

Ottawa Light Rail Commission

Derek Wynne
on Wednesday, May 11, 2022



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OTTAWA LIGHT RAIL COMMISSION
SEMP LTD. - DEREK WYNNE
May 11, 2022

--- Held via Zoom Videoconferencing, with all
participants attending remotely, on the 11th day of
May, 2022, 1:00 p.m. to 4:23 p.m.

1 COMMISSION COUNSEL:

2

3 Christine Mainville, Co-Lead Counsel Member

4 Fraser Harland, Commission Counsel Member

5

6 PARTICIPANTS:

7

8 Derek Wynne - SEMP Ltd.

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14 ALSO PRESENT:

15

16 Carissa Stabbler, Stenographer/Transcriptionist

17 Chandani Joshi, Virtual Technician

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I N D E X

WITNESS: DEREK WYNNE

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1 -- Upon commencing at 1:00 p.m. --

2 DEREK WYNNE: AFFIRMED.

3 CHRISTINE MAINVILLE: Mr. Wynne, the
4 purpose of today's interview is to obtain your
5 evidence under oath or solemn declaration for use
6 at the Commission's public hearings.

7 This will be a collaborative interview
8 such that my co-counsel, Mr. Harland, may intervene
9 to ask certain questions.

10 The interview is being transcribed, and
11 the Commission intends to enter this transcript
12 into evidence at the Commission's public hearings,
13 either at the hearings or by way of procedural
14 order before the hearings commence.

15 The transcript will be posted to the
16 Commission's public website, along with any
17 corrections made to it after it is entered into
18 evidence. The transcript, along with any
19 corrections, will be shared with the Commission's
20 participants and their counsel on a confidential
21 basis before it's entered into evidence.

22 You'll be given the opportunity to
23 review your transcript and correct any typos or
24 other errors before the transcript is shared with
25 the participants or entered into evidence. Any

1 non-typographical corrections made will be appended
2 to the transcript.

3 Finally, pursuant to Section 33(6) of
4 the Public Inquiries Act, 2009, a witness at an
5 inquiry shall be deemed to have objected to answer
6 any question asked of him upon the ground that his
7 answer may tend to incriminate the witness or may
8 tend to establish his liability to civil
9 proceedings at the instance of the Crown or of any
10 person, and no answer given by a witness at an
11 inquiry shall be used or be receivable in evidence
12 against him in any trial or other proceedings
13 against him thereafter taking place, other than a
14 prosecution for perjury in giving such evidence.

15 And as required by Section 33(7) of
16 that act, you're advised that you have the right to
17 object to answer any question under Section 5 of
18 the Canada Evidence Act.

19 So you are employed by a company called
20 SEMP; correct?

21 DEREK WYNNE: Yes, yeah.

22 CHRISTINE MAINVILLE: S-E-M-P?

23 DEREK WYNNE: Yes.

24 CHRISTINE MAINVILLE: What does SEMP
25 do?

1 DEREK WYNNE: We are a systems
2 engineering, systems assurance consultant.

3 CHRISTINE MAINVILLE: Could you explain
4 what "systems assurance" means?

5 DEREK WYNNE: Okay. That's unpacking
6 the box straight out of the door. So systems
7 engineering is a complex amalgam of many
8 specialists, engineering disciplines, requirements
9 management, verification, validation, safety RAM,
10 human factors and so on.

11 In -- well, 20, 30 years ago within the
12 rail sector, assurance would look at the output
13 from design activities and write an assurance case
14 which said that that solution is fit for purpose.

15 In modern day systems engineering,
16 systems assurance, because verification, validation
17 addresses that fitness for purpose, assurance is
18 now about have you followed the right process?
19 Have you used competent persons? Have you followed
20 a risk-based approach? How much of the product's
21 evidence do you need to support the process
22 evidence?

23 And that needs to be commensurate with
24 the level of mission or safety, critical nature of
25 the asset that you're concerned with, and it's also

1 by assuring that a progressive approach is taken so
2 that you effectively don't try and do it all at the
3 end of the day. You progress thinking about the
4 end in mind and the level of assurance that will be
5 required.

6 CHRISTINE MAINVILLE: Okay. And so
7 does -- is SEMP focused on the rail sector?

8 DEREK WYNNE: A lot of our work is rail
9 sector, but -- so at SEMP itself, I'm one of the
10 two founders of SEMP. Our origins go all the way
11 back into the defence sector and then transitioning
12 into rail infrastructure.

13 As a firm, at the moment, we do support
14 projects in defence and avionics still, and also in
15 nuclear sector, but predominantly rail
16 infrastructure.

17 CHRISTINE MAINVILLE: This is a
18 UK-based company; correct?

19 DEREK WYNNE: So we -- at the time of
20 working for the railway in Ottawa, we were
21 UK-based. Since then, we've created a Canadian
22 subsidiary, and we've also got a dormant U.S.
23 subsidiary at this moment.

24 CHRISTINE MAINVILLE: Okay. And aside
25 from being a founder, what is your role at the

1 company?

2 DEREK WYNNE: When time permits, I try
3 to be a director managing the firm, but most of the
4 time I'm engaged with customers actually acting as
5 a systems engineer, systems assurance expert, and
6 in that regard, I'm currently in Vancouver doing
7 just that.

8 CHRISTINE MAINVILLE: Okay. So what is
9 your background and experience? I take it you're
10 an engineer?

11 DEREK WYNNE: I am. So I graduated in
12 applied physics. Went into a graduate
13 apprenticeship with BA Systems, whereupon I worked
14 on safety integrity Level 4 systems, got involved
15 in systems engineering process research.

16 Around about 1996, I got involved in
17 rail sector, Northern Line program update in
18 London, which whet my appetite for working in the
19 rail sector.

20 Since that point in time, I would say
21 85 percent of my time since has been spent in the
22 rail sector.

23 CHRISTINE MAINVILLE: And do you
24 usually come in at the end of a project to do some
25 verifications, or is it through -- are you involved

1 throughout?

2 DEREK WYNNE: Well, there's a really
3 interesting question as well. Frustratingly, it's
4 rare that we're involved at the start of a program.
5 I've got examples where we're involved at the
6 start.

7 So in the UK, the multi-billion pound
8 Transpennine Route Upgrade, we've been involved
9 almost since the beginning. And in that program,
10 we are setting requirements, V&V, and engineering
11 safety best practice nationally for network realm.

12 Other programs, we get involved
13 somewhere in the middle where loss of progress has
14 been -- has occurred, but not necessarily progress
15 in the right way, and then there's a realization
16 that things need to be done differently. So we get
17 called in, and we have to make the best of what's
18 gone before and get the program back on track.

19 And doing that towards the tail end of
20 a program is more challenging because more and more
21 time has been eroded, but at the same time, we've
22 still got a responsibility to ensure the integrity
23 of the solution, and it's how you go about proving
24 that when you're not doing things in the normal
25 sequence.

1 So the very tail end since I was just,
2 like, running into the burning building to go and
3 recover a program, but that doesn't mean to say
4 it's not possible.

5 CHRISTINE MAINVILLE: Is the Ottawa LRT
6 project an example of one of the ones where you had
7 to come in --

8 DEREK WYNNE: Yes.

9 CHRISTINE MAINVILLE: -- and fix it?

10 DEREK WYNNE: Very late. Yeah, very
11 late.

12 CHRISTINE MAINVILLE: Okay. So tell us
13 first of all about your -- well, were people other
14 than you involved in the project at SEMP?

15 DEREK WYNNE: Yeah, very much so. So
16 our involvement changed over time. In -- I believe
17 it was October 2017, myself and the other
18 co-founder of the company, we came to Ottawa to do
19 a health check of the project from a systems
20 engineering, systems assurance viewpoint.

21 We created a report looking at all of
22 the different disciplines, referring it back to the
23 recognized standards, the standards that are
24 actually in the project agreement for Confederation
25 Line Stage 1, and quoted all of the -- the maturity

1 level.

2 We were invited back for a workshop
3 regarding the health check in November. When we
4 came back for that workshop, there were seven of us
5 in total, the two founders of SEMP, and we brought
6 experts on safety, an expert on configuration
7 management, expert on systems assurance. Trying to
8 think who else came with us. Actually three
9 safety, three RAM and safety experts came with us,
10 plus the configuration management and the system
11 assurance.

12 We held a workshop for a week, and then
13 there was lots of discussion about who would
14 undertake what aspects of delivery going forward.

15 In late January, we were asked to write
16 some systems engineering management plans because
17 these were a requisite of the project agreement,
18 and we duly did so.

19 The concern with writing plans at that
20 stage where project is -- in many ways, these are
21 talking a good story that should have happened but
22 are actually what did happen.

23 There was then further discussion, and
24 in March we were asked to start actually doing some
25 of the deliverables rather than the management

1 plans, and we made quite significant progress on
2 those until May of that year when we were asked to
3 take over all of the system engineering and system
4 assurance and help the project go all the way
5 through to entry into service.

6 And through that period of time, our
7 contractual relationship was at points fixed price.
8 At other points, it was a pain-gain arrangement
9 with an upset limit.

10 In terms of our overall team size, I
11 think at peak load, we were somewhere in the mid
12 40s in terms of an overall team, so quite a
13 significant team to try and get on top of all of
14 the asks.

15 CHRISTINE MAINVILLE: Sorry, you were
16 retained by RTG or OLRTC?

17 DEREK WYNNE: It was OLRTC.

18 CHRISTINE MAINVILLE: Were you ever
19 retained for any work by the City?

20 DEREK WYNNE: No, at no time.

21 CHRISTINE MAINVILLE: Okay. When did
22 the work end for SEMP?

23 DEREK WYNNE: The work for SEMP ended
24 October 2019 or November. I struggle with the
25 dates. It was -- it was broadly end of October,

1 beginning of November.

2 CHRISTINE MAINVILLE: Okay. After the
3 trains went into service?

4 DEREK WYNNE: Yes. Yes.

5 CHRISTINE MAINVILLE: When you talk
6 about the systems engineering, do you -- are you
7 referencing all of the systems broadly, or is there
8 more of a focus on the rolling stock --

9 DEREK WYNNE: All railway.

10 CHRISTINE MAINVILLE: -- in terms of
11 the overall system? Sorry?

12 DEREK WYNNE: All railway.

13 CHRISTINE MAINVILLE: Okay. So overall
14 systems integration and --

15 DEREK WYNNE: Yes, I think we need
16 to -- we need to address -- funnily enough, I've
17 spent the morning doing this. Railway systems can
18 be considered signalling, comms, et cetera.

19 To system engineer a railway, a railway
20 system, it comprises the infrastructure, the
21 rolling stock, the people that operate and maintain
22 it and their processes because that is what -- that
23 is an ecosystem, as it were, for that major
24 infrastructure capability.

25 CHRISTINE MAINVILLE: Okay. Would it

1 have included the rolling stock and signalling
2 system as well?

3 DEREK WYNNE: Yes. Yes.

4 CHRISTINE MAINVILLE: Okay. So let's
5 perhaps go back to the beginning. You're called in
6 in or around October 2017 for a health check.

7 DEREK WYNNE: Yes.

8 CHRISTINE MAINVILLE: And first of all,
9 what were you told about, you know, whether -- what
10 you were to look at, whether there were any gaps
11 identified at that point?

12 DEREK WYNNE: So the -- a former
13 colleague, someone that I had encountered in London
14 Underground days part of my career, had got
15 involved with the projectco. His view was that
16 systems engineering, systems assurance wasn't
17 being addressed, so we were invited in to ask
18 questions.

19 We set the agenda and the topics we
20 wanted to cover in the workshops. We were given
21 access to various OLRTC resources in order to
22 establish our understanding of their position.

23 Notably, though, at that time, one
24 person who didn't want to come in and engage with
25 us was the technical director.

1 CHRISTINE MAINVILLE: So who was that?

2 DEREK WYNNE: That was Roger Schmidt.

3 CHRISTINE MAINVILLE: In terms of your
4 colleague who approached you, as I understand it,
5 who was that?

6 DEREK WYNNE: That was Sean Derry. At
7 the time, he worked with SNC-Lavalin.

8 CHRISTINE MAINVILLE: Okay. Was he
9 directly involved in the project?

10 DEREK WYNNE: He was, yes.

11 CHRISTINE MAINVILLE: Okay. So you --
12 the information you had was that it -- the systems
13 engineering or integration was not being properly
14 addressed?

15 DEREK WYNNE: Correct.

16 CHRISTINE MAINVILLE: Okay. And who
17 did you understand was supposed to be overseeing
18 this piece of the work, if anybody?

19 DEREK WYNNE: Well, that should
20 ultimately go to Roger Schmidt, the technical
21 director.

22 CHRISTINE MAINVILLE: And did you have
23 an understanding of why he didn't want to engage?

24 DEREK WYNNE: So I believe the way the
25 project had been set up, there was a -- a designer

1 had been engaged, which was SNC Engineering,
2 predominantly based in Vancouver.

3 The program layer, the OLRTC layer,
4 their client, they were a consortia, and there was
5 a -- well, an expectation that responsibility had
6 been passed to the designer, which was specifically
7 SNC; however, the misunderstanding immediately
8 occurs that that did not involve passing the
9 responsibility to integrate the signalling and the
10 vehicle into the rest of the infrastructure design.

11 Pretty much the best way of describing
12 the actions that had occurred is someone puts this
13 through the project agreement, pass the signalling
14 scope to Thales, the vehicle scope to Alstom, and
15 the rest of it was passed over to SNC-Lavalin
16 design to create a design.

17 The issue with that is that most effort
18 is focused on the primary systems that make up a
19 railway rather than actually designing the whole
20 railway and then apportioning requirements to the
21 major building blocks. So straight away, we -- the
22 design effort is about pieces of the railway rather
23 than the whole railway.

24 And this, in actual fact, is a -- is
25 a -- is a behaviour I encounter quite a lot within

1 major rail infrastructure programs. This is why in
2 the rail sector you'll see the predominant term is
3 to do systems integration rather than to do systems
4 engineering.

5 The term originally starts when you do
6 a major upgrade to an existing railway. You
7 integrate the new solution into the existing whole.
8 And whilst that works for major upgrades, it is a
9 defective practice when you're building brand new
10 infrastructure, and that is a -- it's a capability
11 gap within the market generally. It's not well
12 understood and addressed.

13 CHRISTINE MAINVILLE: So I just want to
14 understand the distinction you're making between
15 systems integration and systems engineering.

16 DEREK WYNNE: Mm-hm. Probably the best
17 way to explain this is to -- when you go to the car
18 dealership, you're buying the whole product. You
19 wouldn't go and buy the wheels and the engine and
20 the transmission separately and then assemble it
21 yourself.

22 But that is effectively what was
23 happening with OLRTC. They were buying all the
24 blocks without the individuals for each of those,
25 having the overall design solution. There's a

1 layer above which apportions responsibility down to
2 the lower components.

3 CHRISTINE MAINVILLE: And so when it's
4 a new system, are you saying that it's -- the
5 preferred terminology is to say systems
6 engineering, or you would still talk about
7 integration?

8 DEREK WYNNE: So system engineering
9 includes designing for future systems integration.

10 CHRISTINE MAINVILLE: Okay. I guess I
11 could ask it another way. Is it -- were there gaps
12 on this project when you came in from both an
13 integration perspective and an engineering
14 perspective?

15 DEREK WYNNE: Yes.

16 CHRISTINE MAINVILLE: Okay. And you
17 talked about SNC as the designer. Had you heard of
18 the entity called RTG Engineering Joint Venture,
19 EJV?

20 DEREK WYNNE: Yes.

21 CHRISTINE MAINVILLE: Is that
22 effectively who was -- who you understood was
23 supposed to be in charge of --

24 DEREK WYNNE: The engineering joint
25 venture is effectively the designer. The work in

1 that level was being undertaken by SNC Engineering,
2 and I think occasionally they brought in a couple
3 of consultants.

4 CHRISTINE MAINVILLE: And Mr. Schmidt
5 was leading that to --

6 DEREK WYNNE: Mr. Schmidt was OLRTC
7 level, so above the procurement of the JV, Alstom,
8 Thales contributions.

9 CHRISTINE MAINVILLE: I see. Okay.

10 DEREK WYNNE: The level that you're
11 referring to had various managers involved. I came
12 across Dave Ellis. He was the design manager, but
13 all of the resources that were provided and managed
14 were by a chap by the name of Keith Brown.

15 CHRISTINE MAINVILLE: Did you interact
16 with Roger Woodhead?

17 DEREK WYNNE: I heard the name, but I
18 never actually interacted with Roger Woodhead.

19 CHRISTINE MAINVILLE: Okay.

20 DEREK WYNNE: I think that might be --
21 predate our involvement.

22 CHRISTINE MAINVILLE: Okay. And were
23 members of the EJV helpful to you, or were they --
24 did you engage with them at all in terms of
25 obtaining information and other resources?

1 DEREK WYNNE: Very interesting sort of
2 interaction and quite complex because lots of the
3 resource were responsible for their part of -- so
4 within the solution that wasn't the vehicle or the
5 signalling, that itself then breaks down into lots
6 of systems, be that stations, traction power,
7 comms, fire life safety system and so on.

8 So within that, lots of different
9 engineer of record under the Professional Engineers
10 Act of Ontario, the PEOs. We had to interact with
11 lots of those, and the way that worked was an
12 interesting relationship because on one hand, they
13 were grateful for the assistance, but on the other
14 hand, our assistance demonstrated the gaps, which
15 is not something that many people wanted to hear.
16 So it was kind of a complex interaction that
17 occurred.

18 Over time, before we finished, there
19 started to be more of an understanding that we were
20 there to help, and we were actually referred to and
21 asked for help rather than we were inflicting our
22 help on those people.

23 CHRISTINE MAINVILLE: Okay. And so
24 were you also engaging with engineers or others
25 from Thales or Alstom?

1 DEREK WYNNE: Yeah, I led an audit
2 team. I audited both Thales and Alstom with a
3 general instruction and thinking, two external
4 companies, both with significant quality and safety
5 regimes in place.

6 Our concern wasn't specifically about
7 their product. It was more the integration of
8 their product into our solution, and that was still
9 an OLRTC responsibility.

10 CHRISTINE MAINVILLE: Okay.

11 DEREK WYNNE: Although at audit, on
12 both of those firms, we generated an audit report,
13 and it was accepted by both parties. Thales were
14 very cooperative during the audit. Alstom were
15 somewhat talking a good story but not actually able
16 to evidence it.

17 CHRISTINE MAINVILLE: To evidence it?

18 DEREK WYNNE: So Thales were pretty
19 good. Alstom were -- as it were, systems
20 engineering, systems assurance was that paperwork
21 that gets in the way of doing trains, rather than
22 with Thales, it was instrumental in how they
23 develop their product. So there was a different
24 embracing of what system engineering is and how it
25 drives your solution.

1 So Alstom were -- they were trying to
2 do the right things, but it was being done in a
3 less-than-efficient and suitable way.

4 CHRISTINE MAINVILLE: So in terms of
5 their approach to -- is it to integration with the
6 signalling system or --

7 DEREK WYNNE: No. So this -- just if
8 we discuss the train on its own, lots of
9 requirements for the train. So fire retardation
10 properties, the fire test, et cetera, so you can
11 create all the requirements and the apportionment
12 of those requirements into their product and all of
13 its components and design.

14 The management of that requirements
15 process, the V&V aspect of it was not particularly
16 great, but at the same time, the Alstom Citadis as
17 a vehicle type operates in many places. It's got
18 proven information, so there's an amount of
19 assurance confidence effectively in their product.

20 The challenge for me with Alstom
21 specifically was this one was the Alstom Citadis
22 Spirit, greater North American-sourced components
23 within the overall solution, so there is a need to
24 do an element of reassurance of the -- of the
25 product.

1 And the other aspect which was a bit
2 different as well is a lot of these vehicles were
3 actually assembled in Ottawa rather than
4 manufactured at Alstom's site and brought to the
5 railway.

6 CHRISTINE MAINVILLE: And so in terms
7 of the vehicle type, did you -- you've spoken about
8 the Citadis Spirit. Did you understand that this
9 was not a service-proven vehicle, or how would you
10 qualify that?

11 DEREK WYNNE: So, again, if I was just
12 to draw a comparison back to, say, defence and
13 avionics, Boeing 747, the old lady that's being
14 retired now, that aircraft's been in service as an
15 overall type for over 40 years, but there have been
16 numerous derivatives of it when it's gone through
17 various upgrades and sort of range extensions,
18 capacity increases and so on.

19 Alstom Citadis to Alstom Citadis Spirit
20 is similar in that it's gone through a -- not
21 necessarily an upgrade but a change, this time for
22 North American componentry content.

23 The way that safety risk was going to
24 be handled, and therefore a City requirement, they
25 wanted to know that the -- because this is a -- the

1 way the train works, this was what's called a GOA2
2 signalling system.

3 The train also drives, but the driver's
4 got to be there to provide vigilance. Whereas if
5 you came to Vancouver, it's a GOA4 system. The
6 trains are driveless. There is no operator on
7 board.

8 Different safety cases are required
9 because of the different signalling types. In
10 Ottawa, it's a driver on the train, but they were
11 concerned about the driver vigilance. So I can't
12 remember if it's every 15 or 20 seconds, that
13 driver has to press a button to show that he's
14 awake. So this is a feature that was put into the
15 Citadis Spirit, which is specific to Ottawa.

16 The normal way you implement that is
17 called a dead man's switch. So the driver rests
18 his hand on the -- if he was going to manually
19 drive the train, which you might do if you're in
20 the depot, and basically you've got to have the
21 hand apply pressure on the dead man's switch,
22 otherwise the train would stop.

23 The City decided that the driver could
24 suffer a cardiac arrest or whatever with his hand
25 still on that; therefore, we have a different

1 solution and he's got to forcibly press a button.

2 In many ways I think it was an awful
3 lot of attention focused in on the wrong thing,
4 but, you know, it's a -- can a system be too safe?
5 Not in my opinion. So whilst I wouldn't have gone
6 to those extremes, I didn't see a problem with
7 having that as the solution.

8 CHRISTINE MAINVILLE: With the button?

9 DEREK WYNNE: With the button, yeah.

10 CHRISTINE MAINVILLE: So when you say
11 the focus may have been on the wrong thing, what
12 aspect was maybe overly focused on, or what was --
13 perhaps more importantly, what -- where should the
14 focus have been?

15 DEREK WYNNE: Well, again, so it
16 depends at what point you think systems integration
17 or the design for systems integration starts. So
18 if I was to look at the project agreement that was
19 issued by the City and accepted by the projectco,
20 it specifies a light rail vehicle, but it also
21 specifies following AREMA for the standard for the
22 permanent-way track.

23 AREMA -- the softest rail type that's
24 prescribed in AREMA has a Brinell factor, which is
25 suitable for heavy rail.

1 A light rail vehicle running
2 consistently on heavy rail gives you problems. The
3 light rail vehicle can't condition the railhead,
4 and because it's not being conditioned by that
5 vehicle, you have to do more frequent rail
6 grinding, and if you don't, you run the risk of
7 suffering from rail breaks.

8 These are natural occurrences on a
9 railway. We obviously want to avoid them, but they
10 cause maintenance overhead, you know, so we were
11 concerned for the availability of the
12 infrastructure that has significant investments
13 made into.

14 Rail breaks are obviously undesirable.
15 And then on the severity of a rail break, it can
16 cause a vehicle to derail. Although the line speed
17 and the check rails used on this one would suggest
18 that that was going to be fairly unlikely, but
19 there is that misalignment in terms of we want a
20 railway that gets maintained at X period, but we
21 have to now do it on Y period because we've
22 misaligned or misintegrated the track and the
23 vehicle type.

24 The other concern with that particular
25 rail type is that it's a very hard rail, so it's

1 not absorbing the vibration from the train because
2 the train is not heavy enough to actually push the
3 vibration in. So effectively all that vibration
4 stays back with the rail vehicle.

5 Now, the interesting aspect of this --
6 and I'll link it back to you asked me about
7 interacting with the designers. So engineer of
8 record has signed to say that that track asset is
9 fit for purpose for public use, system that is at a
10 design-certificate level, construction-certificate
11 level, and ultimately a testing/commissioning
12 level.

13 But for me, the rub of this is, as a
14 stand-alone asset, yes, it's fit to be used. Has
15 he met the requirements of the project agreement?
16 Yes. But the full ask from the Professional
17 Engineers Act is that you sign it fit for service
18 in its intended use.

19 And I think that bit hasn't actually --
20 it wasn't properly understood because the intended
21 use was for a light rail vehicle exclusively, and
22 heavy rail was never going to go over it.

23 CHRISTINE MAINVILLE: So --

24 DEREK WYNNE: Sorry, if I may, there
25 are similar issues to that in terms of the way

1 design and procurement were done. Tunnel
2 ventilation system, SIL floor system, it's there in
3 case there is an incident, train afire.

4 I can never remember which standard
5 number it is, but they're -- one of the standards
6 that we have to comply with states that if a life
7 safety system is managed through a SCADA, a
8 software control data acquisition-type system, the
9 SCADA system is a minimum of SIL-2, safety
10 integrity Level 2.

11 Well, given the safety integrity level
12 determination work hadn't been done, a SCADA system
13 of no SIL rating was procured, and that caused us
14 to have to do a work-around to ensure the integrity
15 of the command and control given to tunnel
16 ventilation system.

17 So that's another example of engineers
18 designing or procuring their solution in isolation
19 to the rest of the railway. So this is all of the
20 issues that my team and I came in to resolve.

21 CHRISTINE MAINVILLE: Okay. So just
22 before we move on from that, you were saying the
23 track that was put in place is meant for heavy rail
24 as opposed to light rail?

25 DEREK WYNNE: Yeah. We wrote a report

1 on it back in 2018.

2 CHRISTINE MAINVILLE: Did you ever gain
3 any understanding of why that was the case?

4 DEREK WYNNE: Well, so the behaviour
5 was the City had asked for -- to follow the AREMA
6 standard, which is a North American standard, but
7 North American track is generally about supporting
8 heavy rail.

9 Even for the mass transits, if you went
10 to Toronto and you went on Line 1, it's a much
11 heavier vehicle than the one that's used in Ottawa,
12 which is specifically known as an LRV because it's
13 a light rail vehicle.

14 So the use of AREMA or specifying AREMA
15 within the project agreement was probably not the
16 right thing to do. The specification should have
17 been to have a -- it should have been
18 objective-based and said a rail-type appropriate or
19 suitable for a light rail vehicle system.

20 So I think the -- what you find with
21 the project agreement for Ottawa, and it's the
22 first in a series of many, is understanding how to
23 client a major infrastructure program.

24 It's 11,000 technical requirements
25 strewn through that document. It's a very heavy

1 way for procuring a railway system that doesn't --
2 if you're clienting, do you want to tell the
3 designer how to do his design, or do you want to
4 tell him what the outcome of the design should be?

5 And so the way you write a project
6 agreement can have a direct influence on the
7 behaviour of the designer, or in other words, if
8 you procure a design that's wrong based on your
9 overbearing and restrictive requirements, who is
10 responsible for the solution not meeting the ask?
11 And I would say it's a shared responsibility, not
12 specifically the designer or the customer.

13 I think the designer or the projectco
14 has got a duty of care back to its customer, but at
15 the same time, the customer is also getting what he
16 asked for. And that relationship is then kind of
17 key to back certain requirements off so that the
18 right solution can be provided.

19 CHRISTINE MAINVILLE: Okay. When you
20 say "rail breaks," what is that?

21 DEREK WYNNE: A rail break is -- so if
22 you imagine -- if you went to look at track, track
23 will -- is usually joined together. Special plates
24 and bolts used to join track together if you're
25 having a continuous rail.

1 But a rail break is basically where the
2 metal literally breaks into two. You get a
3 separation at some point, not on one of the
4 expansion joints but somewhere else.

5 CHRISTINE MAINVILLE: I see. Okay. So
6 you don't mean braking. Well, you mean not as the
7 opposite of acceleration, but you mean actually,
8 like, cracking or snapping?

9 DEREK WYNNE: Yeah, absolutely, yeah.

10 CHRISTINE MAINVILLE: Do you have any
11 awareness of the derailments that occurred on
12 Ottawa's LRT?

13 DEREK WYNNE: Yeah, well, I was
14 involved -- I've since been, and I've spoken with
15 the City. I've spoken with the maintainer. In
16 fact, some of the characters that were involved in
17 the projectco had moved over and are now working
18 with the maintainer, RTM.

19 From my conversations there, I found
20 that either people were keeping cards close to
21 chest or were just generally unaware.

22 I authored the safety certificate for
23 Stage 1, so if you see that, that is -- those are
24 my words. It's supported by an Operational
25 Restrictions Document, which is full of

1 instructions on how to operate and how to maintain
2 that railway given the asset that was created.

3 The fact that the maintainer wasn't
4 aware of the Operational Restrictions Document I
5 find quite intriguing because it set out special
6 provisions, particularly in relation to track, and
7 to do with the condition assessment being monthly
8 rather than quarterly and the provision for
9 railhead grinding and this action on a much more
10 frequent basis than you would normally do.

11 So that seemed to be missed. But, yes,
12 I'm aware of the derailments. I am -- I've heard,
13 rather than I actually know, but I could -- but
14 what I've heard I could believe in terms of
15 probably the most severe derailment that occurred
16 where the train went through one of the stations in
17 contact with the platform edge.

18 But if the mentality of the operator is
19 to take all retrained bus drivers, is to get the
20 vehicle back to the depot so we can fix it, then
21 I've got to say your customer practice is that of a
22 road vehicle, not a rail vehicle.

23 Why the derailment? Well, again, if
24 vibration has not been absorbed by the track and
25 it's being reflected back into the vehicle, you can

1 see why the vehicle would be having problems,
2 because it's sat on the wrong type of track and
3 eventually it takes its toll.

4 So nonoptimal solution, but if the
5 maintenance regime is not addressing these emergent
6 proxies because of the solution, then you've got a
7 problem. And, of course, they weren't addressing
8 it because they didn't read the Operational
9 Restrictions Document.

10 Of concern to me now, I also laid out
11 considerations for the Ottawa Stage 2 for
12 Confederation Line, east-west connectors, and I set
13 out a whole series of provisions about how they
14 were able to extend the railway and the assurance
15 they must provide before they tapped into the
16 current command and control structure.

17 I have no visibility of whether people
18 are watching the operational restrictions that I
19 laid out, but I would suspect that possibly not.

20 CHRISTINE MAINVILLE: Okay. I'll ask
21 you more questions about this, but in terms of the
22 AREMA and rail -- or heavy rail track issue, do you
23 understand that that may have contributed to the
24 derailments that occurred, whether in the yard or
25 subsequently on the main line?

1 DEREK WYNNE: So on the main line with
2 the training running at normal -- at its intended
3 speed, very much. That to me is a combination --
4 it's an inappropriate solution, an inappropriate
5 matching of vehicle to track type, and onwards
6 after that, inappropriate approach to the
7 maintenance of both.

8 In the yard -- this is a different
9 topic. Train speed in the yard is insufficient to
10 create that level of vibration, and you may well in
11 the yard have heavier-type vehicles on the track.

12 The issue in the yard was how the yard
13 was signalled. The yard is eventually going to be
14 UTO, unattended train operation, so effectively
15 there's no supervision on the -- on certain of the
16 tracks.

17 This is for the -- where trains are
18 stabled and then bringing them to a hand-over
19 platform when the operator who provides vigilance
20 along the main line actually boards the train and
21 takes the train out into revenue service.

22 But UTO in the depot was not going to
23 be ready in time. I'm not sure if it's still
24 available at this point, and it certainly fell
25 outside of the provisions of my safety analysis and

1 safety case.

2 So where do you effect yard control
3 from -- to control the yard, because there are lots
4 of lanes for trains to go on. If you move the
5 switch whilst the train is going over that switch,
6 then of course the front of the train is going one
7 way, the back of the train is going another way,
8 and that is what has created certain of the
9 derailments in the yard, to the best of my
10 knowledge.

11 So the control, the interlockings, you
12 know, as it were, the track circuits, do I know the
13 train has got beyond the switch before I move the
14 switch? That is all of that signalling that's in
15 there.

16 And, again, operational restrictions
17 around how you operate and maintain that yard, it's
18 all supposed to be in the maintainer safety case
19 because it's the maintainer's area.

20 So just to speak to maintainer safety
21 case, two of my colleagues helped RTM write their
22 safety case in the final two weeks before entering
23 into service because they had failed to understand
24 that they needed to write one, but I would also
25 make the same statement about the City as well.

1 The City also needed the operator
2 safety case, and ultimately they're responsible for
3 the overarching safety case of all three. They are
4 the duty holder.

5 CHRISTINE MAINVILLE: The City?

6 DEREK WYNNE: Yeah, yeah, or on their
7 behalf, OC Transpo.

8 CHRISTINE MAINVILLE: Okay. And you, I
9 take it, then, despite your -- SEMP ending its
10 involvement in the fall of 2019, you were consulted
11 following some of the breakdowns and derailments,
12 as I understand it?

13 DEREK WYNNE: So the first -- so the --
14 relating to Ottawa, a couple of individuals
15 contacted us regarding information to assist with
16 the east-west connectors, which is the new
17 infrastructure development there.

18 And other than that, I was invited to
19 conversations with RTM and actually visited Belfast
20 Yard in late October last year. I had a long
21 conversation with RTM. That's the point at which I
22 discovered some of the projectco test and
23 commissioning individuals were now working with RTM
24 on the maintenance side.

25 This was a period of time after the

1 most recent and significant derailment where
2 service stopped, and there were question marks over
3 the maintainer's safety management and so on.

4 But, again, in this -- in this space,
5 yes, I had conversations with RTM. This is why I
6 know they haven't read the Operational Restrictions
7 Document because we literally discussed it when we
8 met.

9 There was the suggestion of asking
10 myself and colleagues to help write and improve
11 safety management system for the maintainer, but
12 therein lies the rub.

13 As the duty holder, it is the City and
14 their operator, OC Transpo, that are responsible
15 for a safety management system. I advised before
16 this railway went into service and I will advise
17 now, if it's not been rewritten, it is not fit for
18 purpose.

19 It's about operating buses with an ode
20 to -- we pass out responsibility to all of our
21 suppliers. Unfortunately, whoever sits above all
22 of the suppliers procuring it all has a duty of
23 care to make sure he's procured sufficient service
24 to make sure that the railway is safe, especially
25 if he's procuring new whilst maintaining existing

1 rail, because it all has to work in a collegiate
2 fashion. That responsibility falls to the top of
3 the pyramid, and that is OC Transpo on behalf of
4 the City.

5 CHRISTINE MAINVILLE: Okay. So what
6 was missing in terms of this safety management
7 system? What is that supposed to look like and --

8 DEREK WYNNE: Ooh, okay, so big topic.
9 We can get into the process of how you design and
10 develop railway upgrades, railway -- new railway
11 infrastructure generally centered around -- either
12 it was called the -- referred to as a CENELEC
13 process. But that's all about the change you're
14 making to the railway.

15 You've got the other side, which is
16 your safe operational procedures, SOPs, for the
17 railway, how you operate it, how you maintain it.

18 But when you've got both activities
19 occurring at the same time, how do you stitch the
20 two processes together? And that is the safety
21 management system. That's where it sits. It sits
22 right above all of it.

23 So if you look at the railway that's
24 now in service, we're discussing Stage 1 that had
25 the derailment, but I've mentioned east-west

1 connectors which is already extending that railway,
2 which will cause the control centre to be expanded
3 and so on.

4 So we've got design and development
5 work running in parallel to an operational
6 infrastructure. The safety management system that
7 gels them together to keep the whole thing safe was
8 not fit for purpose when I looked at it.

9 CHRISTINE MAINVILLE: And when did you
10 look at it?

11 DEREK WYNNE: I looked at that through
12 the summer of 2019 getting ready for the first --
13 the first infrastructure to go into service.

14 CHRISTINE MAINVILLE: And are you aware
15 of whether there were any subsequent changes?

16 DEREK WYNNE: I've not seen any.

17 CHRISTINE MAINVILLE: Did you work with
18 the independent safety advisor?

19 DEREK WYNNE: Yes, TUV Rheinland, yes.

20 CHRISTINE MAINVILLE: Yes. And were
21 there any discussions about this with them?

22 DEREK WYNNE: Yeah, absolutely. We had
23 the same conversation.

24 CHRISTINE MAINVILLE: And do you know
25 if they had the same concerns?

1 DEREK WYNNE: They certainly did.

2 CHRISTINE MAINVILLE: And ultimately, I
3 take it, SEMP doesn't -- in terms of the safety
4 case it's put forward, but SEMP doesn't do any
5 certification on the safety front; is that fair to
6 say?

7 DEREK WYNNE: Okay, so let's go into
8 this then. The safety analysis process, starting
9 with hazard identification through hazardous
10 operation assessment, interface hazard analysis
11 assessment, failure modes, effects and criticality,
12 fault tree analysis, safety integrity level
13 allocation, all of which culminating in an
14 operational and supportability hazard analysis, the
15 final step before you operate.

16 All of that culminating in a safety
17 case of the whole railway, supported by safety
18 justification reports for each of the major asset
19 types, and underpinned by the same safety
20 justifications provided through from Thales for
21 signalling, Alstom for the vehicle. All of that
22 was assembled by my colleagues and I.

23 In conjunction with that, we also
24 looked at all the derived safety requirements that
25 came out of that safety process. My team tracked

1 every single one of those requirements to its
2 demonstration through the test and commissioning
3 process.

4 In conjunction with all of that is the
5 authoring of the Operational Restrictions Document
6 because of the remaining issues, misalignments with
7 the approach that had been taken. And that
8 Operational Restrictions Document is referred to by
9 the safety certificate, so it's repeated as many
10 places as possible so it can't be avoided.

11 There are safety justifications on
12 which the safety certificate is predicated, but the
13 safety cert is only valid as long as you respect
14 the operational restrictions.

15 In terms of that safety cert, I signed
16 that. It was countersigned by Sean Derry that we
17 mentioned earlier, and it was from a PEO,
18 Professional Engineer Ontario, Jacques Bergeron,
19 who had a better understanding of systems
20 engineering integration approach. He sealed it as
21 a Professional Engineer Ontario on behalf of OLRTC.

22 CHRISTINE MAINVILLE: Okay. And then
23 does the independent safety advisor have to sign
24 off on this?

25 DEREK WYNNE: He provides the

1 statements, and no objection to each of the safety
2 justifications, each of the overarching safety
3 case, the operational restrictions, et cetera.

4 So he had full visibility of all of
5 that and very much -- and also was able to witness
6 us conducting the hazard identification, hazardous
7 operation workshops that drove the safety analysis
8 that was being conducted.

9 CHRISTINE MAINVILLE: So if I'm
10 understanding correctly, you -- if I'm -- I'm going
11 to try to paraphrase.

12 DEREK WYNNE: That's okay.

13 CHRISTINE MAINVILLE: Is it the case
14 that at the end of the day in terms of reaching
15 revenue service availability, SEMP's view was that,
16 you know, the system was safe, but that is
17 predicated on the operational restrictions --

18 DEREK WYNNE: Yes.

19 CHRISTINE MAINVILLE: -- and that needs
20 to be complied with?

21 DEREK WYNNE: Yeah.

22 CHRISTINE MAINVILLE: Okay.

23 DEREK WYNNE: Yeah. So to really -- to
24 take it away from railways for a minute and maybe
25 describe it in a way that we're all familiar with,

1 so you've bought a new car from the garage. It
2 comes with a warranty. The warranty has provisions
3 in it, and if you fail to honour them, your
4 warranty is no longer valid.

5 If you also think then -- so brake
6 linings to make sure the thing stops, it'll talk to
7 you about tire pressures and so on. They're all
8 standard maintenance things that you should do so
9 that you can operate that vehicle safely.

10 If you're driving a BMW -- I have
11 one -- it even tells you about safe driving styles
12 because it's more fuel-efficient and so on. It's
13 all in the user manual.

14 So let's take a look at some of the
15 features of a car. So when I learned to drive,
16 cruise control was your right foot on the
17 accelerator, and you controlled cruise control.

18 Later cars that I had, there was a
19 stock on the side of the steering column. You
20 could press the buttons, and you set the speed.
21 And the car would hold the speed, but you had to
22 regulate the distance between you and the car in
23 front because the car wouldn't automatically do
24 that for you. The latest cars, they also regulate
25 the distance for you.

1 Cruise control, as I've just described
2 it, is manual. It's semi-auto; it's fully auto.
3 The function is the same. The way we achieve it is
4 different. The human involvement is different.
5 Okay?

6 So I can write a safety case for each
7 one of those based on how well the operator is
8 trained, the standard operating procedure he
9 follows, and also how well that asset is
10 maintained.

11 CHRISTINE MAINVILLE: In this case, did
12 the operational restrictions have more to do with
13 maintenance than the way it was to be operated or
14 both?

15 DEREK WYNNE: It was to do with
16 operation, to do with maintenance, and also
17 restrictions I placed on the City and their future
18 projectco of how they would deliver the extension.
19 It covered all aspects.

20 CHRISTINE MAINVILLE: Okay. And are
21 you able to speak to some of the key aspects of
22 those operational restrictions and perhaps anything
23 atypical or things that were required above and
24 beyond in this case that you may not find on other
25 projects like this?

1 DEREK WYNNE: So the provisions in some
2 regards, particularly in relation to moving forward
3 with the extension piece, I made the provisions
4 about having appropriate assurance before you
5 connect the new extension into the commander
6 control system, for starter, for signalling, et
7 cetera.

8 I wanted the assurance that it was --
9 that it was appropriate to be able to do that,
10 someone was taking responsibility for it rather
11 than we were -- we were working on a plug-and-play
12 basis.

13 Normally, for instance, if I went back
14 to the UK, the safety culture, the safety regime,
15 the understanding of the need for assurance, no one
16 would ever attempt to do such a thing without the
17 assurance being in place.

18 The level of understanding and
19 behaviours that I've seen, exclude the ISA in this,
20 but from projectcos and their engineers through to
21 the City through to the operators and the
22 maintainers, I felt the need to expressly write
23 that in the Operational Restrictions Document.

24 I think that speaks to the overall
25 culture and ability level, everyone, whether you're

1 clienting, operating, maintaining, or designing the
2 building. I just was not comfortable to leave
3 those words unsaid.

4 Thereafter, if we're looking into the
5 restrictions of the -- of the actual system that
6 was delivered, tunnel ventilation system, it's a
7 SIL-4. It's a life safety system.

8 I don't know if you're familiar with
9 how big the tunnel ventilation system fans are, but
10 I'm 6 foot 4, so I'm roughly 2 metres, and I can
11 stand up in these things.

12 The stations have got three or four of
13 these, and there are jet fans as well. So they
14 don't operate all the time. They are a passive
15 provision called upon once in a blue moon.

16 Unfortunately, we can't leave it to
17 chance for an event in ten years' time and then
18 trust that these things will work. So there's
19 operational instructions about exercising the fans
20 on a monthly basis to prove that they're working.

21 There are restrictions in there with
22 regard to -- and this is the end-to-end system and
23 it's expanded. Emergency telephone provisions for
24 passengers on stations to make sure that the
25 bandwidth exist in the comm systems and make sure

1 that you don't affect the current in-service
2 stations because we're expanding, and provisions to
3 do with track maintenance, et cetera.

4 We also have to deal with another
5 interesting topic in terms of restrictions because
6 the -- effectively the front of the train for
7 Ottawa is quite rounded. The driver sits in the
8 middle. CCTV cameras on the platform, they observe
9 the passenger train interface.

10 Driver closes the doors when passengers
11 are no longer going through the doors. We don't
12 want an entrapment. And at that point, the driver
13 presses "go." The train moves, then automatically
14 controlled movement.

15 The CCTV is meant to show you the side
16 of the train until the back of the train has left
17 the platform, and the reason for that is whilst the
18 doors have got a contact strip and if a back strap
19 gets caught, it won't detect a back strap. Someone
20 with a rucksack can get dragged along with the
21 train if a strap is caught. So the driver is meant
22 to observe the side of the train.

23 However, because of certain integration
24 issues, sometimes the cameras were displaying
25 images from the adjacent platform, not the one the

1 train was at, so rewire required.

2 So initially entry into service, there
3 was an operative placed on the platform, and he had
4 a button he will press to illuminate in the cab to
5 say, The passenger train interface is clear; you
6 can now proceed.

7 So it was a work-around, a temporary
8 operational restriction, which is quite a common
9 thing in railways when you're dealing with this
10 sort of infrastructure. Should it have been there
11 at day one? No. But was it an acceptable
12 work-around and safe? Yes.

13 CHRISTINE MAINVILLE: So it was an
14 acceptable work-around?

15 DEREK WYNNE: Yes. Yeah, yeah,
16 absolutely, yeah. Yeah, so if you -- if you -- if
17 you go to -- many railways -- if I took you on a
18 tour of the UK, I could show you many, many
19 stations where there is an operative on the
20 platform. You just even press a button, and then
21 something will light up in the cab.

22 Main line, you'll see the guy hanging
23 out on the side, and the guy is waving a flag
24 saying you can go. It's in the old movies. You
25 see the guy blows the whistle and waves the flag.

1 It's that same principle. It's how railways have
2 operated for over a century.

3 So it was just stepping back. It was
4 removing automation. So if I look at my cruise
5 control example, we were stepping back to -- cruise
6 control was with your right foot, not because the
7 system does something for you.

8 CHRISTINE MAINVILLE: So would you say
9 that there's a heavy reliance here on standard
10 operating procedures in order to address various
11 hazards?

12 DEREK WYNNE: Okay, so this is a really
13 interesting question. So the way safety analysis
14 works, we identify a hazard, and then for each
15 hazard, there are causes, and there are
16 consequences.

17 So the first action should be to
18 mitigate causes, i.e., prevent the hazard
19 occurring. If we're unfortunate enough for the
20 hazard to occur, we then have to do something to
21 minimize the consequence.

22 So on one side, it's about the
23 probability and reducing the probability to a
24 tolerable level, and on the other side, it's about
25 reducing the severity of the hazard should it

1 actually occur.

2 So there is no ability to create a
3 100 percent safe system. You're not safe if you
4 walk down the pavement outside now. You know, a
5 car can come on the pavement. There is no way that
6 we can get it completely down to zero.

7 So the terminology is a tolerable
8 residual risk. What does tolerable risk look like?
9 The way you work that out is normally Heinrich's
10 principle, and the way that works is X number of
11 near misses, add together, that is effectively a
12 minor injury. X minor injuries, add together,
13 that's a major injury. X major injuries, add
14 together, that's equivalent of a fatality.

15 So if you monitor all safety
16 occurrences, even if it's what's called a near
17 miss, as it were, where the hazard nearly occurred
18 but didn't through luck rather than design, we
19 record it because this is the -- this is the wealth
20 of information that helps drive safety improvement
21 and understanding of hazard tolerability.

22 So this is a brand new infrastructure.
23 It's not got that ability yet, so it's about
24 designing -- well, doing the safety analysis,
25 finding the hazards, preventing their occurrence or

1 mitigating the consequence should they occur.

2 In order to do that for Ottawa, my team
3 also looked at the Rail Safety and Standards Board
4 which assesses this sort of data from railways
5 around the world over the last 30 years and queues
6 up a whole series of hazards.

7 It's possible to look at the top-ten
8 hazards of a railway. Passenger train interface is
9 a classic risk area. When passengers interact with
10 the moving bits of vehicles, that tends to be where
11 you get problems, but it's not the only one. So
12 all of that work was done.

13 Now, the rub is anything that you can't
14 mitigate in terms of prevention or mitigation in
15 terms of consequence, you have to create a hazard
16 transfer. You transfer the residual risk for the
17 operator to manage.

18 And, yes, there were hazard transfers
19 done. Hazard transfers to -- the principle that we
20 employ, a hazard transfer form is created. It has
21 to be signed off by the City, and it had to be
22 signed off and accepted by OC Transpo, the
23 operator, at which point that also then has to be
24 baked into their standard operating procedures.
25 And that was the process that we went through.

1 CHRISTINE MAINVILLE: Would you have
2 reviewed the standard operating procedures to see
3 whether everything was incorporated?

4 DEREK WYNNE: No, that is OC Transpo's
5 scope and their safety case. They've accepted the
6 hazards transfer to them. It's now with them to
7 manage. Yeah, and hence the formality of the
8 hazard transfer form.

9 CHRISTINE MAINVILLE: And you did say
10 you eventually reviewed RTM's?

11 DEREK WYNNE: Yes.

12 CHRISTINE MAINVILLE: Was that
13 document, I take it it is, lacking?

14 DEREK WYNNE: So the safety case for
15 RTM was actually authored by my colleagues very
16 last minute to get them their basic safety case in
17 place. Their actions are -- again, obviously
18 follow the operational restrictions, but a lot of
19 their safety case is about the maintain of being
20 safe whilst you undertake certain actions, whilst
21 he's responsible for delivering the maintenance
22 that's required as part of all of the maintenance
23 instructions for the railway that came from the
24 designer and the equipments that were procured.

25 CHRISTINE MAINVILLE: Did you have the

1 opportunity to review the independent safety
2 advisor's final report, which was issued just prior
3 to revenue service?

4 DEREK WYNNE: I think I had a brief
5 look at it, but I must confess, I didn't really
6 read it in much detail. I did one of his earlier
7 reports, but not that very final one.

8 CHRISTINE MAINVILLE: I take it he
9 would sign off on the operator -- or the standard
10 operating procedures or at least the operational
11 safety --

12 DEREK WYNNE: Okay, this is kind of a
13 challenge. The ISA's remit, my involvement with
14 the ISA's remit was in terms of the output from the
15 projectco. I'm not sure whether he was engaged
16 also to check OC Transpo and RTM, the maintainer,
17 because those are effectively entities that
18 continue beyond the delivery of OLRTC, the builder.

19 Now, knowing the character involved,
20 I'm sure he would have wanted to be involved and
21 was probably consulted on those. Whether that was
22 formally or informally, I honestly can't tell you.

23 CHRISTINE MAINVILLE: And by "the
24 character," you mean it would have been prudent?

25 DEREK WYNNE: No. I know the

1 individual. He's very diligent and very committed
2 to this sort of work, lives and breathes it, and
3 would always want everyone to do their absolute
4 best.

5 So if he was involved in the city and
6 having these conversations and a hazard transfer is
7 made, Sergio would have been the character that
8 would want to see that it's gone all the way
9 through to the other end.

10 And in fairness to the City, they did
11 do some operational readiness testing. They did,
12 like, emergency evacuation type, you know, full
13 muster. Newly trained operators know what they're
14 doing, interact with Blue Light Services and so on.

15 So there was a lot of trial run
16 effectively for the operator as well as there was
17 trial run of the -- of the system going back and
18 forth.

19 So -- and a lot of that was possible
20 for many of us to witness occurring, so I'm very
21 sure that Sergio would have been observing a lot of
22 that. Well, Sergio and his colleagues that were
23 involved from TUV Rheinland.

24 CHRISTINE MAINVILLE: I'm not sure if
25 we stated his full name, but you're referencing

1 Sergio Mammoliti?

2 DEREK WYNNE: Absolutely, yeah.

3 CHRISTINE MAINVILLE: You became aware
4 through your later work or involvement on the
5 project that RTM or the maintainers were not
6 knowledgeable about the Operational Restrictions
7 Document.

8 Do you have any awareness of how the
9 operators ended up operating and whether there were
10 any gaps there?

11 DEREK WYNNE: Only through hearsay. As
12 I mentioned before, recovering a derailed train
13 back to the depot is a behaviour you would take
14 with a bus that's suffering a mechanical breakdown.
15 It's not something you would do with a rail
16 vehicle.

17 I've heard that the instruction to the
18 operator was to limp the train back to the Belfast
19 Yard, but I've heard rather than I know. So I
20 wouldn't like to say that's actually what happened.
21 But having said that, there should be a voice
22 recording somewhere that can confirm that.

23 CHRISTINE MAINVILLE: Why do you say a
24 voice recording?

25 DEREK WYNNE: It's the interaction

1 between control centre and the vehicle, so there
2 should be -- there should be some form of record
3 there.

4 CHRISTINE MAINVILLE: You had some
5 involvement then or awareness of trial running that
6 you referenced?

7 DEREK WYNNE: Yeah, yeah, absolutely.
8 So all the way through test and commissioning which
9 was culminated in -- at first there was the -- call
10 it the round demonstration phase, OLRTC driving the
11 vehicles back and forth for two weeks, continuous
12 service simulation, and then the -- there was the
13 test running and then trial running with the City's
14 operator on board doing exactly the same for
15 themselves.

16 So, yeah, I was involved all the way
17 through that. The reason for involvement is
18 certain aspects, certain requirements -- before I
19 explain that, so the standard CENELEC 50126, Fig. 2
20 is a really interesting, simple diagram. RAMS is
21 the subject: Reliability, availability,
22 maintainability, and safety.

23 Safety and RAM are inextricably linked,
24 and the reason being is safety features must be
25 available, and available is driven by the

1 reliability, the maintainability but also how you
2 operate and how you maintain. So it's all a
3 complex, interwoven web.

4 So whilst exercising the reliability,
5 the maintainability that the operators are
6 satisfying themselves that they can operate, and
7 the maintainers are satisfying themselves that they
8 are now engaged in maintaining, the reliability,
9 maintainability part, delivering those safety
10 features and proving those safety features are
11 functioning, all of that is requirements or derived
12 safety requirements or derived RAM requirements
13 which my team was seeking the verification evidence
14 for, and we tracked all of that in a database that
15 tracks all of the evidence for every single
16 requirement.

17 So in the output that we created at the
18 end of the project, we provided an engineering
19 safety -- or engineering and safety assurance case,
20 and within that, there is a map to every single
21 document that provided evidence that the system
22 would be able to meet its mission as well as the
23 safe operation.

24 Specifically in there, there is the
25 end-state integrated hazard log where every hazard

1 is considered and its mitigation, so you can see
2 what was mitigated via a derived safety
3 requirement, see how the transfer was pushed out to
4 OC Transpo.

5 The derived safety requirements that
6 chased into the requirement set and threw into the
7 system integration tests and the evidence of those
8 being exercised is all there.

9 CHRISTINE MAINVILLE: Okay. So the --

10 DEREK WYNNE: Sorry, I should say, the
11 point is and the reason for being involved through
12 test trial running is some end-to-end features and
13 availabilities couldn't be proven until we got to
14 that stage. So that's why we were still gathering
15 evidence at that point.

16 CHRISTINE MAINVILLE: I see. Normally
17 that would have been completed before?

18 DEREK WYNNE: Yeah. Yeah. Yeah.
19 Obviously pressured time scale, you know, open the
20 railway as soon as possible because it was so late,
21 but we were still gathering evidence that enabled
22 the safety certificate to be signed right up until
23 the very end.

24 CHRISTINE MAINVILLE: And in terms of
25 the safety certificate, is that OLRTC's

1 responsibility?

2 DEREK WYNNE: For the -- for the system
3 provided, yes, but that is -- that is only -- a
4 rail transportation system is the physical system
5 procured, what you bought out of the box, plus the
6 standard operating procedures, plus the manner in
7 which you operate and maintain it. So it's all
8 three elements.

9 The safety certificate that came from
10 OLRTC is about the system that was unpacked out of
11 the box. It's not about the procedures. It's not
12 about the people. Those are separate safety cases.

13 And then you need -- OLRTC, the duty
14 holder, they sit above all of that. That's theirs
15 to manage.

16 CHRISTINE MAINVILLE: And was some only
17 overseeing the safety certificate portion of it?

18 DEREK WYNNE: Yes.

19 CHRISTINE MAINVILLE: Okay.

20 DEREK WYNNE: Yeah. Yeah. OLRTC's
21 contribution, not OC Transpo's. Yeah, very out of
22 scope.

23 CHRISTINE MAINVILLE: Sorry?

24 DEREK WYNNE: Everything to do with OC
25 Transpo was distinctly outside of our scope.

1 CHRISTINE MAINVILLE: Do you know who
2 was responsible for those other aspects?

3 DEREK WYNNE: It would have fallen
4 under Jim Hopkins, the head of operations. Who he
5 had prepare the safety case for him, I'm not sure.
6 That might well have been an activity undertaken by
7 one of their owners, engineer-type people that the
8 City had procured. That could well have been done
9 by Parsons. If it was, then that would be a
10 gentleman by the name of John Hulse (ph).

11 That's where I would have gone if I was
12 them. Whether they did, I can't tell you, so I
13 can't confirm that John was actually the person who
14 has to write that.

15 CHRISTINE MAINVILLE: Fair enough. So
16 I take it you -- following trial running or at
17 least as you gather the data you needed during
18 trial running, you were prepared to conclude that
19 it was safe to operate and to issue a safety
20 certificate?

21 DEREK WYNNE: Yeah, it was quite a
22 painful process to get to that stage, but yes.

23 CHRISTINE MAINVILLE: Yeah, so let's
24 talk about that and what, if any, concerns you did
25 have despite that being met.

1 DEREK WYNNE: So I can take you on this
2 journey right back to design, design certificate
3 letter which says from a Professional Engineer
4 Ontario, the engineer of record and says, My design
5 is okay because it's in general conformance.

6 Okay, well, what does general
7 conformance mean? You know, is general 50 percent?
8 60 percent? Whereabouts are we?

9 So the first stage of design
10 verification that my team got involved in, we asked
11 for -- we packaged up the requirements for each of
12 the building blocks, sent out those requirements,
13 and asked for a compliance statement against every
14 requirement, and not just tell me that you satisfy
15 it, but please provide me where I can find the
16 evidence so we can link it together.

17 Interestingly, 100 percent design
18 compliance fell away quite significantly initially
19 until a lot more evidence was generated to
20 demonstrate that level of compliance.

21 Similar process going through
22 construction compliance letters and getting the
23 rigor that's required in there to get the
24 appropriate assurance evidence in place.

25 And then we get to system integration

1 tests. So we actually did an exercise to look at
2 system integration test coverage. Are the tests
3 sufficient to exercise the extent of the railway?
4 The answer was no. We only had about two-thirds of
5 the tests.

6 So a further integration test to
7 exercise the additional -- or the features that had
8 been -- not been exercised by the initial set of
9 system integration tests were created.

10 Then speak to testing behaviour. So
11 lots of outstanding snags and so on. For instance,
12 if it was about intruder access control into an
13 equipment room, maybe the contact plate wasn't
14 there, so that door wasn't working. You can't test
15 that door in that situation, but we could at other
16 stations.

17 So, yes, we know that requirement is
18 partially satisfied, but you can't pass the system
19 integration test until you've proven every
20 location.

21 So we used to get these scripts going
22 back saying, yes, it's passed, which was, yeah,
23 when I fixed all the snags, this thing works, but
24 that wasn't acceptable.

25 So in our database, we tracked 39,000

1 snags that were getting in the way of dealing with
2 all of the system integration tests, and we mapped
3 all of that through to the end until such time as
4 all integration tests could be conducted.

5 So very, very -- well, extraordinary
6 level of scrutiny, but it's required. This is --
7 this is the scale of putting these railways
8 together.

9 CHRISTINE MAINVILLE: Okay. And
10 leaving aside safety, did you have concerns about
11 reliability and performance after trial running?

12 DEREK WYNNE: So in accordance with
13 CENELEC, safety is only safe if it's available, and
14 available means how you -- not just how you operate
15 and maintain it, but the reliability and
16 maintainability features of your solution.

17 So the fact of the matter is, you can
18 buy a cheap railway and put a man every 50 yards
19 with a bag of spanners and every time a train goes
20 past, adjust the nuts and bolts.

21 You can build one you don't have to
22 maintain for ten years and which will do exactly
23 the same job. There's a different cost of
24 acquisition, a different cost of ownership
25 associated with the two ends of -- the two extremes

1 I've just quoted.

2 Both would need regular inspection and
3 intrusive maintenance, dependent on the condition
4 assessment you find when you do that inspection.

5 So where am I going with this? In
6 terms of reliability, availability, and
7 maintainability, found the level of activity quite
8 shocking really in terms of availability of
9 components, was what was being procured.

10 Where was the requirement to specify
11 the ask? In other words, as an off-the-shelf
12 solution, as a candidate solution, I've got a
13 requirement. Is that candidate solution going to
14 meet my requirement? That bit wasn't done.

15 So this was more about bringing
16 together all of the standard off-the-shelf
17 available components and making them work as one.

18 So we looked at the emergent RAM
19 properties, reliability, availability,
20 maintainability, and how they would support the
21 safety features, and that's what then gives rise to
22 the maintenance aspects of the Operational
23 Restrictions Document where I wasn't confident that
24 the RAM -- the required RAM support safety features
25 would be met without continually monitoring the

1 track for instance, a monthly inspection rather
2 than quarterly.

3 CHRISTINE MAINVILLE: Do you know
4 whether those additional or enhanced maintenance
5 requirements were reflected in the maintenance
6 procedures?

7 DEREK WYNNE: No, and I don't think
8 they were because of the lack of understanding of
9 the Operational Restrictions Document.

10 CHRISTINE MAINVILLE: Right. Who were
11 you dealing with at RTM on these issues?

12 DEREK WYNNE: I'm trying to think of
13 the former head of RTM.

14 CHRISTINE MAINVILLE: So I think at
15 RSA, would it have been Claude Jacob?

16 DEREK WYNNE: Yeah, Claude sounds
17 familiar, yeah.

18 CHRISTINE MAINVILLE: Would he have
19 been your main counterpart, do you think?

20 DEREK WYNNE: No, they had another
21 character who since moved on. I'm trying to think
22 who that would be now. There was another character
23 who was more concerned with sort of creating their
24 procedures and their safety undertaking, but I
25 can't think of the chap's name, sorry.

1 CHRISTINE MAINVILLE: I'll have a look
2 at the break because I think I know who you're
3 referencing, but I also don't have it.

4 DEREK WYNNE: Yeah. I could find it if
5 we need. I can certainly let you know later.

6 CHRISTINE MAINVILLE: Okay.

7 DEREK WYNNE: I'll do an email search
8 and find his name.

9 CHRISTINE MAINVILLE: Thank you. And I
10 take it more fundamentally, and this goes back to
11 your earlier evidence, there was insufficient
12 planning in the design for maintaining the system;
13 is that fair to say?

14 DEREK WYNNE: No, I think -- so the
15 challenge here is -- it's all a balance. So,
16 again, give you the car example. Early cars
17 required a service -- my first car required a
18 service every 6,000 miles. In between those
19 services, we do the oil change, et cetera. You
20 will do standard weekly maintenance, tire
21 pressures, et cetera.

22 Move later on, my BMW, it tells me when
23 it wants to service. It monitors itself for a
24 condition assessment. You've used me hard,
25 therefore I need a service, or you've used me

1 light, I need a different service.

2 But none of those remove the obligation
3 to do the regular check, tire pressures, screen
4 wash, et cetera. So there's all different levels
5 of maintenance to be undertaken.

6 Maintenance is in support of
7 availability. So what's the service pattern you
8 want? For instance, if you want to operate your
9 railway 20 hours a day, 7 days week, you've got 4
10 hours of engineering hours to take possession to do
11 maintenance, mobilize, actually achieve the
12 maintenance, and then sign back into revenue
13 service. That's a fairly short window.

14 So if that's what you're aspiring to,
15 you need readily, easily maintainable assets, and
16 they need to be very reliable so you don't have
17 much in the way of maintenance to actually do to
18 them.

19 So that's about achieving an
20 availability of the service, as well as that
21 availability will speak to how it enables the
22 safety features.

23 The other side about maintenance is its
24 cost. You can buy cheap and spend heavy on
25 maintenance, or you can buy expensive and spend

1 little. It's a trade-off between the engineering
2 hours available, the intended usage, and the
3 intended cost of ownership. And this will -- I'll
4 say it again, will come back down to concept of
5 operations, concept of maintenance. How is all of
6 that conceived.

7 So -- and this is -- this is kind of
8 the problem in railways. There are railways of
9 many different standards. I can say it's networks
10 where all of these different things are occurring
11 and different standards, all different points on
12 the network.

13 The fact of the matter is it all sits
14 underneath the same safety management system. The
15 duty holder is aware of his responsibility, and
16 everyone complies with the overall process, and
17 it's that that's not mature enough in the Canadian
18 marketplace at this time.

19 I did mention before, by the way, that
20 the project agreement for Ottawa is the first of a
21 series, so the same agreement with changes trying
22 to fix commercial issues was rolled out for
23 Eglinton Crosstown. Same agreement again with yet
24 further changes for the Finch West. Same agreement
25 again for the Hurontario LRT that's going on right

1 now.

2 Interestingly, Eglinton Crosstown, late
3 being delivered. Same projectco consortia. Finch
4 is going late. Watch the headlines over the next
5 few months; you'll see that's going late. That is
6 only one of the projectco consortia.

7 Or go and watch Hurontario. Entirely
8 different projectco, same behaviours. That one is
9 going to go late as well. And the reason I know is
10 because we keep getting asked to go in and bail
11 these projects out. Same behaviours, same project
12 agreement, basic construct.

13 Very heavily specifying the solution.
14 That gets the behaviour. We've been told what the
15 answer is. We'll just draw it. And that's not the
16 case. It doesn't -- there's still analysis to be
17 done, and it just -- it builds pressure towards the
18 back end of the development cycle.

19 So for me, objective base requirements
20 is a far better approach to that procurement
21 because it places the responsibility down
22 successfully then to the projectco. They have to
23 provide the right solution rather than a solution
24 that met the contract. City, you now own the
25 solution you bought.

1 And I think there's a trade-off between
2 the two because I don't think it's exclusively one
3 side or the other. Railways are a team sport if we
4 do it properly.

5 CHRISTINE MAINVILLE: Okay. We'll chat
6 about this a bit more, but let's take a break. If
7 we could go off record.

8 -- RECESSED AT 2:33 P.M. --

9 -- RESUMED AT 2:50 P.M. --

10 CHRISTINE MAINVILLE: On the concept of
11 operations and concept of maintenance, were these
12 documents you saw?

13 DEREK WYNNE: I did see a concept of
14 operations, but it wasn't the -- it wasn't what I
15 would consider a mature document. Normally what
16 you do with a concept of operations is inform the
17 design solution required so that you have a
18 solution that can be operated the way the intended
19 operations will occur.

20 Given the lateness of our involvement,
21 we were pretty much past the point where a concept
22 of operations and analyzing it and understanding it
23 would have helped.

24 This was more an ask of this is the
25 solution that's now going to -- going into being;

1 how do we confirm and ensure that this is safe and
2 suitable to be operated.

3 And therefore, each of the equipments,
4 each of the different aspects of solution came with
5 a standard operating procedure which the designers
6 were set to provide over to OC Transpo, which they
7 reviewed, and then we amended through the hazard
8 transfers.

9 CHRISTINE MAINVILLE: And the concept
10 of operations normally, I take it, would have been
11 OC Transpo's responsibility?

12 DEREK WYNNE: Yes. Yeah.

13 CHRISTINE MAINVILLE: And then that
14 concept of maintenance, is that something you would
15 expect to see?

16 DEREK WYNNE: So the maintenance one is
17 an interesting position because the City procured
18 the services of the maintainer but retained the
19 rights to change the maintainer to any point they
20 desired, and it was for a fixed term of providing
21 maintenance.

22 So whilst she could get RTM to provide
23 the concept of maintenance, I think it was also
24 incumbent on the City to be certain that that's the
25 maintenance regime that they would like if they had

1 to select someone else.

2 But I think that's -- whether the City
3 did that or not, I personally would have thought it
4 would be wise because that's the asset you're going
5 to live with; that's the maintenance you have to
6 ensure occurs. Not everyone might be comfortable
7 to maintain it in the way that RTM were engaged to
8 do so.

9 So I would have provided that
10 oversight. I'm not sure if the City did or whether
11 the way it's maintained was set by RTM. I must
12 confess, I'm not sure where the influence was
13 there.

14 CHRISTINE MAINVILLE: Okay. In terms
15 of the hazard logs, I take it different entities
16 will identify hazards, for instance, Alstom,
17 Thales, and others?

18 DEREK WYNNE: Yeah.

19 CHRISTINE MAINVILLE: Okay.

20 DEREK WYNNE: Okay, so the normal way
21 is to have an integrated hazard log where all
22 hazards come together, and my team manage that
23 integrated hazard log.

24 Now, signalling system, the hazards
25 around signalling are pretty well known, and the

1 purpose of it is to mitigate some hazards of train
2 movement.

3 So a GOA2 system which has got driver
4 vigilance, the system does an amount; the operator
5 does the rest. That solution was a known quantity,
6 so we were able to factor that into the integrated
7 hazard log. Similarly so with the vehicle itself.

8 The majority of the integrated hazard
9 log and the hazard identification and analysis over
10 and above that done by my team relates to
11 everything outside of those two major systems, but
12 also worked in conjunction with them.

13 So the overall safety case that was
14 produced was predicated on the back of safety
15 justifications for all of the major assets
16 including -- and the safety justifications
17 including the equivalent provided by both Thales
18 and Alstom.

19 CHRISTINE MAINVILLE: Are you aware
20 during the -- well, that one of the derailments
21 involved an axle bearing failure?

22 DEREK WYNNE: Yes.

23 CHRISTINE MAINVILLE: And there was
24 some investigation by the TSB, the Transportation
25 Safety Board, and there was some discussion about

1 there not being a heat monitor --

2 DEREK WYNNE: Mm-hm.

3 CHRISTINE MAINVILLE: -- on the wheels?

4 Did this -- do you have a view on this,
5 and do you have any -- did this feature in any of
6 the hazard logs, or was this considered at any
7 point?

8 DEREK WYNNE: No. Alstom -- so the
9 wheel bearing on the Citadis Spirit in Alstom is
10 the same wheel bearing that's used in Lusail in
11 Qatar, which is a considerably different and warmer
12 environment than you've got in Ottawa.

13 The one in Lusail doesn't have the heat
14 sensors, and the wheel bearings don't fail, but it
15 does have a track that's designed for light rail
16 vehicles, not for heavy rail.

17 CHRISTINE MAINVILLE: So you think that
18 factored in -- again, even in the axle bearing
19 failure, the track?

20 DEREK WYNNE: My opinion on this matter
21 is as is follows: Firstly, you can't always get a
22 component failure, okay, so it could have just been
23 a particularly bad wheel race that failed.

24 These things go through a significant
25 amount of quality testing, random sampling and so

1 on, so you remove the probability to the maximum
2 extent possible.

3 And despite the changing of the -- some
4 of the internals of the train to increase North
5 American content, the wheel bearing wasn't one of
6 those components. It's still the same wheel
7 bearing.

8 So what we have to do is look for the
9 factor that's different, and the factor that is
10 different for me is the track. It's designed for
11 heavy rail. So rather than absorbing vibration,
12 it's reflecting it back. And I think that speaks
13 to the additional pressure placed on the bearing.

14 Now, that might have caused it to
15 overheat, it might have caused it to fail, but the
16 fact of the matter is, do we want to address the
17 symptom or the cause? And to me, the cause is down
18 to the unsuitability of that track with this
19 vehicle.

20 Yeah, so I personally don't think --
21 what the heat monitor would have done is identify
22 there was an issue occurring. I don't actually
23 think it would have been -- and therefore, we might
24 have prevented the actual failure. It might have
25 changed the bearing, but had we done so, we still

1 would be having this ongoing issue, which would be
2 creating a maintenance issue and other bearings
3 fail at other points in time.

4 But it -- a heat monitor like that,
5 yes, you can use it in extreme circumstances, but
6 would you do that on a system that's proven and
7 doesn't cause you any problems in other areas?
8 There is a wealth of assurance evidence for an
9 Alstom Citadis that suggests it doesn't need that.

10 CHRISTINE MAINVILLE: Okay. And did --
11 the location of these bearings, which I understand
12 are not necessarily visible or difficult to
13 visualize, did that require any kind of enhanced
14 maintenance or more frequent inspections?

15 DEREK WYNNE: No. So what you'll find
16 with a lot of systems is all the way through, you
17 get emergent properties. So there's two aspects
18 here: There's emergent properties and latent
19 defects. So let's unpack both of those for a
20 moment.

21 So an emergent property: Emergent
22 properties are both desirable and undesirable. The
23 emergent property is the -- what we're actually
24 writing requirements for, this is what we want to
25 achieve, but in so doing, we can also create other

1 emergent properties we didn't expect that are less
2 than desirable, and we manage those.

3 Speaking to capturing information about
4 near misses through Heinrich's principle and how we
5 aggregate all of that so that we make changes, we
6 improve the way that the rail system works through
7 how we operate, maintain, or even do an asset
8 modification. That's when we address undesirable
9 emergent properties.

10 Latent defect is something different.
11 It can be a dormant fault that was there from day
12 one, and then at some point in the future, you
13 exercise part of the system that you don't normally
14 utilize.

15 I gave the case of an exercise in
16 tunnel ventilation system fans. I wouldn't want a
17 dormant failure to be sat there for two, three
18 years and then find that when I call upon that fan,
19 it doesn't work. So there's two aspects to this.

20 So special maintenance frequencies,
21 et cetera, I wouldn't have expected to do so on
22 this vehicle. This is what I would call an
23 undesirable emergent property as a result of this
24 incompatibility. It wasn't something that was
25 considered at the time.

1 Most of the concern at the time was
2 around the track and the need to focus on the
3 increased maintenance on the track for its
4 condition, avoiding rail breaks and so on. The
5 long-term position on that is, in my opinion, this
6 is what's caused the issue in the wheel bearing.

7 Now, have we -- if regular maintenance
8 is undertaken, eventually you should notice there
9 are issues going on with the bearing.

10 So the extreme heat that's given rise
11 to this, if you do regular inspection, the
12 lubrication in that bearing, you would expect it to
13 be turning a funny colour (indiscernible) rather
14 than grease and so on.

15 So there would have been tell-tale
16 signs, but it depends on whether the maintenance
17 period was reached, and you'd actually take the
18 cover off that bearing and check the lubrication in
19 there to whether you notice that or not.

20 I think what's happened here is all of
21 the safety provisions -- I think a really nice way
22 of explaining it is layers of Swiss cheese. You
23 put layer after layer in place, and if you line
24 them up and look through, you never want to see
25 daylight from one end to the other, and this is one

1 of those rare occurrences where daylight has
2 managed to get all the way through, and that's what
3 we've seen here.

4 So now there needs to be -- if we're
5 not going to replace the track, which is expensive
6 to do, railway is out of service for a long time,
7 yeah, we're going to have to have a difference on
8 the maintenance regime. We're going to have to
9 inspect the bearings on a regular basis and might
10 even at some point change the bearings for
11 something that's more robust and doesn't fail.

12 We might add heat sensors so we get an
13 early indication that something is starting to
14 fail. These are all provisions. But if you put
15 the heat sensor there, then you can reduce the
16 amount of inspection you're doing again. So,
17 again, we're replacing process with product,
18 effectively.

19 CHRISTINE MAINVILLE: Right.

20 DEREK WYNNE: Yeah.

21 CHRISTINE MAINVILLE: The AREMA
22 standards, I take it those were specified in the
23 PA, but there's no -- there was no requirement
24 otherwise to use those or to -- they're not
25 mandatory in North America; is that fair?

1 DEREK WYNNE: So let's look at
2 standards for a minute. So if you're at home,
3 wiring standards for your house, for electrical
4 appliances in your home, standards are -- there are
5 set ways of doing things, there are safe ways of
6 doing things which have been proven time and again,
7 and therefore, it becomes the standard way of
8 mitigating a hazard or whatever and achieving
9 consistency.

10 So what happens is if you build a
11 solution, you work to a standard, and then you look
12 at how you're applying that standard -- sorry, your
13 solution to see whether, in addition to those
14 standards, you need to make any further provisions.
15 And that's what you're doing in the safety
16 analysis.

17 So the AREMA standard, talking about
18 the different standards of rail and a particular
19 rail type, you've got different -- you've got
20 different rail-heavy profiles that work with
21 different wheel profiles, different hardness of
22 rail.

23 Softer rail wears. Hard rail is
24 brittle. You need hard rail for heavy vehicles.
25 They condition it literally by pounding it or,

1 like, re-smelting it as the trains go over and so
2 on.

3 So it's all about metallurgic
4 properties of rail that is getting heavy abuse on
5 an ongoing basis because of the trains going over
6 it, and it's a matter of what is the optimum
7 solution to go with the type of usage. AREMA
8 creates a standard set of principles by which that
9 can be done.

10 The track expert I brought in, one of
11 my colleagues, Ben Venables, he works
12 internationally around the world. He's a track
13 expert. He was trained by the guy who wrote the
14 textbook by which all track standards, et cetera,
15 around the world are based.

16 He's worked on track in the Middle
17 East, Australasia, UK extensively, but he's also an
18 accredited appointed safety person, an AsBo under
19 the common safety method, and the equivalent of
20 that in North America is an ISA. And it's Ben who
21 wrote the report on the unsuitability of the rail
22 type that was used. He's our guy who wrote that
23 report.

24 I must confess, he baffled me. He took
25 me through what Brinell factors mean and how you

1 work it all out, and it got into some pretty
2 complex math. So I just said, Thank you very much
3 for explaining; I believe you.

4 But I was more interested in what's the
5 consequence of having the wrong track type, and
6 that's where we got into what was going on.

7 So in North America, is there a
8 different track standard? Well, AREMA is the only
9 place I'm aware of that actually specifies the
10 track standard. If we would have gone outside of
11 America and come over to more European, we probably
12 would have found a standard that suggested track of
13 a lesser type.

14 So the City specified AREMA. They
15 wanted track to be of a standard, so I understand
16 why they did that, but it wasn't suitable for the
17 type of vehicle.

18 So there's a clienting of prime system
19 integration that's gone wrong in the City. There's
20 a delivery of prime system integration that's gone
21 wrong in the DBFM; that was OLRTC.

22 CHRISTINE MAINVILLE: And the City
23 ultimately is responsible for safety regulation on
24 this project?

25 DEREK WYNNE: Yes.

1 CHRISTINE MAINVILLE: Yes. And so what
2 do they have in terms of regulations or rules to be
3 abided by?

4 DEREK WYNNE: So because the -- this
5 railway is serving a locality -- it doesn't go
6 across provincial boundaries -- the City were
7 delegated to manage themselves, be self-regulating
8 when it comes to safety.

9 So under those circumstances, I think
10 just a straightforward duty of care, almost
11 intelligence and professionalism states that you
12 need to have an appropriate safety regime, and you
13 will base that on similar railways that exist
14 elsewhere in the world.

15 And there's lots of information
16 available about safety. For instance, Rail Safety
17 and Standards Board is accessible. It's not a
18 difficult ask to get involved. Railway industry
19 association, et cetera. And also you can go and
20 procure the services of experts that can come and
21 advise you.

22 So given that basis, the fact that we
23 got entry into service without the City having an
24 appropriate safety management system I think speaks
25 to the level of understanding of the role as a duty

1 holder, but I don't think it was the only problem.

2 You know, safety is a culture. It's
3 something that we should all be responsible for,
4 not just certain individuals, and that's a very
5 difficult ask when you're moving the operators that
6 used to drive buses to now driving trains under a
7 control centre element of it as well. That's a
8 significant change management piece.

9 Under common safety method, there's the
10 safety principles which are available if you do a
11 Google search. One of the -- one of the things in
12 there is about defining the change. What's the --
13 is it a major or a minor change?

14 And in a major change, which this
15 clearly is -- even if it had been exactly the same
16 railway somewhere else, and we say all the staff
17 went off sick so we retrained the bus drivers to go
18 and drive that, that is a significant change, even
19 though the rail system they drive is exactly the
20 same. And that significance is about new,
21 non-familiar operators working that equipment.

22 If you think about the situation in
23 Ottawa, unfamiliar operators run the
24 infrastructure, et cetera. Every single aspect of
25 creating a railway system was brand new, was a

1 significant change, all of it on all sides. That
2 is quite an unusual situation.

3 If you went to Toronto, yes, Eglinton
4 Crosstown, first major new rail piece in Toronto
5 for quite some time, but it will be operated by
6 Toronto transit corporation who have been operating
7 Lines 1 through 4 for quite some time, and they're
8 familiar with how to do it, so you don't get the
9 same behaviours. That's part of the challenge
10 here. Everything was brand new.

11 CHRISTINE MAINVILLE: Right. And so to
12 be sure, the City did not have safety regulations?

13 DEREK WYNNE: They have a safety
14 management system, but on my review, it was
15 something that -- in my opinion, they did two
16 things: Firstly, it seemed more appropriate for
17 other transportation systems that they already
18 have, such as bus rapid transit.

19 The update that it had received,
20 because the LRV was coming, it was entirely about
21 pushing responsibility to people they place on
22 contract.

23 Now, there's a basic principle in my
24 mind, especially when you deal with safety, and
25 that is, yes, you can procure the services, you can

1 delegate people to support your activity, but it
2 does not absolve you of your responsibility.
3 You're delegated the work, not the responsibility.

4 You can share the responsibility, and
5 this is one of the notion of duty holder versus
6 designer. There are certain key roles involved in
7 achieving that safety. Duty holder ultimately is
8 still the person at the top of that pyramid. He
9 was responsible for employing appropriately
10 qualified and capable individuals to ensure that
11 safety was realized.

12 CHRISTINE MAINVILLE: Do you understand
13 that that role is held in this case by the City
14 Manager?

15 DEREK WYNNE: Yeah. Yeah, absolutely,
16 yeah. So, again, if you look at the way the
17 railway operates, OC Transpo will be sensibly their
18 duty holder. They interact with this railway
19 system on a daily basis. They've got access to
20 frontline information. Liken them to be the
21 infrastructure owner/manager.

22 The City wants this thing right into
23 service. The City are effectively the capital
24 projects arm procuring the extensions. That's
25 exactly the same situation we've got here in

1 Vancouver where I'm currently looking after
2 SkyTrain.

3 We've got TransLink who do the capital
4 projects. We've got BCRTC who are the operator and
5 the duty holder. They ultimately say what's safe
6 to run on that railway and deliver passenger
7 service.

8 Now, if I was to look at the way that
9 system works over here, we've got over 30 different
10 projects all running at the moment, line
11 extensions, new control sensors, new depots,
12 upgrades to traction power, et cetera, all
13 different major assets.

14 Some of them are akin to whole
15 railway-type undertakings. All occurring all
16 simultaneously, all underneath the safety regime
17 because of a safety culture and an understanding of
18 it being everyone's job, but ultimately someone is
19 ultimately responsible.

20 And I'm afraid that's not the position
21 I felt at Confederation Line and all those involved
22 reached before they decided to go entry into
23 service.

24 My opinion was that of course the
25 projectco were pushing to get into service as

1 quickly as possible. My opinion is the City
2 accepted it far too soon. It should never have
3 gone into service when it did. It needed more
4 time.

5 And I think that was influenced by a
6 political decision, the statements made in the
7 press about when we were going to operate -- when
8 we were going to open rather than it was done based
9 on system maturity. But that's my opinion from
10 what I saw.

11 CHRISTINE MAINVILLE: Sure.

12 DEREK WYNNE: Having said that, had it
13 opened three, six months later than it actually
14 did, the safety management system still wouldn't
15 have been updated --

16 CHRISTINE MAINVILLE: Right.

17 DEREK WYNNE: -- and would still have
18 been a problem.

19 CHRISTINE MAINVILLE: And so that gap,
20 wasn't that a concern from a safety perspective
21 going into service?

22 DEREK WYNNE: So this is where the --
23 this, again, gets into the duty holder position. I
24 expressed my concerns, so I did discuss the SMS
25 with the ISA. I did discuss it with the City. I

1 certainly discussed it within the projectco.

2 But my remit was to confirm the safety
3 of the product that was being delivered for the
4 operator and the maintainer, so I was not the duty
5 holder.

6 In my opinion, I don't think there is
7 an understanding of what it means to be a duty
8 holder, and the safety management system I reviewed
9 tried to push that responsibility down to the
10 supply base incorrectly.

11 CHRISTINE MAINVILLE: So you mean from
12 the City to the --

13 DEREK WYNNE: Yeah, to RTM, to whatever
14 external firms that they engaged with.

15 CHRISTINE MAINVILLE: Where would that
16 be reflected?

17 DEREK WYNNE: It is in the City's
18 safety management system. I'm trying to think of
19 the specific title for it, but it -- whether it --
20 I think -- I'm sure it wears an OC Transpo badge
21 because OC Transpo do all of the different
22 transport modes in the city.

23 CHRISTINE MAINVILLE: When you -- and
24 when I say "you," SEMP came back later in 2021,
25 were you asked for or did you provide input on gaps

1 at that point in time and improvements to be made?

2 DEREK WYNNE: No. So our visit at that
3 point was to discuss the challenge that RTM were
4 having, to discuss with them maybe writing their
5 subordinate safety management system where the City
6 had expressed a need for them to improve their
7 safety management system, and to help them with
8 effectively putting the service back into revenue
9 service.

10 We were never engaged to do that. It
11 was through those conversations that I highlighted
12 the Operational Restrictions Document, which seemed
13 to be during those meetings. The people that I
14 dealt with were unaware that it existed.

15 CHRISTINE MAINVILLE: Was that at that
16 point Mario Guerra or anyone else you were dealing
17 with at RTM?

18 DEREK WYNNE: Yeah, Mario Guerra, and
19 there's a few other names that I can probably go
20 back to the emails and find for you, but, yes,
21 those were the individuals, yeah.

22 CHRISTINE MAINVILLE: Okay. Yes, if
23 you could, that would be great.

24 And so are you able to express a view
25 today on -- or at least from when you were last

1 involved in 2021 about the system's safety and
2 reliability currently going forward?

3 DEREK WYNNE: Well, I think this
4 railway company operated safely and reliably. We
5 could have a better maintenance regime, a better
6 safety culture, better methods of working, better
7 respect of the Operational Restrictions Document.
8 We could even undertake retrospective upgrade to
9 the assets that are there at this moment in time.

10 Most railways around the world operate
11 on condition assessment based on where they are and
12 the maintenance you need to do to them to keep them
13 in safe revenue service. This railway is no
14 different.

15 And this is a concept that was never
16 understood by the City whilst the railway was being
17 developed. In fact, the suggestion to them of
18 opening with operational restrictions at one point
19 was something -- they didn't expect a single
20 operational restriction, which is utterly naive.
21 Railways will always have them.

22 The fact of the matter is, when you
23 undertake maintenance on condition assessment, you
24 might put temporary operational restriction in
25 place, temporary speed restriction, TSRs or TORs,

1 operational restrictions, they're temporary, to
2 support maintenance and reengineering works.

3 So railways will always operate with
4 operational restrictions. The City didn't seem to
5 think that that was a thing, and I think that
6 speaks to the newness in being a rail system owner
7 and operator.

8 CHRISTINE MAINVILLE: So the
9 operational restrictions were not atypical, but
10 were they more extensive than they normally ought
11 to be?

12 DEREK WYNNE: No, not at all.

13 CHRISTINE MAINVILLE: You just need to
14 follow through on them?

15 DEREK WYNNE: You just need to do it.
16 Absolutely. No, I mean, you know, challenging
17 environments, for instance, the heat of the desert
18 in Lusail, I mentioned the light rail system in
19 Qatar.

20 Given metallurgic properties of rail
21 laid on the ground and exposed to the 45-degree
22 midday heat over there, I would be concerned to do
23 a frequent rail inspection there because rail will
24 twist. It expands in that heat, and then it
25 contracts when you get to a cold night. So there

1 are different behaviours going on in the metal
2 because of the environment it's in. It's a similar
3 situation in Ottawa.

4 So, again, set the conditions for
5 maintenance based on its implementation and its
6 usage, and that includes its location around the
7 planet.

8 So, no, I don't think there is a need
9 for overburdensome maintenance in Ottawa. I think
10 there's just a need to do the maintenance that was
11 laid out, but I think that maintenance is only part
12 of the challenge because the system integration,
13 the system solution as an integrated whole is not
14 optimized because we've got this mixed bag of light
15 rail vehicle running on heavy rail track. It adds
16 maintenance burden.

17 And clearly, from the incident, the
18 wheel bearing, so now we need to raise an
19 additional operational restriction which speaks to
20 inspecting the maintenance of all the bearings
21 until such time as we maybe come back with a
22 stronger one that's recertified that can stand the
23 hammer that it's taking. So maybe that's the
24 solution.

25 CHRISTINE MAINVILLE: Did you interact

1 with Alstom maintenance or make any observations
2 about their work?

3 DEREK WYNNE: No. We were -- we were
4 kept well away from Alstom maintenance. They were
5 a sub to RTM. Our interaction was with RTM.

6 CHRISTINE MAINVILLE: Okay. In terms
7 of City counterparts, did you interact there with
8 their advisors or other people from the City?

9 DEREK WYNNE: Yeah, so I interacted
10 with the -- mainly Richard Holder, but he had
11 consultants, individual consultants such as Gareth
12 Wood. The City also had Parsons as the firm there.
13 The main person there, John Hulse, managing the
14 engagement. Every single assurance deliverable
15 provided was reviewed by the City and the City's
16 representatives, their owner's engineer service.

17 Frankly, having been through the scores
18 of comments they raised on every single
19 deliverable, we honoured about 5 percent of the
20 comments, and the rest of it were rejected because
21 it was complete nonsense.

22 And the 5 percent was effectively
23 reword a sentence so that you can understand it
24 more clearly. It was adding no value, but it was a
25 gesture to help them through.

1 And frankly, it annoys me in the
2 industry, but you do see consultancy services where
3 people enjoy riding the gravy train and generating
4 fees.

5 CHRISTINE MAINVILLE: And whose
6 comments are you referencing?

7 DEREK WYNNE: Those were the ones from
8 Parsons.

9 CHRISTINE MAINVILLE: Parsons?

10 DEREK WYNNE: Yeah.

11 CHRISTINE MAINVILLE: And those were
12 provided, you said, in which document?

13 DEREK WYNNE: They came back on all
14 safety justifications, on the requirement sets, the
15 V&V evidence. They came back on lots of different
16 things, even the engineering management parts.

17 CHRISTINE MAINVILLE: Did you interact
18 with STV?

19 DEREK WYNNE: I interacted with STV
20 twice. Once in relation to the Confederation Line.
21 That was in May 2018. On behalf of OLRTC, I
22 attended a meeting at the OC Transpo building at
23 the far end of Belfast Yard.

24 OLRTC were present. OC Transpo were
25 present. Numerous of the owner's engineer

1 characters were there, as was STV, as was the ISA,
2 and also some of the City staff as well that were
3 doing -- looking after certain of the asset types
4 from an owner's engineer point of view.

5 My role at that presentation was to
6 present a route to completion, and interestingly,
7 as I finished that -- and I withstood about 90
8 minutes of grilling by the entire audience. I
9 answered every single question satisfactorily to
10 the room's satisfaction.

11 The person who leaned across and said
12 "well done" to me was John Manconi. I didn't
13 realize who he was at the time, but that's who was
14 in the room as well. So there was that audience,
15 and that's why I got to meet STV. Specifically
16 STV, Tom Prendergast is the name that sticks in my
17 mind.

18 CHRISTINE MAINVILLE: Okay. And --

19 DEREK WYNNE: He's since moved on, by
20 the way. I don't think he's with STV anymore.

21 CHRISTINE MAINVILLE: Yes.

22 DEREK WYNNE: I think he's with AECOM.

23 CHRISTINE MAINVILLE: AECOM, yes.

24 DEREK WYNNE: Yeah.

25 CHRISTINE MAINVILLE: Okay. And did

1 you have concerns about those interactions?

2 DEREK WYNNE: No, not at all. I think
3 it was a good healthy debate in the
4 route-to-completion presentation I gave. I
5 presented the strategy for making it happen.

6 Late end of the project, running in to
7 fix it, get it over the line, you can't go back to
8 day one and do the whole project again, so you've
9 got to -- you've got to take a risk-based approach
10 and understand how best to deliver with integrity,
11 but at the same time with a mind to time scale of
12 delivery.

13 So it's good to put a proposal there.
14 It's good to get a room full of people to challenge
15 that, people that are knowledgeable and can
16 challenge that, and that was that process. And
17 that was the 90-minute Q&A that we went through and
18 every question answered and accepted successfully.

19 CHRISTINE MAINVILLE: Okay.

20 DEREK WYNNE: But that -- but that
21 speaks to the robustness, the independence of
22 checking not just process but outcome from that
23 following that process, which is everything that
24 was happening.

25 CHRISTINE MAINVILLE: Did you come to

1 see the term sheet that was agreed to and signed in
2 order to achieve revenue service availability?
3 This is between the City and RTG basically agreeing
4 to deferring certain items that were otherwise
5 required by the project agreement to meet RSA. Do
6 you have any knowledge of that?

7 DEREK WYNNE: I didn't actually see the
8 agreement that was reached. Certainly one of those
9 items was UTO in the Belfast Yard.

10 CHRISTINE MAINVILLE: The automated
11 yard, you mean?

12 DEREK WYNNE: Yeah. Yeah.

13 CHRISTINE MAINVILLE: Yeah.

14 DEREK WYNNE: Yeah. So that's
15 certainly one of those that I was aware of. I
16 presume it got extended because of the CCTV, the
17 one-person operation feature of the vehicle,
18 because of the issues over the CCTV integration.

19 I presume there was an agreement to
20 allow it to go forward with that as a -- have we --
21 have we bought something that's incorrect. No, it
22 could work.

23 So it was a work-around. The City
24 weren't happy with that, I'm sure, because it
25 wasn't what they intended to buy. OLRTC -- I

1 should say RTG, somewhere in that group provided
2 operatives to stand on the platform, so I'm sure
3 the City accepted that in the short-term.

4 But I never actually saw the terms of
5 that agreement, what fee payment was withheld until
6 the scope was fully delivered, et cetera. I'm not
7 aware of any of that. That's very much out of my
8 wheelhouse.

9 CHRISTINE MAINVILLE: Okay. Did you
10 have any concerns at least in respect of what you
11 were aware of, such as the automated yard being
12 deferred?

13 DEREK WYNNE: No. The yard -- there
14 are yards that are entirely manually operated and
15 can be done so safely, so no. In fact, I'll be
16 frank. I would much rather the yard was operated
17 without the unmanned train operation than with.

18 Railway yards are again a top-ten
19 safety hazard. Someone controlling the train
20 movement when there are persons accessing other
21 trains that need to go in and out of maintenance
22 sheds, someone driving another train remotely is
23 a -- for me is a more significant hazard than when
24 there's a driver driving manually. So personally,
25 I think it's safer as it is without doing that

1 extra scope.

2 CHRISTINE MAINVILLE: Okay. And what
3 about the Minor Deficiencies List? Would you have
4 been aware of the items that made it there?

5 DEREK WYNNE: Oh, absolutely. So every
6 single one of those, from the multiple different
7 versions of lists that were tracked by multiple
8 different parties, were all captured into our
9 requirements database. So we -- if we added them
10 all together, we had something approaching 39,000
11 different snags that we were tracking.

12 The ones that were of specific interest
13 to us are those that were stopping the mission and
14 safety critical features of this railway.

15 So for instance, snags telling me that
16 the paint is scuffed on a door I'm not interested
17 in. If something is telling me I've got intruder
18 access control that's malfunctioning, we can get
19 around that. We can use standard key and lock
20 until such time a swipe card is working. So there
21 are ways around many of these things.

22 Obviously my focus is on those that you
23 can't do an easy solution with like that because
24 they're what create operational restrictions.

25 But good progress was made on all the

1 properly critical snags because they were stopping
2 us being able to deliver a system integration test
3 to see that the features, the functions were able
4 to be exercised.

5 CHRISTINE MAINVILLE: So at the end of
6 the day, I take it you would have signed off on
7 that list, and it didn't create --

8 DEREK WYNNE: No, I didn't sign off on
9 that list. I tracked that list to show that there
10 were no more snags against the derived safety
11 requirements and those requirements that underpin
12 safety, but I was not involved in or even concerned
13 with quality of finish, of esthetics and so on.
14 It's kind of irrelevant.

15 Over time, the doorways and so on, they
16 get worn through. You see it on floor tiles. You
17 see it on paint finishes and so on. It's
18 irrelevant to the safe function of a railway, so I
19 didn't waste my time on that.

20 CHRISTINE MAINVILLE: Fair enough.
21 Okay. But from a safety perspective, at the end of
22 the day --

23 DEREK WYNNE: Yeah, all of it.

24 CHRISTINE MAINVILLE: -- it didn't
25 cause you concern?

1 DEREK WYNNE: So certainly where there
2 were snags that were stopping safety features and
3 so on, yeah, very much a concern, and all of those
4 were mapped against the derived safety
5 requirements.

6 We tracked every one of those to its
7 closure so that the system integration tests could
8 be conducted in their fullness because that's the
9 information we wanted back. That's showing me that
10 the safe -- the derived safety requirement has
11 actually been implemented, the safety feature
12 exists.

13 CHRISTINE MAINVILLE: So there were
14 items there that could impact the systems
15 integration test, but I take it those were
16 resolved --

17 DEREK WYNNE: Yeah. Yeah.

18 CHRISTINE MAINVILLE: -- ultimately to
19 do --

20 DEREK WYNNE: Yeah, apart from things
21 that go into the Operational Restrictions Document,
22 and if you ran the operational restrictions
23 effectively, that's the system that you realized is
24 no longer a snag; it's a permanent restriction.

25 CHRISTINE MAINVILLE: Okay. And were

1 there -- other than the operational restrictions,
2 were there retrofits that resulted or other changes
3 to the system that resulted from SEMP's work?

4 DEREK WYNNE: If there was retrofits --
5 so I was aware of something happening with a leaky
6 window on one of the trains which I'm sure was
7 getting retrofit after entry into service, but away
8 from that, any further retrofits and so on, no, we
9 weren't involved at that point. We finished by
10 then.

11 So I was conscious of the fact that
12 there were certain items to do with Alstom, that
13 there was a fit and retrofit, but the scope of
14 those -- so what's happening, every vehicle has its
15 own build book. Each one of those has got a safety
16 case according to the type of safety case, and then
17 you have the conditions associated with that
18 particular rail vehicle.

19 Any change to that rail vehicle needs
20 to be done in conjunction with the safety case and
21 safety assurance and also be updated in the build
22 book to make sure there's a full audit trail of it
23 there.

24 So not something I would have been
25 concerned with. I would have expected that to be

1 done in accordance with the procedure and the
2 safety assurance maintained. To my knowledge, I
3 wasn't aware of stuff that was wrong with the
4 vehicle entering into service that would have given
5 us any safety concerns.

6 CHRISTINE MAINVILLE: So would your
7 work involve assessing whether there are defects,
8 or you would look at the design and consider that
9 the system was built according to the design?

10 DEREK WYNNE: So I want to see a
11 system -- first of all, I'm interested in the very
12 start of the process, what are the requirements.
13 That in itself is a big piece because there's
14 the -- what's the objective? What are the outcomes
15 you're looking for? What are the restrictions on
16 achieving those outcomes? What are the
17 instructions? I want a solution that looks like X,
18 Y, Z and so on.

19 But requirements have to be
20 embellished. That's why we elicit, derive,
21 capture, et cetera, all the other requirements that
22 are required in order to have a requirement set of
23 the solution we must design.

24 I'm interested in the design meeting
25 all of that because within the derived part is the

1 derived safety requirements and derived RAM,
2 et cetera. I'm interested in seeing that all the
3 way through to the far end and entry into service.
4 So I'm involved -- well, I want to be involved at
5 all stages of that process.

6 My responsibility stops at the point we
7 reach entry into service and are satisfied that at
8 that moment in time, subject to following the
9 operational restrictions and the maintenance
10 regime, that that railway -- and operating it
11 correctly, that railway was safe to operate.

12 CHRISTINE MAINVILLE: Okay.

13 DEREK WYNNE: So I want to say in this
14 regard, whilst that's my interest, the way
15 assurance works is if you've got a competent person
16 signing and taking responsibility through a design
17 certificate, construction certification, test
18 certificate, which is exactly what you get from
19 Alstom and Thales as well, then I want to see an
20 amount of evidence, but my evidence start point is
21 their certificates.

22 Alstom and Thales, I was more than
23 happy to have faith in them. It was, for me, the
24 EJV and the designer there where engineers of
25 record weren't certain about signing things, or if

1 they had, they hadn't provided the evidence to
2 substantiate it.

3 And that's where a lot of our focus was
4 spent, is extracting that information to bring that
5 to a level because we weren't seeing the
6 appropriate levels of competence and rigor that was
7 required.

8 CHRISTINE MAINVILLE: And that was --
9 you said mostly your interactions were with Keith
10 Brown and you said Dave Valens; is that --

11 DEREK WYNNE: David Ellis, yeah.

12 CHRISTINE MAINVILLE: David Ellis.

13 DEREK WYNNE: Yeah. And, of course,
14 they were -- what's the best word I can say? Their
15 ability to undertake work was, in my opinion,
16 hampered by Roger Schmidt who was controlling their
17 funding.

18 CHRISTINE MAINVILLE: Who was what,
19 sorry? Controlling their funding?

20 DEREK WYNNE: Funding. The budget they
21 had.

22 CHRISTINE MAINVILLE: Okay. How did
23 you ultimately assess the level of integration of
24 the systems? I don't know if that's too broad a
25 question.

1 DEREK WYNNE: Okay. So each of the
2 primary building blocks of the railway, track or
3 traction power, signalling, et cetera, they all
4 have to work together in an integrated fashion, and
5 the way you prove that is through integration test.

6 So probably one of the best end-to-end
7 descriptions of this is the fire life safety
8 system. So if a train suffered an incident, a fire
9 incident, there is what's referred to as a fire
10 wire, bit of a mouth full, that runs around the
11 train.

12 If the fire wire breaks, the train
13 management system knows that the fire wire is
14 broken, and it knows where it's broken. So this is
15 the first part of the system doing something. That
16 level of integration is all within Alstom.

17 The train management system then
18 provides that notification to the vehicle onboard
19 controller, which is a signalling solution which
20 sits within each vehicle. The reason for that is
21 this is now a safety critical event, and we need to
22 notify the control centre.

23 So the route for that notification is
24 through the vehicle onboard controller. It goes up
25 the system, the SIL-4 system from -- for

1 signalling, and it's displayed to an operator. And
2 that is telling him which train, where's the train
3 going, and which end of the train. He can then
4 respond by instructing the tunnel ventilation
5 system to basically switch up.

6 So let's explain why there's a bit of
7 importance about where on the train the fire is.
8 If the fire is at the back of the train, you want
9 the fans at the back end of the platform to pull,
10 to pull fumes away. You want the fans at the front
11 of the train to push, to push clean air over the
12 escaping passengers.

13 The end to end of this response has
14 gone through the train, the signalling, through the
15 SCADA, down to the tunnel ventilation system PLCs.

16 If you've got a failure of a fan, that
17 TVSPLC then notifies the next station along, and
18 that station switches its fan on to provide pull
19 through the tunnel to try and compensate for a
20 failed fan.

21 All of that is integration testing, to
22 demonstrate an exercise of that system from end to
23 end, and that was certainly undertaken in Ottawa.
24 And not only just the safety functions, but with
25 Ottawa fire service present and other emergency

1 services. There was actually smoke bombs set and a
2 live witness demonstration of it actually removing
3 fumes from the station tunnel space.

4 CHRISTINE MAINVILLE: Did you consider
5 more specifically the systems integration between
6 the rolling stock and the signalling system? Was
7 that a focus at all of the work?

8 DEREK WYNNE: Yeah, so within that
9 space, this desire to rush to put scissors through
10 the project agreement, a solution had been brought
11 from Thales, a solution was brought from Alstom.

12 In the Alstom contract, there was the
13 expression of this interface to instruct in a fire
14 life safety event to notify the signalling system,
15 but they didn't put the reciprocal requirement in
16 the signalling contract, so at which point this
17 became an operator's restriction.

18 Notification to the control centre
19 would have to be made by the operator. This is
20 less than ideal because it's a pressured situation.
21 You've got a vehicle that's on fire, potentially
22 suffering traction issues. The operator's job is
23 to get it to the nearest platform. That's the best
24 way of getting passengers to escape the vicinity
25 and so on.

1 It just adds to the workload at a
2 critical time, so it's not the ideal solution, but
3 it is still an acceptable solution. If you run all
4 the trains, that's exactly what you'd be doing
5 anyway.

6 CHRISTINE MAINVILLE: Were there other
7 integration issues that -- at that level that
8 you --

9 DEREK WYNNE: So another one that
10 relates to this was the feature of autocoupling.
11 So autocoupling, the way the LRVs are constructed,
12 they are currently four carriages, and there is the
13 ability to couple two of these together to run as
14 an eight-car set.

15 Now, each of those four-car consists,
16 each LVR has got a vehicle onboard controller. So
17 when you couple the train together, you need to
18 know which end of the train the active vehicle
19 onboard controller is at because that then
20 determines, when you're going through, which end of
21 the train will the fire be on. So it's all
22 contextual about where the incident might be.

23 And there were also a couple issues
24 around, well, firstly, selecting that and actually
25 getting the also coupled trains to actually confirm

1 and register onto the system as an extra-length
2 unit, but I believe those got resolved before it
3 went into service.

4 CHRISTINE MAINVILLE: Are they two
5 one-car consists? Double, two --

6 DEREK WYNNE: No. If you look at the
7 way it -- effectively it's -- whilst it looks like
8 it's one car, that is actually one consist, and
9 then you can double up the consist to make two.

10 It's like a coupled pair, but each
11 consist has actually got four carriages in it at
12 entry into service, and you can actually split it
13 and add a fifth carriage in and make it a longer
14 one.

15 So each consist is then five carriages.
16 Coupled, ten carriages, if you couple two trains
17 together, and that's the length of the platforms
18 that were created for Ottawa.

19 CHRISTINE MAINVILLE: Did you
20 understand that there were challenges in the
21 integration of the rolling stock and the signalling
22 system during the project?

23 DEREK WYNNE: So the challenges that I
24 was party to were around the coupling, as I was
25 just mentioning, and also around the notification

1 of an incident like a fire event which you would
2 notify back through the signalling system.

3 And all of that stems back to lack of
4 prime system integration by OLRTC and rushing in to
5 place contracts out. And missing the interface
6 requirements that should have been specified into
7 both contracts. So I'm aware of those issues.

8 CHRISTINE MAINVILLE: Would you have a
9 way to know or tell whether the interface control
10 documents, the ICDs, for each of Thales and Alstom
11 were fully integrated or not? Is that something
12 that can be assessed?

13 DEREK WYNNE: Yeah, absolutely. So as
14 I -- in OLRTC's position, you would have put an
15 interface requirement on both parties. So the
16 requirement is normally followed by an agreed
17 interface definition, and an agreed interface
18 definition is then followed by an ICD.

19 For an ICD or an agreed interface
20 definition, both of those are -- they effectively
21 describe the conduit between two parties;
22 therefore, they have to be accepted by two parties.

23 Where this falls over is what precedes
24 that, and it's in the requirements. Requirements
25 in the Alstom contract and the reciprocating ones

1 not placed in the Thales contract. So you can
2 already see where the integration issue started.

3 CHRISTINE MAINVILLE: Do you understand
4 that this had any implications on the performance
5 of the system ultimately, on the reliability of it?
6 I'm not necessarily speaking about safety.

7 DEREK WYNNE: No. To my knowledge, at
8 entry into service, the signalling was working
9 well. The issue seemed to be about vehicle
10 availability and how the vehicle was performing
11 when they were going through test and trial
12 running.

13 But, no, as far as I knew, the -- that
14 interface, apart from not having all the features
15 it was supposed to have, as far as I know, that
16 feature was working well by the time we got to the
17 end of test of trial running.

18 CHRISTINE MAINVILLE: And in terms
19 of -- is it possible that -- you know, you don't
20 know what you don't know, so if there are train
21 behaviours that one system is not aware of for the
22 other system to respond to, is it possible that
23 things could have been overlooked if some things
24 were simply not known as between the Thales and
25 Alstom systems?

1 DEREK WYNNE: Sorry, I might need to
2 ask you, is there something particular you're
3 looking for in there maybe as an example?

4 The reason I ask is because the vehicle
5 can be driven manually by the operator, and that is
6 normally done to a speed restriction so the
7 vehicle -- if the vehicle onboard controller is
8 disengaged, the train will only allow you to drive
9 at a certain speed, usually about 30 kilometres per
10 hour max speed. I have a feeling it's lower than
11 that for Ottawa.

12 If the vehicle onboard controller is
13 functioning, then the train is in GOA2 automatic
14 mode, and the train is then accelerated and
15 decelerated using the signalling system.

16 So the command comes from the
17 signalling system, and that was proven to be
18 working. It had to be, otherwise we couldn't have
19 done test and trial running.

20 CHRISTINE MAINVILLE: I'm not
21 suggesting that by this time any such issues remain
22 because I understand there would be a lot of
23 reliability growth over time, but for instance,
24 there was a point in time where emergency braking
25 issues arose?

1 DEREK WYNNE: Okay, so the challenge on
2 the emergency braking -- if this is -- so I'll
3 describe the one I was aware of. You tell me if
4 this is the one that you're thinking of.

5 So within a certain distance of each
6 train station, if you have a guideway intrusion
7 detection system failed where a passenger is in the
8 guideway running from one platform to the other,
9 instruction was sent in order to emergency brake
10 the train.

11 It's a pretty harsh reaction to an
12 intrusion in the guideway. So the City were asking
13 for emergency brake, and I was asking for
14 disengagement of the traction power so the train
15 could coast and then, under driver vigilance, which
16 is the whole point of the system -- if the driver
17 can witness the obstacle, the person or whatever
18 might have fallen in the guideway, then the driver
19 would actually do the braking, including using the
20 emergency brake, and I think that's the more
21 appropriate and proportionate response.

22 So that's what was happening. The
23 challenge around EB was twofold: So first of all,
24 the alignment to the station, the field of view of
25 the operator, what's the approach speed, some of

1 that can be set as part of the configuration of the
2 signalling system. What's the speed profile that
3 you also drive a train to.

4 The other is about sensitivity of the
5 guideway intrusion detection system. If a piece of
6 litter flies in front of it, then would you want it
7 to emergency brake the train, because it can be
8 made that sensitive. And at one point, it was that
9 sensitive. So you have to desensitize it. The
10 challenge of desensitizing it then is so what
11 purpose does it serve.

12 But moreover, guideway intrusion
13 detection system is about stopping people heading
14 along the guideway rather than stepping off the
15 platform edge.

16 For instance, if someone steps off a
17 platform to retrieve a mobile phone that had been
18 dropped, guideway intrusion detection system would
19 not pick them up. It wouldn't be known. The train
20 is still coming, also driving. It was only about
21 people running around the central barrier and
22 tripping the gids (ph).

23 So for me, this was a partial solution
24 that was implemented. The City didn't want the
25 full solution which is available.

1 By the way, that's the full solution
2 that you find here in Vancouver. The City didn't
3 want the full solution, and therefore, they've got
4 a partial solution.

5 And then there was a lot of complaints
6 around how sensitive the system is and how it keeps
7 emergency braking. Well, the system is doing what
8 it was intended to do because you wanted to specify
9 something that you're now not happy with the
10 consequences of your ask.

11 So, yes, there were issues, but I do
12 think that is a particular red herring in terms of
13 integration challenge. That's more configuration
14 challenge.

15 CHRISTINE MAINVILLE: Okay. And then
16 you mentioned the goal availability being the
17 bigger concern, and I just want to be clear -- and
18 I know we touched on this a bit -- about what you
19 mean by that.

20 DEREK WYNNE: Yeah. Okay, so build of
21 vehicles was running late, and I think there were
22 numerous issues as the first vehicles were being
23 shaken down. It wasn't a design issue; it's more
24 of a manufacture and quality issue concerned with
25 doing appropriate sort of factory inspection,

1 factory acceptance test, which you would do of each
2 vehicle.

3 I did mention the fact that trains were
4 assembled in Ottawa at the Belfast Yard. This was
5 supposedly to do with a cost savings and so on. I
6 can't tell you whether that started with the City
7 instructing the OLRTC that it's going to be this
8 LRV or whether it was -- that was driven by OLRTC
9 looking to save money.

10 I certainly know that both parties were
11 involved in selecting this particular vehicle, but
12 this was a lateness to come to revenue service, and
13 there were a few issues, things that caused
14 breakdown, and where a vehicle would stop moving,
15 maybe there was a braking issue. Or there were
16 times where continuous test couldn't occur because
17 there was a signal issue because of a
18 non-deterministic switch.

19 Actually, in my opinion, that was
20 driven by an earthing and bonding issue, because
21 the signalling system is running at 110 volts to
22 move the switches, and if you get to sort of 60
23 volts, you know, it's 110 volts plus or minus 5.
24 Well, halfway point is 60. You're kind of creating
25 a voltage where the switch doesn't know which way

1 to go, so it becomes non-deterministic.

2 So there were issues like that which
3 stopped trial running from occurring. So there
4 were various issues. Most of the issues with the
5 vehicle was about the build quality rather than the
6 actual design of the solution, and that was being
7 worked through at the time.

8 CHRISTINE MAINVILLE: The quality part
9 of some of the components?

10 DEREK WYNNE: No, no, the build
11 quality. So imagine going to the garage and
12 picking up your car. If the paint is scuffed, you
13 would reject it. The wing mirrors are on, but
14 they're loosely fitting; they're not tightened up
15 properly.

16 That's build quality versus quality of
17 the components. You can have good components, just
18 not assembled correctly or sufficiently tight and
19 checked and so on.

20 CHRISTINE MAINVILLE: And do you
21 attribute that mostly to where the assembly took
22 place, the MSFs, or the labour?

23 DEREK WYNNE: I think it was a
24 combination of the labour and the location. If you
25 had been working from Alstom's factory, then you

1 would have had their regular workforce who were
2 familiar with doing this. I don't think there is
3 one particular statement you can make as to why
4 it's a problem. I think it's a combination of
5 factors.

6 CHRISTINE MAINVILLE: Have you seen
7 that much elsewhere, this assembly in a facility
8 that's not -- well, whose purpose is not an
9 assembly facility or a production facility?

10 DEREK WYNNE: I must confess, it
11 surprised me to see that the vehicle was being
12 assembled at the MSF. That's not what I was
13 expecting at all.

14 Certainly if -- I'm familiar in London
15 with digging a big hole in the road and lowering an
16 entire train carriage through it when it's
17 delivered from the factory to get it down into the
18 railway, but that speaks to the fact that the
19 trains are built at the factory.

20 Near the factory, you've also got the
21 test track, so they do the shakedown remotely and
22 then bring it to the line.

23 Creating the vehicles at the MSF, I've
24 got to say, did seem -- it's there to maintain the
25 trains. You can pull big bits on and off the

1 train, but how the whole thing is assembled there,
2 it's not a facility that's set up to cater for
3 that. So it's almost like a temporary
4 manufacturing facility. I'm not sure why you would
5 have chosen to do it, and I'm not sure it was the
6 optimum solution, quite frankly.

7 CHRISTINE MAINVILLE: And from your
8 perspective, would this system have benefitted from
9 a longer trial running period or dry running
10 period?

11 DEREK WYNNE: Very much from a longer
12 burn-in period, yeah, through to test and trial
13 ops. Because all the way through those periods of
14 time, further snags are being addressed, further
15 configuration is being undertaken to get a much
16 better entry into service point. So, yeah, it
17 would have benefitted.

18 CHRISTINE MAINVILLE: Are you aware of
19 other breakdowns or the other derailments that this
20 system encountered that we haven't spoken about yet
21 that you have some understanding of what may have
22 contributed to?

23 DEREK WYNNE: So I'm familiar with -- I
24 know there's been numerous derailments in the yard.
25 All seem to be going over switches, and I think

1 that's down to yard control and sensing where the
2 train is.

3 On the main line, I'm conscious of two
4 derailments that have occurred, the one where we
5 came through the platform, damaging the side of the
6 rail vehicle, moving the rail ties, and damaging
7 some wayside equipment.

8 That's the incident I refer to when
9 I've heard, not actually exactly got evidence but
10 heard, that the operator on the vehicle was
11 instructed to limp it back to the MSF.

12 I believe that that particular vehicle
13 operator summoned a maintainer because of sensing a
14 smell. I believe the brakes were freed on the
15 adjacent axle to the one that's got the failed
16 wheel bearing, but -- and then that train -- there
17 was an attempt to drive that train back.

18 What concerns me is some of the
19 mentality to recover a train that's at the end of
20 the line rather than operating with a restriction
21 until such time as you get past revenue service and
22 you can recover the train that's misbehaving. You
23 recover it during engineering hours.

24 So, yeah, I've got a reasonable amount
25 of understanding of what's been going on. The

1 first derailment on the line, certainly there was a
2 derailment, but it was not as impactful as the last
3 one that I'm aware of from last year.

4 CHRISTINE MAINVILLE: Would you be able
5 to provide us your résumé if you have it?

6 DEREK WYNNE: Yeah, absolutely.

7 CHRISTINE MAINVILLE: Okay. So we'll
8 include that as an exhibit subsequently to your
9 interview.

10 EXHIBIT NO. 1: CV of Derek Wynne.

11 CHRISTINE MAINVILLE: I know it's
12 already -- yeah.

13 DEREK WYNNE: I was going to say, I'm
14 very conscious of the fact that normally when I'm
15 explaining to engineers that are involved in this
16 process, I'm normally studying from a very large
17 whiteboard and mapping out all of these concepts
18 and how all of this works, the process of systems,
19 engineering system assurance, and then run an
20 example through this from end to end.

21 So it's very difficult to verbalize it,
22 and I hope you've been able to understand and
23 follow, but I will certainly offer this, that if
24 you need to revisit and need me to be in a room and
25 do that for you, then please let me know, and I'll

1 make myself available to do that as well.

2 CHRISTINE MAINVILLE: Thank you.

3 DEREK WYNNE: As for a résumé, yeah,
4 I'll get that forwarded over to you. To the same
5 email address that I put the confidentiality thing
6 back to?

7 CHRISTINE MAINVILLE: Yes. Let's go
8 off record.

9 -- OFF THE RECORD DISCUSSION --

10 FRASER HARLAND: Just two fairly brief
11 questions: The first was, I mean, you've spoken a
12 number of times about this mismatch, if we can put
13 it that way, between the rail and the cars.

14 Was that issue, to your knowledge,
15 identified by anyone else other than SEMP?

16 DEREK WYNNE: I identified it. The ISA
17 was cognizant of it. The engineer of record for
18 the designer was notified of it. It caused quite a
19 deal of upset because the track had already been
20 laid, and effectively he had signed off on it.
21 And, in our opinion, he signed off against the
22 project -- an agreement requirement rather than its
23 suitability for its service life.

24 But, yes, we did -- more than one party
25 knew about that, but it wasn't something that

1 anyone was willing to address. It would have to be
2 dealt with through how you maintain and operate the
3 railway, which clearly hasn't happened correctly.

4 FRASER HARLAND: And that would have
5 been identified from you to OLRTC, I assume?

6 DEREK WYNNE: Yes. Yeah. Yeah.

7 FRASER HARLAND: In your experience, is
8 that something that the constructor could have
9 flagged despite the project agreement saying, you
10 know, Are you sure you want to do this and --

11 DEREK WYNNE: Yeah, so this is -- this
12 is where I think it's -- I don't think any
13 particular parties covered themselves in glory. I
14 think that the City specifying AREMA were tying the
15 hands of the projectco, but I think any supplier
16 has got a duty of care to its customer, and if it
17 considered that the rail type was inappropriate, it
18 should have flagged it rather than going and
19 blindly ask for the constraint placed on it.

20 And therefore I think, you know, in
21 view of the fact that this is a team sport, all
22 levels and all stages of design and development, I
23 do think the relationship between client and DBFM
24 could have been a lot better, and the behaviours
25 could have been a lot better all around to resolve

1 these sort of issues.

2 FRASER HARLAND: And then just one
3 other category of question: You mentioned the
4 operational restrictions on a number of occasions
5 and particularly how it seemed to you that RTM had
6 never reviewed this document.

7 I guess my question is do you have any
8 sense of, you know, how that possibly could have
9 happened? It seems to me that that's a fairly key
10 thing, particularly, as you said, it's in the
11 safety certificates and everything else.

12 DEREK WYNNE: One of the things that I
13 would look for -- I produced -- my colleagues, we
14 produced an engineering and safety assurance case.
15 That was based on all of the aspects of the
16 physical solution being provided.

17 It was out of our scope to consider the
18 operator and the maintainer. If I was back in my
19 London Underground days, I would have also included
20 in the engineering and safety assurance case a
21 statement of operational readiness.

22 Operational readiness was not our
23 scope. Ours was about getting it to the point
24 where it could be operated, expecting that the
25 operator and maintainer would be operationally

1 ready.

2 This requires passing of information,
3 and given the City is still searching for documents
4 that OLRTC were producing, I'm going to guess that
5 there was a communication issue and misfiling of
6 information and things not being made available to
7 OLRTC.

8 I -- also, if it helps, I've actually
9 got the Operational Restrictions Document on my
10 screen now if you guys would like to see.

11 CHRISTINE MAINVILLE: Which document
12 did you say? This is the --

13 DEREK WYNNE: Operational Restrictions
14 Document.

15 CHRISTINE MAINVILLE: Just perhaps so
16 we can then identify it.

17 DEREK WYNNE: I'll share screen. There
18 is the Operational Restrictions Document. Here is
19 the Operational Restrictions Document specifically
20 against Phase 1.

21 Mike Williamson, Steve Leonard, both
22 part of the SEMP team. John Blowfield, give you a
23 flavour of John Blowfield as RAM's lead: John has
24 over 30 years' railway safety and RAM experience.
25 Prior to working on Ottawa, he led safety and

1 assurance for a multibillion-pound upgrade to the
2 Great Western route modernization program.

3 There's myself. There's Sean Derry
4 that we mentioned before, SNC-Lavalin systems
5 assurance director. Here is the seal of Jacques
6 Bergeron, who was brought in as the professional
7 engineer to sign and seal this document.

8 So this is the Operational Restrictions
9 Document, and if we wander into this document,
10 you'll see it gives an explanation of its
11 provisions.

12 So we discussed what this document is
13 for, the system description, the restrictions,
14 conditions and limitations, all expressed through
15 here, and recommendations as well against the
16 railway in general, against stations, comms, track,
17 energy, tunnel and so on, and a whole series of
18 conclusions.

19 But in the introduction, we overview
20 the safety case and what is provided in the various
21 points. So we discuss the scope, all of the assets
22 that are considered. We describe the document
23 structure.

24 Here is an engineering safety assurance
25 case sat in the middle. It's showing that this is

1 the Operational Restrictions Document that informs
2 it. It sits alongside operational and
3 supportability hazard analysis. It sits alongside
4 interface hazard analysis.

5 It's all fed by the integrated hazard
6 log and the integrated hazard log summary report,
7 which is specifically talking to satisfaction of
8 the derived safety requirements from there.

9 The other side of the ESAC, you'll see
10 we manage the competencies of engineers of record
11 who signed off design certificates, the overall
12 system assurance approach, and the audits that were
13 conducted.

14 The compliance matrix of every single
15 requirement from the project agreement, plus
16 requirements are listed derived, et cetera. The
17 RAM analysis that was done which informs the case
18 for safety and backup into here.

19 Here's the suite of safety
20 justifications through the middle, and outside of
21 our scope but very much contributing into the case
22 for safety is the light rail vehicle safety case
23 that was produced by Alstom rather than all of
24 these produced by my team.

25 And there's the computer-based train

1 control, the signalling safety case that came up
2 and was included as well. So that is the ESAC.

3 CHRISTINE MAINVILLE: I just want to
4 say for the record, you're describing the figure at
5 page 8 of the document, Figure 1 document,
6 hierarchy.

7 DEREK WYNNE: Yeah. Okay, so if I now
8 move forwards a little into this document, see if I
9 can give you an example of certain restrictions
10 that were placed. Here we go, restrictions. So I
11 can set the scene for context. I talk about
12 standards for railway applications, so this is
13 restrictions about 50126.

14 And then we start to place some notion
15 of restrictions, and what you'll see going forwards
16 is I'm placing a restriction here, and you can see
17 I've actually sourced this directly from the
18 controlling standards, CENELEC, which is the
19 internationally recognized way of dealing with
20 railway RAM and safety.

21 We talk about policies and
22 restrictions. So on the communication system: (As
23 read)

24 "No equipment shall be
25 physically or otherwise installed in

1 or connected to the existing
2 Communications Primary System unless
3 the appropriate Threat &
4 Vulnerability Certification has been
5 obtained."

6 That is a cybersecurity restriction.

7 (As read)

8 "No equipment shall be
9 physically or otherwise installed in
10 or connected to the existing comms
11 primary system unless appropriate
12 cyber is done.

13 No equipment shall be physically
14 or otherwise installed in or
15 connected again unless the system
16 engineering and system assurance has
17 been applied in accordance with the
18 system engineering standard ISO
19 15288 and the CENELEC suite 5012628
20 and 29."

21 So these are restrictions against
22 comms, against signalling, against the train
23 service control centre and its backup control
24 centre, against the stations, against the guideway,
25 against the track, against the NG, which is said to

1 be a traction power, and your low voltage power.
2 Against the maintenance service facility, against
3 the vehicle itself. So those are restrictions.

4 These are conditions, and this is
5 condition of operation. So when we get into a
6 condition of operation -- and we mention this
7 particular one. So signalling to tunnel
8 ventilation system interface, so there's a
9 description of what's going on. And we mentioned
10 before, by the way, about the eight-car consist
11 configuration and the VOBC in the front LRV or the
12 rear one. So here's all the text and the
13 explanation, and here's the condition: (As read)

14 "When notified of a fire
15 onboard train, the LRV operator must
16 communicate verbally with the train
17 service control centre operator to
18 confirm LRV location, direction,
19 train set configuration and whether
20 the front or the rear VOBC is
21 active.

22 The train service control centre
23 operator verifies the VOBC message
24 by comparison with the driver status
25 report and instructs the tunnel

1 ventilation system fans and dampers
2 accordingly."

3 This is the work-around because of the
4 interface that wasn't ordered.

5 So I also placed a restriction on the
6 downtown tunnel, and the reason for this was quite
7 simple. When you're in ATO mode, you can leave a
8 platform even though the platform ahead is not
9 clear.

10 If the platform ahead isn't clear and
11 you then get your train trapped in a tunnel, you
12 can effectively get a captive train that's caught
13 up behind an incident train.

14 So this is a restriction about
15 receiving permission to proceed to avoid creating
16 captive trains because that puts more passengers at
17 risk if there's an incident train.

18 Talk about the similar issues around
19 the MSF connector. This is connecting the MSF with
20 the main line. One train total permitted in TVZ --
21 TVZ is a signalling area -- at any given time. So
22 what we're -- what we're talking about here is the
23 safety provisions of the conduit between main line
24 and depot.

25 I mentioned to you about testing of

1 TVS. The first six months of revenue service, an
2 end-to-end train service control centre to fan
3 actuation test, to be performed every month.

4 After the first six months of revenue
5 service the following actions: Cycle each fan
6 every month; end-to-end test to be performed every
7 three months. These are all the restrictions of
8 operation of this railway.

9 Now, how many of these have been
10 conducted? It's not difficult to see because I've
11 even -- I've even pulled up the text blocks to
12 highlight the text as well as also setting the
13 scene.

14 Track, we mentioned track. (As read)

15 "Due to the concerns about rail
16 hardness and the lack of any
17 technical methods of detecting rail
18 breaks, it is a condition on the
19 approval of the system that the
20 ultrasonic testing regime was
21 amended to once every three months
22 for the first two years."

23 This has never happened. (As read)

24 "MSF connecter and yard should
25 be tested every six months" --

1 because they're lower speed -- "for
2 the initial two years. The
3 frequency of all ultrasonic testing
4 may then be changed based on
5 findings and a risk-based approach."

6 So this is about a risk-based condition
7 assessment. We talk about grinding rails and even
8 placed one that said because of the settlement and
9 the wear, you can see spooling (ph) on the
10 railhead, but after two months of service,
11 continuous service, don't grind the railhead. The
12 railhead has never been ground in Ottawa since we
13 went into service.

14 So station minimum operating standard,
15 so we talk about what it is to actually operate a
16 safe station remotely. (As read)

17 "Rideau station is the deepest
18 Ottawa Confederation Line station.
19 Escalators support safe evacuation
20 in the event of emergency.

21 Compliance with NFPA 130 can only be
22 achieved if at least one of the
23 escalators is operational. The
24 station should be closed in the
25 event of loss of all escalators."

1 And this is the level of detail I went
2 into in the Operational Restrictions Document, and
3 this is not unusual for a railway.

4 I mentioned to you before about
5 emergency telephones, what you do with station
6 CCTV. These stations are unmanned intentionally.
7 Loads to -- and we mentioned about unattended train
8 operation in the yard, so we've got some notice in
9 there about: (As read)

10 "Yard functionality being
11 delivered in stages, from initial
12 revenue service, until Alstom
13 vehicle production is complete and
14 the MSF is at its final
15 configuration.

16 All stages need to be identified
17 and the configuration of each stage
18 documented, analyzed and the impact
19 of the safety case determined.

20 In each case, attention should be
21 paid to which parts of the yard are
22 dedicated to vehicle production,
23 which parts are dedicated to
24 maintenance and to storage, the
25 interfaces between these two

1 activities.

2 LRT train movements for the yard,
3 in addition to that of the handover
4 platforms, are not yet controlled by
5 CBTC. Future upgrades are planned
6 to introduce CBTC and unattended
7 train operation. The impacts to
8 safety of this transition shall be
9 subject to hazard
10 identification/hazardous operation
11 workshops to identify new risks and
12 associated mitigations."

13 So we can see we were unpacking all of
14 these considerations that we've been talking about.
15 It's all here all the way through.

16 CHRISTINE MAINVILLE: Okay, I just want
17 to be clear. This last one, you were reading from
18 page 23 of the document.

19 Okay. I think we probably have to stop
20 given the time, but what we'll do is we'll file
21 this -- if you could email it to us, we'll file it
22 as an exhibit to this interview since we don't have
23 a document number yet.

24 DEREK WYNNE: Yeah.

25 CHRISTINE MAINVILLE: So that will be

1 Exhibit 2, I believe.

2 DEREK WYNNE: Yeah.

3 EXHIBIT NO. 2: Ottawa Confederation
4 Line Phase 1 - Operational Restrictions
5 Document.

6 CHRISTINE MAINVILLE: Okay. We'll stop
7 there. So we can go off record.

8

9 -- Adjourned at 4:23 p.m.

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REPORTER'S CERTIFICATE


I, CARISSA STABBLER, Registered
Professional Reporter, certify;

That the foregoing proceedings were
held remotely via Zoom videoconference at the time
therein set forth, at which time the witness was
put under oath by me;

That the testimony of the witness
and all objections made at the time of the
examination were recorded stenographically by me
and were thereafter transcribed;

That the foregoing is a true and
correct transcript of my shorthand notes so taken.

Dated this 12th day of May 2022.



NEESONS, A VERITEXT COMPANY

PER: CARISSA STABBLER, RPR

COURT REPORTER

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