of work to do and, by the time we got to get the time to write a proper procedure
28 so, you know, it was part of the project, it was at that time, basically. It was a time

1 constraint more than anything else.

2 **MR. ANTHONY IMBESI:** Okay. So it was a function of you not
3 having the opportunity to have prepared this document?

4 **MR. JACQUES BERGERON:** You got that right.

5 **MR. ANTHONY IMBESI:** Okay. Would it have served a benefit to
6 the parties on this project to have issued this document sooner to have formally
7 established in writing the roles and responsibilities of the parties with respect to systems
8 integration?

9 **MR. JACQUES BERGERON:** You know, those documents are
10 used when we have, I'm going to say, difference of opinions or, you know, we don't
11 agree to the way of working. In this case it was not the case. We -- you know, we did
12 follow this procedure but, you know, kind of informally. Everybody knew what they had
13 to do but, you know, it was not down black and white on paper. So, you know, we never
14 really had any issues or arguments between parties but just to make clear that it is the
15 way that we did work. We had to put it down as a, you know, I'm going to say, good
16 practice again.

17 **MR. ANTHONY IMBESI:** Is it not the case, though, sir -- but by this
18 point in time, the EJV and OLTRC had already had disputes arise as between them with
19 respect to their respective understandings of the scope of EJV's integration role?

20 **MR. JACQUES BERGERON:** Well, I don't think it was integration
21 role. I think it was mostly the way EJV was conducting their design. And, you know, the
22 one example comes to mind -- and this doesn't touch -- this document doesn't touch the
23 work of EJV -- is that every drawings and design that they did doesn't encompass a bill
24 of material. So this is a big part of engineering work, is to -- especially when you're
25 working on a budget, is to make sure the bill of material is there so you can assess the
26 price of the design. And in that case, it wasn't there, so, you know, that's one of things
27 that we kind of very much argued about.

28 **MR. ANTHONY IMBESI:** Right, but in terms of some of things that

1 are more directly ties to integration, would you agree with me that the systems
2 integration tests are a critical component of integration?

3 **MR. JACQUES BERGERON:** Yes, it is.

4 **MR. ANTHONY IMBESI:** And so this -- by this point in time,
5 though, would you not agree with me that the EJV and OLRTC had already had a
6 dispute or issue that had arisen between themselves as to who was actually responsible
7 to write those plans.

8 **MR. JACQUES BERGERON:** We had issues. We had kind of
9 arguments. But if my memory serves me right, the system engineering group that was -
10 --

11 **MS. JESSE WRIGHT:** Sorry, I'm going to call him, one second.
12 Maybe we're going to see if he can dial in by phone and keep his video on if there's
13 going to be issues.

14 **MR. ANTHONY IMBESI:** Thank you.

15 **(SHORT PAUSE)**

16 **MR. ANTHONY IMBESI:** Mr. Bergeron, can you hear me?

17 **MR. JACQUES BERGERON:** Yes, I can hear you. I'll join by
18 phone right away if you want to give me a few seconds.

19 **MR. ANTHONY IMBESI:** Okay, thank you.

20 **(SHORT PAUSE)**

21 **MR. JACQUES BERGERON:** Do you hear me?

22 **MR. ANTHONY IMBESI:** Yes, I do.

23 **MR. JACQUES BERGERON:** Okay, thank you. sorry about that.
24 The first time it happened to me.

25 **MR. ANTHONY IMBESI:** Okay. Thank you. Just you sound a little
26 bit faint so if you could just make sure you speak into the microphone of the phone, we
27 will continue.

28 **MR. JACQUES BERGERON:** Yes. Is that better?

1 **MR. ANTHONY IMBESI:** Yes, it is, thank you.

2 So just before I move on from that last point -- so as I understand it
3 then you evidence is that there wouldn't have been a practical benefit to having had a
4 written developed systems integration program plan like the document we're looking
5 any earlier than when it was issued?

6 **MR. JACQUES BERGERON:** Well, there was -- there's always
7 some benefits but in our case I think it was pretty much straightforward. We had only
8 two vehicles or two systems between Alstom and Thales. And you know, it's not like we
9 had the full 19 systems to integrate through EJV. So they did their integration on their
10 part and we did our integration on our part. And the interfaces in between were -- I'm
11 not going to say "simple" for between Alstom and Thales but for EJV it was a little bit
12 more simple.

13 **MR. ANTHONY IMBESI:** Okay. And if we could scroll down to
14 page 6 of this document, please. And so if we could go to the bottom four paragraphs.
15 So under "Integration strategy" -- so sir, if you could take a second and read through
16 that and then I'll have a few questions for you.

17 And if we could scroll just down to the top two paragraphs on page
18 7?

19 So what this is saying, sir -- and so when it references GIDS or G-I-
20 D-S, that's the Guideway Intrusion Detection System?

21 **MR. JACQUES BERGERON:** That's correct.

22 **MR. ANTHONY IMBESI:** And so what these paragraphs are
23 saying essentially is that OLRTC is responsible for the GIDS system and its integration
24 but the balance of the responsibilities for the train and signalling systems lie with Thales
25 and Alstom respectively?

26 **MR. JACQUES BERGERON:** That's correct.

27 **MR. ANTHONY IMBESI:** And so to summarize then what's set out
28 here, what it's indicating is that each design entity -- so Alstom, Thales, or the EJV --

1 was required to provide their integrated sub-systems and to confirm what is critically
2 required of the other systems?

3 **MR. JACQUES BERGERON:** You're right.

4 **MR. ANTHONY IMBESI:** Right. And then the design entities that
5 we just spoke about, they were to provide their design and critical requirements directly
6 to each other, not to OLRTC; is that right?

7 **MR. JACQUES BERGERON:** Yes.

8 **MR. ANTHONY IMBESI:** And so is it fair to say then that OLRTC
9 viewed its role as providing more of a management or oversight function to allow these
10 design subcontractors to perform the integration amongst themselves?

11 **MR. JACQUES BERGERON:** That's correct.

12 **MR. ANTHONY IMBESI:** Okay. But you would agree with me that
13 in terms of contractual structure, the EJV, Alstom, and Thales, none of them have
14 contractual relationships with each other?

15 **MR. JACQUES BERGERON:** That's correct.

16 **MR. ANTHONY IMBESI:** Right. They all have contractual
17 relationships only with OLRTC?

18 **MR. JACQUES BERGERON:** That's correct.

19 **MR. ANTHONY IMBESI:** So OLRTC is really just --- they're
20 relaying on the cooperation amongst the subcontractors in order to ensure that this
21 integration work gets completed as it should?

22 **MR. JACQUES BERGERON:** Yes, if you put it that way.

23 **MR. ANTHONY IMBESI:** Right. And so just on that point, we've
24 heard evidence from some other witnesses and one of the particular witnesses that I'll
25 put to you is Michael Burns from Thales. His evidence was that Thales and Alstom
26 were left to work out the requirements and interface controls amongst themselves. And
27 that there was a lack of a systems integrator role that defaulted to the subcontractors to
28 try to work out conflicts amongst themselves.

1 **MR. JACQUES BERGERON:** Can you repeat the question,
2 please?

3 **MR. ANTHONY IMBESI:** I was just -- I hadn't asked the question
4 yet. I was indicting to you, sir, that we had heard evidence from Michael Burns that
5 Thales and Alstom were left to work out the requirements and interface controls
6 amongst themselves, and that there was a lack of a system integrator role that
7 defaulted to these subcontractors to try to work out conflicts amongst themselves.

8 And I was going to put it to you, sir, is that -- would you agree or
9 disagree with that statement?

10 **MR. JACQUES BERGERON:** I would disagree with that.

11 **MR. ANTHONY IMBESI:** But in light of what we just looked at in
12 terms of what's set out as the roles, you indicated to me that OLRTC was essentially
13 just providing a management function to allow the subcontractors to deal amongst
14 themselves. Is that not right?

15 **MR. JACQUES BERGERON:** Well, this is what you said. But you
16 know, as those companies didn't have any relations or contractual relations in between,
17 you need to have somebody that makes the link for -- just like you said. If we do have
18 some conflicts or some relevant information that doesn't flow from one place to another,
19 you need a party that will deal with this -- I'm going to say a situation when they arise.

20 **MR. ANTHONY IMBESI:** Right, and so ---

21 **MR. JACQUES BERGERON:** And this was basically our role.

22 **MR. ANTHONY IMBESI:** Right. And the plan sets out that the
23 parties are to deal amongst themselves. So my question is for you then, sir, would it not
24 have been preferable for OLRTC as the systems integrator to take a more proactive
25 approach in controlling systems integration?

26 **MR. JACQUES BERGERON:** Yes, it would. But this is basically
27 what that that -- basically what I did without the documents that you, you know, put in
28 front of me, to take charge, to make sure that we have a communication flow and

1 working exchange between the two parties or the three parties because sometimes EJ
2 was involved as well.

3 **MR. ANTHONY IMBESI:** Right. And so do you feel that that
4 process went reasonably well throughout the project?

5 **MR. JACQUES BERGERON:** I think it went very reasonably well.
6 I think at the beginning it was, you know, very hard. I can to my recollection, I don't
7 think, you know, there was a very good communication and teamwork between Alstom
8 and Thales, but after we set down some unwritten ground rules and opened the
9 communication and get into meetings of the problems that we were facing and together
10 finding solutions, I think the relations between Thales, Alstom, and us has improved
11 quite dramatically, to be frank with you.

12 **MR. ANTHONY IMBESI:** And so what were the issues then with
13 respect to a lack of team work and communication between Alstom and Thales to your
14 knowledge?

15 **MR. JACQUES BERGERON:** Well, to my knowledge, you know,
16 at the beginning because they do not have any contractual requirements between them,
17 I think they didn't want to enter that type of relations. But their contract said that, you
18 know, the end product has to perform according to, you know, the PA that was signed
19 between, I'm going to say, RTG and the City, that it was kind of a back to back
20 responsibility that fell into their respective contract which was, to my knowledge, good
21 enough so that we can start the good relationship and good teamwork.

22 **MR. ANTHONY IMBESI:** Right. And so then as I understand what
23 you're saying, it was in your view because there was a lack of contractual -- a lack of a
24 contractual relationship between Alstom and Thales, this just led to a lack of
25 cooperation, at least initially?

26 **MR. JACQUES BERGERON:** Initially, yes.

27 **MR. ANTHONY IMBESI:** And were there any concerns about
28 those parties collaborating on the basis of trade secrets or any confidentiality that one

1 party had with respect to their systems?

2 **MR. JACQUES BERGERON:** I think at the beginning, yes there
3 was because, you know, Alstom and Thales are in the signalling system. Alstom's got a
4 signalling system division and they are basically competitors. So at the beginning there
5 was but you know, at the end we never asked anybody to exchange trade secrets or
6 design solutions that they developed over the years, but just to make sure that all the
7 signals and the functions that we're trying to achieve was kind of a basic understanding
8 on each other, the requirements from one side to the other. So once we set that down I
9 think it was a more cooperative relationship.

10 **MR. ANTHONY IMBESI:** Right. And so I suppose in hindsight,
11 looking back, if there was something like that set out earlier on in the project, that
12 probably would have been of use?

13 **MR. JACQUES BERGERON:** Maybe used, but not necessarily
14 because – you know, at the beginning of a project you have so much work to do before
15 you get into details that would infringe, like I said, intellectual properties or stuff like that;
16 you're going to spend a good year, year and a half of preliminary design work to make
17 sure that you design things properly.

18 **MR. ANTHONY IMBESI:** So is it fair for me to say that as a matter
19 of good practice OLRTC would want to ensure that the design deliverables under the
20 Thales and Alstom subcontracts, or those subcontracts of any of its subcontractors are
21 aligned so that the design and construction of the systems proceeds in lockstep?

22 **MR. JACQUES BERGERON:** Yes, that's correct.

23 **MR. ANTHONY IMBESI:** Because if the timing of one party's
24 deliverables differs from the other, this can lead to delays, redesign, retrofits, things of
25 that nature?

26 **MR. JACQUES BERGERON:** You're right.

27 **MR. ANTHONY IMBESI:** And so when we're talking about
28 interfaces, do you agree with me that the interface between the vehicles and train

1 control systems is a key interface on this project?

2 **MR. JACQUES BERGERON:** It is a key interface, yes.

3 **MR. ANTHONY IMBESI:** Right. And we touched on this in your
4 formal interview with Commission counsel, and in the interest of time I won't put the
5 document to you, but do you recall a suggestion being made to you that the Alstom
6 subcontract with OLRTC required OLRTC to deliver a finalized CBTC specification by
7 April of 2013?

8 **MR. JACQUES BERGERON:** Yeah, I clearly recall that.

9 **MR. ANTHONY IMBESI:** Right. And the evidence that you gave
10 during your interview was that that's not a realistic or achievable deadline; is that
11 correct?

12 **MR. JACQUES BERGERON:** That's correct.

13 **MR. ANTHONY IMBESI:** And can you just explain for us why you
14 say that?

15 **MR. JACQUES BERGERON:** Well, I'm saying this because – and
16 I cannot talk about Alstom's signalling system; I never used them; I never worked with
17 them. But you have, like I said a little bit earlier, you have ATC, "Automatic Train
18 Control" systems that are, you know, six block, you know, very limited interface and the
19 data that you exchange are basically very primal and are known for basically all the
20 manufacturers of ATC systems; they all work the same way. When you move to a
21 movable block system that has a completely autonomous way of operation and then
22 you have interfaces with, I'm going to say, you know – the GIDS, you talked about the
23 GIDS a little bit earlier, about the power distribution and cameras, to that point it
24 become a whole lot more complex. And the number of signal exchange that go
25 through, increase expediently. So to make sure that the data is correct, that it comes in
26 the form that we want, that they have the quality that is required, meaning, you know,
27 the performance and tolerances, it takes a lot of work. And if my memory serves me
28 right, we have in the neighbourhood of 170 to 175 different data that are exchanged

1 between the vehicle and the Thales, the Thales system. So before we get to the – I'm
2 going to say "excuse my French", the "nitty gritty" details of those exchanges, it takes
3 quite a while before we get to basically a full fledged integration of both systems.

4 **MR. ANTHONY IMBESI:** Right. So it's an ongoing collaborative
5 effort between the two parties?

6 **MR. JACQUES BERGERON:** It is. It is definitely.

7 **MR. ANTHONY IMBESI:** And so there would be a back and forth
8 of each party providing certain details of their design, distributing different ICD's or
9 interface control documents until you can finally come to the point where they're both
10 sufficiently developed that you can fully integrate the two together?

11 **MR. JACQUES BERGERON:** That's correct. And basically you
12 have design limitations as well. And one example that comes to mind is the teathed
13 wheel requirements from Thales and the one that was provided by Alstom was
14 completely different and, you know, from that point, on Alstom's side, it couldn't be
15 changed so Thales has to, and then I don't know how they did that, but has to change
16 their – probably their software or their way of computing the information to ensure that
17 we have an accurate enough information to control the trains, you know, with the proper
18 precision.

19 **MR. ANTHONY IMBESI:** Right. And is it a fair description as well
20 to say that the integration project continues to be finalized throughout the testing and
21 commissioning period?

22 **MR. JACQUES BERGERON:** It is correct.

23 **MR. ANTHONY IMBESI:** Right. And so any issues or
24 discrepancies that arise can then lead to retrofits at that point in time?

25 **MR. JACQUES BERGERON:** It can lead to retrofits. Most of the
26 time they're software-related, not necessarily hardware related, but, yes, retrofits.

27 **MR. ANTHONY IMBESI:** So when we're talking about the
28 integration between Alstom and Thales, as I understand it from your formal interview

1 previously, that there were certain issues that arose in the integration process; is that
2 fair?

3 **MR. JACQUES BERGERON:** Yes, there was. There was
4 numerous ones actually.

5 **MR. ANTHONY IMBESI:** Right. And I think you had mentioned
6 that one of the primary issues that you encountered when you first arrived at the project
7 was just an issue of space with respect to the VOBC rack, the "Vehicle On-board
8 Computer"?

9 **MR. JACQUES BERGERON:** Yeah, that was the very first task
10 that I tackled because the VOBC originally didn't fit inside the driver's cabin. That was –
11 prior I heard that, and I don't know if it was the real, you know, solution that was
12 envisioned, but to install the VOBC in a heated box in the room of the vehicle, but you
13 need access for testing, for verifying, for just like we said, if you do have some
14 modifications to make on the software, you need access so you can load those. To
15 have that type of equipment on the roof was completely kind of non-acceptable in this
16 type of operation.

17 So, yes, we worked with Thales, we worked with Alstom to find the
18 space to work the VOBC inside the driver's cabin. And that was kind of a big deal at the
19 moment.

20 **MR. ANTHONY IMBESI:** Is it fair to say that was an ongoing
21 challenge that was experienced for a while on the project?

22 **MR. JACQUES BERGERON:** It was. You know, we end up with
23 a – you know, a lack of maybe 5mms of space on the type of connectors for the
24 antennas that – basically by the time that I left we didn't receive the proper connector
25 but we had the solution. You know, by the time I left we had the solution, but that was
26 the very last bit of integration that needed to be done, physical integration that needed
27 to be done to put the VOBC in the vehicle.

28 **MR. ANTHONY IMBESI:** Right. And so just to clarify what you

1 just said; so it wasn't until towards the end of the summer of 2018 that that problem had
2 been solved?

3 **MR. JACQUES BERGERON:** Yes.

4 **MR. ANTHONY IMBESI:** And was the issue of space for the
5 VOBC rack, was that a particular issue on this project because of the low floor nature of
6 the LRV?

7 **MR. JACQUES BERGERON:** No, it was not. It was – it is the
8 nature of the LRV point blank, because an LRV is a very narrow vehicle at 2.65 metres
9 and the front end is tapered to passing tight curves and the space in the driver cabin is
10 quite restricted, so it was – it was not related to the floor height, it was related to the
11 type of vehicle.

12 **MR. ANTHONY IMBESI:** Right. But is this not an issue that
13 should have been dealt with early in the design phase when you're talking about fitting a
14 piece of one supplier's equipment into another?

15 **MR. JACQUES BERGERON:** Well, you know, my experience
16 with Thales was that usually they will supply different equipment that formed the VOBC
17 to a train supplier that will install it in different areas of the car.

18 I think to my knowledge, and we can even ask the question, but it is
19 the first time that actually the whole VOBC was packaged in what we called a "19-U
20 rack" that was basically self-contained. We had VOBC, the primary one, and a slave
21 one that occupied both ends of the train, but to my knowledge it is the first time that that
22 packaging was done by Thales.

23 **MR. ANTHONY IMBESI:** Right. And so what's the particular
24 reason, then, that that was the first time. Is that just the nature of Thales' system and
25 how they would interact with this particular LRV or was there something more unique
26 about this project?

27 **MR. JACQUES BERGERON:** Well, I don't know. I wasn't there
28 when they signed both contracts, especially for Thales, but because of the type of

1 vehicle, I think it would be -- and I still believe that it was the right direction to go to have
2 a very simple package to minimize the interface -- physical interface throughout the
3 vehicle.

4 **MR. ANTHONY IMBESI:** Okay. And during your interview with
5 Commission counsel, you had mentioned some issues with respect to retrofits, and one
6 of the retrofits you'd indicated was the most significant was what you called the "double-
7 cut retrofit". Do you recall that?

8 **MR. JACQUES BERGERON:** Yes, I do.

9 **MR. ANTHONY IMBESI:** And so could you just explain for us what
10 this double-cut issue was and the impact that it had?

11 **MR. JACQUES BERGERON:** Well, for 19 signals that was
12 required by Thales, they needed to have a redundant, meaning that the power or the
13 beginning of that signal comes from two separate entities. In case that there's a failure,
14 at least you have a redundant feed so you don't lose the signal. I wish, actually, I had
15 that in my house so we can have a redundant Wi-Fi feed, but it doesn't work that way.
16 So -- but that was a -- that was a requirement, actually, that was there in the very first
17 ICD but I can only guess that Alstom didn't understand that, you know, those need two
18 separate feeds and just provided two feeds but that came from the same source, which
19 was not acceptable for Thales, and eventually it lead to a 40 -- 38 or 40 wire retrofit
20 inside the car.

21 **MR. ANTHONY IMBESI:** And so you had attributed -- you had
22 indicated, if I understand, then, that that was something that was listed or set out in
23 either Thales first ICD or an early iteration?

24 **MR. JACQUES BERGERON:** Yes.

25 **MR. ANTHONY IMBESI:** Right. And to your observation, that was
26 perhaps something that Alstom misunderstood?

27 **MR. JACQUES BERGERON:** I think it was a little bit overlooked.

28 **MR. ANTHONY IMBESI:** And so, then, what -- in terms of the

1 actual retrofit itself, did that have a impact on the timing of the delivery of the vehicles or
2 the testing and commissioning?

3 **MR. JACQUES BERGERON:** Yes, it did. Yes, it did. We did -- I
4 mean testing and commissioning, it depends when we -- you know, there were some --
5 it's never kind of black and white. There's always grey areas. You know, to test the
6 vehicles, we don't need the ATC system, or the Thales system to test acceleration,
7 braking, doors, air-conditioning, and so on and so forth. Thales can test some other
8 functions that are related outside of those signals that were required to be, I'm going to
9 say, redundant. But at the end of the day, you need to find and correct the situation so
10 the full system can be 100 percent tested.

11 **MR. ANTHONY IMBESI:** Okay. And were there any other major
12 retrofits or other design issues that, in your view, contributed to a delay in either the
13 delivery of the vehicles or the testing and commissioning of the vehicles and signalling
14 system?

15 **MR. JACQUES BERGERON:** Okay, if I understand it well now,
16 we're not just talking about the integration of Alstom and Thales. We're talking about
17 the test in general, right?

18 **MR. ANTHONY IMBESI:** Well, I'm speaking to what's in your
19 knowledge. I was particularly focused on the integration of the vehicle and signalling
20 system but, certainly, if there's another component that you're aware of that's relevant
21 to my question, I'm happy to hear that as well.

22 **MR. JACQUES BERGERON:** Yeah, I mean I don't think there's
23 any -- I mean the retrofits in a new vehicle build is always something that is very
24 common -- on all systems, actually. Usually, it's the first time you integrate those type
25 of functions together. But yes, what we lack the most, and we were still lacking when I
26 left, was the test track, which was supposed to be available to us, if my memory serves
27 me right, in September 2016. And it wasn't until January or February 2017 that we were
28 able to actually the test track with only one kilometre and not the four kilometres that

1 was planned originally. So that was a big -- I'm going to say big hiccups in the testing
2 program.

3 **MR. ANTHONY IMBESI:** Sure, and I'll turn to that right now. I
4 have a few questions for you about the track availability. You'd indicated -- well, you
5 just indicated to us now the issues that that caused, and you specifically stated in your
6 interview with Commission counsel that, in your view, the main reason that the May
7 2018 revenue service availability date was missed was because of a lack of track
8 availability. Is that correct?

9 **MR. JACQUES BERGERON:** That's correct.

10 **MR. ANTHONY IMBESI:** Right. And so when you speak of a lack
11 of track availability, I take it you're referring to the availability of the track for the testing
12 and commissioning of the vehicles and signalling systems?

13 **MR. JACQUES BERGERON:** Yes, that's correct.

14 **MR. ANTHONY IMBESI:** And the lack of access to the track, lack
15 of track availability, that's a delay on OLRTC's part on the delivery of the infrastructure
16 to Alstom and Thales for the testing?

17 **MR. JACQUES BERGERON:** That's correct.

18 **MR. ANTHONY IMBESI:** And what was the cause of those delays,
19 to your knowledge?

20 **MR. JACQUES BERGERON:** I mean I know of the -- you know,
21 the tunnel, lack of accessibility was because of the sinkhole. The rest, I cannot -- I
22 cannot say why. Was there -- was there problems in the supply chains? Was there
23 problems in manpower equipment, or so on and so forth? But it didn't move at the
24 speed that it was supposed to move.

25 **MR. ANTHONY IMBESI:** Okay. And to your recollection -- and
26 you'd indicated a few moments ago -- the test track was supposed to be available to
27 Alstom and Thales and commissioning starting in 2016, is that correct?

28 **MR. JACQUES BERGERON:** Yeah, end of 2016, yes.

1 **MR. ANTHONY IMBESI:** End of 2016. And what was expected to
2 have been handed over to Alstom and Thales? Are we talking about the entire line?
3 Are we talking about a dedicated component of it?

4 **MR. JACQUES BERGERON:** No, we're talking about the
5 dedicated component on the east end of it for four kilometres. And I don't remember
6 the station name, but it was supposed to be from Blair to four kilometres west of there. I
7 don't remember. It's been, what, six years ago now. But it was supposed to be to have
8 access to four kilometres of double track for both the vehicle testing and Thales
9 integration testing and, you know, through that, we had to form, or train, the OC
10 Transpo drivers. So -- and for a long period, we had -- I'm going to say, until probably
11 mid-2017, end of 2017, we had only one kilometre to work with.

12 **MR. ANTHONY IMBESI:** Okay. So, initially, four kilometres of
13 dedicated track was to be turned over for testing and commissioning, and it was also to
14 be used to train OC Transpo drivers?

15 **MR. JACQUES BERGERON:** That's correct.

16 **MR. ANTHONY IMBESI:** And that was four kilometres of dual
17 track?

18 **MR. JACQUES BERGERON:** That's correct.

19 **MR. ANTHONY IMBESI:** And ultimately, certainly into 2017, all
20 that was available was one kilometre of test track, just one track, not a dual track?

21 **MR. JACQUES BERGERON:** No, we had a dual track but just one
22 kilometre.

23 **MR. ANTHONY IMBESI:** One kilometre of dual track, okay. And
24 to the best of your recollection, when would the full four kilometres of dual track, as
25 envisioned, have been provided to Alstom and Thales for these purposes?

26 **MR. JACQUES BERGERON:** To my recollection, I think October,
27 November 2017, if my memory serves me right.

28 **MR. ANTHONY IMBESI:** So late-2017?

1 **MR. JACQUES BERGERON:** Yeah, I would say late-2017.

2 **MR. ANTHONY IMBESI:** And in fairness to you, sir, I'll pull up a
3 document and we'll see if this refreshes your memory or if you have any knowledge of
4 this. If we could go to ALS7097. And while we're pulling up this document, so I
5 understand what you just indicated in terms of the dedicated four kilometres of track for
6 testing and commissioning, as I understand it, at a certain point in time, Alstom, or at
7 least Thales, needed the full guideway in order to complete its integration testing. Is
8 that fair?

9 **--- EXHIBIT No. 101:**

10 ALS0007097 – Letter Reference from Thales to OLRTC 18
11 October 2018

12 **MR. JACQUES BERGERON:** That's fair. That's absolutely
13 correct.

14 **MR. ANTHONY IMBESI:** And so at what point in time in OLRTC's
15 original plan had it envisioned turning over the entire guideway to Thales to complete
16 that testing?

17 **MR. JACQUES BERGERON:** I -- to be frank with you, I have -- I
18 don't remember. But from the document that I see there, you might have, you know --
19 and we're talking about 2018, 2015, 2018, I mean.

20 But the -- I don't remember the original, original plan before we hit,
21 you know, several delays.

22 **MR. ANTHONY IMBESI:** Okay. So but looking back -- so if the
23 original RSA date, revenue service availability was May of 2018, is it fair to say that
24 probably at some point in 2017 you would have expected the entire track to have been
25 turned over?

26 **MR. JACQUES BERGERON:** Probably in mid-summer or at least
27 September of 2017, we would have the full system to calibrate and perform the -- all the
28 integration testing for Thales.

1 **MR. ANTHONY IMBESI:** Right. And so if we could scroll down to
2 page 3.

3 And so sir, just before we move on, you see that this letter is dated
4 October of 2018?

5 **MR. JACQUES BERGERON:** Yes.

6 **MR. ANTHONY IMBESI:** And so I appreciate that you had left the
7 project at the end of August of 2018?

8 **MR. JACQUES BERGERON:** Yes, but you know, I can still read.

9 **MR. ANTHONY IMBESI:** Right. No, just for the purposes of my
10 next question, and we'll see here under the -- so if we look, it indicates that the:

11 "As previously advised, automatic speed control ASC
12 testing was critical path activity that posed the
13 greatest threat to completion of CBTC testing and
14 commissioning. OLRTC was unable to provide the
15 necessary prerequisites for the scheduled
16 commencement of ASC testing." (As read)

17 First bullet, "Entire guideway complete by June 2018."

18 Second bullet, "Golden vehicle LRV-11 for exclusive ASC testing,
19 10 February, 2018.

20 Third bullet, "No restrictions of mainline guideway operating speed."

21 And then below that, it indicates that the entire guideway has only
22 been available for end-to-end vehicle running since late September 2018, but there
23 remain operating speed restrictions due to trackwork concerns from various
24 stakeholders.

25 Is that fair? In terms of the time when you left the project at the end
26 of August 2018, had the entire guideway been completed?

27 **MR. JACQUES BERGERON:** No, it wasn't.

28 **MR. ANTHONY IMBESI:** No? Okay. So that -- you take it that

1 that's probably a fair statement then as to when that was turned over?

2 **MR. JACQUES BERGERON:** From what I read here, it -- just like I
3 said, it juggle my memory and you know, from what I have -- you know, we've been
4 talking about and impatiently awaiting for the system to be fully operational, that sounds
5 probably right.

6 **MR. ANTHONY IMBESI:** Okay. And when it talks about operating
7 speed restrictions due to trackwork concerns, do you have any knowledge as to what
8 that's referring to?

9 **MR. JACQUES BERGERON:** Yeah. I was supposed -- my
10 original contract, I think I told that in my first interview -- my original contract was
11 supposed to be to end in May or beginning of June 2018. And finally, we extended to
12 August, the end of August 2018 so I could perform at least the vehicle final testing.

13 But when we start to get the speed up on those newest four
14 kilometre, three kilometres more than we had, we -- Alstom noticed that we had some
15 climbing issue with the bogies, meaning that the track basically was too narrow.

16 If you -- the gauge -- the rail gauge, except for Toronto, but the rail
17 gauge in North America is 1435 millimetres and the FRA, the APTA, even Alstom
18 requires a tolerance of minus 1 to plus 3 millimetres. And we measured at multiple
19 places up all the way to minus 6 millimetres. This is where the possibility of climbing is
20 very important, and this can actually lead to derailment.

21 So you know, we could operate on the four kilometres, but at the
22 restricted speed, so we do not produce any climbing due to speed.

23 **MR. ANTHONY IMBESI:** And so two questions, just to clarify what
24 you've just indicated.

25 You referred to the track gauge. As I understand it, that's the
26 distance between the two rails?

27 **MR. JACQUES BERGERON:** That's correct.

28 **MR. ANTHONY IMBESI:** Okay. And when you mentioned that as

1 a result of these concerns that the vehicles had to be tested and operated at reduced
2 speeds, what speed are you referring to?

3 **MR. JACQUES BERGERON:** We're talking about 25 to 30
4 kilometres per hour instead of the -- in this part of the system, it was run -- it was
5 supposed to run at 70 to 80 kilometres per hour, maybe.

6 **MR. ANTHONY IMBESI:** Right. And so as part of the overall
7 testing requirements, I take it that you would need to run the vehicles at those
8 anticipated speeds in order to complete all of the necessary testing?

9 **MR. JACQUES BERGERON:** Correct.

10 **MR. ANTHONY IMBESI:** Okay. So at this point in time, that was
11 still something that could not be done?

12 **MR. JACQUES BERGERON:** You're correct.

13 **MR. ANTHONY IMBESI:** And before we move on from this
14 document, it references Alstom Golden Vehicle LRV-11. The reference to Golden
15 Vehicle, do I take it -- did I take to mean that was the best and brightest Alstom vehicle
16 available at the time?

17 **MR. JACQUES BERGERON:** Well, it was maybe not the best
18 Alstom vehicle, but the one that had all the equipment related to the VOBC and the
19 Thales equipment all the way up to date, plus the updated braking capability of the
20 vehicle, because we did have some braking issues with the calipers, with the HPUs. So
21 those had new HPUs and new brake pads, so Alstom could -- Thales could rely on the
22 performance of the vehicle so we can calibrate the data and software.

23 **MR. ANTHONY IMBESI:** So was that the vehicle that Thales had
24 to use to perform its testing?

25 **MR. JACQUES BERGERON:** Yes.

26 **MR. ANTHONY IMBESI:** Okay. And that was the only vehicle they
27 could use at that point in time?

28 **MR. JACQUES BERGERON:** Well, it depends on what they want

1 to calibrate, because we had five or six vehicles at that time. We were not missing any
2 vehicles for testing at that time, but the most updated ones -- because there were -- I
3 don't remember at that time, but we had two or three vehicles in retrofit at the same time
4 -- but the original vehicles to Thales, I think it was Number 5 at the top, it was Number
5 7, and then LRV-11 was the most -- greatest, most updated one that I can remember at
6 that time.

7 **MR. ANTHONY IMBESI:** Okay. And I'll get right to the point of my
8 question. So if you look at the end of that paragraph there, it says that:

9 "The Alstom Golden Vehicle remains unstable,
10 breaking down and returning to Alstom for repairs on
11 multiple occasions." (As read)

12 Was the ability or inability as is indicated here, of Alstom to provide
13 a vehicle that could be used for the testing, was that a delay, to your knowledge, in
14 OLRTC and Thales progressing with the testing for the project?

15 **MR. JACQUES BERGERON:** Of course. It comes down to a
16 delay, but I don't, you know, recall the faults that we had in the -- just like Thales said,
17 the unstable, but usually, it comes in, yes, it is a setback, but it comes in and Alstom
18 repairs. Usually, it's ready by the next day. So -- but we had too many occasions that
19 was like that.

20 **MR. ANTHONY IMBESI:** Too many occasions where you couldn't
21 use the vehicles as intended?

22 **MR. JACQUES BERGERON:** That's what I'm saying.

23 **MR. ANTHONY IMBESI:** And did that hinder the ultimate delivery
24 of the system in any way, or were you still constrained by these track and infrastructure
25 issues?

26 **MR. JACQUES BERGERON:** At that time, we were still
27 constrained with track issues.

28 **MR. ANTHONY IMBESI:** Okay. And so as you've indicated, you

1 left the project August 30th of 2018. Were there any outstanding integration issues at
2 the time you left the project?

3 **MR. JACQUES BERGERON:** The only one that I remember was
4 the brake acuity. And remember, I talked a little bit earlier about the keyed (phonetic)
5 wheel, which is every automobile has that, trains have this. It's a keyed wheel that you
6 can count the number of rotations that the wheel does.

7 We had an issue with the stability of braking to a very defined point,
8 and it was not a safety issue, it was more a comfort issue that you would brake and then
9 coast and then brake and then coast and brake finally just when you reach your final
10 destination.

11 So that was still in the -- to be resolved, and I don't know if it was on
12 Alstom's side because of the HPU issues that we had, and I don't remember if that was
13 100 percent solved at the time, but you know, that was probably the last integration
14 point that remained to be done.

15 **MR. ANTHONY IMBESI:** Right. And to be fair to you, you can't
16 speak to any issues that would have arose after you left the project, right?

17 **MR. JACQUES BERGERON:** No, I can't, and I'm sorry. I'm not
18 aware of it.;

19 **MR. ANTHONY IMBESI:** No, and I appreciate that. And I say this
20 just to indicate that at this point in time, when you left the project, the full track still hadn't
21 been turned over. As we can see from this letter, they hadn't been able to run the
22 vehicles at the necessary speeds. There we're still some vehicle issues.

23 So I think it's fair to say and I think you'd agree with me that at the
24 time you left the project the vehicle and signalling system were not yet fully integrated?

25 **MR. JACQUES BERGERON:** Yeah, that's correct.

26 **MR. ANTHONY IMBESI:** Okay. And I would like to turn now to a
27 document COW459399.

28 And just to orient you, sir, while we're waiting for the document, this

1 is going to be the “operational restrictions” document. Can you see that there?

2 **MR. JACQUES BERGERON:** Yes, I do.

3 **MR. ANTHONY IMBESI:** So this is the operational restrictions
4 document, this is an OLRTC document; if we scroll down just slightly we see it’s dated,
5 just a little bit more, please. We see it’s dated August 19th, 2019. It’s noted as Revision
6 2; correct? Do you see that there?

7 **MR. JACQUES BERGERON:** Yes, I do.

8 **MR. ANTHONY IMBESI:** And then we see your professional
9 engineer’s seal with your name beside it and a date of August 20th, 2019; right?

10 **MR. JACQUES BERGERON:** That’s correct.

11 **MR. ANTHONY IMBESI:** Right. And so did you prepare this
12 document?

13 **MR. JACQUES BERGERON:** I didn’t prepare this document; I
14 reviewed it.

15 **MR. ANTHONY IMBESI:** You reviewed it, okay. And we spoke
16 earlier about how you became involved again on the project following your retirement at
17 the end of August of 2019. So could you just explain for us briefly; what was the nature
18 of your reengagement on the project after that point in time?

19 **MR. JACQUES BERGERON:** Well, after SEMP came in they
20 basically worked to get all the documentation, make sure that everything was done for
21 safe operation and, you know, they came up with – of course, we still had some issues
22 with the track, with some other issues, and you know, they had to come up with
23 documents to amend the restriction or, you know, to basically say how we’re going to
24 operate the vehicle while the system is not fully 100 per cent.

25 **MR. ANTHONY IMBESI:** Right. And so was the reason that you
26 were reinvolvement in the project is because they needed a professional engineer to sign
27 off on a number of these documents?

28 **MR. JACQUES BERGERON:** Well, they needed professional

1 engineers to sign off but they needed somebody also that had the background and was
2 there in the development of all those systems so, you know, you can – I didn't, you
3 know, have to spend two months to review everything that was done. I was mostly
4 participating in everything that was done under the system prior to my leaving at the end
5 of August. But I was familiar with all the problems that we had and the restrictions that
6 are there I was still familiar with them.

7 **MR. ANTHONY IMBESI:** And you had mentioned the involvement
8 of SEMP and we see Derek Wynne's name on this document as the Systems
9 Engineering and Assurance Lead; he's the principal of SEMP; is that correct?

10 **MR. JACQUES BERGERON:** That's correct.

11 **MR. ANTHONY IMBESI:** And is it fair to say that in 2017 or 2018
12 OLRTC and RTG had concerns about the system's engineering and integration
13 activities, the status of those items on the project?

14 **MR. JACQUES BERGERON:** Yes, that's correct.

15 **MR. ANTHONY IMBESI:** And it was a result of that that SEMP
16 was brought in in 2017 and then subsequently to prepare a number of deliverables,
17 ultimately to get to the point that you've just indicated where we have this operational
18 restrictions document and we have a safety case and we have an engineering, safety
19 and assurance case?

20 **MR. JACQUES BERGERON:** Yeah, that's correct, but there's also
21 – another very important point is, you know, we had Brian McDonald that was our safety
22 engineer that was 72 years old and was working and wanted to basically retire and he
23 was, I'm going to say, thinking about retiring and he wouldn't be there to, you know, do
24 the final safety assessment, so SEMP came in, I think, because of that. But I wasn't
25 aware of the implication of SEMP but I think, you know, in retrospect, that's why, you
26 know, we needed a strong group of individuals to dig back all the documents inspected
27 and having a safety recommendation for the system.

28 **MR. ANTHONY IMBESI:** Right. And so are you generally aware

1 then that in the fall of 2017 SEMP became involved and they identify significant
2 concerns and, I would say, a lack of progression with respect to the systems
3 engineering component of the project, in particular?

4 **MR. JACQUES BERGERON:** Yes, I was aware; we had been into
5 – I’m going to call it “interview” with SEMP, all of us, everybody that was involved in the
6 system. So, yes, I was aware of that.

7 **MR. JACQUES BERGERON:** And as I understand your evidence
8 earlier today, your role – so even though you’re the Director of Integration, you didn’t
9 have a significant involvement in the systems engineering side; was that left to the
10 engineering joint venture?

11 **MR. JACQUES BERGERON:** That’s correct.

12 **MR. ANTHONY IMBESI:** And really what I’m driving at, and the
13 Commission has heard evidence with respect to SEMP’s involvement and seen some of
14 the reports, but in your interview with Commission counsel you gave evidence that you
15 weren’t sure what value SEMP added; is that a fair statement in light of what we just
16 discussed?

17 **MR. JACQUES BERGERON:** It is a fair statement. I mean the
18 documents are there; they made some very – all the reports and, you know, in hindsight
19 it was nice to have a second opinion but, you know, we didn’t change any design; we
20 didn’t change any procedures or anything because of their findings.

21 **MR. ANTHONY IMBESI:** Right. But they became involved, as
22 you’ve acknowledged, because – well, they became involved because of some concern;
23 they identified issues with systems engineering, and I appreciate that you weren’t
24 necessarily involved heavily in that process, but certainly they were engaged by OLRTC
25 to provide all of that background assurance that was required to get to where we
26 ultimately are here with the operations restriction document and the engineering safety
27 case.

28 **MR. JACQUES BERGERON:** Yeah, probably.

1 **MR. ANTHONY IMBESI:** Right. So they certainly – at least
2 OLRTC was of the view that they had some value and they contributed to the project?

3 **MR. JACQUES BERGERON:** Yeah, of course, of course.
4 Because – you know, I wasn't part of the decision to hire a third party to review all this,
5 so that's why I'm saying that I don't know the foundation of why it was there but, you
6 know, I contributed. We worked together. At that time it was a load of work there
7 because we were trying to test the vehicle and finalize all the integration and that was a
8 tremendous amount of work on top of what we already had to do. So if I was a little bit
9 impartial into this, but that was the situation at the time.

10 **MR. ANTHONY IMBESI:** Right. Okay. So just turning back then
11 to this operational restrictions document, you sealed it as a professional engineer and
12 the reason that this was sealed, I take it, is because this was a critical engineering
13 document?

14 **MR. JACQUES BERGERON:** Yes, it is. It is – you know,
15 whenever you apply restriction to a train operation it's usually because of safety
16 reasons.

17 **MR. ANTHONY IMBESI:** Right. And so because of that you had
18 to have a professional engineer sign off on it?

19 **MR. JACQUES BERGERON:** Yeah, yes.

20 **MR. ANTHONY IMBESI:** If we could turn to page 3 of this
21 document. And if we could scroll down, I believe it's the last paragraph. So this report
22 concludes that: "Based on the evidence presented, it is considered that Ottawa
23 Confederation Line Phase 1 Railway is acceptable for revenue service subject to
24 adherence to any restrictions, conditions and limitations identified in this document and
25 resolution of issues identified in the engineering, safety and assurance case outstanding
26 items."

27 This document itself, this is then relied upon in the engineering
28 safety and assurance case; correct?

1 **MR. JACQUES BERGERON:** Correct.

2 **MR. ANTHONY IMBESI:** Right. And so the purpose of this
3 document is to confirm that the railway is fit for service subject to the restrictions,
4 conditions and limitations set out in this document?

5 **MR. JACQUES BERGERON:** Correct.

6 **MR. ANTHONY IMBESI:** Right. And this document is also relied
7 upon in the overall safety case for the project; correct?

8 **MR. JACQUES BERGERON:** Correct.

9 **MR. ANTHONY IMBESI:** And so is it fair then for me to say that
10 these restrictions underpin the overall assurance and safety case for the project?

11 **MR. JACQUES BERGERON:** Yes, correct.

12 **MR. ANTHONY IMBESI:** And so if any of these restrictions,
13 conditions or limitations are not followed the system wouldn't be considered fit for
14 service?

15 **MR. JACQUES BERGERON:** Yes, that's correct.

16 **MR. ANTHONY IMBESI:** And so this is a critical document then
17 that both the operator and the maintainer need to be aware of?

18 **MR. JACQUES BERGERON:** Yes.

19 **MR. ANTHONY IMBESI:** And if we could turn to document
20 COW466007.

21 Okay, can you see the document on the screen, sir?

22 **MR. JACQUES BERGERON:** Yes, I do.

23 **MR. ANTHONY IMBESI:** Okay, so if we scroll up just a little bit -- if
24 we scroll -- scroll up, please. No, if we could go to the -- I just want to identify the
25 document for him on page 1. I want to see what the title is, so if you scroll down just a
26 little bit.

27 So you see here, this is also identified an Operations Restrictions
28 document.

1 **MR. JACQUES BERGERON:** Yes, I do.

2 **MR. ANTHONY IMBESI:** And if we scroll down just to the bottom
3 of page 1, we see here, it's a Revision 3 -- so we were just looking at Revision 2 -- and
4 it's dated 13 September 2019. Do you see that?

5 **MR. JACQUES BERGERON:** Yes, I do.

6 **MR. ANTHONY IMBESI:** Have you ever seen this document
7 before, sir?

8 **MR. JACQUES BERGERON:** I didn't see the Revision 3, no, I
9 didn't.

10 **MR. ANTHONY IMBESI:** No. So the last document that you were
11 provided with was Revision 2?

12 **MR. JACQUES BERGERON:** Yes.

13 **MR. ANTHONY IMBESI:** Okay. And do you have any knowledge
14 as to why this document does not appear to be sealed?

15 **MR. JACQUES BERGERON:** No, I don't. I would assume that, to
16 their assessment, that, you know, there's probably some restrictions that has been
17 lifted, and since they were approved before that they should be okay. That's how I see
18 it, but I cannot be sure.

19 **MR. ANTHONY IMBESI:** Okay. So in -- just as a professional
20 engineer, then, in what circumstance would this document not need to be sealed, only if
21 -- only if restrictions are being lifted?

22 **MR. JACQUES BERGERON:** Well, if there's no major issues, you
23 know, that the bulk of the document hasn't changed, if there's corrections, typos, or
24 something like that, I don't think it needs to be sealed as long as everybody has
25 reviewed it.

26 **MR. ANTHONY IMBESI:** If restrictions are modified or added,
27 would that require this document to be sealed?

28 **MR. JACQUES BERGERON:** Yes.

1 **MR. ANTHONY IMBESI:** Okay.

2 **MR. JACQUES BERGERON:** If it's -- you know, if it's substantial
3 requirements, substantial further restriction, yes, I would say so.

4 **MR. ANTHONY IMBESI:** And when you say "substantial", is that
5 just referring to anything that would deal with safety, or how do you define that?

6 **MR. JACQUES BERGERON:** Yeah, mostly related to safety.

7 **MR. ANTHONY IMBESI:** Okay. If we could turn to document
8 RTM30914 -- can you see this document on the screen, sir?

9 **--- EXHIBIT No. 102:**

10 RTM00030914 – Ottawa Light Rail Transit Project Track
11 Safety Justification Report 14 August 2019

12 **MR. JACQUES BERGERON:** Yes, I do.

13 **MR. ANTHONY IMBESI:** And this is OLRTC's Track Safety
14 Justification Report?

15 **MR. JACQUES BERGERON:** Yes.

16 **MR. ANTHONY IMBESI:** And we see it's August 14th, 2019. It's
17 Revision 2.

18 **MR. JACQUES BERGERON:** Yes.

19 **MR. ANTHONY IMBESI:** And this document is also sealed by
20 yourself with the handwritten date, August 20th, 2019.

21 **MR. JACQUES BERGERON:** Yes.

22 **MR. ANTHONY IMBESI:** And if we turn to page 3 of this
23 document, and if we scroll down to the bottom of this page, we'll see there there's a
24 similar, if not identical, paragraph to what we looked at in the Operational Restriction
25 document.

26 **MR. JACQUES BERGERON:** Yes, I see it.

27 **MR. ANTHONY IMBESI:** Okay. And so is it fair for me to say that
28 this document also forms part of the overall safety case and the engineering safety and

1 assurance case?

2 **MR. JACQUES BERGERON:** Yes.

3 **MR. ANTHONY IMBESI:** Okay. And if we go down to page 42,
4 specifically -- so if we could scroll down just so that 4.6.2.1 is at the top, try to get the
5 most text available for Mr. Bergeron to look at -- so if you just take a quick look here, sir
6 ---

7 **MR. JACQUES BERGERON:** Yes.

8 **MR. ANTHONY IMBESI:** --- I have a few questions for you.

9 **MR. JACQUES BERGERON:** Can we make it a little bit bigger,
10 please?

11 **MR. ANTHONY IMBESI:** Sure. So why don't we make it a little bit
12 bigger, and then we'll give him the first few paragraphs, and then we'll scroll down, let
13 him take a look, and then I have a few questions for him.

14 **COMMISSIONER HOURIGAN:** We'll take the afternoon break,
15 thanks.

16 **THE REGISTRAR:** Order, all rise. The Commission will recess for
17 15 minutes.

18 --- Upon recessing at 3:35 p.m.

19 --- Upon resuming at 3:51 p.m.

20 **THE REGISTRAR:** The hearing has resumed.

21 **--- MR. JACQUES BERGERON, Resumed:**

22 **COMMISSIONER HOURIGAN:** All right, please proceed.

23 **MR. ANTHONY IMBESI:** Okay, thank you.

24 **--- EXAMINATION IN-CHIEF BY MR. ANTHONY IMBESI, (cont'd) :**

25 **MR. ANTHONY IMBESI:** So, Mr. Bergeron, I'm going to pull up
26 that document again, if we could.

27 **MR. JACQUES BERGERON:** Yes, please do. Do you hear me
28 correctly? It seems that my internet is stable.

1 **MR. ANTHONY IMBESI:** Yes, I do. I can hear you.

2 **MR. JACQUES BERGERON:** Thank you. If something ---

3 **MR. ANTHONY IMBESI:** Could you pull up ---

4 **MR. JACQUES BERGERON:** If something happens, I can call
5 back to the number.

6 **MR. ANTHONY IMBESI:** Okay, well, fingers crossed.

7 **MR. JACQUES BERGERON:** Yes.

8 **MR. ANTHONY IMBESI:** So if we could pull up RTM30914,
9 please. Okay, so this is the Track Safety Justification Report that we were just looking
10 at and I had turned your attention to towards the bottom of page 42. And I did want you
11 to take a quick look through this so you appreciate my questions once they -- once
12 they're asked of you, so if you just want to take a moment, please. Okay?

13 **MR. JACQUES BERGERON:** Yes.

14 **MR. ANTHONY IMBESI:** Okay. So -- well, first of all, I mean, you
15 sealed this document. I take it you generally agree with what's set out here?

16 **MR. JACQUES BERGERON:** Yes.

17 **MR. ANTHONY IMBESI:** Okay. And so, to my understanding, is
18 this identifying potential hazards with the rail?

19 **MR. JACQUES BERGERON:** No, it doesn't. You know, the rail
20 and the wheel has to be fairly closely matched as far as Brinell hardness. A tolerance of
21 310 to 350 is in the normal range of tolerance. If you had one, you know, the rails -- if
22 the rails would be, let's say. 100 Brinell harder, that would be very, very tough on the
23 wheels and you would have premature wear. And if the same opposite on the wheel,
24 that would mean that you would have extreme wear on the rails.

25 So -- and -- you know, mind you, that the rail is going to -- just like it
26 says here -- is going to get hard -- hardened by the rolling of the wheels in due time.

27 But it is basically, in what we've seen as far as tolerance in
28 differential between the wheels and the rail.

1 **MR. ANTHONY IMBESI:** Okay. So in your view then, this report's
2 not saying that the rail is too hard or too soft?

3 **MR. JACQUES BERGERON:** No, not at all.

4 **MR. ANTHONY IMBESI:** And it mentions rolling contact fatigue or
5 RCF. Could you just explain for us briefly what that is?

6 **MR. JACQUES BERGERON:** Well, you know, the -- basically, the
7 contact touch of a wheel against the rail is about 70 millimetres square, so it's very tiny.
8 What we see on almost every railway is in braking zones, you're going to have some -- I
9 don't know what the English term is, but in French, it's fluage..

10 It's kind of a wavy characteristic meaning that the material is pulled
11 towards the direction of the braking, and this needs to be worked on periodically,
12 because basically, on every railroad, you see that. Or the other place that you're going
13 to see that is if your wheel profile doesn't match the speed that you're going to take the
14 curve, you might have what we call slip and slide, meaning that one side of the --
15 usually the outside wheel is going to slip, re-catch and slip, and then, you know, create
16 the same phenomenon in certain curves.

17 So those are part of normal maintenance of a railway.

18 **MR. ANTHONY IMBESI:** Okay. And so when you talk about that,
19 that effect on the railway -- and I apologize, I'm not a French speaker -- but is that the
20 same thing as corrugation, a wavy rail?

21 **MR. JACQUES BERGERON:** Yeah, it is. It is. You get different
22 types of corrugation, but this one is mostly like, you know, the phenomena is that if you
23 roll let's say a heavy couch on a carpet, you see kind of a wave that forms in front on
24 the carpet? That's basically the material that flows in one direction. So that is a type of
25 corrugation.

26 You can have corrugation on the site if the wheel slips from side to
27 side too often or too hard, let's say, so there's different types of corrugation, but yes,
28 you can call it the corrugation.

1 **MR. ANTHONY IMBESI:** Okay. So if I understand it then, there's
2 different causes of corrugation, but one of them can be rolling contact fatigue?

3 **MR. JACQUES BERGERON:** Yes.

4 **MR. ANTHONY IMBESI:** Okay. And that's being identified as a
5 potential issue here then; is that fair?

6 **MR. JACQUES BERGERON:** Yeah, that's fair. That's to advise. I
7 think it's a good thing to say, but you know, to the maintenance staff to pay attention to
8 those, in those -- you know, those areas that are more prone than others.

9 **MR. ANTHONY IMBESI:** Right. And so if we look at the last
10 paragraph, speaking about that, is it fair then that the curves on the track might be one
11 of those instances where that might become more of a problem? And I'm speaking
12 about the RCF in the corrugation. Is that what that's indicating?

13 **MR. JACQUES BERGERON:** Yes. But the vehicle is equipped
14 with flange lubrication, so you know, it is a way to manage and control the corrugations
15 in curves.

16 **MR. ANTHONY IMBESI:** But then at the same time, in the last
17 sentence there of the final paragraph, it's indicating that additional rail grinding will be
18 required throughout the life of the system to prevent the buildup of RCF type defects?

19 **MR. JACQUES BERGERON:** Yeah. Well, that's going to be --
20 that has to be seen, basically. You know, every curve and every braking zones are
21 prone to that in every system, so of course, you have to pay attention to it.

22 In the curves, in our system, frankly, I don't know what type of
23 lubrication that we -- I don't remember, but usually, that takes care of it.

24 **MR. ANTHONY IMBESI:** Right. But here, is it not the case though
25 from that sentence that they're recommending -- well, you are recommending additional
26 rail grinding and additional ultrasonic and visual inspection. Does that not imply that
27 there's in increased risk for this kind of issue?

28 **MR. JACQUES BERGERON:** Well, you know, through the -- at

1 that time, when it -- when that was -- that happened, I don't fully remember, but I don't
2 think that the wheel lubrication, the frames lubrication was, in fact, in effect.

3 So yes, early on, you can see those type of things, and of course,
4 you have to repair it before the start of revenue service. It's not a safety issue, but it's
5 much more a comfort issue.

6 **MR. ANTHONY IMBESI:** And if we turn to page 51, please, of the
7 document, and if we scroll down?

8 So sir, I'm looking here. So this is the recommendation section of
9 the report. Do you see that?

10 **MR. JACQUES BERGERON:** Yes.

11 **MR. ANTHONY IMBESI:** And if we could scroll down a little, just a
12 little bit more, I want to see items number 1 and 2 if possible. Right.

13 So you'll see here, Item number 1 talks about establishing a
14 working group to monitor wheel and rail wear data?

15 **MR. JACQUES BERGERON:** Yes.

16 **MR. ANTHONY IMBESI:** Do you recall that being a discussion in a
17 recommendation?

18 **MR. JACQUES BERGERON:** Yeah. I mean, to be frank with you,
19 when it comes to rail of the Ottawa, we purchased the rails, if my memory served me
20 right, in July 2015, and we started to install them in, you know, late 2016.

21 And you know, there was a lot of what we call scale on the rails
22 because they had been left in a field for over a year and a half in the rain and
23 everything. So they started to rust and you know, my recommendation was to actually
24 grind the entire system before revenue service.

25 **MR. ANTHONY IMBESI:** Right. And I ---

26 **MR. JACQUES BERGERON:** So ---

27 **MR. ANTHONY IMBESI:** I do believe that's reflected, either in this
28 document or the operational restriction document. But when we're talking about

1 establishing a working group to monitor the wheel and rail wear data, does that not
2 imply that there's an additional potential issue beyond just cleaning up the rails prior to
3 revenue service?

4 **MR. JACQUES BERGERON:** Well, it is a good practice to have
5 somebody that is qualified to inspect and monitor the rails, not only for that, but for
6 potential rail breaks as well. So yes, it is. It is a good practice to establish that type of
7 group.

8 **MR. ANTHONY IMBESI:** And then -- so but I think you'd agree
9 with me -- but on any rail system, there's some level of visual inspection and ultrasonic
10 testing that needs to take place at given points in time, right?

11 **MR. JACQUES BERGERON:** Yeah, right.

12 **MR. ANTHONY IMBESI:** And so that likely would have been
13 reflected in some of the maintenance materials for this project, right?

14 **MR. JACQUES BERGERON:** Yes. I never reviewed the
15 maintenance material, but I would assume so, yes.

16 **MR. ANTHONY IMBESI:** So what I'm wondering though is why, in
17 these recommendations, does it indicate that it needs increased rail wear visual
18 inspections on all sharp curves, and increased ultrasonic testing?

19 **MR. JACQUES BERGERON:** Well, I -- like I said, I don't know if
20 they -- when that was written, to make sure that all the testing and the running that we
21 had done without the proper system, lubrication system, didn't generated -- I'm going to
22 say over wear of certain areas of the track.

23 **MR. ANTHONY IMBESI:** Okay. And so I'll just ask you, are you
24 aware of an increased concern on this particular project with respect to either RCF or
25 corrugation?

26 **MR. JACQUES BERGERON:** No, I am not.

27 **MR. ANTHONY IMBESI:** Okay.

28 **MR. JACQUES BERGERON:** I'm really not.

1 **MR. ANTHONY IMBESI:** Okay. And so I take it then from your
2 evidence that you can't really tell us for certain the basis for these recommendations,
3 sitting here now looking back?

4 **MR. JACQUES BERGERON:** No, I cannot, but you know, it does
5 make sense to monitor the rails. And in this, to be frank with you, I agree with those,
6 because on most railway system, the track monitoring is something that is of a weak
7 point, and the only exception I can say is Vancouver, that have a very, very good track
8 maintenance and inspection regime.

9 But most commonly, in all systems, it's kind of an afterthought and
10 when people get to it, it's too late, you know? The damage has been done.

11 **MR. ANTHONY IMBESI:** Okay. And so when you speak about
12 damage, what are the implications of not monitoring these issues and performing this
13 maintenance?

14 **MR. JACQUES BERGERON:** You know, you can -- it's mostly
15 extra wear on the wheels and comfort for the passengers and noise for the surrounding
16 environment.

17 **MR. ANTHONY IMBESI:** Right. And so -- and the wear on the
18 wheels, that can lead to any number of issues with the vehicle components
19 themselves?

20 **MR. JACQUES BERGERON:** Yeah, it could but it's mostly an extra
21 cost in wheel truing and noise for the surrounding environment and the passengers as
22 well.

23 **MR. ANTHONY IMBESI:** And if any of the requirements that are
24 set out in here -- so we've been talking about increased ultrasonic inspecting, increased
25 wheel rail grinding, and there are a number of other recommendations set out in here as
26 well as in the operational restriction document. So is it fair to say that if any of those
27 requirements or conditions are not followed, this could have the potential of
28 compromising the safety of the system?

1 **MR. JACQUES BERGERON:** I don't believe it compromises
2 safety, to be frank with you. But you know, it can happen. The amount of G forces that
3 -- and vibration that are designed into, let's say, the bogies, are in the 50 Gs
4 neighbourhood. So they have a very large safety factor. But if it's left unattended for a
5 long period of time, yes, it can have effects.

6 **MR. ANTHONY IMBESI:** Right. It does have the potential to lead
7 to ---

8 **MR. JACQUES BERGERON:** Yes.

9 **MR. ANTHONY IMBESI:** --- a compromising situation.

10 **MR. JACQUES BERGERON:** On a long term, definitely. It's just
11 like on your car. If you don't change your tires you eventually you may lead to a
12 catastrophic experience.

13 **MR. ANTHONY IMBESI:** All right. Thank you. Those are my
14 questions, sir.

15 **MR. JACQUES BERGERON:** Yeah. You're welcome.

16 **COMMISSIONER HOURIGAN:** All right. Thank you, Counsel.
17 Next is City of Ottawa.

18 **MR. JESSE GARDNER:** Thank you, Mr. Commissioner.

19 It's Jesse Gardner, G-a-r-d-n-e-r, counsel for the City of Ottawa.

20 Mr. Bergeron, I have a few questions for you.

21 **--- CROSS-EXAMINATION BY MR. JESSE GARDNER:**

22 **MR. JESSE GARDNER:** I understand that there was no previous
23 Director of Integration prior to your taking on that role; is that right?

24 **MR. JACQUES BERGERON:** That's my understanding, right.

25 **MR. JESSE GARDNER:** And when you became the Director of
26 Integration, you would agree with me that there hadn't really been much integration
27 work that had started at that time; is that fair?

28 **MR. JACQUES BERGERON:** I'm not going to say that there

1 hasn't been but they were certainly at the beginning of the integration work.

2 **MR. JESSE GARDNER:** Okay. You stated in your interview that
3 the early interface meetings were difficult because Thales and Alstom were competitors
4 but that it became easier as the project went on. I assume it was easier partially
5 because of your role as Director of Integration to facilitate those meetings; is that fair?

6 **MR. JACQUES BERGERON:** Well, you know, it is fair. I don't
7 want to take the full credit for this, but I think once each party understood their roles and
8 we're all there basically -- what I used was in the same team; we're building the same
9 system. And to make sure that nobody was there to hurt or to reduce the effectiveness
10 of the collaboration. I think it went very well. It went from -- I'm going to say a cold
11 relationship to a warm one within a year or year and a half or so.

12 **MR. JESSE GARDNER:** And you understood when you took on
13 this role that RTG had committed to the City in its proposal and in the PA, the Project
14 Agreement, that it was responsible for systems integration? Is that right?

15 **MR. JACQUES BERGERON:** Yes, that's right.

16 **MR. JESSE GARDNER:** Okay. And specifically, the City had
17 been told by RTG that Alstom and Thales had worked successfully together previously
18 and would do so on this project. Are you aware of that?

19 **MR. JACQUES BERGERON:** Yes, I am aware of that.

20 **MR. JESSE GARDNER:** Okay. And you are aware that RTG had
21 advised the City that systems integration was one of the highest risks on the project?

22 **MR. JACQUES BERGERON:** Yes, I was aware of that.

23 **MR. JESSE GARDNER:** And so you'd agree with me that your
24 role as Director of Integration was quite important.

25 **MR. JACQUES BERGERON:** Yes, I do.

26 **MR. JESSE GARDNER:** So you would agree that, you know, to
27 the extent that Alstom and Thales were not working well together, it was OLRTC's
28 responsibility to resolve that?

1 **MR. JACQUES BERGERON:** That's the role that I took. And
2 that's the responsibility that I put upon myself to make sure that they do work
3 harmoniously between each other.

4 **MR. JESSE GARDNER:** And it's not the City's role to interfere and
5 to take on that role; would you agree with me?

6 **MR. JACQUES BERGERON:** I totally agree. I've never seen, you
7 know, the City or any client that actually interfered with this. It's too -- I'm going to say it.
8 It's a little bit complex and you need quite a lot of experience to know what you're
9 looking for.

10 **MR. JESSE GARDNER:** Right. So not the City's role to interfere
11 with that integration work. But you'd agree with me that the difficulties between -- in
12 coordination of the systems integration between Thales and Alstom, that's something
13 that the owner should have known about; wouldn't you agree?

14 **MR. JACQUES BERGERON:** Yes, to a certain extent. But you
15 know, it's -- how can I say this?

16 It's something that -- how can I say? When you start a project
17 people don't know each other. They don't know their style of working and it's not the
18 kind of a smooth sailing event right on the offset.

19 **MR. JESSE GARDNER:** I understand. And you've agreed with me
20 that RTG identified to the City early on that systems integration was one of the highest
21 risks. So you would agree with me that when things were not going well, the City
22 should have been made aware of that; is that fair?

23 **MR. JACQUES BERGERON:** Well, you know, that's fair, yes.

24 **MR. JESSE GARDNER:** Okay. And Commission counsel asked
25 you about the different schedules for Thales and Alstom with respect to certain design
26 deliverables, I think including the ICD; do you recall that?

27 **MR. JACQUES BERGERON:** Yes, I do.

28 **MR. JESSE GARDNER:** Okay. And you testified or you provided

1 evidence that typically someone at the oversight level at OLRTC would review the
2 subcontracts and ensure that those timelines were aligned and the requirements were
3 aligned; do you recall that?

4 **MR. JACQUES BERGERON:** Yes, I do.

5 **MR. JESSE GARDNER:** But that didn't happen in this case; you
6 would agree?

7 **MR. JACQUES BERGERON:** I don't -- I don't think it's 100 percent
8 true. I think the delivery of information was onset, you know, made, I'm going to say,
9 well-adjusted between each other. But once we started to have issues then the one -- if
10 you were there early on when I talked about -- and everybody understood that, you
11 know, the incapacity of Alstom to supply a "teked" wheel to the performance requested
12 by Thales, that basically, you know, is a bump on the road and a redesign needed to
13 happen and that takes time to find a solution and then finalize the design.

14 So you know, those schedules early on, I think, were well balanced
15 and adjusted but as the program evolved we hit some issues that took longer to resolve
16 than if we didn't have it, basically.

17 **MR. JESSE GARDNER:** Sure. My question is a little bit more
18 narrow, Mr. Bergeron. So I'll ask it again or I'll rephrase it.

19 So you would agree with me that some of the major deliverables ---
20 the timing for the deliverables between the Alstom contract with OLRTC and the Thales
21 contract with OLRTC did not align, for example, in relation to the ICD. Is that fair?

22 **MR. JACQUES BERGERON:** Yeah, well, this one yes, definitely.
23 It was not aligned.

24 **MR. JESSE GARDNER:** Right.

25 **MR. JACQUES BERGERON:** That is correct.

26 **MR. JESSE GARDNER:** And that was fairly significant, right, that
27 that timeline was not aligned?

28 **MR. JACQUES BERGERON:** Yes, it is. It is significant.

1 **MR. JESSE GARDNER:** And given the importance and the high
2 risk nature of this issue, systems integration, that's something that owner should have
3 bene made aware of that Thales and Alstom were not working to the same schedule.

4 **MR. JACQUES BERGERON:** Well, to be honest with you, yes,
5 they didn't work on the same schedule; that's for sure. But to be honest with you, I don't
6 know if on the management of RTG if they understood the value of those dates truly,
7 and the implication of them. I don't want to excuse anybody but you know, it is
8 something that if you haven't done it two or three times you don't understand how
9 critical it is.

10 **MR. JESSE GARDNER:** I understand that. But I'm getting at a
11 slightly different point. Given the significance and the importance that we've talked
12 about of systems integration and the misalignment with the Schedule for the ICD, you
13 would agree with me that that is something that would have been important for the City
14 to be aware of?

15 **MR. JACQUES BERGERON:** Yeah. I think the City was entitled
16 to be aware of any, you know, issues that we have in scheduling or otherwise. Yeah, I
17 cannot -- you know, I cannot say No to that.

18 **MR. JESSE GARDNER:** Thank you.

19 I would like to show you the Systems Integration Test Procedure.
20 The document number is COW0248989. So 248989.

21 Okay, and if we scroll down to the date, do you recognize this
22 document, Mr. Bergeron?

23 **--- EXHIBIT No. 103:**

24 COW0248989 – Ottawa Light Rail Transit System
25 Integration Test Procedure 12 July 2018

26 **MR. JACQUES BERGERON:** Yes, I do.

27 **MR. JESSE GARDNER:** Can you see your signature there?

28 **MR. JACQUES BERGERON:** Yes.

1 **MR. JESSE GARDNER:** Okay. This is the System Integration
2 Test Procedure dated July 12th, 2018?

3 **MR. JACQUES BERGERON:** Yes.

4 **MR. JESSE GARDNER:** And this is prepared by RTGE, the
5 engineering joint venture, is that right?

6 **MR. JACQUES BERGERON:** Yes. Yes, it is.

7 **MR. JESSE GARDNER:** All right. And you'd agree with me that
8 this procedure was put into place so that the vehicles and signalling systems could be
9 tested, right?

10 **MR. JACQUES BERGERON:** That's correct. That's correct.

11 **MR. JESSE GARDNER:** So if we scroll down to page 5 of the
12 PDF, Section 1.2, it lists a number of abbreviations, and SIT is Systems Integration
13 Test, would you agree?

14 **MR. JACQUES BERGERON:** Yes, it is.

15 **MR. JESSE GARDNER:** Okay. And the -- we'll turn to the next
16 page, so looking at Section 2.4 on page 6 -- 2.14:

17 "This SIT requires three OLRT LRV trains, one car
18 train." (As read).

19 Do you see that?

20 **MR. JACQUES BERGERON:** Yes.

21 **MR. JESSE GARDNER:** So I take it, then, that the systems
22 integration test could be -- could commence as soon as there were three vehicles that
23 had been delivered so, in other words, there was no need to wait for all of the vehicles
24 to be delivered for this SIT -- this systems integration test to be completed. Is that right?

25 **MR. JACQUES BERGERON:** That's right.

26 **MR. JESSE GARDNER:** Okay. We can take this document down.

27 **MR. JACQUES BERGERON:** There's -- if I can add a little thing,
28 it's that we don't need to do systems -- just like this one was a SCADA -- system

1 integration test, we don't need a lot of vehicles, but we do need a system.

2 **MR. JESSE GARDNER:** Understood.

3 **MR. JACQUES BERGERON:** We need all the connections and, of
4 course, we need a SCADA to be installed and working.

5 **MR. JESSE GARDNER:** Thank you, Mr. Bergeron. I'd like to now
6 show you a letter from Peter Lauch, CEO of RTG, to Michael Morgan at the City. It's
7 dated August 26, 2019, so it's COW0436983 -- 436983. All right, so this is a cover
8 letter from RTG to the City, but I'd like to scroll down. It encloses a letter from Steve
9 Nadon, who was the testing and commissioning director, so if we scroll down. Yeah,
10 scroll down the next page, please. Thank you. So you can see this is a letter from
11 Steve Nadon to Peter Lauch.

12 **--- EXHIBIT No. 104:**

13 COW0436983 – Letter RTG to City of Ottawa 29 August
14 2019 with attached Letter from OLRTC to RTG 20 August
15 2019

16 **MR. JACQUES BERGERON:** Yes.

17 **MR. JESSE GARDNER:** And if we just scroll up to see the date.
18 it's dated August 20th, 2019. Do you see that?

19 **MR. JACQUES BERGERON:** Yes.

20 **MR. JESSE GARDNER:** So in this letter, OLRTC advised RTG
21 that the systems integration tests were completed and in general compliance with the
22 project requirements. And if we just scroll down, it's the portion that's just at the bottom
23 of the page. So:

24 "It is our opinion that in relation to the SITS listed in
25 Appendix A, the system is in general compliance with
26 the PA requirements, drawings, and system
27 architecture, which will perform together and be safe
28 for use, operation, and maintenance, as required."

1 (As read).

2 And you can your stamp there, Mr. Bergeron, is that right?

3 **MR. JACQUES BERGERON:** Yes, that's right.

4 **MR. JESSE GARDNER:** And so you signed this document
5 confirming that the SITS had been completed in accordance with the PA and that the
6 system could operate safely and -- for use, operation, and maintenance, right?

7 **MR. JACQUES BERGERON:** That's correct. And I had -- you
8 know, prior to putting my seal on this, I had a long conversation with Steve to review all
9 the tests and mostly all the open items that were left on and, basically, what was left to
10 re-test or correct were very minor items that didn't affect the safety of the system at all.

11 **MR. JESSE GARDNER:** Right. So you were confident when you
12 applied your stamp and signature that this final statement was accurate, is that right?

13 **MR. JACQUES BERGERON:** That's correct.

14 **MR. JESSE GARDNER:** Okay. And you signed this document,
15 obviously, in your capacity as a professional engineer in Ontario, correct?

16 **MR. JACQUES BERGERON:** Yes, I did.

17 **MR. JESSE GARDNER:** And you'd agree with me that this
18 document being provided, as we saw at the top, to Mr. Morgan, Michal Morgan of the
19 City of Ottawa, was intended to tell the City that this systems integration testing was
20 completed and your view was that the system was safe for use, operation, and
21 maintenance. Is that right?

22 **MR. JACQUES BERGERON:** That's correct.

23 **MR. JESSE GARDNER:** Okay. We can take this document down.
24 Thank you. You'd agree with me that in March in 2014, you were appointed vehicle
25 procurement officer replacing Rainier Iowski, is that right?

26 **MR. JACQUES BERGERON:** Can you repeat the question?

27 **MR. JESSE GARDNER:** Sure. I understand that in March 2014,
28 you were also appointed to be the vehicle procurement officer. Is that right?

1 **MR. JACQUES BERGERON:** I don't recall that. I never been a
2 vehicle procurement officer. I don't know where that comes from, if you can enlighten
3 me.

4 **MR. JESSE GARDNER:** Sure, okay. So I'll bring up the document
5 COW0158983.

6 **--- EXHIBIT No. 105:**

7 COW0158983 – Letter OLRTC to City of Ottawa 5 March
8 2014

9 **MR. JESSE GARDNER:** All right. So this letter is a letter to Nancy
10 Schepers. If we scroll down a little bit, it's from David White, Project Director. And, if
11 you wouldn't mind scrolling back up, it says:

12 "Please be advised that we are requesting the
13 replacement of Ranier Iowski as Vehicle
14 Procurement Officer. Our replacement is Mr. Jacques
15 Bergeron. Mr. Bergeron's been in involved in
16 numerous mass transit projects." (As read).

17 I assume they're talking about you. Is that right, Mr. Bergeron?

18 **MR. JACQUES BERGERON:** Yes, that's me.

19 **MR. JESSE GARDNER:** Okay. So do you recall taking on that
20 role as well?

21 **MR. JACQUES BERGERON:** Actually, I never saw that letter.
22 And I know of Rainier. I mean we worked together at the beginning. I didn't know what
23 was his title, really. And he was going out of the project, so, you know, I came in and,
24 you know, it's -- you know, if you're talking about, you know, everything that relates to
25 Alstom, I was part of it as well, as much as Thales.

26 **MR. JESSE GARDNER:** No, Mr. Bergeron, if I could just ask a
27 question to understand this. This is a letter in which RTG is putting forward a key
28 individual under Schedule 9 of the Project Agreement to the City. They're suggesting

1 that you will be taking over the role of Vehicle Procurement Officer. Did you not take on
2 that role?

3 **MR. JACQUES BERGERON:** I guess I did. At the end of the day,
4 I guess I did. I had -- I had somebody that was in my time that was dedicated to
5 Alstom's, basically, design and production of the vehicle.

6 **MR. JESSE GARDNER:** Right, but you didn't see this letter and
7 you hadn't heard specifically that you were being assigned to this role, is that fair?

8 **MR. JACQUES BERGERON:** Yeah, that's fair. That's fair.

9 **MR. JESSE GARDNER:** Okay. And going back to your role as
10 integration director, when you left the project, no one took over that role, specifically, is
11 that right?

12 **MR. JACQUES BERGERON:** I -- I wasn't there. I had a
13 replacement, which I think everybody knows was Joe Marconi. But at that time, I don't
14 know what exact role he was given, if it was integration role or just a follow-up on the
15 vehicle manufacturing. That, I don't know.

16 **MR. JESSE GARDNER:** You're not certain. Is that fair?

17 **MR. JACQUES BERGERON:** That's -- exactly.

18 **MR. JESSE GARDNER:** Okay. So I'd like to ask you about -- a
19 little bit about safety. I wanted to clarify a question you were asked during your
20 interview with the Commission. Do you recall being asked about integration standards
21 and, specifically, EN50126?

22 **MR. JACQUES BERGERON:** Yes.

23 **MR. JESSE GARDNER:** You'd agree with me that EN 50126 is a
24 part of a suite of documents that makes up the CENELEC Safety Standard or safety
25 approach, is that fair?

26 **MR. JACQUES BERGERON:** That's fair.

27 **MR. JESSE GARDNER:** And the U.S. standard that's been
28 referred to, I believe, in your interview as well is the mill standard. Is that fair?

1 **MR. JACQUES BERGERON:** That's fair.

2 **MR. JESSE GARDNER:** You indicated that in relation to your work
3 on integration with Thales and Alstom you used EN50126; is that right?

4 **MR. JACQUES BERGERON:** That's correct.

5 **MR. JESSE GARDNER:** And so this would involve hazard logs,
6 identification of risks and solutions, traceability, all of those components, right?

7 **MR. JACQUES BERGERON:** That's correct.

8 **MR. JESSE GARDNER:** You also indicated in your interview that
9 SNC was responsible for systems integration; is that right?

10 **MR. JACQUES BERGERON:** Yes, except for the vehicle and
11 Thales.

12 **MR. JESSE GARDNER:** Right. And you indicate that SNC might
13 have been using the mill standard?

14 **MR. JACQUES BERGERON:** They might have. I don't know what
15 standard they actually used.

16 **MR. JESSE GARDNER:** So I'm going to suggest to you, Mr.
17 Bergeron, that it's possible that at various points during the project two different
18 standards were being used for integration; is that fair?

19 **MR. JACQUES BERGERON:** That's fair.

20 **MR. JESSE GARDNER:** Okay. Would you agree with me that
21 during your time on the project OLRTS didn't make an overarching decision to use a
22 single standard for systems integration so that there was a consistent approach with
23 respect to artifacts and tracking hazards?

24 **MR. JACQUES BERGERON:** I agree with that.

25 **MR. JESSE GARDNER:** So I'm going to suggest to you, Mr.
26 Bergeron, that OLRTC was generally using the mill standard approach until Sean Derry
27 was retained by OLRTC in 2017 to lead the engineering system safety assurance team.
28 Is that fair?

1 **MR. JACQUES BERGERON:** That's fair.

2 **MR. JESSE GARDNER:** And when Sean Derry was retained and
3 took on that role, OLRTC started to use a new approach that was very similar or in line
4 with the CENELEC approach. Are you aware of that shift?

5 **MR. JACQUES BERGERON:** Yes, I was.

6 **MR. JESSE GARDNER:** So you'd agree with me that there was a
7 more unified approach to safety assurance and specifically the approach was more in
8 line with CENELEC one Sean Derry was retained in 2017 and then moving forward; is
9 that fair?

10 **MR. JACQUES BERGERON:** That's fair.

11 **MR. JESSE GARDNER:** Okay, thank you.

12 Now, you'd agree with me that when performing your work in
13 relation to system integration with Thales and Alstom, compliance with safety standards
14 was a priority for you. Is that fair?

15 **MR. JACQUES BERGERON:** It is fair, and it was.

16 **MR. JESSE GARDNER:** Okay. And you agree that the City could
17 be confident that safety was being properly addressed by OLRTC?

18 **MR. JACQUES BERGERON:** Yes. Yes, I am.

19 **MR. JESSE GARDNER:** I'd like to look at the Rev 2 of the
20 Operations Restrictions document that we looked at before. It's COW0459399.

21 So we looked at this document earlier, Mr. Bergeron, with
22 Commission counsel, but I'd like to take you to page 31 of the PDF. So this is the
23 conclusion section. And if we scroll down -- sorry, one moment.

24 So if we look at the fourth bullet at the last -- so if we can scroll to
25 the top, please. Okay. So looking at the fourth bullet:

26 "Rim analysis shown in Confederation line, phase 1
27 report provides confidence that failures and the
28 consequences of failures have been adequately

1 managed and that the Confederation line phase 1 is
2 capable of delivering long-term, safe, reliable and
3 cost-effective performance.” (As read)

4 Do you recall this conclusion in the document that you stamped and
5 signed?

6 **MR. JACQUES BERGERON:** Yes, I do.

7 **MR. JESSE GARDNER:** And you were confident in that
8 conclusion when you signed this document. Is that fair?

9 **MR. JACQUES BERGERON:** Yeah, it is fair. And I ---

10 **MR. JESSE GARDNER:** Okay. Thank you. And if we look at the
11 next bullet:

12 “Safety risks have been reduced by using mature and
13 proven systems that have been integrated using
14 processes that have been demonstrated to be robust
15 and traceable.” (As read)

16 Was that accurate when you stamped this document?

17 **MR. JACQUES BERGERON:** Yes, it was.

18 **MR. JESSE GARDNER:** Thank you. We can take down the
19 document.

20 I'd like to quickly take you to the Engineering Safety and Assurance
21 Case. It's ALS0084164. And do recognize this document, Mr. Bergeron?

22 **MR. JACQUES BERGERON:** Yes, I do.

23 **MR. JESSE GARDNER:** Okay. And I believe, if we scroll down,
24 you stamped and signed this document?

25 **MR. JACQUES BERGERON:** Yes, I did.

26 **MR. JESSE GARDNER:** Okay. And I'd like to take you to page 4
27 of the PDF. It's the Executive Summary. And it states that -- and it's paragraph 3:

28 “With the evidence available, it was possible to

1 determine that the highest level system engineering in
2 its systems assurance argument, namely, the
3 Confederation line phase 1, is fit for operation could
4 be made.” (As read)

5 Do you see that?

6 **MR. JACQUES BERGERON:** Yes, I do.

7 **MR. JESSE GARDNER:** And would you agree that that was
8 accurate when you signed this document?

9 **MR. JACQUES BERGERON:** Yes, it was, and I agree.

10 **MR. JESSE GARDNER:** Right. So you agree that the -- would
11 you agree with me that when the system was launched, when RSA was achieved and
12 the system was launched it was fit for operation and safe for use?

13 **MR. JACQUES BERGERON:** Yes, it was.

14 **MR. JESSE GARDNER:** Thank you. We can take this document
15 down.

16 I just have a few more questions for you, Mr. Bergeron.

17 You'd agree with me that one of the primary responsibilities of a
18 contractor is to meet its obligations under the contract it has entered into with an owner?
19 Is that fair?

20 **MR. JACQUES BERGERON:** That's fair.

21 **MR. JESSE GARDNER:** And you'd agree with my that OLRTC did
22 struggle to perform its systems integration obligations earlier on in the project; is that
23 fair?

24 **MR. JACQUES BERGERON:** That's fair.

25 **MR. JESSE GARDNER:** And over the course of the project the
26 system integration issues were addressed to the point whereby the time RSA arrived
27 everyone could have confidence that the system was safe, and that the PA
28 requirements had been met; is that fair?

1 **MR. JACQUES BERGERON:** That's fair.

2 **MR. JESSE GARDNER:** So you would agree with me that when
3 RSA was achieved and the system was launched it was safe, it was fit for use, and
4 compliant with the Project Agreement?

5 **MR. JACQUES BERGERON:** Yes, it was.

6 **MR. JESSE GARDNER:** Thank you, Mr. Bergeron. Those are my
7 questions.

8 **MR. JACQUES BERGERON:** Thank you.

9 **COMMISSIONER HOURIGAN:** Thank you.

10 Next is Alstom.

11 **MR. JACOB McCLELLAND:** Good afternoon, Mr. Commissioner.
12 Can you hear me?

13 **COMMISSIONER HOURIGAN:** We can hear you. Go ahead.

14 **MR. JACOB McCLELLAND:** Okay. Jacob McClelland, counsel
15 for Alstom for the record. Good afternoon, Mr. Bergeron.

16 **MR. JACQUES BERGERON:** Good afternoon. I can't see you
17 though but I can hear you.

18 **COMMISSIONER HOURIGAN:** Mr. Gardner is still showing even
19 though he's not showing, just his screen. So if we could get out of that screen and get
20 Mr. McClelland in. Thank you.

21 **MR. JACOB McCLELLAND:** Just let me know when you can see
22 me, Mr. Bergeron.

23 **MR. JACQUES BERGERON:** I can see you clearly now.

24 **---- CROSS-EXAMINATION BY JACOB McCLELLAND:**

25 **MR. JACOB McCLELLAND:** Okay, great. So I just have a couple
26 of questions for you this afternoon, Mr. Bergeron. And in fairness and so we're on the
27 same page over the next couple of minutes, when I am referring to your formal interview
28 I mean your interview with Commission counsel of or on April 27th, 2022. Okay?

1 **MR. JACQUES BERGERON:** That's correct.

2 **MR. JACOB McCLELLAND:** Okay. And during that formal
3 interview with Commission counsel you talked a bit about the design of Alstom Citadis
4 line of vehicles and the fact that they are, in your words, modular in design. Do you
5 remember that?

6 **MR. JACQUES BERGERON:** I do remember that.

7 **MR. JACOB McCLELLAND:** Okay. And I'm going to paraphrase
8 here. But your evidence was that the beauty of Alstom's design -- referring to the
9 Citadis line of vehicles -- is that they can be built in facilities all around the world with
10 minimal tooling. Do you remember giving that evidence?

11 **MR. JACQUES BERGERON:** I did give that evidence, yes.

12 **MR. JACOB McCLELLAND:** Okay. And I take it you will agree
13 that this modular design makes the Citadis a good option where the vehicles are being
14 assembled away from one of Alstom's centres of excellence; is that right?

15 **MR. JACQUES BERGERON:** That's absolutely correct.

16 **MR. JACOB McCLELLAND:** Okay. Earlier this afternoon during
17 your examination with Mr. Imbesi you talked a bit about the delays attributable to the
18 late delivery of the test track; do you remember that?

19 **MR. JACQUES BERGERON:** Yes, I do.

20 **MR. JACOB McCLELLAND:** And specifically, you referred to
21 delays to Alstom and Thales' testing activities, and consequently, your ability to close
22 certain gaps in the interface between those two parties; is that fair?

23 **MR. JACQUES BERGERON:** That's fair.

24 **MR. JACOB McCLELLAND:** Okay. And in addition to Alstom and
25 Thales, you mentioned during your formal interview that OC Transpo's driver training
26 program was also delayed due to the lack of track availability; is that right?

27 **MR. JACQUES BERGERON:** That's right.

28 **MR. JACOB McCLELLAND:** Okay. So I'm going to suggest to

1 you, Mr. Bergeron, that the late delivery of the test track had a sort of knock-on effect in
2 terms of delay for this project; is that fair?

3 **MR. JACQUES BERGERON:** It is fair to say, yes.

4 **MR. JACOB McCLELLAND:** Earlier this afternoon during your
5 examination with Mr. Imbesi, you also talked about some of the issues with the track
6 during your time on the project. Do you remember that?

7 **MR. JACQUES BERGERON:** Yes, I do.

8 **MR. JACOB McCLELLAND:** First, issues with the track gauge,
9 and second, issues with scale on top of the rail. Do I have that right?

10 **MR. JACQUES BERGERON:** You have that right.

11 **MR. JACOB McCLELLAND:** Okay. And with respect to the track
12 gauge, your evidence during your formal interview was that in 2017 or 2018, it was clear
13 that the gauge was out of specification and causing the vehicle to climb during testing.
14 Do I have that right?

15 **MR. JACQUES BERGERON:** You have that right.

16 **MR. JACOB McCLELLAND:** And during your formal interview,
17 you described this is a big issue. Do you remember that?

18 **MR. JACQUES BERGERON:** Yes, I do.

19 **MR. JACOB McCLELLAND:** And I take it that it's a big issue
20 because a track gauge that is too narrow or wide can lead to problems for the wheel rail
21 interface; is that right?

22 **MR. JACQUES BERGERON:** That's correct.

23 **MR. JACOB McCLELLAND:** And as I understand it, in this case,
24 the gauge was narrower or tighter than what was specified, right?

25 **MR. JACQUES BERGERON:** Right.

26 **MR. JACOB McCLELLAND:** Okay. And with respect to the scale,
27 your evidence during your formal interview was that there was a lot of scale on the rails
28 in 2017 and 2018; is that right?

1 **MR. JACQUES BERGERON:** That's correct.

2 **MR. JACOB McCLELLAND:** And in your words, this is not really
3 good for the wheel rail interface either. Do you remember saying that?

4 **MR. JACQUES BERGERON:** Yes, I do.

5 **MR. JACOB McCLELLAND:** Okay. And you said today that you
6 had recommended that OLRTC perform some rail grinding prior to RSA to address this
7 scaling issue. Do you remember that?

8 **MR. JACQUES BERGERON:** Yes, I do.

9 **MR. JACOB McCLELLAND:** And are you aware if OLRTC
10 undertook any sort of rail grinding campaign?

11 **MR. JACQUES BERGERON:** No, I haven't. I requested that when
12 we started or we wanted to start at, you know, the much higher speed testing and
13 braking testing, and especially the interface and adjustment of the braking accuracy at
14 stations. And I do remember that we had, you know, contacted a specialized company
15 that can do that grinding, but by the time I left, it was not done, so I cannot go further
16 than that.

17 **MR. JACOB McCLELLAND:** Do you remember the name of the
18 company that you or OLRTC contacted?

19 **MR. JACQUES BERGERON:** Unfortunately, I don't. I'm sorry.

20 **MR. JACOB McCLELLAND:** Okay. Those are all of my
21 questions, Mr. Commissioner.

22 Thank you, Mr. Bergeron.

23 **COMMISSIONER HOURIGAN:** All right. Thank you, Counsel.

24 Thales is next.

25 **MR. PETER MANTAS:** Thank you, Mr. Commissioner. Can you
26 hear me?

27 **COMMISSIONER HOURIGAN:** Yes, I can hear you.

28 **--- CROSS-EXAMINATION BY MR. PETER MANTAS:**

1 **MR. PETER MANTAS:** Bonjour, Mr. Bergeron. My name is Peter
2 Mantas. I'm legal counsel to Thales. Thank you for your testimony today.

3 I only have a few brief questions and then you can move on to the
4 next person.

5 Thales' system, that was a known system, correct?

6 **MR. JACQUES BERGERON:** It is.

7 **MR. PETER MANTAS:** And like any system in this area, it must be
8 modified to suit the trains and the conditions of the line?

9 **MR. JACQUES BERGERON:** Yes, that's correct.

10 **MR. PETER MANTAS:** Okay. And there's no plug and play
11 signalling system for such a project?

12 **MR. JACQUES BERGERON:** Not that I know of.

13 **MR. PETER MANTAS:** Yeah, okay. Thank you.

14 And I have one final question. Now, would you agree that Thales'
15 performance was strong during your time on this project?

16 **MR. JACQUES BERGERON:** It was strong.

17 **MR. PETER MANTAS:** Thank you.

18 **MR. JACQUES BERGERON:** I really appreciate the time I spent
19 with them.

20 **MR. PETER MANTAS:** Thank you, sir.

21 Thank you, Mr. Commissioner.

22 **COMMISSIONER HOURIGAN:** Thank you, Counsel.

23 Next, we have RTG EJV.

24 **MR. MICHAEL VRANTSIDIS:** Thank you, Mr. Commissioner.

25 Michael Vrantsidis for the EJV. We do not have any questions for Mr. Bergeron.

26 **COMMISSIONER HOURIGAN:** All right. Thank you. Next is
27 witness counsel, so your own counsel.

28 **MS. JESSE WRIGHT:** Thank you, Mr. Commissioner. Jesse

1 Wright for the -- counsel for the RTG parties.

2 **--- CROSS-EXAMINATION BY MS. JESSE WRIGHT:**

3 **MS. JESSE WRIGHT:** Mr. Bergeron, I just have a few questions
4 for you.

5 You discussed your start date with Commission counsel and also
6 Mr. Varda. So construction on the project started in, I think, April 2013, and you started
7 in the project, I think the systems integration role, in January 2014, so nine months into
8 the project, into construction.

9 What are your views on the fact that the project did not have a
10 systems integrator for the first nine months?

11 **MR. JACQUES BERGERON:** Well, you know, it's always better to
12 have somebody at the beginning, but in many companies, you know, to find the proper
13 specified with experience people is the more, you know, technically and experience
14 you're looking at, the more -- the harder it is. And it is a fact of life that you might not
15 have all the people that you need at exactly the right time.

16 However, just like I said a little bit in my interview, is that you know,
17 there were some documents exchanged. There was a manager that had those Thales
18 and Alstom to manage. And you know, it is the start of design and you know, to my
19 experience, before a year, year and a half, you don't get into the real detail that you
20 start to see that -- you know, what -- the requirements for both parties are not aligned.

21 So did it slow down on the process of integration? I don't believe
22 so, but you know, yeah, in an ideal world, everybody is going to have a full team at Day
23 1, but unfortunately, we don't always live in that situation.

24 **MS. JESSE WRIGHT:** Right. So -- and is that consistent with what
25 you've seen on other projects, that sometimes the system integrator can start a bit
26 later?

27 **MR. JACQUES BERGERON:** Yes. I saw that many times,
28 because you know, they were busy on other running project, more advanced, and you

1 know, as soon as they get -- they finish one project, they go to the other. And it's not
2 unusual to get six to nine months a little bit later.

3 **MS. JESSE WRIGHT:** Right. Okay. Thank you.

4 So when you were speaking with Commission counsel, you
5 mentioned that systems integration was a critical risk on this project. How did you
6 prepare for that risk?

7 **MR. JACQUES BERGERON:** Well, you know, we have a risk --
8 how do you call that -- a -- Jesus, I forgot that. Anyway, it's been four years now. But
9 you have your risk -- oh, I forgot the exact name of the document -- but your risk
10 assessment, which is a Excel spreadsheet that state all the risk that you're going to
11 have in the project by categories, and it was part of that risk assessment early on, and
12 you know, we review it. We -- you have meetings every three months, I think, about
13 those and see if there's new ones that have been added, if there's some that we can
14 close. So you know, that's the risk management issue of any kind of big project like
15 that.

16 **MS. JESSE WRIGHT:** Right. Okay. Thank you.

17 So you spoke with Commission counsel about delays to testing,
18 and you mentioned that this -- the delays in part were related to delays to the test track.
19 Were there any other reasons that the testing was delayed?

20 **MR. JACQUES BERGERON:** Besides, you know, the -- first of all,
21 the testing never goes as planned. That's one thing. But you know, if you don't have
22 the test track, you cannot find all those issues and you know, to work on them. And
23 unfortunately, it's not because you have found any issue today that tomorrow it's going
24 to be resolved. So you always have other things to test, and basically, it is not wise to
25 say that if we had more test tracks that we would have more testing done because we
26 would have discovered more issues that need more time to resolve.

27 So it is hard to say that it's only because of the test track, but the
28 major part is because of, you know, the availability of the test track that we didn't

1 perform the test in the time that was already originally planned. That is a given.

2 **MS. JESSE WRIGHT:** Right. Okay. And so the Golden vehicle
3 was the LRV that was used during the testing and was it the case – were all of the other
4 vehicles ready at that time?

5 **MR. JACQUES BERGERON:** Well, we had a lot of vehicles. And
6 the golden vehicles were related mostly to Thales' testing. That was the one that was
7 most up-to-date, that had the best performance or latest equipment to reflect the proper
8 performance that we wanted to have. And that vehicle, like I said, moved from five to I
9 think seven and then eleven as the parts and the retrofits were done on those vehicles.

10 **MS. JESSE WRIGHT:** And so you spoke a little bit about
11 facilitating information flowing between Alstom and Thales, so what was your role in
12 facilitating that communication?

13 **MR. JACQUES BERGERON:** Well, you know, as we discussed;
14 you know, I used the teathed wheel earlier. When we come with a solution that doesn't
15 fit one side or the other, we have to come up with an agreement. And, you know, I'm
16 going to say Alstom is going to propose a solution and I have to pass it to Thales to see
17 if that will resolve their problem; if not, we have to go back and they might have a
18 suggestion and so on and so forth.

19 So this is the type of information that was flowing and we were
20 looking at, you know, does that solution make sense; with our experience is it feasible;
21 is it correct? And, you know, there's a lot of back and forth in finding solutions to
22 integrating two systems. It's always the case. And that was basically what we were
23 working on.

24 **MS. JESSE WRIGHT:** Right. And so was there information, at
25 least from your perspective, that wasn't shared with Alstom or Thales and vice versa?

26 **MR. JACQUES BERGERON:** From my side, we always shared,
27 you know, the minute that we had it, we were going to share it with the other parties. It
28 doesn't mean that it was an official revised signed and sealed document, but you know,

1 in preparation to their response or to the revisions of documents, we shared that
2 information as soon as we had it.

3 **MS. JESSE WRIGHT:** Okay. Thank you. Those are all of my
4 questions.

5 **COMMISSIONER HOURIGAN:** Thanks, counsel. Re-
6 examination?

7 **MR. ANTHONY IMBESI:** Nothing further, Mr. Commissioner.

8 **COMMISSIONER HOURIGAN:** Mr. Bergeron, thank you very
9 much for participating today. It was very helpful to have your testimony. You're
10 excused. We're down until tomorrow at 9:00 a.m.

11 **MR. JACQUES BERGERON:** Thank you.

12 **THE REGISTRAR:** Order, all rise. The hearing is now closed for
13 the day and will resume tomorrow at 9:00 a.m.

14 --- Upon adjourning at 4:47 p.m.

15

16

C E R T I F I C A T I O N

17

18 I, Wendy Clements, a certified court reporter, hereby certify the foregoing pages to be
19 an accurate transcription of my notes/records to the best of my skill and ability, and I so
20 swear.

21

22 Je, Wendy Clements, une sténographe officiel, certifie que les pages ci-hautes sont une
23 transcription conforme de mes notes/enregistrements au meilleur de mes capacités, et
24 je le jure.

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