OLRTPI Witness Interview with Alstom Transport Canada Inc.

Bertrand Bouteloup
on Wednesday, April 13, 2022

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OTTAWA LIGHT RAIL COMMISSION MEETING

ALSTOM TRANSPORT CANADA INC.

BERTRAND BOUTELOUP

APRIL 13, 2022

--- Held via Zoom Videoconferencing, with all participants attending remotely, on the 13th day of April, 2022, 9:00 a.m. to 12:16 p.m.

COMMISSION COUNSEL:

Christine Mainville, Co-Lead Counsel Member
Anthony Imbesi, Commission Counsel Member
Fraser Harland, Commission Counsel Member

PARTICIPANTS:

Bertrand Bouteloup,
Michael Valo, Esq. & Charles Powell, Esq.
Glaholt Bowels LLP - Counsel for Bertrand Bouteloup

ALSO PRESENT:

Carissa Stabbler, Stenographer/Transcriptionist
Chandani Joshi, Virtual Technician

I N D E X

WITNESS: BERTRAND BOUTELOUP

-- Upon commencing at 9:00 a.m. --

BERTRAND BOUTELOUP: AFFIRMED.

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

It will be a collaborative interview such that my co-counsel, Mr. Harland, may intervene to ask certain questions. If time permits, your counsel may also ask follow-up questions at the end of the interview.

The interview is being transcribed, and the Commission intends to enter the transcript into evidence at the Commission's public hearings, either at the hearing or by way of procedural order before the hearing commences.

The transcript will be posted to the Commission's public website, along with any corrections made to it after it is entered into evidence, and the transcript, along with any corrections later made to it, will be shared with the Commission's participants and their counsel on a confidential basis before being entered into evidence.

You'll be given the opportunity to

review your transcript and correct any typos or other errors before the transcript is shared with the participants or entered into evidence. Any non-typographical corrections made will be appended to the transcript.

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

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

With that being said, I think we can begin with some questions. First of all, could you explain your role in Stage 1 of Ottawa's LRT

project?

BERTRAND BOUTELOUP: That's an interesting question. Actually, I started to be involved in Ottawa as a project manager for Alstom starting, if I remember well, end of 2014.

Okay. I was leading the project for Alstom, meaning that I have the coordination of the Alstom team and also the relation with OLRTC under my responsibility.

Okay. When I say that, it's coordination of all different functions within Alstom, engineering, whatever, in relation with the project were working for me. They were not under my responsibility, but they were working for me.

So I was starting in 2014. Then I left -- I was based in Montreal at that time. Then I left Canada in summer 2015, so I had no more action on this project.

Even so, I joined the project management in Paris, having an overview of all projects within the world for urban projects, meaning that whatever was inside my portfolio.

So I still have some connection but not direct. I was just putting it on a process point of view, and on a monthly basis I knew the progress

of what I want.

Okay. Then I joined back in Canada in 2017, in May 2017, as project director for all rolling stock projects within Canada for Alstom, meaning that I had under my responsibility the project manager for Ottawa.

At that time, it was Lacaze when I joined, okay, in 2017, and I had a PM, but I had also other PM in Toronto and Montreal Metro. So other projects.

Then as Lacaze resigned end of 2018, I don't remember exactly the day, but end of 2018, I had to take the intervene as project manager until I found Alexandre L'Homme as a project manager joining Alstom in March 2019.

Then I took back my role of coordination of all the project in Canada. Even so, as Alex L'Homme was joining Alstom, I was deeply involved, and it was a hectic period I would say in 2018 -- 2019, sorry, having in mind that we have the revenue service date coming.

So then I was involved as a project director until I would say March 2020. Then I took over also the overview of the maintenance contract.

Still again having a PM, a project

manager in place, Richard France (ph), but having so the overview of both Ottawa project, the maintenance side and the rolling stock side.

That lasts for a year roughly, until March 2021, when we again split the rolling stock activities and the maintenance activity between the organization, the new Alstom organization.

So I had overview on the LRT portfolio, meaning that I was still the overview of the project managers. And at that time, it was -- it is still Arnaud (ph) as a project manager.

So meaning I was deeply involved in details in some slot of time. I was also an overview project directors on most of the time.

CHRISTINE MAINVILLE: Okay. Thank you.

BERTRAND BOUTELOUP: I don't know if that answer your question. I think for now.

CHRISTINE MAINVILLE: Yes. Thank you.

And could you tell us a bit about your background and experience?

BERTRAND BOUTELOUP: I'm starting to have a few years of experience. I'm age 56. Most of my career was in project management, not always in transport.

I joined Alstom Transport in 1999,

okay, or 2000 I think, just in between. Then I was always involved in project management within all tenders.

When I say that, I've been the high-speed train, TGV, in France project manager. Been deputy first, then project manager.

I have been also project manager for some of the part of the equipment of the train in some different projects, Sweden, USA and others, like the ACELA, the old one.

Then I was also tender for metro project, meaning that I had to answer some of the tenders, and then I joined the Canada by having the responsibility of Alstom portion in the construction of the Montreal metro.

So I have a background of urban project, metro project, but also some other projects like high speed and businesses. So I have got more than 20 years within transport projects.

CHRISTINE MAINVILLE: And you are an engineer; correct?

BERTRAND BOUTELOUP: Yeah, sorry, my background is, yeah.

CHRISTINE MAINVILLE: Important.

BERTRAND BOUTELOUP: You're correct.

And before that, I was mainly commissioning engineers and making some jobs in plants and things like that. I was involved still in technical matters.

CHRISTINE MAINVILLE: I understand from your response that Alstom had several other projects in North America, but do I understand that the Ottawa LRT was part of a new development project for Alstom in North America?

BERTRAND BOUTELOUP: It's an in-between situation for Ottawa. There was -- there's still a product base from French product. We have TTNG which is the mid between a train getting city to city and entering into the city. So that's the train we have in France. So that's still the base of the product.

Now, for Ottawa, we had to adapt and to make some changes for a few reasons. First of all, some of them are technical one for coping with the infrastructure and the requirements of Ottawa, but also as we had to face some different context -- when I say that, is the industry organization is -- also has to be made for making it possible in Canada and North America, so we had to adapt some of the components, I would say, to that market,

yes.

CHRISTINE MAINVILLE: And --

BERTRAND BOUTELOUP: It's not a full development, as I said. Okay. It's not a full development.

CHRISTINE MAINVILLE: Right. Did -- first of all, did adapting the train for North American standards -- did that ultimately present some challenges for Alstom?

BERTRAND BOUTELOUP: It does represent some -- how some of the changes, meaning that in some of our purchase specification, if we haven't got the equivalent or the capacity to adapt, we can face difficulties to get the part as expected as to our needs.

So that the reason -- the easiest one to understand is cabling. It's not maybe a fancy one, but it's still very important because you had to have the capacity to purchase and to build and to manufacture in Canada.

And definitely we're not in the same standards as we might do. So, yes, there were some aspect of, let's say, focus on development, yes.

CHRISTINE MAINVILLE: And I'll come back to some of the specifics of that, but what

were some of the key City requirements that required changes to Alstom's Citadis train?

BERTRAND BOUTELOUP: Okay. It's maybe not directly from the City. Sorry, I was not deeply involved in the development phase. As I said, I was six months I would say, eight months maybe, of what we call the critical phase of moving from engineering to install, but I was not deeply involved.

Even so, I have seen some challenges to make it buy Canadian one, the 25 percent of Canadian, and nothing is all, but it has forces to have some choices. Okay. When I say "choices," it's like finding some suppliers and capacity to get it...

So we had, for example, doors which I think purchased in Canada. So we had some, let's say, incentive to go there, okay, in some area, so we had some choices that I remember.

Now, to specifically say that we had to change two things. It's mainly on integration. When I say "integration," it's either the interface with a system or the interface with some infrastructure.

We had to secure interface between the

track, between the gauge of the train. We had to look at it. Okay. Again, not major changes on the product but still some adaptation. Definitely there were some adaptations to the project.

I could not remember the specificity forcing us to change and generate solution. I know we had to demonstrate a fire -- sorry, how do you call it? To prove it under the North American standards. That has forced us to do some qualification but, again, hasn't changed the full engineering solution. So I cannot pinpoint one like that.

CHRISTINE MAINVILLE: So just so I'm clear, when you say changes were needed to -- or some adaptations were required as it relates to the interface -- or, sorry, the integration component of the signalling system and the infrastructure, do you mean given that this was a City of Ottawa project and requirement, or were you talking about the Canadian content requirement?

BERTRAND BOUTELOUP: No, sorry, I mean -- yeah. On our side internally, internally meaning Alstom, we had to make some choices for Canadian company. That's one thing. That was known from the start.

And it forces -- or it forced some of our suppliers also to have some local base in Canada, or we had also maybe sometimes to find some suppliers in Canada, okay, for little work and other things.

When I was calling from -- when I was answering your question regarding is there any City requirements forcing you to change your solution, not directly, but, again, as we have to make the trains operate on an FTG, let's say, infrastructure, a new infrastructure, we had to consider and to make it work with their choice. When I say "their choice," the track.

And, again, some of them were quite easy. It's just an input we need to situate, okay, but still it's just something you have to face when you are in a design phase when you have to make choices.

So, again, I should segregate these. There is the normal way of, let's say, integration and considering all the infrastructure constraint, but in terms of performances, I could not point one thing which forced us to change our solution.

CHRISTINE MAINVILLE: Okay. Did -- I understand there was a requirement for 100 percent

low floor vehicle. Was that something unique to this project? No?

BERTRAND BOUTELOUP: No, it's something existing already. As I said, TTNG is already the same. It's a need for the train which is usually on -- you know that with VIA Rail. It's something normally you jump into the car.

It's a bit -- the solution we have in France, it's also a mix of trains and entering in a City like Ottawa, means that you have the low floor, the full low floor.

So the full low floor was not a challenge. We had the solution and the other things. That's a reason why we choose that Citadis Spirit as the base for Ottawa projects.

So, no, the low floor was not a constraint. It's a technical constraint but already, let's say, considered in our product.

CHRISTINE MAINVILLE: Okay. And there was nothing particular to the City of Ottawa's climate or cold temperatures and winters that needed --

BERTRAND BOUTELOUP: That's a good question. Yeah, there were some review of that. Mainly the one I remember -- remember, again, I was

not fully in the full engineering development phase.

That's why maybe I'm missing some, but I remember that some of them were really attached and focused on the snow and to avoid having snow compact on the roof of the vehicle melting, going to highs and then destroying things.

So one of the constraint has been -- on that one I remember has been exported (ph) to OLRTC having the full covered shed in the MSF in Ottawa. The reason why the MSF is fully covered and you have all the trains are stopped during the night under the shed.

So that's one of the things we looked at. Okay. And, again, there was some specific analysis, yes, regarding snow removal, regarding capacity to run under certain conditions, yes. We had to look at it.

I'm not too sure we had to change climatically the solution, but, yes, we had to adapt and secure the snow removal, secure other things. Yes, we had to do that.

CHRISTINE MAINVILLE: Okay. Was there a need to -- for a more complex bogie for this train?

BERTRAND BOUTELOUP: The bogie is quite a technical challenge overall. The reason I'm saying that is this train has the capacity to run at 100 kilometre per hour, meaning that it has to be rather stable, but it has also to go through inside a city with some sharp turn. So it's always a compromise.

So that one is a nice, let's say, technological challenge but, again, nothing unusual because we had that capacity with the French solution. Yes, we adapted this one with some assembly on the site but nothing -- nothing risky, I would say. Nothing -- we haven't got the solution yet.

CHRISTINE MAINVILLE: Okay.

BERTRAND BOUTELOUP: To me, the bogies itself is a very critical things, and I know some events occur, but, again, the solution -- it's designed for that solution also.

CHRISTINE MAINVILLE: Okay. And on the speed, I understand the -- there was a time guarantee, like a journey time guarantee as between stations. And so there was a requirement for that, which was, as I understand it, a Thales commitment; is that correct?

BERTRAND BOUTELOUP: It's not a Thales commitment. It's a result of -- no, it could not be Thales. It could not be Alstom. It's -- it has to be -- I'm sorry to say that. It has to be OLRTC as the designer of the system.

The reason for that -- and I will try to explain. The reason I'm saying OLRTC, it's the capacity for the train to brake, the capacity of the train to accelerate for sure, because you are depending on acceleration, deceleration, of course, leaving the station.

Yes, all the system is under the control of Thales due to the automatic train control system they have, okay, using the capacity of the train, but you have also some choices.

When I say "choices," you have also speed limitation when you enter in a station. You could have speed restriction if you have a sharp curve. You could have the choice of operating time.

When I say that, it's the time -- it's really crazy, but the time of opening the doors -- sorry, authorizing the door to open, door open, remain the door open, close the door, and authorize the trains to depart from the station. So all

that -- the journey time is a result of all that.

So saying that it's a full picture is in the -- is under the control of OLRTC, definitely. We know what we have to make on our own was the capacity to brake, to accelerate for sure and also our door system, and then we can look in between the City -- between the train -- the train door operation and the authorization to move.

That was under our responsibility, and we had some constraint in our specification for sure, but the journey time is a full result. It's not only one. It's a few items involved, definitely.

CHRISTINE MAINVILLE: Would you consider that requirement to have been an aggressive one in terms of the time requirements?

BERTRAND BOUTELOUP: I could not -- I could not judge myself. The reason I could not judge is I know it was a challenge at one point because I remember OLRTC stress this, but I don't know how much it was a challenge.

Again, I don't have a benchmark to tell you it should have been blah, blah. No. I knew it was a challenge because I knew they had made some simulation, and they were really worried about it.

So they have been quite aggressive.

And what I know is the end result. When I say "end result" is they have used intensively -- I choose my words -- intensively the capacity of the train.

The reason I know that is we have seen in the first month of operation during the trial run and doing after that, we have seen a lot of events in relation with either overspeed or emergency brake, meaning that they were very close to the limit, saying that they were pushing to the limit the system.

So I could imagine they have been facing that, but I could not tell you it was impossible. It was -- no, I could not tell you. I haven't made any study on this.

And, again, it's not our role. In this project, our role is mainly to deliver the performance of the train.

CHRISTINE MAINVILLE: And in terms of that -- in terms Alstom's role on that piece of it, were there any challenges in terms of meeting what Alstom needed to deliver on that? No?

BERTRAND BOUTELOUP: No, we had -- we had the capacity to brake and to accelerate without

any problem. We have a -- the -- this train is highly motorized, and there is no major issue.

Even the braking system is quite efficient, and we are using most of the electrical brake, so no issue to reach the performance. It was never a question, and we never failed to any of the result of performances.

CHRISTINE MAINVILLE: So could you speak to the events that you say occurred as a result of this overspeeding and emergency brakes?

BERTRAND BOUTELOUP: Yeah, I could. In the trial run -- and, again, I'm -- it's -- I think it is no more the case today. I'm not in connection on a daily basis with Ottawa anymore, but when I left, it seemed that the operation was smoother overall in the choice of speed profile.

But what we have seen when we were -- in the early phase of operation, what we have seen is a lot of emergency brake, for example, meaning that the train has to react, saying you're asking too much speed, and the normal braking capacity is not enough to fulfill the speed where you are. So you have been told by the system saying, guys, you have to brake more.

It's like you're -- when you are seeing

that you are approaching something and you could not -- so we have seen a lot of emergency brakes, and it was -- when I was in 2019, I remember that shows only that our system was not fine-tuned. It doesn't say the system is not capable of. It's just saying the system is not set for a good compromise. That's it.

So that's what we have seen on our side. Then overall what we have also seen, we have seen some shaking movement in certain area. The track was -- and that's a challenge. That's a real challenge.

Having explained now some of the Canadian projects, it's a huge -- it is a constraint because you have potential minus 30, 40 in winter, and you have plus 40 in the summer. And that range of temperature on the rail system and track system is foreseeing a lot of constraint and load within the system, and you have to consider it. And I know that in Ottawa we faced, and there's been since.

We have seen some rail movement in the summer because you have too much materials and you can see the snake coming on the track itself, and you have seen also some breakage during the winter.

We have three or four rail completely cut just due to the compression.

So that's something as a challenge. So when I say that, the reason I'm saying -- I'm mentioning that is we had faced some high level of stress in our bogie because you have the wheel directly in contact with the rail and everything -- and it effects on the track. You can see it, and you can feel it in the bogie.

As well you have two level of suspension, but the reason I'm saying is we have seen also some movement on that testing.

CHRISTINE MAINVILLE: And would it be typical to adjust the speed profile or the journey time requirements based on bad weather?

BERTRAND BOUTELOUP: That's something you can do. When you are not able to -- you have two limits mainly. You can have what we call icy condition, and that's very specific because when you have very high speed icy condition, you can have a lot of phenomena on this.

But, yes, it is usual to have potentially two or three -- you have two level of braking which authorize some capacity. The reason for that is to avoid having default.

Your system is always controlled. If you ask for a sudden acceleration and you don't get it, your system is telling you, hmm, it seems you cannot fulfill it. So you have that fault, and it's the same for braking.

So your setting is the way to again optimize the performances and the level of default your train is seeing, so it's just to avoid -- like when you have a wet condition with your car, to avoid having the bad feeling of uncontrolled situation.

As your system is fully under control, the computer is telling you take care, take care, and that's not what we want. So that's the reason why you have different setting, the winter one and the summer one. That's mainly to explain you why braking and acceleration has got different settings.

CHRISTINE MAINVILLE: But should the winter setting lead to lower speed generally?

BERTRAND BOUTELOUP: If not lower speed, at least lower acceleration, and, yes, you give more time. You give more time to your system to react, yes.

CHRISTINE MAINVILLE: So would you

normally expect to see a different requirement in the contract? At least for climates like in Canada where you would have potentially harsh winters, would you expect to see different requirements on that basis?

BERTRAND BOUTELOUP: That could be -- yes, that could be a solution. If not -- and I think it was not the case in Ottawa. I'm sorry. I'm not -- maybe I don't have good memory, but I think it was decided during the design really.

And, again, it's something I had in mind. Maybe you could ask -- I don't know if you have interview with the direct development team, all the people from my team, but I think it was the solution we propose through the design, which was agreed actually, the two setting, winter and summer, but I'm not so sure it's a requirement within the PA. I'm not so sure.

CHRISTINE MAINVILLE: Okay. Do you know what provisions were made for winter testing in terms of the testing and commissioning phase and whether the seasonal conditions were taken into account?

BERTRAND BOUTELOUP: It's an interesting question. We had -- okay. You could

not only rely on the calendar. So what is happening is we have validation plan developed within Alstom and within engineering phase which force us to go into climatic chamber in some of the major components. Even actually have a train is going through a climatic chamber.

Again, what you do there, you do the capacity for heating, for cooling and everything on your train, but you don't do the generic one. It's what I call the static validation of the winter conditions. You do that in climatic chamber.

There was a plan which has been made and which a lot of reports on the capacity for again heating and cooling system mainly, but also some of the subsystem like start in cold condition, like electronics. You do that kind of testing in steady conditions. Okay.

Then you have the generic part of it. Usually what you do, you have a schedule and planning of -- between commissioning, dry run or dry run phase, you establish the plan with your customer, like OLRTC and City of Ottawa in this case, to secure that you have at least one season you can go through.

And it's a good way to make it.

It's -- yeah, it's a pretty good way to make it. Maybe you could have a good winter or bad winter, I don't know, but it's a way of forcing, let's say, the system to see how you can operate it in winter conditions.

And I think in Ottawa we had a chance to have few trains running on the system, as we have the first -- if I remember well, the first train was in 2017 or even maybe earlier.

Maybe not the full representation of the serial configuration, but at least we had trains running in 2017, so meaning that you had the chance to go through at least one winter.

When the revenue service was due in May 2018, the plan was to go through the winter before.

CHRISTINE MAINVILLE: At least in hindsight, do you deem the winter testing to have been sufficient?

BERTRAND BOUTELOUP: The static one, yes. The static one I was referring first, yes, definitely enough. Good enough even maybe some -- very extensive, so, yeah, I would say yes.

Now, on the generic one, certainly not. When I say that is -- but it's not on even winter condition. It's the overall system.

We had the full picture available late. When I say that, it's due to various reason. We had capacity to run on some portion of the track but not on the other one.

We had the capacity to go through the tunnel very late in that project. And, again, the tunnel is not a minor things because your train is entering a tunnel and then exiting, so you have to look at it also on the behaviour of the whole.

But we haven't been able to make enough, I would say, on that global perspective with a full operational system. It was always by bit and pieces.

And I'm not so sure we had the full -- yeah, I would say that the generic testing has been -- has been extensively, let's say, made on that project.

At the end, it was really a challenge for us to get mileage and to get, let's say, representative mileage.

CHRISTINE MAINVILLE: What was the main cause of not being able to do more of that dynamic testing?

BERTRAND BOUTELOUP: Late availability on the fleet itself, I would say, on our side also,

okay, because the trains arrived, and the capacity to have trains was more in 2017 -- sorry, 2018.

And even in 2018, we've got to have the full fleet available, but also the fact that the coordination -- and I remember -- and there was really -- I don't know how to call that. Point of change of attitude.

Until summer 2018, we were -- on the construction -- on -- we were on the positive side of building a plan with OLRTC. From summer 2018, we start to be in a rushing phase, and I put it in brackets, whatever. We were more on running in various direction.

You need to finalize that, you need to do that, you need to do that. But overall, the plan was not, let's say, maybe not tackling the real challenge at the end. Painting a station is important, but painting a station could be a result in one or two days. When you have to adapt your signalling system, it takes months.

So, again, you have to make choice of activities on-site, and the reason I'm mentioning that -- let's say date, I could not fix a date like that, but I remember that from summer 2018, we were thinking and rushing without proper coordination.

Take it with some cautiousness. I'm not criticizing. I'm just saying from that date, the plan was to finalize as early as we can, but maybe not for the benefit of the project.

CHRISTINE MAINVILLE: And do you know where that pressure was coming from or the rush to get it done?

BERTRAND BOUTELOUP: I do not have any notices, but I would imagine few of them. There was the -- definitely, as you know, the date of revenue service has been already moved from May 2018 to November 2018 at that time.

When I was -- in the summer, so we knew that the date was moved already. Then we knew that it has moved spring 2019 and then finally to September 2019. So, again, there was the contractual/financial pressure, definitely.

We knew that the company RTG has got -- facing also some -- as it is a PPP project, were facing some important challenges on that side, definitely.

Then there was also some misalignment on what is feasible and what is the target overall, and I remember that because we were really on the proactive and collaborative approach until that

summer 2018, and then there was a change also in the team at that time. A lot of movement in the project team at that time.

I could imagine a lot of, let's say, external causes for that pressure to influence the project, I would say. The other things at that time was that for the first time, the City -- or let's OC Transpo, not the City, but OC Transpo start to be involved as well.

OC Transpo was more on the customer side until the summer, and then they start to be one main stakeholder because they had to be on-site. They had to be also with their operators driving the train.

It's also maybe where a lot of things were made in full transparency. Everything you do, the people can see it. And so we start to be maybe fully all the stakeholders inside together in that period of time, so it's also something we have to consider.

CHRISTINE MAINVILLE: So are you saying there was more transparency after --

BERTRAND BOUTELOUP: You are no more in a presentation mode. You see, when you're in the project, you can present. I've got a nice image.

Now we were facing real things all together on the field.

When I say that, it's not full transparency. It's we have to cohabitate on the same site so we can see each other directly.

CHRISTINE MAINVILLE: Right. People were working on the same -- in the same areas at the same time, is what you're saying?

BERTRAND BOUTELOUP: Yes, and you could not present something which was not the real things happening on the site, so then you start to have some mind-set change.

And it's always the same project. You have always the phase when you are on the paper phase or PowerPoint or drawing phase. You present things.

Then you have the industrial when you can start seeing some material, and as soon as you start the testing, you have proof and you have performances and you have values and data. It's normal forecast. It's something you can prove and you have it, so it's -- we were moving to that phase in 2018 as well.

CHRISTINE MAINVILLE: And in terms of the changes to the project teams in 2018, was that

as a result of the RSA not being met, that there was a lot of turnover?

BERTRAND BOUTELOUP: Yeah. The reason I'm saying that is there was a change in our counterpart in OLRTC. I -- at that time, we had few interfaces, direct interfaces with City of Ottawa, except for design reviews and safety design review with them, but we were more with OLRTC and RTG, okay, which we were responsible for getting everything on time all together.

And we have seen faces changed. I remember in 2018 we had -- even I think the three partners within RTG change. They are project directors. So it was a change.

We know that on-site they had also additional people coming, which was good, let's say, new people coming, but also a lot of, let's say, uncertainty in who is the counterpart, I would say.

And we faced a big loss on our side is -- the technical coordination of OLRTC was really under, let's say, one man and he was really -- and that guy was really constructive really in a positive way, presenting solution, finding solution and coordinating.

That was Jacques Bergeron. I don't know if you have him on the book, but for me he really represent the type of people who wants to make it happen. Even defending the company, which is fine, but he wants to construct and to build something.

And from that time when we lost him, then it seemed that again the main target was maybe lost somewhere, and it was more, as I say, in a rush, go do it, make it. You had people do that.

It's not the way of managing things again, so it's -- there was really a change in 2018. Sorry to insist a little bit on that one.

CHRISTINE MAINVILLE: So is that when Mr. Holloway came in as -- for OLRTC as project --

BERTRAND BOUTELOUP: Contact was already there. Actually he was also involved in that one, and I think he has to -- it's one of the stable things at that time, but they replaced -- they replaced their project director. I don't recall the name, but they replaced it.

CHRISTINE MAINVILLE: Mr. Creamer -- Mr. Creamer --

BERTRAND BOUTELOUP: Eugene Creamer left as well, so all that moves, yes, that was our

counterpart moving. The only stable one is Sharon Oakley (ph) Still there.

CHRISTINE MAINVILLE: Is who, sorry?

BERTRAND BOUTELOUP: Sharon Oakley.

CHRISTINE MAINVILLE: Oh, yes.

BERTRAND BOUTELOUP: She's still there after seven years. Still there managing the contract. But what I remember at that time is a change of people really within the management decision. Rupert Holloway was part of it, but Eugene Creamer was there for few months.

We had also a guy -- I don't recall his name -- joining but only for a few months. It was a real change in 2018.

CHRISTINE MAINVILLE: So was that -- that was disruptive to some extent?

BERTRAND BOUTELOUP: That was tough but -- and I'm discussing that with you today in a different manner than I would have done it in that time.

At that time, I was saying, okay, they are putting a new team to make the things, let's say, happen and they need new energy coming in, and I could imagine that. But now with all the story now, I just realize that it was more in a reaction

mode rather than on the real plan to get it.

CHRISTINE MAINVILLE: Mm-hm.

BERTRAND BOUTELOUP: Again, I could not judge a company like that, but I'm just telling you that I feel a huge difference of collaboration until that time and after.

CHRISTINE MAINVILLE: Okay. And just on changes on Alstom's team, because I understand you said Mr. Lacaze resigned, what was the cause of that?

BERTRAND BOUTELOUP: Actually, he has a nice position in VIA Rail. He could not -- so he was -- he was quite happy in his role even it was a tough period, and he -- and I have to say that when I -- when I joined back in 2017, I had to -- I had to be involved in Ottawa because huge pressure was rising in that project, as you could imagine.

Even on our side, we had also some financial constraint and some exposures with some contractual matters, so it requires some support, I would say.

So maybe he was really tired also, but definitely what's create the things and what trigger his resignation is definitely he had a good opportunity in VIA Rail.

CHRISTINE MAINVILLE: Okay. In terms of the systems integration piece in particular relating to Thales' signalling system and Alstom's trains, could you speak to -- so you mentioned Mr. Bergeron, who I take it had some involvement in that, but was there -- who -- was there a systems integrator from the outset of the project?

BERTRAND BOUTELOUP: He was definitely the one, and I do not find -- he has been replaced. Even so, he has been replaced by the lead engineer, in essence, but the person who replaced him hasn't got the same capacity to make solutions and to define compromise and to go where he has to go.

That's where I said the technical competency is one thing, but also on the leading other things, because Jacques Bergeron was involved to present to the City of Ottawa solution and compromise.

Jacques Bergeron was also -- he has been through that. He had a lot of experience, and he knew what has to be done. So he was listening and deciding, which is quite nice, let's say, capacity to do, but he was -- he has enough experience to show and tell everybody where he wants to.

I was sometimes opposed to him, but, again, he was, again, having a good target and a good goal at the end, so I could accept his decision.

So, again, after that, it has been replaced by somebody, but maybe not -- potentially we stick to competencies, but maybe not with the same role of -- or maybe was not instructed to do so, but there were more accusation and finger pointing, let's say, attitude than on behaviour to make it again positive for everybody.

So that's something which is really the key change in some area, and we start to be -- at that time, we start also to be potentially in silo. I don't like that term, but it's represent what it says.

They were managing Thales on that site with their own schedule, and we were managed by OLRTC with our own schedule, and sometimes the two schedules are not matching each other.

And instead of proposing -- allowing people to make good compromise, they were fighting on both side, Thales and us, instead of making them working together. And, again, it makes a huge difference at the end, huge difference.

CHRISTINE MAINVILLE: Right. And could that impact the reliability or performance even of the system?

BERTRAND BOUTELOUP: It has -- maybe not a full -- it has -- yeah, it led to some difficulties and some real technical issue, one of them being the rear vision.

Maybe you have been aware of that because we had to establish a mitigation plan very close to the revenue service date in end of August 2019, and we discover in September, October that we were using an input from Thales system, meanings of having the understanding that it was representing a certain value, when we realized that it was not reliable.

When I say "reliable," the accuracy of the information was not guaranteed all along with it. So that goes misfunction of the system of the rear vision in some location, and it was an easy one to tackle.

It's just because if we knew that there were some change of status of this value, we would have not considered that one as reliable input for us. We would have used the other one. That was clear.

So easy to answer, easy to tackle, easy to work around because you use another value of the system and it works.

But, again, that -- it has not caused a full reliability of the system, but, again, it's very -- it is a good representation of the bad coordination.

Instead of letting us discuss and understand each other, interfaces were not shared, and that's clearly something which was, I would say, stupid because it's easy but it has forced us to view another release after release.

So technically, having discussion would have solved it before without an issue.

CHRISTINE MAINVILLE: Right. And so just so we're clear, this rear vision issue, first of all, was that resolved prior to the final RSA?

BERTRAND BOUTELOUP: No.

CHRISTINE MAINVILLE: No?

BERTRAND BOUTELOUP: No. It has been resolved in -- sorry, it has been found and clearly stated in October 2019, so after the revenue service, when we analyzed the data. Okay. The reason why I'm mentioning it, because it was there from the start, so we could have done it earlier.

Anyway, the other -- the other interfaces which has really impacted us was the senior -- when I say "senior," the system is the numerous things I was mentioning, and I think it has really shaken and forced our system to work to the maximum that we need.

So that one has also an impact on us, and we had even seen some, let's say, issues on our bogies in relation to the numbers of accelerations meaning that when you force your system to react, you have some stresses inside your structure on your system. So we found some afterwards.

So that critical phase of integration test has been squeezed, meaning that we discover on even easy -- and potentially some of them are not as easy as the other one with the rear vision, but instead of getting that issues earlier and solve it, we discover it by bit and pieces during the start of operation.

CHRISTINE MAINVILLE: How did the rear vision issue manifest itself?

BERTRAND BOUTELOUP: Okay, the rear vision, what it is, it's -- the system is -- as the rear vision is saying, it's for the driver to ensure that he has no issue on his train before

departing the station.

So he has on his screen with the camera which were on the platform. He can see the side of the train saying, okay, there is nobody trapped. There is -- all doors are closed, and I can depart from the station.

I'm really simplifying it. It's a video feed going from the wayside to the train. Okay. And what happened is to ensure you have a proper camera loading onto the train, you need to have a synchronization of where you are on the station, east, westbound, which station to secure that you have the full cameras which are the one related to your train and not the other one or whatever on the network.

So that's where we discover that these interface with Thales with the system was always showing dark screen, because we didn't know that we switch from one track to the other one because we consider one of the value of the things instead of the other one. So it's real coordination, only that. It's nothing -- nothing work at science. I would say that.

So it's -- but that rear vision has an impact on the operation because if you don't have

that, if you don't have any mirror -- maybe on the metro, you can see on some of the metro you have a mirror where you can see on your back of your train. The driver can see and say, okay, I can look.

So we have to have mitigation plan, and we have been forced to put some spotter, what we call spotter on that to replace that system.

So that was one of the issue highlighted in the trial run period and in the few days before revenue service. So we had to put in force some spotters.

CHRISTINE MAINVILLE: So I think one way to put it is the ICDs from Thales and Alstom were never fully integrated; is that fair to say?

BERTRAND BOUTELOUP: Actually, we -- somewhere in 2017, 2018, we didn't get proper update of these ICD, yes.

CHRISTINE MAINVILLE: And that's why I was asking ultimately about the systems integration role and how -- whether that was sufficiently discharged -- well, let me ask you first. Would that responsibility have fallen on OLRTC to your understanding?

BERTRAND BOUTELOUP: That

responsibility is fully under OLRTC as a designer of the system. Definitely. There is no doubt.

CHRISTINE MAINVILLE: So how would you say they managed that piece of the work?

BERTRAND BOUTELOUP: I think they had -- they had enough issues. And, again, I'm not in their shoes, but I remember at that time they had enough issues on all different subsystem. They had also to face some catenary. They had a lot of things to tackle. Okay.

So, again, the idea that they can -- by having pressure on separate work stream, they can make it happen quicker and faster.

So that's the only explanation I have in my mind because at the end again, as an engineer, they should know that they need to have that coordination, that technical coordination.

I'm pretty sure that nobody would contest that. It's technically -- it's in need of. You need to understand each other if you want to work together.

So there was no doubt about it. But I think, again, there was momentum at that time that we can rush on that, we can rush on that, and we will make it happen.

CHRISTINE MAINVILLE: Did -- sorry.

BERTRAND BOUTELOUP: Yeah, sorry, but that's for me the main, let's say, things which happened in 2018.

CHRISTINE MAINVILLE: Are you aware of Alstom raising concerns about that?

BERTRAND BOUTELOUP: We did, a lot of times. We did technically first. We did technically first. We said -- even myself, I said, and I remember that, guys, you have an ATO, an automatic train operation system. It means that at least -- I didn't know that there was some technical issues at that time.

But I say take care, because I've been through that in Montreal metro as well when we had to face some integration with the signalling system anyway.

So an ATO is always requesting fine-tuning. When I say "fine-tuning," it's, as I said, the compromise between your speed profile and your acceleration and capacity of the system and the real infrastructure.

You always have testing, and you always have to make a set of issues, and that I've never seen. On few times I've said to OLRTC, When are we

doing that? And they couldn't answer me.

So they were doing it mainly on -- and I know that they were concentrated and focused directly with Thales on proving, as you said, the journey time back and forth.

And they were also focusing on getting the obligation of the system, because signalling is also a critical system safety-wise and has to be fully certified.

So I know that they had a lot of batteries of tests to run, and they were really focused on that. So I could imagine that there was a third level of priority in their minds.

Even so I said, Hey, guys, you need to do it, but they haven't done it. So, yes, I raise my few times that, that that was one of my concern.

CHRISTINE MAINVILLE: Sorry, did you say ATO?

BERTRAND BOUTELOUP: ATO, yes.

CHRISTINE MAINVILLE: What does that stand for?

BERTRAND BOUTELOUP: Automatic train operation. You have -- ATC is the overall name, automatic train control, but you have inside the protection, ATP, protection of the train where you

secure the distance between trains, and you secure you don't have any people in front of you before you run, blah, blah.

So that is protection of the train, but you have also the ATO, meaning that the operation is also managed, meaning that the driver has no choice to make. The system is requesting the speed, controlling everything. So ATO, yes, that's the automatic part of Ottawa system.

CHRISTINE MAINVILLE: So you're saying that was not tested?

BERTRAND BOUTELOUP: To me, it requires our participation, and we were not involved. That I know. And I said, When are we doing it because we need to be involved, because we have the capacity of resetting and tuning our traction. We can't do some tuning on our traction, on braking system. That's normal way of doing things in other project.

So I said, When are we doing it? No answer. I'm sure they have done it on their own side without us involved, yes.

CHRISTINE MAINVILLE: And when would this normally take place and as part of what testing?

BERTRAND BOUTELOUP: On the normal project, you could not do that at the early stage because the reason for that is you need first to go by steps on testing your subsystem. You test first the safety side, and you test all the wayside communication.

And I do understand that the ATO is not the first one you do, but then you have to do it, I would say, at least three months before revenue service. The reason I'm mentioning three months, even if it's only adjustment and settings within software mainly, it requires a new software release, meaning that you need a certain lead time.

That's the reason I'm mentioning that ATO three to four months before operating service makes sense. After that, you can always decide to not consider it as mandatory and say that we do it later.

You can -- you can always do that, but then you know that you will stress your system, even your passenger by having emergency brake, but you will stress your system for some period of time.

So you can make that choice. If you are really in a hurry, you can do it, but usually

normal project, you plan it four months, three, four months before revenue service.

CHRISTINE MAINVILLE: Is that part of integration testing?

BERTRAND BOUTELOUP: Yeah.

CHRISTINE MAINVILLE: Okay.

BERTRAND BOUTELOUP: Definitely, yeah.

CHRISTINE MAINVILLE: And in terms of implications, you mentioned -- of not doing it, you mentioned that it can lead to some stresses on the system. The emergency brake issue might have been something that would have been identified; yes?

BERTRAND BOUTELOUP: Mm-hm. Yes.

CHRISTINE MAINVILLE: And so beyond that, is it -- not doing it, could that just lead to performance issues, other reliability issues?

BERTRAND BOUTELOUP: Exact. You don't take a risk on the safety side because it's -- as I said, it's mainly performances and the life of your system. You're just stressing your system, but you can lead for some months with that.

But, again, having make the choice to make it without us, it's automatic to me that they were in a rush of doing things and the bare minimum, let's say, or the minimum of, and they

wound up doing another holdback. That's something which is again showing that.

Again, I mentioned some of the things they have to take it on the CNE side, and we had also to take some on our side in the same time. And I have to say also at the same time, we had the braking issue and not in relation with their system, also with our system.

We had an important retrofit in -- when was it? I think it's in early 2019 when we had to review and check our system. So, again, to make that fine-tuning, ATO fine-tuning, usually you wait for having the stabilized cellular configuration or revenue service configuration.

So I, again, understand their choice sometimes, but the fact that they ignore it was just letting me know that they were really in a rush. And, again, I can lead without it. I was -- again, we have our internal process for revenue service readiness, and this one is not a blocking point for us. It's only something we do usually, but if they don't want to do it, why not?

CHRISTINE MAINVILLE: Okay. Who did you raise this with, you know, when this ATO testing would be conducted?

BERTRAND BOUTELOUP: I raise it to mainly two people. First one was the guy replacing Jacques Bergeron who was -- not John. Joseph Manconi. Joseph Manconi, the lead engineer for OLRTC. But also I raise it to the project directors, Matt Slade at that time, our counterpart.

CHRISTINE MAINVILLE: And how --

BERTRAND BOUTELOUP: Only with OLRTC. Only with OLRTC. I never raise it with the City.

CHRISTINE MAINVILLE: Okay. How -- to what extent would you say integration testing was compressed? Can you -- can you help me with that a bit?

BERTRAND BOUTELOUP: Yeah. It's always tricky, and we face it also in our project now, in other projects. You can face during your project some delays on engineering, some delays on construction like we face in Ottawa, which was late and pushing everything.

You always think that you can squeeze your testing. It's -- on the paperwork, it works. It's only a choice you can make. Now, you have to balance it with again your technical, let's say, maturity and the stress you want to have.

When I say squeeze and stretch, when you know the full story, we could have arranged differently, I would say now, but you should have known.

But, again, as we have ability to push the date of revenue service by three months, six months, that never gives the possibility for everybody to build a plan of how to tackle everything. And when I say "everything," even the interaction of one system with the other one. Okay.

And, again, usually that integration test, I would say, starts -- I don't know if I can throw figures like that, but in my mind, ten months before revenue service, you prefer to have some integration made.

When I say "integration," like secure the interface between the catenary and your train, secure interface between the track and your train, which is a heavy one because if you have to correct something, it could be quite important as a notification.

Then you can always authorize a few tunings at the end because it requires -- again, if it's a scratch or if it's something, you can make

it at the end.

Like, we had, for example, a very tiny one on the cab door. You cannot always create and correct it easy, but some of them has -- if you have to change your design, it has some impact on the delay.

So that's where the integration plan has to be built on progressive testing to secure you have enough time to react and to correct in case of, and I haven't seen that on this project.

CHRISTINE MAINVILLE: Do you recall an original plan for integration testing?

BERTRAND BOUTELOUP: We've been involved until beginning of 2018 on that overall plan. Then after that, we have been a little bit blind on that testing. We didn't know what they had.

Again, I don't know if it's a change of people or a change of contractual behaviour against -- between Alstom and OLRTC, but, again, we were not part anymore on the overall view of things. We were only partial view of my being involved.

We did do the integration test on this date, okay, fine, but overall we did not know the

full plan of the test.

CHRISTINE MAINVILLE: Through what, sorry?

BERTRAND BOUTELOUP: The full plan of the validation, integration.

CHRISTINE MAINVILLE: Who would have prepared the original plan?

BERTRAND BOUTELOUP: Definitely -- so, again, I think that one is under RTG because it has to involve also -- you don't only test the material or the design of your material, but you also test also the people in the organization inside that integration.

So I think it would have been RTG. It has to go through the maintainer on the operator, OC Transpo.

You have to secure that everybody would be ready on. So that integration at the beginning is involving mainly OLRTC as pure technical performances I would say, because they are the designer of the system, but the more you progress, the more you involve stakeholders.

When I was mentioning that at summer 2018, OC Transpo start to be involved because they start to be taking the driver, taking the people,

and they want to have a look, and they know everything.

So it's a progressive thing. So the overall plan, I would say, has to be studied by RTG, on my point of view. I don't know if it was the case, but I would say it's RTG.

CHRISTINE MAINVILLE: Okay. So when does integration testing in fact start? Is there a point in time when you recall it started?

BERTRAND BOUTELOUP: Actually, if you look at the definition of integration, it has started in 2017. As I was mentioning, we start having a train running on the track, means that you start your integration. You start having work coming the catenary, and you run on the track. So you start your integration by that point.

But the -- let's say the main phase of integration, as I said, is usually eight to ten months. Now, on this project, I've seen it by -- maybe because I was not aware, maybe because we have not been involved, but I've seen it by bit and pieces.

Again, I know that we have done a run on the track, and our maximum speed was reaching 2017, and we haven't done it anymore. The 90

kilometre per hour we have reached on that time was good enough to show that we have the capacity, but...

So from 2017 until revenue service, that's where we have done on Ottawa but, again, not on a progressive, normal way of doing things. We had done it on a rushed way by meeting one things. We met an integration test again -- I have to remember. I think it was in 2018.

In 2018, we had some integration, but we have to redo it -- redo it on 2019 because few things has changed.

So, again, the overall plan for that integration test is key and essential in that type of business because infrastructure was new. The MSF was new. So very, very important, let's say, factor to this.

The depot or the way we operate and the way we maintain train was new, so all that has to be tested. All that has to run and to make a dry run. It is not maybe again very public and fancy to show, but even a small tools inside them as -- you have to secure that you have it and you have the capacity to make it, and that's integration testing.

And so to answer your question, it's a long period of things. And, again, I'm not so sure there was somebody having a good plan.

CHRISTINE MAINVILLE: And there was no ability to do a full integration testing in terms of the entire main line until when?

BERTRAND BOUTELOUP: That one I think I -- I'll need to find a date. One typical things to show that and to demonstrate it is the fact that we have to run from -- we have to demonstrate the comfort of the train, the behaviour of the train, dynamic behaviour of the train.

And we were not authorized to go through the tunnels until -- I need to find a date. I don't know if I've got it like that, but I need -- maybe I got it somewhere. I don't have the answer like that. No, I don't want to waste your time, but --

CHRISTINE MAINVILLE: That's fair, but do you recall if it was into 2019 possibly with RSA being -- having been met August 30th, 2019?

BERTRAND BOUTELOUP: I think you have the -- I know -- I know I've made the last recalls of the dynamic behaviour myself with the guy during the night. It was in May 2019. That I remember.

That date is known to me, in my head, because I was there on-site.

To make a full recalls of one hand to the other hands needs a normal speed profile. Okay. That one has been done May 2019. That's for sure. But I don't remember when we had the full access of running train through the tunnel. I don't -- I don't -- no, I don't have the date.

CHRISTINE MAINVILLE: And so can you tell me about how the trains were performing into 2019 when some of this testing is happening?

BERTRAND BOUTELOUP: We were discovering few technical issues on our side. We have to -- some of them were -- let's say needed for revenue service, and clearly share with all parties that we had to cover it.

Like, example the -- I remember the HPU. I don't know if you heard about it. It's the high pressure unit for the braking. We had a retrofit, and that retrofit has to be made and fully completed before revenue service.

So we had faced some technical issue. We had also some line contacters which was failing, but, again, it's -- it could have affected the service performance as we have to have less power

on the train. But, again, it's a degrading load, but that one has to be happen also before.

We faced what we discovered as well. We faced or we discovered few technical items on the train itself. I have to recognize and we have to -- we have also to modify, if I remember well, the cab door. There were an issue on the cab door, the door between the passenger area and the driver. We had to make it happen.

We had -- so we had some technical issue. We had also the CD (ph) you can see in that summer 2019. Also we have seen it. What we have seen again? There was also the auxiliary power unit. We are facing some failure on that component. And we had also some door behaviour to be corrected, adjustment and thing like that.

That's the main technical, but within our process, again, we tackle them and we -- sorry, we capture them, and we define the one which has to be corrected before and the one we can lead with, but it's always with an assessment, a technical assessment behind.

There is a process. So we capture all of them, but we had to face some bad news, I would say, bad behaviour about this meeting.

CHRISTINE MAINVILLE: Was the City part of those discussions and present for this?

BERTRAND BOUTELOUP: Yeah, as I said, they start to be involved on December 2018, and I -- and I think it's a personal touch. I impose to have reliability review to share -- to share the data with all parties.

And I know OLRTC at the beginning was not so keen having that, but we put in place, and I think we put it in place in 2018, what we call events or -- I don't remember the acronym on Ottawa.

But it's mainly you take the events of the last week, you analyze it, you share, because sometimes it's due to the behaviour of the driver. Sometimes it's due to the bad preparation of the train. Sometimes it's a real technical issue.

So we share -- to answer your question, we share that on a weekly basis, all our findings and events.

So at the beginning, that meeting is -- you have to take care because you have to factor so many allows and faults because you can see a lot of got hold by -- by the train, and some of them are false hold. Some of them are real technical issue,

so...

But, again, we start putting that into place, I think it's 2018, and that's shared between RTM, OC Transpo for the operator, the maintainer, OLRTC and us.

CHRISTINE MAINVILLE: OLRTC and?

BERTRAND BOUTELOUP: And us, Alstom.

CHRISTINE MAINVILLE: And Alstom.

BERTRAND BOUTELOUP: Because it's important to have our system engineers telling them, Take care. We can tackle. Yes, we can correct. No, there is something wrong. We need to analyze. So all that is shared, and it was shared in full transparency from that date.

CHRISTINE MAINVILLE: And how is that looking like approaching the August 2019 RSA date?

BERTRAND BOUTELOUP: That list has to be integrated on the open items. When I say "open items," I think officially on that contract it's called minor deficiency list. When you do an inspection of the train, there is the official open item list which is called minor deficiency, if I remember well, on Ottawa.

So you consider it, and you present as the -- manufacturers and builders, you say, That

one has to be tackled. That one, we have the workaround solution, or you can lead with a degraded mode, or we can do that. Or if your driver is -- sorry, I will -- is doing that, you can leave and you can continue. So, okay, the system is maybe not stable, but you can lead with. Okay.

So you always classify things and try to put it by categories. And in 2019 -- and to answer your point is in 2019, it starts to be an official list of open items before revenue service open item, after revenue service, or to be defined, because you always have some issues you can't answer straight away.

So, yes, we start to have that list which were discussed -- if I remember well, maybe the first one was in April 2019 with OLRTC, and I think in June 2019, we start sharing with the City of Ottawa that list of open item.

It's quite late, but I think they knew the topics and the items, but that list was starting to be more and more, let's say, contractual as an open item list and a shared, let's say, referential and configuration we want to reach before revenue service. Okay. So I think it

was in April or June 2019.

CHRISTINE MAINVILLE: And so I take it Alstom had input into this list. Did they have any authority over it?

BERTRAND BOUTELOUP: They do. They do because the minor deficiency list is part of the official acceptance of the train, okay, what we call -- I think on Ottawa -- yeah, it's called final acceptance, I think.

There was the provisional acceptance which was -- they were taking the trains for doing the test and doing all the operation and dry run and everything, and there is the final acceptance where the train is considered as rated for revenue service.

So that list was part of the final inspection of the trains. That's the reason why it has to be reviewed, and they had to consider it because in -- and it's also -- it's also valid that point in our internal process.

When you do a safety assessment and you authorize a train -- and, again, we had an official paper authorizing a train to run, that list has to be reviewed and assessed, because some of them you can leave with. Some of them you say I don't want

to take the risk.

An easy one I can share is just imagine we were -- we were over the safety braking distance. We would never have authorized the train to run. That open item list is always reviewed technically and safety-wise before you can authorize.

And it was also the case in Ottawa with the safety and with the independent certifier of the system. Before accepting the full list, it was also noted and shared, yes.

So City of Ottawa, the OLRTC has got review, and they can decide on this one, yes.

CHRISTINE MAINVILLE: Did you on behalf of Alstom have concerns about what ultimately was being deferred?

BERTRAND BOUTELOUP: Concern is -- no, the -- safety-wise, performance, I knew we -- I knew we were there, so I had no problem at all to say to consider it.

Now, I knew that we were exporting some constraint on the maintenance and operation. That's clear. That's clear from the beginning. We knew that the operations and maintenance will not be smooth and easy, to say it.

So concern is maybe -- two important terms: I got some concern on Alstom because I'm putting some pressure on the maintenance side, but, again, sharing that usually with a mature operator -- sorry, I -- I'm going in another direction.

Another project, when you have a mature operator, the operator knows what he can accept, what he could not accept. So you -- as a builder, you are challenged by it.

On Ottawa, what is a little bit strange to me is I'm not so sure we had that exchange overall. Yes, they had some tools in the contract to make that happen, like a minor deficiency list, an independent certifier, City of Ottawa accepting or not accepting new things. Yes, there are tools inside.

Now, I'm not so sure in front of us we had a mature maintainer and a mature operator to challenge us on the level of things, so it's always a balance and a compromise on the project.

So when you have -- and I will -- I will take a French story, a French example. When you have the Parisian metro, they know what they can handle as a maintainer.

And they say, Okay, I know what I can do, so I don't like, but I can accept it. That one I can't. When I say that is in this -- the roles of making that counterpart was not maybe well defined, I would say.

CHRISTINE MAINVILLE: That's where I have questions because if -- given that Alstom is also maintaining the train, how did that factor into Alstom's assessment of what ought to be -- well, of whether the trains were ready in terms of being able to perform smoothly given that it was going to fall onto Alstom ultimately in many respects, the performance issues?

BERTRAND BOUTELOUP: As I said, it's a balance. Again, I was not involved on the maintenance contract. Even I had contact to maintain -- the people in maintenance. I've not seen that, but I was not in charge of the maintenance at that time. I just started to be involved on the maintenance in March 2020.

Now, we get people and we had to keep some technical expertise on-site. We had to keep some additional workforce on our side for retrofit of the train because the open item list was still to be tackled by us, by Alstom, train builder, car

builder.

So all that remaining activities force us to have some competency and capacity on our side. So that's called the rolling stock side.

Now, in full transparency, we share that view with the maintainer who's as per maintenance side, and I'm not so sure they were in a position to challenge us in front of so many stakeholders because, as you could imagine, the pressure was there, and you had different stakeholders.

You had OLRTC, RTG who wants to have their -- you have City of Ottawa who has some public, let's say, pressure. You have all the valued stakeholders. RTG is the lenders. A lot of different context. I'm not so sure that we're in the position to challenge officially.

Now, internally we shared with them that they had to face some inspection. They had to face some degree, and they were part of the weekly meeting I was mentioning for the events.

So they knew the maturity of that. But they have in the meantime -- and I remember that. In the meantime, they were under the pressure to accept not only the train from us, but they had

also as the maintainer to integrate 15 subsystem. When I say 15, they had also to consider the maintenance of the track, the maintenance of the catenary, the maintenance of the...

So they had other areas of concern on their side. So even we throw them, and we shared with them the value -- the list of. I'm not so sure we have been prepared altogether to tackle. And I'm completely honest on that.

They were focused also on all other business. The MSF was not ready. The building was not ready. They were still not in the normal operating mode. A lot of things.

I don't know if you -- if you -- if you know that, but we were also in September 2018 reviewing Stage 2, so we had an occupation in the building to build new trains, so all that was a challenge overall.

So they had enough, I would say, on other parts, not maybe on what we call the open item list, and also they have the confidence that we will not let them down. We will have the additional resources, but we were more on the reacting mode that -- on the overall.

So I'm making that in full transparency

with you. I don't know if somebody wants to raise a question.

CHRISTINE MAINVILLE: Well, so in terms of internally, Alstom's position on going into RSA, was there pressure for Alstom to say yes, this is ready despite the performance issues and the pressure that there would be on Alstom's maintenance team?

BERTRAND BOUTELOUP: Clearly in 2019, we were in a contractual position with OLRTC. We were always a contractual position also as a maintainer because we were also in the context of all that. So the pressure was also on Alstom.

And, again, we had some blocking points, okay, and we had some safety items where -- and, again, we've made our own assessments. The good -- the good enough was there. Definitely the good enough were there, and we were confident on fulfilling that.

Now, we knew that the operation would be completed. Yes, we had knew that the completion will be there. Yes, we had a pressure to secure that.

And I remember some of the meeting including the one end of August 2019 where we were

there between City -- we'd been invited, you know, for the revenue service. We were invited partially to some meeting with City of Ottawa, RTG and all the people.

And, yes, the electricity and the tension was easy to understand at that time. Really easy to understand. And I remember that so well. Yes, we were also under the pressure to get it.

CHRISTINE MAINVILLE: And I would think largely financially because of the delays that had already occurred?

BERTRAND BOUTELOUP: Not really on our side because we were not in bankruptcy. The situation was not easy. We were expecting cash from the revenue service, and we were exposed to ideas as well.

Now, we don't have the same pressure like others. When I say that is, as you know, the PPP contract is made with some business that time, and that is definitely under the stress.

Now, the full Alstom company, yes, we don't like the situation where -- we don't like it, for sure. But, again, overall, it has no huge -- it has an impact on cash. It has an impact on

things, but at the end of the day, we knew we had good arguments, and we are really first of all car builders. We want to make solution and transport.

So the pressure on the economic side has never influenced from our side our capacity to understand and to tackle issues. We have never put an issue on the side saying, We don't have the money so we don't do it. Never.

Again, the pressure was coming, for sure. Contractual obligation to be overall met as well, but not to an extent of making wrong decision at that time.

So we knew -- with full transparency, we've made our assessment, and we were confident again to have the (indiscernible). Now we knew that we were facing a difficult time of recovering and retrofitting and tackling all the issue.

We knew the level of obligation still to be made on the train. Yes, we knew. I don't know if I answered your question, but --

CHRISTINE MAINVILLE: Yes. Well, I guess I just want to be clear on what the ultimate driver for Alstom -- the driver of the pressure is. It's the contractual undertaking? It's the relationships or reputation?

I'm just -- in terms of, you know, why Alstom wouldn't say, There's going to be performance issues, so why can't we push it back one more month to be fully ready? You know, what is driving the --

BERTRAND BOUTELOUP: Okay. You're right. There are some, again, technical point. Easy to say go fight. It's basic. You know, like I said, the safety systems, braking capacity. That's one. If we know we don't fulfill our requirements, it's a no-go. You don't go.

CHRISTINE MAINVILLE: Yes.

BERTRAND BOUTELOUP: We know we have it. That's the normal process of design. On the quality side, we have also the insurance. We have been through all our assessment correctly. Our manufacturing has been done under the process of. We know the open items. All that, we review it. And, again, as a metro company, we can say oui, oui.

So what we propose to our management -- I was part of that decision, because my project manager is the one who is with the team preparing the file. He's engineering. He's all the manufacturing. And I was the one also presenting

to my management with -- as part of the decision.

So we knew. And, again, there was no financial, political pressure forcing us to take a wrong technical decision. None, never.

Now, having said that, it's not that everything was perfect on our side. We knew, and, again, we knew that we had some judge too.

So, again, at that time, we even -- well, sorry, not at that time, sorry. I should -- I put my -- I take my words.

From early 2018, and I remember a meeting in 2018 with head of SNC-Lavalin in Montreal with our top management of North America, and we propose to say why not go in by progressive revenue service instead of making it a rush.

That ideas last for maybe one or two months maximum, and for contractual reason, for whatever, I don't know. I do not know. I was not part of. But we have been said by OLRTC, Forget about it. This will never happen. It will be either the full service or no service.

We propose them because to stress -- and as I said, you have the materials, you have infra, but you have also the people, and it's always easier to do by random and to make it

progressive. So we tell them, Why not starting by? They were annoyed.

So at that time, if I remember well, as a consequence of the trial run, they relieve a certain level of pressure by changing the service they want and removing in the peak hours the numbers of trains.

So that was a relief on the operation of the site. The system was there but, okay, let them the time to go and progress.

So I would have been more, let's say, progressive on the way we have been doing it knowing the maturity of the --

CHRISTINE MAINVILLE: What was the time frame for when that was raised?

BERTRAND BOUTELOUP: Sorry, we -- our proposal?

CHRISTINE MAINVILLE: The progressive start, yes.

BERTRAND BOUTELOUP: We proposed it in January 2018 to OLRTC and management of RTG and the three companies, and to me, the only way -- or the only time we have heard about it is when they present us end of August 2019 the so-called term sheet or revised term sheet associated to revenue

service readiness.

So that's where RTG, City or whatever has revised their, let's say, trial run period, and they have made a change of requesting, I think if I remember well, 13 multiple unit instead of 15 multiple unit at peak hours.

So that's the first time we've heard about it was when we received the term sheet on the maintenance and on the train builder contract. We received it in August 2019.

CHRISTINE MAINVILLE: And so when it's raised by Alstom in January 2018, that is -- and it's shut down, the idea is shut down, that is in respect of what is, at that point in time -- and correct me if I'm wrong -- a November 2018 RSA start date; is that --

BERTRAND BOUTELOUP: It's when -- it's -- you're right. It's when it has been announced in February, March 2018 that they will revise the revenue service. They move it to November, yes. That was in the same time, yes.

CHRISTINE MAINVILLE: But it was known that the May 2018 date was not going to be met -- going to be met already? I think -- I think that was clear.

BERTRAND BOUTELOUP: Everybody knows that May was not -- was not achievable. They didn't want to recognize because they want to -- they want to keep pressure on the system, so everybody knows it was not achievable at that time in January 2018, but even so, they had a plan, and they present us a plan, a very squeezed one, where it would be ready by May 2018.

But anyway, that's where we said, Hey, guys, to give more time, you have to think about potential progressive ramp-up.

The reason we presented as well is based on our benchmark, first of all, but also on the fact that we knew and that we still have a lot of activities and the numbers of trains. We knew that been able to launch every morning would not be there.

CHRISTINE MAINVILLE: In terms of when you said we knew that the operations and maintenance will be smooth going into RSA, well, I have a question about what the City's understanding of that would have been. Would that have been clear to them?

BERTRAND BOUTELOUP: I'm not sure. I'm not sure because to me, City of Ottawa is -- City

of Ottawa is the contract, let's say management is one side, but then there is also the operator side, OC Transpo, and the one we informed is definitely OC Transpo, the one doing the operation with us, because they had to know that we rephase the -- they had to rephase that. So that be where of where we inform them.

Now, in terms of contractual matters with the City of Ottawa, the City of Ottawa have not been involved in this kind of discussion, never. You know there is the operational side of City of Ottawa, the Troy Charter teams and teams under John Manconi was responsible for the operation. And there was also the contractual side of it. Mike Morgan and his team were aware of the contract.

And, again, they were not reacting the same. They were not always aligned of things, and the one I was informing was definitely the operator.

And due to the contractual, let's say, context overall, I raise it to OLRTC as a project, but I never commission try to pass -- bypass and go directly to OLRTC.

CHRISTINE MAINVILLE: Mm-hm. So you're

saying you raised it directly with John Manconi and perhaps Troy Charter?

BERTRAND BOUTELOUP: Yeah, more Troy Charter. Later on Matt Pieters. The people who will operate the train, yes.

CHRISTINE MAINVILLE: And would that be reflected anywhere or even in terms of them being aware of the reliability reviews approaching RSA in 2019? Would that --

BERTRAND BOUTELOUP: Yeah, okay, as I said, in a weekly meeting, we were discussing last week or the week before, blah, blah, to explain where we stand on some technical issues, where we stand in our corrective action plan, where we stand on things.

So, again, for me, it's the good communication factor to give the operator the right temperature of the system, where we stand on things like that. So they had the reliability.

Again, with mature operator, the consequence of it is noted. If you face some things, you know what -- okay, so they learn or so on that perspective. Since May 2018, they learn -- at the beginning, maybe they were not familiar with what we call events, system development.

At the end, I would say that in 2019, they were aware of the behaviour, of the danger. The behaviour and the risk of things they were aware of.

Nothing was not known actually, and maybe we face other issues after, but, again, everything we knew at that time, yeah, we share with them. We share the data. We share the events. We know even the numbers of events during trial run. Everything has been analyzed, yes.

FRASER HARLAND: I'm wondering if I can just go back. You've said a few times -- you've mentioned that you never had any concern about the safety of the vehicles within the RSA and that, you know, the trains were good enough, but that it would put stress on maintenance and stress on the system.

So I'm just wondering, isn't that kind of stress in -- over a time period, doesn't that also create safety issues if there's that kind of stress on the system and on the maintainer?

BERTRAND BOUTELOUP: So it's a -- it's a good question. When I say stress on, it's additional inspection, additional checkup or survey we had to perform.

So some of them were still in our hands. When I say "our," the car builder. We had engineers to take care of some of the issue, but I -- again, like, you are right. It requires manpower at the end.

You can have all the engineering support. At the end of the day, if you are to make the trains running, you have to inspect. You have to secure the train is in correct functionality to go out there.

So, yes, we have put some stress on the organization of the maintenance. And, again, at that time -- again, I'm talking about 2019. At that time, the stress was definitely more coming from the capacity of running inside the MSF.

I don't know if you've been in that MSF area, but it's a -- it was a crowdy area at that time, and mixing activities was more complicated, and especially you have some bottleneck inside that one. It's a yaw (ph), and you have some bottleneck.

So to answer your question, yes, it put some challenges on the organization, other things. You have to prepare the train. You have to secure the train you want to inspect is the correct one

ready to be there, because it's a crowded place in the MSF. And at that time in 2019, it was even more complicated as we were doing this on the -- of the train.

So the specific location where we can do that inspection was completely full and booked at that time. So the stress I was calling is yes, there is a stress on manpower, but there is also a stress on the system, on infrastructure, of capacity of the site, okay, and that's one which was really, really a concern at that time. It was really a concern at that time.

Do we have a full capacity, and we know that we are faced on failure also on the infra of the maintenance tool. I know we had the crisis of the wheel flat. The wheel flat was one example where it's easy. In the OCB, blah, blah, blah, but it's easy to correct if you have the capacity to turn the wheels and to make it happen. But just to correct that took three weeks because we have limited capacity in the site.

So, again, the pressure was not all the time on the people. In that case, it was more on the time occupation of the infrastructure or the capacity of the -- of the -- of the maintenance

side.

So that's really in 2019 the concern was there, because we had, again, all our people available if we had to support the team of the maintenance, and we did -- we did at the beginning.

CHRISTINE MAINVILLE: Could you speak about the trial running period --

BERTRAND BOUTELOUP: Mm-hm.

CHRISTINE MAINVILLE: -- and issues that arose there and how the trains were performing?

BERTRAND BOUTELOUP: Mm-hm. So I had -- I had -- in all honesty, I had to go back in some of the files because I don't remember all the figures, so I -- the figures were -- I'm sure because I opened it yesterday.

During the trial run, we made roughly 1,000 -- sorry, 100,000 kilometres overall during that two weeks period, 12, 14 days if I remember. Even it's 14 days.

So that has been made. Some of the issue were known and were clearly explained as a development, and we had the answer before revenue service, some of it.

So we made that analysis, and if I

remember well, we had, in that period of time, 60 event which could have impacted the services. When I say "impacted," it's delaying the train or degrading mode. Okay. We had 250 events on the train. 250 was the overall numbers of, let's say, faults we capture. And we had 16 back-up units.

So out of it, we looked at the category of it to see if it would have an impact, a bad impact on it. So most of them were associated to the rear vision we were discussing earlier where we had to put a mitigation plan, the spotter plan.

I think 40 of them were part of the system, and all the other one were either under control, under retrofit, or manageable.

When I say "manageable," it is -- if it fails, you had a redundancy on the car. You can let the car running. You capture it. At the end of the night, you replace the parts, and you can run it the day after.

So that analysis has been made of that trial run, making let's say the capture and the analysis on our side of this period. So we've made it.

Now, on the overall, I know that the trial running criteria was not only on events. It

was on our capacity to make numbers of kilometres or revenue service stable on that one.

That one I don't have the value, and I don't -- I have not been aware on the important data. But we've made our own analysis on the train we had. I remember.

CHRISTINE MAINVILLE: And so in terms of the events --

BERTRAND BOUTELOUP: Yeah.

CHRISTINE MAINVILLE: -- do you have or did you have any insight into how those were classified, how they were analyzed in terms of knowing how the system scored on any given day?

BERTRAND BOUTELOUP: The mathematics of the system score, I -- again, I was not involved, so I could not say.

I remember -- because at that time, we had daily call with the management of RTG, so I remember that we -- that's strange how the memory of the people is done, but I remember 86 percent. I don't know why. But at the early days of the trial running, I know that we had 86 one day. That's it. That's the only thing I know.

We have not been involved in that process, so I don't have more than that. So sorry

I could not give you the mathematics, what has been analyzed and shared between the RTG and the City of Ottawa.

Now, again, we were focused on -- because at that time, I was really the LRV contract only. We have been focused to analyze our system, meaning the train, how it behaves. So that one has been analyzed.

But, again, on the overall system score, I could not make any judgment or anything. I don't know. Everything I know is the outcome was the things, term sheet I was mentioning by reducing the service to 13 multiple unit and with some conditions which has been rejected on our side.

But I remember that City and RTG ends up at the end of this trial running by having revised target of running 13 multiple units. That's the only thing I know.

CHRISTINE MAINVILLE: And so Alstom didn't have input into the term sheet?

BERTRAND BOUTELOUP: No. It has been discussed by the City first -- between City and RTG. We only have the outcome of it, and the contractual obligation they want us to sign, and we refused.

CHRISTINE MAINVILLE: Why was that? What was the concern?

BERTRAND BOUTELOUP: The concern was quite easy. They were putting everything on us in terms of responsibility, in terms of -- there was an action plan behind, meaning that we have to recover four trains by blah, blah, blah December twenty -- I don't remember. 2019.

There was a lot of condition associated which were not acceptable by us so that at that time we rejected it.

CHRISTINE MAINVILLE: And what was --

BERTRAND BOUTELOUP: It was -- it was -- sorry, not a penalty. It was a retention of, if I remember well, 8 million per unit, so two times, so 16 million. That kind of things we did not accept.

CHRISTINE MAINVILLE: Well, what was -- what is the implication of Alstom refusing? What happened?

BERTRAND BOUTELOUP: It -- I think it -- what OLRTC was trying was to pass the pressure on us or some of it at least to take some back-to-back things. And we said we don't want to recognize.

Again, we were not in a position to -- as I said earlier, to say we are in a hurry, and we need to make it happen. Yes, I'm always supporting them, but contractually, why should we have to sign it? To recognize things to be penalized financially?

I -- at that time, our management -- and I was really part of the decision. We say clearly there is no reason for us to accept it.

So OLRTC has been forced with RTG to sign it with City of Ottawa, but they were not able to pass it through to us. That's it. That was the consequence of our rejection.

CHRISTINE MAINVILLE: Going back to the events and scoring, Alstom wasn't involved in the discussions around the application of the criteria, but I understand you received the scores at the end of the day whether it was a pass, fail?

BERTRAND BOUTELOUP: No, they didn't share that. Again, once -- I remember when I was there on-site, I capture the famous 86 percent I can remember, but that was one day. I don't know -- I don't know which one. The third day, I don't know. But, again, we were not part of --

CHRISTINE MAINVILLE: Were you able --

BERTRAND BOUTELOUP: What we were able to capture is our recalls. When I say "our recalls," the events on the trains, yes.

CHRISTINE MAINVILLE: All right. Were you able to infer, then, whether a particular day ended up being a pass as opposed to a fail?

BERTRAND BOUTELOUP: No, we didn't make that exercise, no.

CHRISTINE MAINVILLE: Okay. So you don't know whether or how the criteria was achieved, was met?

BERTRAND BOUTELOUP: No.

CHRISTINE MAINVILLE: Do you -- yes?

BERTRAND BOUTELOUP: The only thing I know is with the numbers of events, you have to categorize them, okay, by it's a failure or something.

I don't know -- I really don't know what the mechanism they had to analyze and categorize. I don't -- I really don't know, so that's the reason I...

The only thing I know is technically, the system was behaving in a certain way that it was, again, for us important to capture what we have to.

When I say "we," Alstom on our side. And we were really focused on that. So all the exercise of the things, yes, we hear that, but we are not involved -- we are not really involved in that.

CHRISTINE MAINVILLE: Did you have an understanding of what the criteria was going into trial running?

BERTRAND BOUTELOUP: Yes, yes, because we have -- we have an obligation to support it. We are not -- we are a -- we are a contributor of the result, of the end result.

So, yes, we have the criteria, but, again, we didn't make the calculation mathematical at that time to make any forecast or guess or whatever.

CHRISTINE MAINVILLE: Having the criteria and just based on the data you had from Alstom, were you -- would you say you were surprised that the criteria was met?

BERTRAND BOUTELOUP: And I will take a personal position. Sorry to say that. Surprise, maybe not. Technically, it was not obvious that it would be best. I would say it like that. Sorry to be -- I'm cautious on that.

Again, what I know is the result of it. I know that at the end of this period, they have been proposed the term sheet, which is a revised timetable, which is already a recognition of the system is not there to make the peak hours at 15 multiple unit. That's the -- that's the only thing I would say.

Again, I have not been involved. I'm not going to accept one figures. I got it when I cross somebody in the corridors, but, again, I'm not in the exercise itself.

But the maturity of the overall system, yeah, I've got some doubts. I've got some doubts about the end result, but I could not be sure.

CHRISTINE MAINVILLE: And did Alstom have any say -- at the end of trial running, did it have any say at that point about whether the system was ready for operations or not?

BERTRAND BOUTELOUP: Not really. I don't see, and we were, again, focused on our issue to be tackled, to be resolved, because we still had some. Again, we had the doors. We had the HPU, the cab doors I was mentioning. We had -- we had things, and we were focused on that one rather than especially on the other one.

Now, overall, I always segregate in my mind as a project manager the collaborative approach and things which is the technical context.

As I said earlier, sharing -- securing the people of maintenance and operation know these things, and in the meantime, the contractual and the relations, and we have to segregate this.

I understand the overall pictures is there, but, again, at that time, it was a tough situation. On -- everybody on our side, we were really, really, really focused on getting our system the best we can. That's really our focus and our concern at that time.

So, yeah, you can make some strategy and things like that, but we have not been -- again, in that period, again, clearly we were not there. We were really tackling our own scope.

CHRISTINE MAINVILLE: Everybody was incentivized to get to RSA; right?

BERTRAND BOUTELOUP: Sure.

CHRISTINE MAINVILLE: And given the issues that ended up arising, would you say in hindsight that the trains shouldn't -- weren't ready or shouldn't have gone into -- let me -- let me rephrase.

Should there have been a hand-over of the trains to the City at that point in time?

BERTRAND BOUTELOUP: I do not see why it should not have happened, the hand-over of the train. Again, I was focused on the train -- on the train itself.

That doesn't mean that it would be an easy way to have the full-service schedule every day. It just says the trains is delivering what it has to, with incidents (ph) definitely. It's not perfect.

We have, as I said, additional activities in place to secure the normal operation, but there was, again, no blocking point, and we haven't been twisting our processes for revenue service on our side on the -- on the design and manufacture of the train.

Even with the open item list, we can tick in the box, yes, the train is -- I'm sorry again to use it -- safe to operate. And that's our criteria that now -- I understand your question overall, but we are one of the system contributing to the operation of the service.

So, again, our obligation is definitely to be transparent and let them know what they will

face, but to decide, it's not in our hands again.

So I can have my own opinion as a trained professional for so many years, but I could not make myself as a decision-maker in that case. Definitely not.

CHRISTINE MAINVILLE: Correct. And I was asking as the train manufacturer as opposed to the ultimate decision-maker on that decision, the hand-over decision.

BERTRAND BOUTELOUP: I am still in the impression that we shared everything we had to share for them to decide. I will just summarize like that.

So we have not been hiding things leading to other issues later, no. Everything we knew, everything we have been, we shared for more than a year. Again, not maybe in full site configuration.

In 2018 and 2019, the trains, the system was not in the same configuration for many reason, software, retrofit, change in catenary. A lot of things, okay, is that we had issues in the yard which has been sorted.

So all that experience were shared, and our expertise was also shared with them. So I do

not feel let's say -- I feel really comfortable on making our obligation.

CHRISTINE MAINVILLE: And you didn't go -- you didn't move to the maintenance piece until -- it wasn't overnight; right? It wasn't immediately after RSA?

BERTRAND BOUTELOUP: No, it was in -- what happened is as we stress a little bit the system on our side, and we still have the pressure to make it happen in terms of operational side and also due to internal reason, organization between USA and Canada.

I took over in March 2020. Actually, what we did -- and I think you met Alexander. Alexander is the PM for Rolling Stock from March 2019 to December 2020, if I remember well.

But in the spring 2020, we would like to have a seniority of the team on-site, so under the responsibility of Jean-Francois Nadeau, VP operation for Canada for us, and myself for projects, both of us were empowered, let's say, to make it smooth between maintenance and rolling stock project and between maintenance and rolling stock manpower on-site.

That's the reason why Alex move from

the project position to a managerial site position in summer 2020, and then I had to recruit another PM for Stage 2.

But Alex was there and was leading the operational side. And we were, Jean-Francois and myself, situate maintenance and rolling stock are working together for the interest of -- yes.

CHRISTINE MAINVILLE: So would you have been aware around trial running perhaps into RSA of the City's pressure -- the City putting pressure on the maintenance system?

BERTRAND BOUTELOUP: Yeah, yeah, I was aware. Yeah, I was fully aware because I was part of some of the management call with RTG, so we were discussing maintenance and LRV contract all together as we have to secure both.

We have to secure the correct key action plan or the -- from our side, but also the maintenance of things. So things were mixed all together.

So I've been aware of that and -- but what I do not understand is overall, from day one on maintenance, RTG -- or maybe not all, but part of RTG was thinking and making publicly known that its boots on the ground is the solution. Having

people, having manpower was the only solution.

That's not correct. That's definitely not correct. You do not overcome technical issues only by having people. Yes, sometimes it is the solution, but not overall. So I know and I've been aware of the pressure that are being put on that, on numbers of people.

But, again, they never wanted to recognize technical maturity of the system, technical maturity of the people. When I say "people," it's including maintenance operation and all the people running on-site and also the limited capacity of the MSF.

Again, I know it doesn't make big news, but the MSF was a tiny place to operate these things. Busy, busy, busy, busy and not fit for purpose. Even we didn't have huge activities through from our remaining open items to them, but there were still a lot of things happening in that MSF which could not fit with all the things, and that's clear.

And what some of the people realized at that time is the time schedule of Ottawa is, in fact, almost very close to a 24 hours operation.

When I say that, the last train is

leaving the track at 1, 1 a.m., something like that, and the first train is leaving the yard at 4:35 in the morning.

But the time of using the fleet overall is very strong. If you don't sequence it correctly, it is making the system almost a 24 hours. So we should have consider it as almost a 24 hours operation rather than having potentially the night shift to work.

So that's a lot of times to realize that they have to schedule activities differently as they have done on the maintenance side.

So to your point, yes, I knew the pressure we were there, but instead of facing and building a plan until we receive the notice of the 14 March 2020, the only complaint I've heard is boots on the ground, boots on the ground, put people, put people.

No, that's not the -- that's not always the answer. So, yes, I was aware to answer your point.

CHRISTINE MAINVILLE: But in terms of having sufficient people, was that -- did that prove to be a challenge for Alstom?

BERTRAND BOUTELOUP: Yes, it was a

challenge. No, it was a challenge overall to secure people and competencies because it's a system overall which has to be maintained.

So you need not only numbers of people, but you need also good organization. And when I say that, it's -- everything is including the maturity of our maintenance instruction, and that covers -- for the trains, it was quite easy for us because we are Alstom, and we can give them everything they want in terms of documentation.

But in some system and some area of the subsystem, the structure and the infrastructure, it was a little bit more difficult as a learning phase for the maintenance team. And I know they had a lot of difficulties to get that up and to learn things.

So the pressure was quite huge on them, not only, again, on numbers of people, recruitment, but also competencies and knowledge.

The hand-over for us was quite natural because it's between Alstom and Alstom, so we can share the data, but, again, on the other one, it was quite the challenge also to scramble and to make sure that the team has got the competencies to maintain everything. The hand-over was quite

perfect.

CHRISTINE MAINVILLE: So while you're saying the focus shouldn't have been solely on having more people on deck, there were certainly some challenges in terms of finding the resources?

BERTRAND BOUTELOUP: Yes. Correct.

CHRISTINE MAINVILLE: And in terms of the City's pressure on maintenance, I was also referencing a program where the City went and tested the system, work orders being placed.

BERTRAND BOUTELOUP: At that point was interesting, yeah.

CHRISTINE MAINVILLE: Could you speak to that?

BERTRAND BOUTELOUP: To me, and as I have not been deeply involved -- again, I start off revenue service, but I know the issue and I know how we handled it afterwards.

But what you have to take care of this is the tool is always used to support and help you rather than, let's say, and to analyze data, something like that, and the way it has been used was more on the what I call contractual way of securing the activities instead of -- because I know there was a discrepancy between the closure of

the work orders and all the events.

I know the difficulties we had at the beginning is the -- not secure, let's say, communicationing between the two systems. But, again, if the end goal is to transport people, you have to use it as a tool to secure the activities you need to instead of making and throwing figures.

I remember at the beginning it was more used for throwing figures in between parties rather than securing and tackling the real issue behind.

So the reason I'm mentioning it is -- and I was saying that at the beginning. If you have a mature manager and a mature operator, you know what the system and what the two (indiscernible). When you don't know at the beginning, you can use it, interpret it, and not on the right way.

So the battle was not there. The battle was more on the maturity issue. The reason I was mentioning the notice of default in March 2020, that in some way put back into perspective some real challenges and issues on the system.

But at the beginning, it was more throwing figures than recognizing all the challenges we were facing.

When I say "we," it's all of us. In that case, I'm putting everybody there, and that everybody make, let's say, reassessment after the notice of default received in March 2020.

CHRISTINE MAINVILLE: And given what you're saying, I -- do you have a view about why -- I mean, you can't speak for the City, but was it unwise to put pressure and stress on the maintenance system if the City knew that there was already going to be stress on the maintenance system?

BERTRAND BOUTELOUP: Okay, and I understand. I don't know, but maybe you're aware of the City of Ottawa has been using some consultant for the engineering phase, has been using some consultant for the revenue services as well, and they have even changed consultant afterwards.

But they have been using external stakeholders, and some of them were a lot of experience and good maturity, other things, but he didn't be part of the decision-making process.

Because when you do a project -- and I don't want to make it too large, but when you do a project, you start to make decision, and each party

has to consider the consequence of the decision.

When I was mentioning compromise in design review for the speed profile, all that, that's another way of doing it, but it's taking their own responsibility and consequences of this.

Now, saying that, the reason I'm mentioning it is at that time, some newcomers and some other outsider was just throwing ideas, pressure, but not on the correct way.

When I say "not on the correct way," not on the way to resolve issues. It was really -- the pattern was more important than the topic, to be honest. That's my feeling. But, again, I was not in the deep inside of all the different activities.

But, again, when you face things and what I know from technical matters and from all my experience is when technical issue is there, you can't hide it. It's exist. You can present it. You can whatever. It's exist.

And I realize that very few people were with that target I would say, with that objective at the end to tackle. But, again, inside all organization, I discover that -- and, again, I was mentioning the March 2020 when -- and I think March

2020 is also the time of the court date also, which remove a little bit the public pressure on the system. And when I say, the expectation of the transport system.

And also that's where people have been attacking the real topics in some instance. Like, we agree we had real issues to face, and we have been covering them up.

So, again, all that first month of operation was quite hectic, and I'm not so sure we put the right energy. We put a lot of energy, let's say, on the contractual positioning and others rather than on the operational side.

CHRISTINE MAINVILLE: I might move back in time a little bit --

BERTRAND BOUTELOUP: Sure.

CHRISTINE MAINVILLE: -- and talk a bit about validation testing. And I understand that was delayed in terms of what the original plan was.

First of all, just at a high level, can you talk about what kind of impact that would have had -- let me rephrase.

Could that have contributed ultimately to some of the performance issues and other issues that were encountered ultimately down the road?

BERTRAND BOUTELOUP: And I will not come back to the integration phase. I will come back to the validation of the train itself.

The validation of the train itself, the major impact we had is instead of correcting issues at earlier stage, we have been building the 30, 30-something LRVs in a configuration which requires modification and changes. That is one.

When you do -- normally, when you do your validation plan, you always try to remove and mitigate risk on a timely manner, and the best is to have a first prototype. Take all the return of experience, then you restart. It's -- that's a dream, but that doesn't exist.

Now, on delaying things, you are just maximizing the numbers of hours, numbers of retrofit, and that has been clearly highlighted. That's the first, let's say, very straightforward impact.

The second one is technical discovery. If you -- if you discover something again two months in advance, you can have solution. If you discover something two weeks in advance, you don't have any more solution. You have only -- you are defending your position. You found mitigation but

not the proper way.

And, again, overall what I want to mention as a second and part of my answer is it has delayed some solution or it has forced us to spend energy on quick and fast correction rather than resolving issues.

Meaning that for example -- and even on our side, we took wrong decision, and nobody invited us. We took wrong decision by having that as a replacement, and we know that we had to redo it afterwards. So we support the cause, we support everything, but it's not good actually if you don't take your time.

So the validation delay has also an impact on the way to try to mitigate or try to correct. If you don't have time any more to correct, you do, let's say, an intermediate solution. Okay. So that's also the second impact of delay validation.

CHRISTINE MAINVILLE: So it would have contributed to the compressed schedule leading also -- or feeding into the compressed integration testing phase. It's kind of all bundled up together; is that fair?

BERTRAND BOUTELOUP: No, that's fair.

It's -- but to answer your first point is delay is, first of all, forcing us to have more retrofit, more activities to retrofit, because trains was already built, and yet on the other hand, it doesn't allow you to clearly investigate, find a solution and implement a solution.

So you go fast. You always run for the times when you said, Okay, I do that. It's cover maybe 80 percent of your case, your issue, but it doesn't cover the full thing, so you know you will have to come back. And that is energy also to all the teams on all the things.

So that's, for me, the main two things. When you delay validation, you go -- first of all, major impact on your retrofit schedule, but also sometimes you find not the best-in-class solution, and you find solutions which is the one you can make. That's really part of it.

CHRISTINE MAINVILLE: And in terms of this -- and in this particular case, the late retrofits would have compounded the issues at the MSF; is that fair?

BERTRAND BOUTELOUP: More, yeah. We had the thousand of hours to earn and to make this, and even we have not been able -- you know we have

the contractual obligation to complete it by six months. The minor deficiencies has to be completed by six months. We have not been able even to do that in two years, so yes.

CHRISTINE MAINVILLE: So what mitigation strategies were put in place? You said, you know, you're not finding the -- or applying the best-in-class solutions in some cases, and so what did Alstom do to mitigate these issues, if they could?

BERTRAND BOUTELOUP: I -- what sort of temporary solution? I have to find some example for you. We found some temporary solution before we can do and implement the final, let's say, configuration. I'm trying to find an example like that, what sort of --

CHRISTINE MAINVILLE: Well, let me ask you this: Do you think ultimately some of this may have contributed to the breakdowns or the derailments that we saw in the system?

BERTRAND BOUTELOUP: Not directly. No, I don't see that. I don't see a direct link to the derailment. That link doesn't exist, no.

Again, it has more of an impact on the overall, let's say, behaviour of the system, but it

has not been the root cause of the meat of the issue.

We have been facing the derailment. The derailment is -- on the first one, it is an easy -- let's say it's technical matters. It's known now and analyzed, and the second one is really different.

So, no, I could not make a link directly between late validation and the derailment.

CHRISTINE MAINVILLE: Given that -- I take it the fact that the retrofits aren't completed, the minor deficiencies haven't been corrected is why there's been no final certificate issued of completeness?

BERTRAND BOUTELOUP: I -- the final acceptance, if I remember well, has been pronounced, you know, just 2019.

CHRISTINE MAINVILLE: Sorry, yes, on the trains. I guess I'm talking about the broader project, but maybe that's not a question for you.

BERTRAND BOUTELOUP: That's -- that's -- I do not know. I have been -- yeah, I've been involved in one or two meeting where they were going through the full system, but very rare. I've

been twice, I think, where they presented the full system.

So I do not know what was behind. I don't know. I know they had some technical proof to make, and they had some occupancy of the station, but I -- no, I do not know the details.

CHRISTINE MAINVILLE: Has there been some consideration given to delaying the Stage 2 train assembly given the pressure on the MSF and work?

BERTRAND BOUTELOUP: You're correct. Actually, it was an internal decision. If we have listen to OLRTC, we would not have make it, but anyway, when we -- we had to -- we were facing two things: The readiness -- okay, before launching the Stage 2, supposedly the Stage 2 was in serial production. We were continuing after Stage 1. We should have completed.

We took a decision to remove for two reason internally: The first one is the configuration setup. Exactly the point I was mentioning earlier, we didn't have time to capture everything and secure the proper baseline for technical reason to implement a new configuration for Stage 2.

When I say "new," it's all the data on the technical issues you found during your validation. All the things there, we would like to capture, correct it, and implement it directly in serial condition.

So that was one of the reason because in April 2018, we were not able to have that design, let's say, setup.

And the second reason is the capacity to phase retrofit, maintenance, and serial manufacture. We were -- we were not able to face all this amount of hours in 2018.

So that the reason why we delay the start of Stage 2 in MSF, I think if I remember well, from April 2018 to September, October 2018, so during four months, yeah, four months, we were fully focused on Stage 1 completeness. That's a choice we've made.

Since then, OLRTC challenged us and said, You should not have done it, and you put a lot of pressure. And that's something I do not understand because we all knew at that time that Stage 2 vehicles might be needed for services, but in terms of the global centralization of the Stage 2 and the Stage 2 extension was not set. We know

that the decision for Stage 2 was later.

If I remember well, the decision has been made in March, early -- I don't know. When it has been announced by the Government of Ontario, I think it was in early 2019, and we knew that the vehicles were needed in 2024 or something like that.

So the need of the vehicle was not under the pressure, but everybody put the pressure. The contract put pressure to build the Stage 2 vehicle. Even we knew that the real operational need of these vehicles were not there.

So that's the reason why we delay a little bit the start-up of Stage 2 vehicle. I don't know if I answer your question, but the decision was, first of all, an internal one.

CHRISTINE MAINVILLE: Going back to the validation testing, I take it the delay was a result of relocating the manufacturing of LRVs 1 and 2 at least -- let me rephrase that.

If we track what the original plan was, first of all, can you speak to that original plan and the subsequent decisions that were made?

BERTRAND BOUTELOUP: You're right. On day one of the Stage 1, we were supposedly having

two vehicles. In essence, that's what you're calling it. Okay.

That vehicles, we had to change our plan for two or three reasons: The first one is the transfer of -- between Europe and North America and also to MSF for the manufacturing, but there was also the design freeze.

We have been facing some engineering delays, but also we have been facing some late design input or late decision.

Within the process I was mentioning, design review, you decide, you make compromise, okay, that's where I want to go. All that were a little bit delayed as well on this. This has an impact also on some of our delays in manufacturing.

So, again, we had to review our plan for LRV1 and LRV2, and what has been decided in -- when I was joining actually, when I was joining in 2014, there was one LRV plan to be assembled in Hornell, like a prototype train. And then after that, all the -- all the other one were brought in to be assembled in Ottawa.

That had impact on the manufacturing schedule, but it has impacted, as you said, on the capacity to have two trains to operate. But that I

was not deeply involved in before, so I did not know all the plan at that time, but it has changed the picture. Yes, definitely has.

CHRISTINE MAINVILLE: So at one point in time when at least the first LRV was to be built in Hornell, I believe the validation testing for that train was going to be in Pueblo, Colorado?

BERTRAND BOUTELOUP: Pueblo. Pueblo. Pueblo.

CHRISTINE MAINVILLE: And eventually, the decision was made to do the validation testing in Ottawa instead; correct?

BERTRAND BOUTELOUP: Yeah.

CHRISTINE MAINVILLE: Whenabouts was that decision made to move the validation testing to Ottawa?

BERTRAND BOUTELOUP: I was not involved, so I don't know. Sorry, I really don't know on my side. I don't if the decision has been made -- I don't know. I don't -- I was not involved in the Pueblo/Ottawa move. I was not. I don't know if it happened before -- anyway, I wouldn't know.

CHRISTINE MAINVILLE: So let me ask you this --

BERTRAND BOUTELOUP: I think it's maybe when I was in France because Pueblo was still in the picture when I was there in 2015 --

CHRISTINE MAINVILLE: Right.

BERTRAND BOUTELOUP: -- and it was no more there when I rejoined in 2017. So I would say it's in between, but I don't know when.

CHRISTINE MAINVILLE: And the validation testing, in the original plan, am I right that it would have been completed before 2015?

BERTRAND BOUTELOUP: The original plan --

CHRISTINE MAINVILLE: Given that it's -- yeah.

BERTRAND BOUTELOUP: It was in 2015 that a train would have been in Pueblo and potentially completed by 2016, something like that, yes. I would say yes, something like that in the original plan.

CHRISTINE MAINVILLE: So if that had occurred, would that have allowed for the serial manufacturing to occur after the validation testing?

BERTRAND BOUTELOUP: It could have been

better synchronized. To my point earlier made, yes, it would have been earlier. Now, the only thing on the technical, and I don't know the capacity for -- but I've been in Pueblo sometimes for other projects.

It's better because you do your generic testing, but what we have -- what you have to take care is the -- again, the interface. You do your performance capacity. The train is able to move. The train is shaking, is not shaking. You can do that. The train itself, the performance.

But in this project, the performance itself, again, has not been an issue. We had the capacity for power. We had enough power, definitely. It's on the setting so, yes, it would have helped on setting.

I'm not so sure it would have -- Pueblo would have completely removed, tackle, or highlight every technical issue we have been facing after, but potentially, it would have helped, yes. Definitely you're right.

CHRISTINE MAINVILLE: And do you recall when validation testing ended up occurring on the Ottawa project?

BERTRAND BOUTELOUP: To me -- to me, we

did validation up to the last day, so 2019. I remember the generic testing in May 2019, but I know we done still some test afterwards.

So we were asking to make another test. I think it was May or June. I think we ended up in 2019, I would say.

CHRISTINE MAINVILLE: When did it commence?

BERTRAND BOUTELOUP: Oh, train was running and testing -- it's always difficult, sorry. The validation itself starts far in advance because we do test, as I said, by test chamber --

CHRISTINE MAINVILLE: Right.

BERTRAND BOUTELOUP: -- but the train itself starts in end of 2016, early 2017, I think.

CHRISTINE MAINVILLE: And even though you weren't involved in the decision to move the validation testing to Ottawa, did you understand that in the -- in the original plan, when it was decided to move to Ottawa, the validation testing would have been performed earlier in terms of the train --

BERTRAND BOUTELOUP: Correct. You're right. In terms of, again, the performance of the train itself, you're right. We could have been in

Pueblo. If we have build a train before, we could have been able to do testing.

But the train itself has not -- again, at that time -- and, again, I was not involved, but I would say that the challenges we were facing and the area of concern, the risk we had in front of us, we were confident enough in our capacity to deliver a traction system and our capacity to deliver a braking system.

And, again, we don't know when you start from design, but we were confident enough in these system. And it's normally the strength, that backbone which is the centre of the train. We know and we are confident on our side.

So, again, the challenges were not there in Ottawa. Maybe that's driven them for, okay, I can make it in Ottawa. I -- again, I was not involved in the detail of it, but I would imagine that their challenge at that time was -- the risk assessment was at that time more focused on other areas than on traction. That's what I would have made. I don't know.

CHRISTINE MAINVILLE: In terms of completing validation testing, though, are you able to say, was that delayed because the track wasn't

ready or because the Thales integration wasn't complete? Like, what ended up impacting that the most?

BERTRAND BOUTELOUP: What has been more disrupting is definitely the access. When I say "access" is the conjunction of activities on-site. We have been mainly authorized to run trains on the portion of the track, which is 1.5, 2 kilometres on the south side of it. That's where we were.

And, again, that makes -- that makes roughly the Pueblo capacity of testing the train running on traction, but it doesn't prove that you have all the interface going everywhere.

So that one was at the beginning. Then what was really disrupting, I think, is to be authorized gradually and partially to go through some other areas and to validate.

So at the beginning, the train itself, we had enough. With that kilometres, we can run back and forth for us to mature our train. That's what we did. But then after that, it was very impacting that we could not have access to some of the areas. That's the real disruption we were facing.

On Thales and signalling, what has been

again more impacting on the end result is the lack of communication starting in 2018. That has been impacting, but not the readiness itself.

I understand that both systems are evolving. That I could accept, and we have been facing that in so many project, but what has been very, very impacting is the lack of communication. That is really tough.

CHRISTINE MAINVILLE: Lack of communication?

BERTRAND BOUTELOUP: We were discussing, you know, the ICD, coordination, all that, that has been impacting more than the fact that they were not able to deliver things.

I know they had all these strategy plan for delivering software from Thales. We understand it, and we learned when they were asking the train to make this, but that's not fair. They should have -- we should have been part of that progressive, let's say, maturity of the system.

That has been more impacting than the availability of the system itself. It seems to me that Thales has done what they can do in terms of installation and commissioning.

And, again, the progressive

commissioning is not an issue. What has been really, really, really impacting is the fact that we could not be part of it. That was more than the maturity of the system.

CHRISTINE MAINVILLE: Would you say there was at some point in time a breakdown in your -- in Alstom's working relationship with OLRTC?

BERTRAND BOUTELOUP: Oh, yes. Oh, yes.

CHRISTINE MAINVILLE: When would that have --

BERTRAND BOUTELOUP: I don't know if it's people related, if it's context, if it's both. I would imagine it's both, the context and everything.

Summer 2018. It's a change in behaviour, yes. Summer 2018. I don't know if it's June, July, whatever, but it's somewhere there. Definitely I got the impression, and I really get it now, that it is the change in the way of doing things.

CHRISTINE MAINVILLE: And who was your counterpart mainly in OLRTC and at that point in time?

BERTRAND BOUTELOUP: So in that point

in time, again, we were using the technical link because what we -- what we do when we have a project like that, you have contract to contract or project to project, but you have also technical to technical, because both technicals were hands to hands to present things to the City.

So, again, there was using -- I mention Jacques Bergeron as one of the main -- he was really influencing on the solution itself, on the way of doing things.

And at that time, myself, I was in -- I was with Eugene Creamer in beginning of 2018, and then we move to Rupert Holloway and then Matt Slade appears as well.

So Matt Slade took over an SNC-Lavalin position within the consortium, and he was responsible for us. He was our counterpart in this case. So Matt Slade, Robert Holloway, and Jim Creamer in that period.

CHRISTINE MAINVILLE: What is a dry run? Is that -- is that the integration testing component?

BERTRAND BOUTELOUP: Usually the dry run is the end of -- you have all your system to a certain level of configuration, technical

configuration, and you consider that now you are testing and stressing and making the overall system in the revenue service configuration.

So it is a dry run. The dry run should be something representative to -- at the exception of numbers of passengers on board, it should be a way of ensuring that everything is ready for.

CHRISTINE MAINVILLE: So it typically happens right at the end, then, of --

BERTRAND BOUTELOUP: It's usually one of the end of the validation and integration test, yes.

CHRISTINE MAINVILLE: For final acceptance?

BERTRAND BOUTELOUP: That depends on the contracts. Sometimes the acceptance are meet before or after. So that exist on -- I've seen both, but technically this is normally the conclusion and the demonstration that all subsystems are working together.

CHRISTINE MAINVILLE: And did this take place on this project?

BERTRAND BOUTELOUP: At the exception of the trial run, trial run meaning the official demonstration, no, there was no dry run as such

before. No, there was not.

CHRISTINE MAINVILLE: Do you link that to the automatic train operation, the ATO testing?

BERTRAND BOUTELOUP: Maybe, because I know that they had their final release in June, July, but the -- I'm not even sure because I think so many -- actually, that was the driver.

But, again, so many activities running in parallel, we were not -- sorry, RTG was not in a position to make a full dry run because they had so many touch-up and activities in parallel still at that point. They had our vehicles to touch up, but they had also some station things, and they had a lot of track things, and they had...

So to make a dry run, what you need is at least some stability, and it was not the case. So the dry run has been squeezed to the minimum potentially also due to the fact that so many things to do in parallel.

CHRISTINE MAINVILLE: Could you -- we just have a few more minutes. Could you speak to the supply chain issues that Alstom experienced and explain to what extent they were or were not connected to the need to modify Alstom's regular chain of supply because of where this project was

located?

BERTRAND BOUTELOUP: Okay. No, no, you're right. Two things actually: The location of the estimate. As it was in Ottawa, we had to establish a supply chain which -- with some warehouse and things like that. So that's something.

And mainly what has -- that supply chain has put the pressure on our manufacturing schedule. We were -- we were most of the time impacted on -- that was not stable. Our manufacturing schedule has not been very stable in terms of production here. Definitely that supply chain has an impact on our capacity to assemble trains.

Now, in addition to that, as you mention it, we had to make some choice on configuration. So when you have change, you make a choice of either sending that change to your vendors for him to implement, and then you don't have to correct it, or you consider that you prefer to receive the task, you modify it, and then you do it.

So it's -- that supply chain overall has, and I can say, not been stable all along

Stage 1 and even the first week of Stage 2.

It has not been stable until we get the Brampton facility. Then for the Brampton facility, you have more an industrial view and focus on making your -- manufacturing things.

So it has had an impact on the capacity to be in trains, yes. Potentially it has had also some retrofit and correction, yeah.

CHRISTINE MAINVILLE: And is that because it was a new supply chain for Alstom that you had these issues?

BERTRAND BOUTELOUP: The setup. Honestly, it's the setup. It's not a setup which is known. It's warehouse with -- a remote warehouse with an assembly line there.

Also with some suppliers to develop and to secure, we had -- maybe as you mentioned or you've been aware of, we had some -- we had to change some of the suppliers in the due course of Stage 1 for some of the parts of the bogie, for example.

And also what I was seeing, the product itself was known but to manufacture and purchase it in North America requires a translation.

When I say "translation," you have to

know how the people could make it. And imposed on me in specification is not good enough. What you have to secure is the fact that your suppliers is able to do it. So that has also caused some trouble.

CHRISTINE MAINVILLE: Would the changes in suppliers have -- were they the result of the Canadian content requirement, or would they have been made regardless just because you were building in North America?

BERTRAND BOUTELOUP: Mainly the second. It's mainly North America that's preferential in the way of doing things and way of moulding parts, the way it is specified, the thickness of the metal sheet, all that. It's something you have to face as a reality because it's something you have to purchase on the North America thing.

Now, some Canadian suppliers' choice has also got an impact on us, yeah. At the learning phase at the beginning, you have to learn how to help with some of the vendors, so -- but less than the first one. The first impact is definitely the way of doing things in North America.

CHRISTINE MAINVILLE: Was the bogie

supplier a new supplier for Alstom?

BERTRAND BOUTELOUP: The one you're referring to is the issue of the bolster. Yes, it was new. Not all our -- our techies were known for the brake system or that. We were always some people we knew. We know how to be direct about it, but the one you mentioned for the bolster, yes.

CHRISTINE MAINVILLE: Okay. We're out of time. I wonder if perhaps we can go off record for a second.

-- OFF THE RECORD DISCUSSION --

CHRISTINE MAINVILLE: Do you see the supply issues as having had any impact ultimately on the performance of the trains post revenue service on operations, on the breakdowns and derailments?

BERTRAND BOUTELOUP: It's a bit a large question. It's a large question. Again, making a link between the supply chain and the derailment, not as such. Even so, as you know, potentially 60 percent of the value of the train is coming from vendors. So, yes, parts are coming also from vendors, but...

Now, the derailment itself -- and I don't want to make the full inquiry there -- it's

something in relation with design -- I'm talking about the first derailment. It's something in relation with design and involvement with the suppliers, definitely.

But I could not make the link with supply chain issue you were mentioning. Again, the supply chain issue, the setup, the delays has an impact on the manufacturing, on the assembly of the train, not on the performance of the train.

Now, to your first part of your question, has it got an impact on the reliability, some of the behaviour of the thing. Yes, we have, because for example, the retrofit -- the latest retrofit we have to do on some of the components were on the open item list I was mentioning. So we knew that some of them were still to be tackled.

So, yes, some vendors has got an influence on some of the issue we were facing, but to make the link directly between supply chain issue to derailment, no, I will -- I will not do that, no. It's not any pressure, time pressure, anything like that. It's more technical matters.

CHRISTINE MAINVILLE: Were the supply issues the main cause of delay for Alstom?

BERTRAND BOUTELOUP: No. The main

cause of delays was design choices and interfaces mainly. The interfaces, sorry to say it again, has got not only an impact on the functionality of the train, as I was mentioning the rear vision, but you have to know that in a design process which is almost 18 months in a train roughly, you make choices. And when you make choices, it's also for lead time behind, and one of the biggest lead time is the cable.

The cable of a train could be an issue at the end because to make the functionality of your train, yes, you rely on computer, you rely on software, you rely on specific item, but you also rely on the way you manage it, and the way you manage it is what we call train control inside our design.

And that's how you handle the way of information. Information is not only made for maintenance, something else. It's also made for interacting and ensure that the system is working well.

The late design of some -- or the late input of some of the items has an important impact on the configuration, and that was really one of the other issues. And I'm not speaking about fancy

choices, but just normal way of doing interface selection and decision.

On this project, we were doing the batch 8, which is the 8th configuration of our harnesses, in 2018 or even late in 2019. That's very late.

Normally, after that, you should only make minor things, but you don't change your full functionality. And that's -- that's one of the difficulty in this project, the harnesses and the configuration.

CHRISTINE MAINVILLE: Was this delayed on the City's end, or was this --

BERTRAND BOUTELOUP: No. Some of them were on -- yes, we had faced some of them on the City. Well, I know the City was involved in the choice for the radio operational mode because they were part of -- they were supplying the bare radio on the system on the train, and we had to make some modification in 2018 due to that radio.

So they had a late issue there, but not the City always. Mainly Thales, as you know, the CME, that one has been -- we had two batches of modification, and quite important one in 2018 as well, and that led to some delay in our things. So

that one.

And after that, it's mainly, I would say, some of the choices and -- but I will not finger point directly one items like that. It's the maturity of the decision or the configuration of our train, I would say.

So part of it, Thales definitely, the signalling and the radio, and we had also some configuration late design choices.

But, again, one -- if you take only one issue, you can always work around, but the numbers of issues are not frozen. These things was important to manage.

If I remember well, when I was joining in 2017 and even in 2018, we were still making choices, and that's difficult. That's always difficult.

CHRISTINE MAINVILLE: Was there a specific bogie design required for the Citadis Spirit that was new?

BERTRAND BOUTELOUP: The bogie is based on some existing. If you look at the axle beam, all that were exactly the same as on other project like Istanbul, like TTNG, so they are strictly the same inside.

The one potentially you're looking at for derailment, they are exactly the same from Citadis Spirit -- sorry, the French things and the one we have been using in Istanbul and in France.

But we had, if I remember well, four assembly -- new assembly on this bogie specific to Ottawa, mainly on the suspension, which has no issue or no issue afterwards involving service. We had four different, I think, assembly which were specific to this bogie.

But the basic of the bogie, the reset, things like that, they are not new. We use the same wheels on others. We use the same bearings on others. We use the shaft itself on other project, so it's not specific to Ottawa.

CHRISTINE MAINVILLE: So would you have considered the Citadis Spirit a proven train design despite all the adaptions, or was it no longer a proven --

BERTRAND BOUTELOUP: So solution, it is a design proven. When I say "solution," you take traction. It's something we know -- we know how to make it. Braking, we know how to make it. Wheels.

So it is design proven in terms of solution. Now, the assembly of it is specific to

Ottawa. Yes, it is.

Again some strength within Alstom is the fact that some subsystem are reusing solution from others. So you're really confident in the backbone of the train. It's a well known, let's say, product.

So it's always -- it's not easy to say design proven. I know some -- a lot of people would like to say it's copy/paste, and you don't change -- just change your colours. No, it's not like that. Never like that. Never like that.

CHRISTINE MAINVILLE: And would that have been the case for other manufacturers too in terms of --

BERTRAND BOUTELOUP: It will. It will because a specific case of Ottawa for capacity, for performances, yes. It would have been, yes.

CHRISTINE MAINVILLE: It would have had to be custom designed to some extent?

BERTRAND BOUTELOUP: Yeah. Sure.

CHRISTINE MAINVILLE: The -- and, sorry, is that something that's typical in most projects, or often you are able to just replicate a model?

BERTRAND BOUTELOUP: No, no, it's

rather typical. We don't like -- we don't like to start from scratch a project normally. We have a status which is ready for tender or ready for order. We like to have at least some confidence we can rely on, and we don't make fancy development on project.

So Ottawa is -- in terms of technicality, for me, it's not something very special, specific. It's the same on other project, I would say, and it's not a very challenging thing.

What has been challenging is the continuity to organize. The fact that we had, as you said, a design authority there, the manufacturing site in Ottawa, that has been a challenge overall, okay, because it's something which has to be, and doing also the MSF assembly was a challenge, definitely.

The reason we move also station is -- but in terms of design, I would say Ottawa is in the normal range. It's not high technology development, nothing.

CHRISTINE MAINVILLE: And what about integrating Thales' signalling system? I understand -- well, can I ask you this: In the Citadis used in Europe, would -- is Alstom's

signalling system used, or it depends?

BERTRAND BOUTELOUP: Most of the time, yes, but it is something which is specified by the operator. As we run on specified track outside the city, the system is imposed by the train.

What is different in Ottawa, the line was not built. The line was not existing that time, so the development is in parallel of. So that's the difference mainly on Ottawa.

But usually you freeze -- usually you freeze your design by, Okay, I allow you that space in my cabin. You can do that. I earn that. Then you give me and I -- yes, I can pass the cable. Yes, you can do that. You do this progressive. Okay.

On Ottawa, again, the maturity was going like that up to a point where we were no more connected. That's the real challenge.

But to answer your question on others, the maturity, you don't have to discuss. It exist. It's an existing on-the-shelf equipment you have to put on your train. That's it. That's what happened.

So there is no choice. There is nothing. You can ask for modification. They're

unlikely to happen, but you can ask, but usually you have to use as is. On Thales, it was a little bit different.

CHRISTINE MAINVILLE: Last question: Did the fact that Thales is a competitor -- did that have an impact on the project or the relationship?

BERTRAND BOUTELOUP: Not to my point. And one example I will take is the GTA LRV. You know that they are building the train also for Finch where Thales is a supplier, okay, and we work well in terms of collaboration. So I don't see an issue, no.

Even we had good relation with Thales up to a certain point. Again, it's all different -- it all depends on people as well. The competition exists, but even so, on making a project, it's also you rely on the behaviour of the people, and we had good relation with them, again, without an issue. So, no, I would not say that competition would have been an issue.

CHRISTINE MAINVILLE: Okay. And just to be clear, was there any hesitation by Alstom -- from Alstom in providing Thales with information, with data?

BERTRAND BOUTELOUP: No. No. I think -- I think we know each other, and maybe you will have a better answer with some engineering people, but I haven't seen data issue, no. There is no confidentiality of a role, no.

CHRISTINE MAINVILLE: Thank you. Those are my questions. I know we're -- I've kept everybody well past the time. Unless there's any important question that needs to be asked, Michael, or --

MICHAEL VALO: None from me.

CHRISTINE MAINVILLE: Okay. Thank you so much, Mr. Bouteloup, for your time.

BERTRAND BOUTELOUP: You're welcome. It's a pleasure. Take care.

CHRISTINE MAINVILLE: Take care. Okay. Thank you, everybody.

-- Adjourned at 12:16 p.m.

REPORTER'S CERTIFICATE

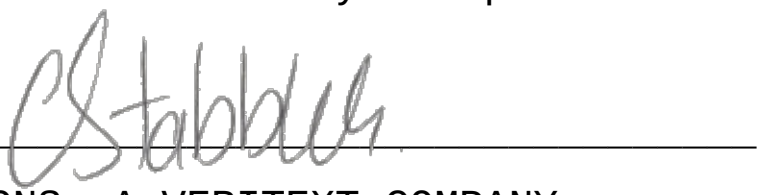
I, CARISSA STABBLER, Registered Professional Reporter, certify;

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 14th day of April 2022.



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