MANITOBA PUBLIC UTILITIES BOARD

Re: MANITOBA HYDRO

2017/18 and 2018/19

GENERAL RATE APPLICATION

PUBLIC HEARING

Before Board Panel:

Robert Gabor	- Board Chairperson
Marilyn Kapitany	- Vice-Chairperson
Larry Ring, QC	- Board Member
Shawn McCutcheon	- Board Member
Sharon McKay	- Board Member
Hugh Grant	- Board Member

HELD AT:

Public Utilities Board

400, 330 Portage Avenue

Winnipeg, Manitoba

January 22nd, 2018

Pages 5519 to 5839

APPEARANCES

Bob Peters		)Board Counsel
Dayna Steinfeld		)
Patti Ramage	(np)	)Manitoba Hydro
Odette Fernandes	(np)	)
Helga Van Iderstine		)
Doug Bedford	(np)	)
Marla Boyd	(np)	)
Matthew Ghikas	(np)	)
Byron Williams		)Consumers Coalition
Katrine Dilay	(np)	)
William Gange	(np)	)GAC
Peter Miller	(np)	)
David Cordingley	(np)	)
Antoine Hacault		)MIPUG
George Orle	(np)	)MKO
Senwung Luk	(np)	) Assembly of
Corey Shefman	(np)	) Manitoba Chiefs

LIST OF APPEARANCES (cont'd)

Kevin Williams (np)	) Business Council
Douglas Finkbeiner (np)	) of Manitoba
Daryl Ferguson (np)	) City of Winnipeg
Christian Monnin	)General Service
	)Small, General
	)Service Medium
	)Customer Classes
William Haight	)Independent Expert
William Gardner	)Witnesses
Kimberley Gilson (np)	)

TABLE OF CONTENTS

LIST OF EXHIBITS

LIST OF UNDERTAKINGS

NO.	DESCRIPTION	PAGE NO.
52	Manitoba Hydro to provide a breakdown of person hours for the 15 million person hours.	5629
53	Manitoba Hydro to provide the distance between Bipoles III and Bipoles I and II at its point immediately west of Jenpeg. Then further to what level of resistance from when they've been built.	5644
54	Manitoba Hydro will provide the presentation Dr. Swatek presented on the risks of reduction associated with the construction of Bipole III.	5647
55	Manitoba Hydro to provide the PUB with an update of Manitoba Hydro's control schedule for the completion of Keeyask at the end of February or as soon as it's received	5669

LIST OF UNDERTAKINGS (CONT'D)

NO.	DESCRIPTION	PAGE NO.
56	Manitoba Hydro to provide the Board with an indication of how much Manitoba Hydro has paid KPMG since May the 2nd on the Keeyask project and, likewise, how much they've paid KPMG related to the Bipole III project. (TAKEN UNDER ADVISEMENT)	5709
57	To advise the Panel of Manitoba Hydro's calculation of the costs for stopping construction on Keeyask entirely, together with what, if any, rate impacts that would have.	5712
58	Manitoba Hydro to provide the Board with its current estimate of the additional costs of Bipole III being on the western side of the province compared to the eastern side of Lake Winnipeg; and to review the number that it put forward at the Clean Environment Commission proceeding, and confirm that it was accurate when given (TAKEN UNDER ADVISEMENT)	5781

LIST OF UNDERTAKINGS (cont'd)

NO.	DESCRIPTION	PAGE NO.
59	Manitoba Hydro to provide confirmation that the road costs that are attributable to Conawapa are not included in the $380 million that Manitoba Hydro wants to amortize over the thirty (30) years	5837

--- Upon commencing at 9:29 a.m.

RULING:

THE CHAIRPERSON: Morning, everyone. I apologize for the technical delay. Before we start today, the Board is going to issue a ruling in relation to Manitoba Hydro's request to give rebuttal evidence in response to Morrison Park Advisors.

In this proceeding, Intervenor expert witnesses and the independent expert consultants retained by the Board provided written prefiled evidence in the form of expert reports. Manitoba Hydro was given the opportunity to file written rebuttal evidence in response to the expert reports filed by Intervenor witnesses and the independent expert consultants and did so in response to the reports of the Intervenor expert witness -- witnesses; the Daymark expert -- export - independent expert consultants; the Daymark load - independent expert consultants; Dr. Adonis Yatchew; and MGF Project Services.

After providing written prefiled evidence, a number of the Intervenor expert witnesses and the independent expert consultants have given oral evidence in this proceeding. There are also still

Intervenor expert witnesses in independent expert Consultants scheduled to give oral evidence in the remaining two (2) weeks of the evidentiary portion of this hearing.

Morrison Park Advisors is an expert witness in this proceeding, and was jointly retained by the Consumers Coalition and the Manitoba Industrial Power Users Group. Morrison Park Advisors filed written prefiled evidence in accordance with the deadlines set by the Board. All parties had the opportunity to ask written Information Requests of Morrison Park Advisors, following which Manitoba Hydro responded to the written prefiled evidence in its written rebuttal.

Mr. Pelino Colaiacovo gave oral direct expert evidence in the oral evidentiary hearing on -- of this General Rate Application on January 15, 2018.

On January 16, 2018 during Manitoba Hydro's cross-examination of Mr. Colaiacovo, Manitoba Hydro reserved the right to call rebuttal evidence to respond to what was, in its position, new evidence raised in his oral testimony. This is found at page 5111 of the transcript and was further explained by Manitoba Hydro beginning at page 5140 of the transcript.

The testimony in question related to slides 17 and 18, of Mr. Colaiacovo's oral presentation marked as Consumers Coalition Exhibit 45. The testimony in question also related to a spreadsheet provided by him with his PowerPoint slide presentation, which was marked as Consumers Coalition Exhibit 46.

In cross-examination by Manitoba Hydro, Mr. Colaiacovo confirmed that the analysis on slides 17 and 18 of Consumers Coalition Number 45 and the spreadsheet marked as Consumers Coalition Number 46 was not included in his written prefiled evidence.

Manitoba Hydro's position is that as the calculations presented by Mr. Colaiacovo were not presented in his initial evidence, the Utility should therefore have the right to respond to the new analysis.

This request was not opposed by the Consumers Coalition or the Manitoba Industrial Power Users Group. As set out in the leading Sopinka, Lederman & Bryant text, The Law of Evidence in Canada, the right to call rebuttal or reply evidence is limited to new issues raised in the evidence and does not include matters which might properly be considered to form part of the Applicant's case in-chief.

Rebuttal evidence cannot be used under the guise of replying to confirm or reinforce the case which the Applicant was required to make out in the first instance. This ensures fairness for all those who are engaged in testing the Applicant's case.

The Board has determined that the analysis presented by Mr. Colaiacovo on slides 17 and 18 of his direct presentation and supported by the spreadsheet marked as Consumers Coalition 46 is new evidence, not previously raised in the written prefiled evidence of Morrison Park Advisors or responses to Information Requests. As such, it could not reasonably have been anticipated by Manitoba Hydro.

Manitoba Hydro can, therefore, properly address this evidence through calling rebuttal evidence on February 2nd, 2018, the day currently reserved in the schedule for that purpose. Should Manitoba Hydro's rebuttal evidence include new analysis or calculations performed by the Utility, such analysis or calculations must be provided to all parties by no later than 5:00 p.m. on January 31st, 2018. All parties will be given an opportunity to ask questions of the Manitoba Hydro witnesses called to give oral rebuttal evidence.

Based on the submissions of Manitoba Hydro, the Board has furthered determined that to date this matter is the only matter in this proceeding that is properly the subject of oral rebuttal evidence, unless another new matter is raised in the remaining scheduled oral testimony of Intervenor and independent expert consultant witnesses.

Manitoba Hydro's oral rebuttal evidence will be strictly limited to addressing only the evidence that formed the subject of this request as set out in page 5111 of the transcript.

This opportunity for the Utility to call oral rebuttal evidence cannot be used to attempt to reconfirm or reinforce its case in-chief, including any matters that could have reasonably been anticipated by the Utility. Should any further new evidence be raised in the oral testimony of the remaining scheduled witnesses that Manitoba Hydro wishes to respond to oral rebuttal evidence, Manitoba Hydro should make the appropriate request of the Board. Thank you.

Mr. Simonsen, if you could swear in the witnesses, please.

MANITOBA HYDRO PANEL 4 - MAJOR CAPITAL PROJECTS

JEFF STRONGMAN, Sworn
DAVID BOWEN, Sworn
LORNE MIDFORD, Sworn
DAVID CORMIE, Sworn
ALISTAIR FOGG, Sworn
GLENN PENNER, Sworn

THE CHAIRPERSON: Ms. Van Iderstine...?

MS. HELGA VAN IDERSTINE: Thank you, Mr. Chair. I would like to just enter before we start two (2) exhibits, the Capital Panel CVs should be entered as Manitoba Hydro Exhibit Number 118. And the presentation which you're about to hear should be entered as Manitoba Hydro 120.

MR. KURT SIMONSEN: Thank you.

--- EXHIBIT NO. MH-118: Capital Panel's CVs

--- EXHIBIT NO. MH-120: Capital Panel's PowerPoint presentation.

EXAMINATION-IN-CHIEF BY MS. HELGA VAN IDERSTINE:

MS. HELGA VAN IDERSTINE: Thank you. And with that, I'd like to introduce Mr. Lorne

Midford, who is going to lead the presentation.

THE CHAIRPERSON: Sorry, for a second. Mr. Simonsen, we have it written down as 130, is it --

MR. KURT SIMONSEN: 120.

THE CHAIRPERSON: It's 120, okay, thank you. Sorry, Ms. Van Iderstine.

MS. HELGA VAN IDERSTINE: So with --

MR. KURT SIMONSEN: Sorry, just to backup, 119 is -- is a letter from Manitoba Hydro to PUB regarding the MGF redacted report.

(BRIEF PAUSE)

--- EXHIBIT NO. MH-119: Letter from Manitoba Hydro to PUB regarding the MGF redacted report.

THE CHAIRPERSON: Sorry, Ms. Van Iderstine...?

CONTINUED BY MS. HELGA VAN IDERSTINE:

MS. HELGA VAN IDERSTINE: And with that, I'd like to introduce Mr. Lorne Midford who is going to lead the Keeyask portion of -- or who's going to lead the capital panel.

I would just caution you and let you know that as you saw when they're being introduced, we've got almost everybody up here. We have one (1) person who's in the back, so, they're going to move back and forward during the -- the presentation so that the appropriate person's in the front row.

And the other thing, just to let you know, is that we anticipate the Keeyask present -- portion of the presentation, which is the starting portion, will take up the majority of the time up until what you've got your scheduled breaks. So, we'll ask whether or not you want to proceed with a break at that point.

THE CHAIRPERSON: Thank you.

MR. LORNE MIDFORD: Good morning, Mr. Chairman, Madam Vice Chair, Board members, Board advisors, Intervenors, and our audience. I'm Lorne Midford and I am the vice-president of Generation and Wholesale at Manitoba Hydro. And since early 2016 I have executive responsibility for construction of the Keeyask generating station. And I also chair the Keeyask Hydropower Limited Partnership Board of Directors. It's a pleasure to be here.

Before I introduce our panel members, I'd just like to take a minute to pass on our

condolences to the family of Todd Maytwayashing, who tragically lost his life last week following a workplace accident at a marshaling yard near the Limestone generating station on the lower Nelson River. Our thoughts and prayers go out to his family.

Beside me is David Cormie who I don't think needs any introduction. He's -- you're already familiar with Mr. Cormie. He's a part of the panel today through his involvement with both the Great Northern Transmission line and the Saskatchewan transmission line.

Glenn Penner behind us is the Director of Transmission Construction and Line Maintenance. Glenn is responsible for a diverse team of project managers, designers, engineers and lifeline workers. He has been with Manitoba Hydro for almost twenty-seven (27) years, much of that in transmission working in a variety of roles throughout including structural engineer and manager of transmission construction.

Beside David is Alistair Fogg. Mr. Fogg is the manager of the Converter Commercial and Controls Department in the Bipole III Converter Stations Division. Alistair is a professional engineer with a Masters of Business Administration and has a CMA designation. Alistair manages project

control functions for the Bipole III project, including commercial support, contract strategies, project cost and schedule, change management and risk management.

Beside me is Dave Bowen. Mr. Bowen is the Director of the Keeyask project. Dave has over twenty (20) years of experience in both the consulting engineering and electric utility business. He's a registered professional engineer and has a Master of Science in Engineering. Dave's work experience has seen him taking on progressively senior roles as an engineering consultant in areas of infrastructure and within Manitoba Hydro, focused on the delivery of new generation projects. This has included work on the Wuskwatim generating station, Pointe du Bois spillway, Bipole III and Keeyask projects.

And beside David is Jeff Strongman. Jeff is the manager of the Keeyask Business Department. He's a civil engineer with over twenty (20) years of experience in the consulting, manufacturing and construction industries and prior to working on the Keeyask project, Jeff was a senior contracts negotiator working primarily on development of agreements with Minnesota Power on power export sales and a new transmission interconnection to the

United States. Prior to that, Jeff played a key role on the construction team during the Wuskwatim generating station build.

For myself, I am a professional engineer with thirty-two (32) years of experience in the electric utility business; about half in the transmission side of the business and half in the generating station side of the business.

So now I'd like to start the presentation. We're on slide 2. Nearly all of the electricity we produce each year is clean, renewable power generated at 15 hydroelectric generating stations on the Nelson, the Winnipeg, Saskatchewan, Burntwood, and Laurie Rivers.

We also operate two (2) thermal generating stations at Brandon and Selkirk which are, essentially, only used for backup power and four (4) small remote diesel generating stations at the off-grid communities of Brochet, Lac Brochet, Shamattawa and Tadoule Lake.

Our total generating capability is just under 5700 megawatts and Keeyask, once complete, will increase this capacity to just under 6400 megawatts. We also have wind power purchase agreements from independent windfarms at St. Leon and St. Joseph.

Manitoba Hydro's transmission system transmits electricity from generating stations around the province and also interconnects the Manitoba system with neighbouring provinces and states. Our major high-voltage transmission lines operate at 115,000 volts to 500,000. The high-voltage MR. DAVID CORMIE: lines shown in this picture are, essentially, an expressway for the majority of power that is generated in the north and transmitted to the south. The power that is generated in the north system is converted to high-voltage direct current at two (2) converter stations Radisson and Henday and transmitted over 1800 kilometres to Dorsey converter station just outside Winnipeg where it's converted back from high-voltage direct current to high-voltage alternating current.

We deliver electricity to our customers using over 18,000 kilometres of transmission lines and 68,000 kilometres of distribution lines.

Slide 3. Keeyask generating station is a collaborative effort between Manitoba Hydro and four (4) Manitoba First Nations working together as the Keeyask Hydropower Limited partnership. Our four (4) Cree nation partners are: Tataskweyak Cree Nation and War Lake First Nation acting as the Cree nation

partners; York Factory First Nation and Fox Lake Cree Nation. The partnership is governed by the joint Keeyask Development Agreement, sometimes referred to as the JKDA, which outlines such things as the contractual investment terms for the partnership and outlines commitments in the form of training, employment and business opportunities during construction, as well as the ongoing governance structure.

Slide 4. The Keeyask Hydropower Limited Partnership has a Board of Directors with representation from all four (4) partners. The Board meets at least quarterly to review the project status, review any issues and concerns and, essentially, provides an ongoing and regular opportunity to meet and to talk and to provide feedback for the project.

I can tell you at a very personal level that I've come to better understand the Cree worldview. I've come to better understand the impact our legacy operations have had on these communities. And I've come to better understand the importance of reconciliation. And I continue to learn and to understand and I thank our Cree Nation partners for putting their confidence in me as chair of the Keeyask Hydropower Limited Partnership. Keeyask, and our

approach to planning, constructing and operating this station like Wuskwatim is to Tataskweyak before it, is a cornerstone for Manitoba Hydro on behalf of the province to build a long-standing positive relationship with our Cree Nation partners based on respect and trust.

To reconcile the past, to work together for a better future, this will take some time. Reconciliation is a long journey. If the Tataskweyak is any indication, I'm very confident that we're on the right path and with time and openness, we will get there together.

I don't want to take too much time but this is so important to me personally and to the -- everyone involved in the project that I'd like to share a story with the Board, perhaps to provide some perspective.

In 2015 when the rock was being excavated for the powerhouse, essentially 100 foot rockface was drilled and blasted out of the rock, which is where the units will ultimately generate their power. In this rockface, there was a relief of a face in the rock that appeared that was perhaps ten (10) to fifteen (15) feet high. When I first learned of this by a photo that was circulating, I thought it

was interesting, and frankly quite cool. But I can tell you that I didn't give it any more thought than that nor did others who did not grow up as the Cree have. Our Cree partners, on the other hand, had a very, very deep spiritual connection with this event and because of my and other's lack of acknowledgment and understanding, it created conflict and sadness with our Cree partners; that, of course, was unintentional.

We had emergency meetings with the Keeyask Hydropower Limited Partnership Board and through a lot of discussion and learning, we hosted several ceremonies both at site and within some of the communities to recognize the significance of this event. These ceremonies that I participated in were very moving. I can tell you that this is just one (1) example of how we are learning and continue to learn and to understand as we travel on this long journey of reconciliation.

The Keeyask Hydropower Limited Partnership Board also commissioned paintings from two (2) of the Cree nation communities to commemorate the rockface from Fox Lake Cree Nation and Tataskweyak Cree Nation which you can see on the -- on the screen in front of you. These lovely paintings hang on the

wall at the check-in desk at the Keeyask camp and will, ultimately, find a home at the Keeyask generating station when it is complete. So when you visit the Keeyask site and you see these pictures hanging on the wall when you check-in, I hope you may reflect on this story. And understand that several Board members have had the opportunity to travel to Keeyask and look forward to future opportunities to host members of the Board as well at the site.

Slide 5. The Keeyask Hydropower Limited Partnership will own the Keeyask generating station. The Keeyask Hydropower Limited Partnership is structured as a limited liability partnership consisting of a general partner with .1 percent, a wholly owned subsidiary of Manitoba Hydro and four (4) limited partners with 99.9 percent. Manitoba Hydro, the Cree Nation partners made up of Tataskweyak and War Lake, Fox Lake Cree Nation Limited partnership and York Factory First Nation Limited Partnership.

The general partner manages the affairs of the Keeyask Hydropower Limited Partnership and has contracted with Manitoba Hydro to construct and operate the project. The general partner is managed by a Board of Directors consisting of seven (7) Manitoba Hydro reps and five (5) Keeyask Cree Nation

reps, a monitoring advisory committee and a construction advisory committee provide advice to the Board. An advisory group on employment provides advice to the Manitoba Hydro project manager and also provides reports to the board. And an issues coordination committee, in turn, triages issues for discussion and direction to the Board of Directors.

Mr. Bowen is the director of the Keeyask project, and he reports directly to me. Dave has structured his team into areas of site construction manager, commercial contracts manager, engineering manager, and business manager.

The major projects -- slide 6. The major projects executive committee, which is Chaired by our President and CEO Kelvin Shepherd, oversees, directs, and makes strategic decisions on Manitoba Hydro's major capital projects. The executive committee was established in early 2016, with membership from the president and CEO, vice president of transmission, vice president, myself, generation and wholesale, vice president of HR and corporate services, vice president of Indigenous relations, and vice president of finance and strategy. The executive committee meets biweekly, or as often as required. Each operating group retains authority and

accountability of the project within their scope of accountability.

I would now like to pass it over to Mr. Strongman.

MR. JEFF STRONGMAN: Thank you, Lorne.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: Manitoba Hydro's Keeyask team is comprised of roughly two hundred and twenty (220) people split geographically between the Keeyask site and the corporate head office in Winnipeg. The site team, headed by the construction manager, is located at Keeyask and provides construction oversight and project management. The engineering, contracts management, and business teams are stationed in Winnipeg, as well as other corporate resources to provide the necessary support to the construction team at site.

Slide 8. So what are we building? We're building two (2) things. First, the 695 megawatt Keeyask Generating Station will be the fourth-largest generating station in the Province, providing 12 percent of Manitoba's renewable energy. It's clean, renewable energy that will benefit

Manitobans for more than one hundred (100) years. Secondly, we're building a stronger relationship with our First Nation partners.

The Keeyask project...

(BRIEF PAUSE)

MR. JEFF STRONGMAN: How's that? Is that better? Okay.

The Keeyask project includes a seven (7) unit powerhouse, a seven (7) bay spillway, an extensive network of dams and dikes, all-supporting infrastructure, which includes camp, access roads, and temporary infrastructure such as cofferdams, and all required transmission facilities. The Keeyask site is located on the Nelson River in northern Manitoba, roughly 700 kilometres north of Winnipeg, and 180 kilometres northeast of Thompson.

I understand that some of the members attended the site. I'll just give you a -- a rough roadmap of the road that you took once you landed in Gillam. Starting in Gillam, you'd proceeded east on the highway, away from the project site, in order to cross the Nelson River at the Limestone Generating Station, then back west towards the Keeyask site on

PR290. Then you turn left on the Keeyask access road, pass through the security gate, and finally arrived at the main camp after roughly two (2) hours.

Also note on this map the location of our partner communities and their close proximity to the site, Bird and Gillam on the right side are Fox Lake communities. On the left, Split Lake is the Tataskweyak First Nation community, York Landing is the York Factory First Nation community, and Ilford is the War Lake First Nation community shown.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: This aerial photo, you can see the project site before construction. The Nelson River flows from the left to the right in this photo, and is roughly 1000 metres wide as the river approaches the Gull Rapids. At that point, the river splits into three (3) channels, referred to the North, Central and South channel, with the North at the top. Through the rapids, the river drops 12 metres in elevation, which makes it an attractive site for the placement of a generating station.

Slide 10. This rendering shows the

layout of the principal structures at Keeyask with, again, the flow from the left to the right, and the top being North. The powerhouse is located on the north side of the river, and is a -- a mile from the spillway, separated by the Central dam. There will be short dams on the North and South side as well. Keeyask is constructed in relatively flat terrain, so it requires extensive diking, roughly 23 kilometres total.

The principal structures of the Keeyask Generating Station are the North and South dikes along the upstream shorelines, the North dam that connects the North dike to the powerhouse, the powerhouse complex constructed on the North side of the river, including an intake and tail race channel, a Central dam that will connect the powerhouse to the spillway, a spillway structure located on the North side of the Gull Rapids South channel, including the intake and -- and tail race channels, and the South dam that connects the spillway to the South dike.

Slide 11. This is an artist's rendering of the Keeyask powerhouse, once finished. In order to provide context on the size, the height to the top of the powerhouse is equivalent to -- pardon me. The height to the top of the Manitoba Hydro

building is 88.6 metres, and the height of the powerhouse is 64 metres, which is roughly three quarters (3/4) of the height of the Hydro building. The powerhouse is 64 metres by 64 metres by 192 metres long. The total length is over two and a half (2 1/2) football fields.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: The second of the two (2) principal concrete structures is the spillway. And slide 13 is an artist's rendering of the Keeyask spillway, showing the completed version. Again, for context, comparing the spillway to the Manitoba Hydro building, the spillway is tall as the 17th floor of Manitoba Hydro. The spillway's dimensions are 60 metres high, 44 metres wide, and 119 metres long.

MR. JEFF STRONGMAN: Slide 15. The river management structures are the main features of this slide, and they are highlighted in green. In order to perform the construction work, the natural path of the North and Central channels of the river have been blocked by cofferdams, forcing the river to pass the construction site through the South channel. Inside these cofferdams, all the water has been pumped

out so that the work can progress in dry conditions.

Slide 16 is a typical cross-section of a dam. The schematic depicts a typical permanent earthwork structure, such as what we were building in the North, Central and South dams. Shown are the impervious core and successive layers of rock designed for sufficient strength to hold back the pressure of the water on the west side of the dam. Not shown on this schematic is the variability of the underlying bedrock upon which the structure is built.

The top left picture in slide 17 is a -- - a photo depicting the cleaning of the bedrock surface to what's referred to as dinner plate clean. The bottom left is the placement of dental concrete as a means of leveling the bedrock, and on the right, a portion of the central dam under construction in the summer of 2017.

Slide 18 shows the permanent structures of Keeyask overlaid on a map of Winnipeg. Again, this is designed to try to achieve context and perspective of the extent of the site. The South dike is 10 kilometres long, 22 metres high, roughly 10 metres wide at the top. The North dike is 11.6 kilometres long, 17 metres high, and roughly 10 metres wide at the crest. The North Dam is 320 metres long, 24

metres high, and 10 to 15 metres wide at the crest. The Central dam is 1,577 metres long, 28 metres high, and 15 metres wide at the top. And the South dam is 610 metres long, 22 metres high, and 15 metres wide at the top.

When you overlay the permanent structures on a map of Winnipeg and extend from -- there's -- they extend from Portage and Main almost to the west perimeter. Note that the North dike extends out of downtown, past Polo Park, continues to the James Richardson Airport, well into St. James, and the South dike extends out of downtown, through the Osborne junction, then west through River Heights, and into Charleswood, past Assiniboine Park, ending south of Wilkes.

Slide 20. We've taken the concrete structure of the powerhouse and overlaid it into a block of downtown. Similarly, the service Bay would take up a -- a similar footprint. The infrastructure required to support Keeyask include the following -- this is slide 21 -- 23 kilometre north access road, linking the Keeyask site to PR280, a 25 kilometre south access road linking the site to Gillam, a major bridge structure over the Looking Back Creek, and a two hundred (200) person start-up camp, and a twenty-

four hundred (2,400) person main camp at either ends of the access road.

Slide 22 is the Keeyask transmission project, which has two (2) main components. The first is providing the power required for the current -- the construction of the Keeyask Generating Station, and the second is to transmit the power from Keeyask to the Manitoba Hydro Converter Stations linking and integrating the station into the Manitoba Hydro system. The Keeyask transmission project includes the construction of a power line and station, a switching station on the south side of the Nelson River, three (3) generation outlet transmission lines, four (4) unit transmission lines, and upgrades to the Radisson switching station.

Manitoba Hydro has incorporated lessons learned from previous projects, including Wuskwatim, at a cost of 1.4 billion, at Pointe du Bois, at a cost of 0.6 billion, into the delivery of Keeyask. The Corporation's project management capabilities have been built up over the last ten (10) years in preparation for delivering Keeyask and the Bipole project.

Lessons learned from past projects include: Early contractor involvement is valuable.

The contract model has to fit the circumstances and market conditions. Goals and incentives must be mutual and tied to project critical success factors. Independent third-party reviews are beneficial, providing independent perspective on the projects and processes enhances the opportunity for continuous improvement. Rigorous oversight is essential. Project integration is critical to success. Manitoba Hydro has to be active in managing the interface points between contracted work packages, and doing things as they have always been done does not work for complex projects that require constant innovation and a culture of collaboration.

Slide 24. Keeyask is a complex, multiyear Hydro construction project with suffic -- significant coordination and integration requirements. It's being developed at a remote Northern location with access from only one (1) Provincial highway that's -- and that's Provincial Road 280. Productivity of trades has been declining over the last twenty (20) and thirty (30) years.

On-site camp is required capable of accommodating the peak workforce of twenty-four hundred (2,400) workers. Seasonal constraints exist, and they limit the warm weather construction season

significantly. Operating in a regulatory environment that includes necessary constraints such as environmental spawning windows that limit when certain construction activities occur.

River management is key. The Nelson River is over a kilometre wide, requiring significant earth structures for the variable flow conditions. Large earthworks projects with subsurface conditions within the former river channel can significantly impact the design and the construction of the project.

Slide 25, employment. Employment on the Keeyask project is a real success story, as the vast majority, 73 percent to date, of Keeyask workers are from Manitoba. As well, our project has enjoyed unprecedented employment from our partner communities, the First Nations within Manitoba. Midway through 2017, the project reached a significant milestone of 2 million person hours worked by our Keeyask partners and 4 million person hours worked by Indigenous people.

(BRIEF PAUSE)

MR. LORNE MIDFORD: In addition to the vast majority of project employees coming from

Manitoba, our project workers come from across the provinces of Canada and roughly half of the United States. In addition, project workers also come from Portugal, Italy, the United Kingdom, Australia, Chile, and Argentina.

Slide 27. A project site the size of Keeyask draws on global resources to fulfil its -- all of its requirements. Manitoba supplies the generator step-up transformers and trashracks. From across Canada the intake and spillway gates are supplied, as well as the powerhouse crane, intake, and draft tube cranes, turbine components, and the governors. From the United States we source the isolated phase bus and the exciter. And from Europe and Brazil we source the turbines, generators, and generator circuit breakers.

(BRIEF PAUSE)

MR. LORNE MIDFORD: Slide 28. The Keeyask project has a strong safety record for a large complex project in a remote location. However, last week a tragic accident took place. An employee of a contractor working for Manitoba Hydro near the community of Gillam suffered a fatal injury on January 17th, while securing tower steel bundles to a flat

deck semi. The worker was an employee of Forbes Brothers, tasked with building the transmission line that will carry power from Keeyask to the Radisson converter station just out -- just outside of Gillam. Our hearts go out to the family. We cannot comment further until the investigation is complete.

To date, over 15 million person hours have been worked on the project to the end of 2017. The project is performing well compared to the construction sector in Manitoba. The lost time incidence rate for the project to date is less than one-tenth (1/10) of the provincial rate. The Keeyask project rate is zero-point-two-nine (0.29) lost time incidents compared to the construction sector average of four-point-two (4.2). The general civil contractor has gone over one (1) year without a lost time incident. Manitoba Hydro and all of our contractors will continue to work on our goal of zero injuries.

(BRIEF PAUSE)

MR. LORNE MIDFORD: Slide 29. The contracting model is specifically tailored for each contract and scope of work. This includes an evaluation of the market capacity, potential

competition, constraints, and capabilities within Manitoba Hydro. This also involves allocating risk to the party who is best able to manage it.

There are variety of types of contracts. The four (4) main ones that are used on this project include cost reimbursable, where the contractor is paid for all of its allowable expenses plus a -- plus an additional payment for profit. The second is a target price, which is based on a cost reimbursable mechanism in which the contractor is reimbursed for actual costs subject to the application of a pain/gain formula at the end of the project based on performance.

A fixed-price contract is where a contractor is paid a predetermined price to complete the work regardless of actual costs. And the fourth type is a unit price contract where the contractor is paid a fixed sum for each unit of work complete.

Slide 31 shows the major contract types. This is a list of the Keeyask contracts whose value exceed 35 million. Note that there are total of two hundred and thirty-nine (239) contracts awarded to date, and that only the largest eleven (11) on the con -- on the project are shown on this slide.

Earlier when I spoke of the types of

contracts, you can see in the column on the right how all fit -- all four (4) main types are utilized in this project. For example, the turbines and generator contract to supply and install seven (7) units is a fixed-price because the scope of work is very clearly defined, while the service contracts, such as camp operations, are cost reimbursable largely because they are a function of time. The service contracts continue in duration for however long the construction phase requires to completion.

Slide 32, some remarks about the general civil contract. The general civil contract, or GCC as it's commonly referred, was awarded to BBE Hydro Constructors Limited Partnership in March of 2014. BBE is a tri-party consortium including Bechtel Canada, Barnard Construction of Canada, and EllisDon Civil Limited. It is by far the largest contract on the project, and includes the following key scopes of work: coffer dams, which are temporary river management structures; rock excavation; principal concrete structures, including the powerhouse and spillway; the earthwork structures, including the dams and dikes; and the electrical and mechanical work.

This contract was awarded as a single contract rather than a separate contract for the

electrical and mechanical work, which was done on Wuskwatim, to minimize the interface risks and delays in coordinating other parties to take over the work from the general civil contractor as the concrete work progresses. This is subject to significant variability based on performance rates to completion.

Slide 33. In order to understand the context surrounding the decision to proceed with the general civil contract as a target price contract, we need to rewind the clock back five (5) years to 2012 when the procurement process was underway. At that time oil prices exceeded a hundred dollars per barrel and the North American megaproject market was hot, with dozens of capital expansion projects taking place in northern Alberta as well as LNG projects across the country.

In that environment megaproject contractors were not accepting hard money contracts where many risks such as labour productivity pass on to contractors without substantial and cost prohibitive premiums. This caused owners to proceed with alternative forms of contract sharing risk, where possible, and retaining them where they couldn't be passed on.

On the Wuskwatim project, Manitoba

Hydro attempted to tender the general civil contract as a unit price contract. However, the market was hot and unresponsive to hard money contract. As a result, Manitoba Hydro received only one (1) bid, which was cost prohibitive. Another lengthy procurement was undertaken, culminating in a responsive, competitive process and an award of a target priced cost reimbursable contract to O&E who performed the general civil contract work for Wuskwatim.

Slide 34. This is a timeline of the general civil procurement process. The procurement of the Keeyask general civil contract required a three (3) step process. The first step was market sounding to identify and open communications with potential parties interested in and capable of doing the work. This took place in early 2012.

The second step is the preq -- prequalification phase, where the market is invited to indicate interest in becoming prequalified to bid on the work. This took place in the second half of 2012. Seven (7) parties responded to Manitoba Hydro's invitation and four (4) proponents were qualified in early 2013.

The third and final step is the call for proposals from the four (4) qualified -- qualified

proponents, which was done in the second half of 2013. All four (4) proponents responded to the call and submitted proposals. The submissions were evaluated on best value to Manitoba Hydro, and a contract award was made to BBE in March 2014. A third party was also retained to provide a reference proposal, in addition to the engineer's estimate, that also served as a reference point for comparison of the bids.

Slide 35. The general civil contract is a target price contract cost reimbursable contract with a pain/gain share formula that is intended to motivate the contractor to perform. The contractor's profit is at risk. However, their liability is capped at the profit. Once the profit is eroded all actual costs are 100 percent paid by Manitoba Hydro.

The target price contract model was used because the marketplace would not accept a fixed-price contract without a significant cost premium. In addition, all forms of contract require relief for changed conditions. This form of contract is intended to secure competitive bids in a competitive major project environment.

Slide 36 is a timeline showing the construction milestones that have been achieved. Starting with infrastructure, work including the

access road, camp, and bridge over Looking Back Creek was built between 2012 and 2014. During NFAT this phase of work was referred to as KIP, or the Keeyask Infrastructure Project.

The general civil contract was awarded in March 2014 and in July of that year the milestone of first rocks in the river was achieved on July 16th, 2014, that signified the start of coffer dam construction which would continue through 2014 and 2015. The start of 2016 also saw the start of construction of the first permanent earthworks, followed by first concrete in the powerhouse in May of 2016. The construction of permanent concrete and earthwork structures has been the focus over the last two (2) years.

So that's looking backwards over the last five (5) years. Now looking forward we'll talk a bit about the future construction milestones. Slide 37 provides a look ahead for the next five (5) years required to complete the work. Starting at the left side of the slide with 2018, this year we'll see the start of turbine and generator installation at Keeyask. And, in fact, our contractor Voith has mobilized and begun work at the site.

Late summer of this year we'll see the

work advance sufficiently to divert the south channel of the river through the spillway. This is a major milestone as this signifies the transition of the river from its natural path through our control -- spillway control structure.

This also permits constru -- construction traffic crossing the river and utilizing the South Access Road to get to the Keeyask site, considerably -- considerably reducing travel time from Gillam. So in the fall of this year the travel from Winnipeg to the site will still be the two (2) hour flight to Gillam. However, rather than an additional two (2) hours on the highway it will be about a twenty-five (25) minute drive from Gillam. So if anyone's travelling a return visit, September-ish is a good time.

Looking ahead to the end of 2019, we'll see the enclosure of the full powerhouse. Currently only the service Bay and unit number 1 are enclosed, while the remaining units are under construction. Looking further to 2020, we would see impoundment of water up against the permanent earth structures followed by the first unit in-service date of August 2021, and the last unit by August 2022.

Slide 38 is another general

arrangement. 362,000 cubic metres of concrete are required to build the powerhouse and spillway. 2.2 kilometres of earth-filled dams are required to construct the North, Central, and South dams. 23 kilometres of dikes are required to build the North and South dikes along the Nelson River to contain enough water to produce power at Keeyask.

This rendering shows the layout of the principal structures at Keeyask. The river flows left to right with the north at the top. Again, the powerhouse is located on the north side of the river, is about one (1) mile from the spillway separated by the central dam. The short dams on the north and south side are also depicted. Keeyask is in a very flat area, so extensive diking is required, as I mentioned earlier, roughly 23 kilometres total.

Slide 39 is a powerhouse rendering. This is an artist rendering showing the powerhouse with the service bay on the right and the seven (7) units progressing leftwards.

Slide 40. This slide shows a time-lapse representation of the powerhouse. On the left and labelled "2015" is the powerhouse excavation progression. In the middle and labelled "2016" is the first year of concrete work showing the lower stages

getting off the rock. And on the right and labelled "2017," you can see the service bay and the concrete work on the first three (3) units starting to take shape.

Slide 41. Shown on the left is the first concrete. Leveling and bay slab pours of the powerhouse are shown from early 2016. And shown on the right is the development of the draft to formwork for units 1 and 3. Unit 1 is on the right and unit 3 is on the left.

Slide 42. This is a shot of the powerhouse towards the end of the first year of construction in October 2016. You can see the five (5) tower cranes coloured in blue that serve the work face and are used to lift rebar, formwork, and any material requirements into place. I'd also want to point out the orange tarps that are visible. These are required as part of the heating and hoarding necessary to provide adequate temperatures for the working environment and for concrete curing.

Slide 43. This photo shows the powerhouse complex at the end of 2016, the first year of concrete construction at Keeyask. The model in the bottom half of the slide shows a rendering of the concrete pours completed within the powerhouse in that

first year. Again, the service bay is on the right, and moving from the left you see the intake, and moving down you can see the units of the powerhouse, together with the tailrace pour shown on units 1 and 2.

Slide 44. This is another shot of the powerhouse looking upstream from the downstream side of the structure. This was taken in July 2017. You can see there are no orange tarps needed in the summer months. The service bay is on the right, and the units under construction are progressing on the left, starting with unit 1.

Slide 45 is an overhead bird's eye view of the powerhouse in the summer of 2017. You can see units 1, 2, and 3 identified by the circular draft to formwork in the middle of the shot. Progressing leftwards from there, you can see nothing in unit 4, 6, and 7. And the wooden formwork in unit 5 is visible but there's no concrete there.

Slide 46. This photo was taken just prior to Christmas on December 15th, 2017. At that time, you can see that the superstructure steel above units 1, 2, and 3 and the enclosure of the service bay in unit 1 on the right. By February of 2018 units 2 and 3 will be enclosed as well, to permit work

continuing throughout the most extreme months of winter.

Slide 47. The previous series of pictures were of the powerhouse. Now I'll show you the spillway, starting with the artist rendering of the end product. You can see seven (7) bays in the spillway, each with its own gate that moves in the vertical direction. This is how we control the flow of the river by moving the gates up and down, increasing or decreasing the open area for water to pass. Also shown here are the upper and lower bridge decks that will connect with the South Access Road and the highway network leading to Gillam. Once construction is complete, the spillway bridge deck will become part of the highway as a river crossing.

Slide 48. This shot of the spillway shows the bay slab, which is the lowest lift of concrete progressing up from the bedrock. The rebar standing vertical and the formwork installation is underway for the first lift -- lift up off the bay slab, which will see the development of the piers starting to take shape. This was July 2016.

Slide 49. By the end of 2016 the spillway was about half complete, as you can see in the shot on the top left. The rendering on the bottom

is dated December 17th, 2016, and you can see all of the piers are up off the bay slab, but only a few of them past the halfway point in reaching full height.

Slide 50. By August 2017 nearly all of the piers have reached full height. Preparations are now underway to finish the top lift, strip the forms, and prepare for the installation of the bridge deck.

Slide 51. This shot of the spillway was taken about a week and a half ago. It shows the completed spillway structure. The seven (7) bays are clearly defined and the top deck is in place. You can also see white tarps in the spillway bays providing a heated environment for the spillway gates and guides contractor who is preparing to do their work throughout the winter months.

Slide 52 is a satellite image of the Keeyask site taken in September of 2017. The previous series of slides, I showed you pictures of the powerhouse and spillway, located on this image to the right and on the bottom. They are connected by the central dam, which is the earthwork structure nearly a mile long linking the two (2) structures. The north dam is on the top, running from the powerhouse to the north dike. And the south dam will be on the centre bottom across the south channel linking the spillway

to the south dike.

We have a short video prepared and I will pass off to Dave at this point.

(BRIEF PAUSE)

(VIDEO PRESENTATION PLAYED)

THE CHAIRPERSON: Mr. Bowen, I'm just wondering if this is the appropriate time to take the midmorning break.

MR. DAVID BOWEN: Sure.

THE CHAIRPERSON: Okay. So we'll break for fifteen (15) minutes. Thank you.

MR. DAVID BOWEN: Thank you.

--- Upon recessing at 10:34 a.m.

--- Upon resuming at 10:48 a.m.

THE CHAIRPERSON: Mr. Bowen...?

MR. DAVID BOWEN: Thank you, Mr. Chair. Mr. Strongman has walked us through the project features, construction completed in the past two (2) seasons and the basis of the general civil contractor procurement.

I would now like to spend some time describing our challenges with the construction, the permanent earthworks and concrete and what Manitoba Hydro's done and continues to do, deliver the project at the lowest cost and shortest schedule.

I will focus on what happened during the first months of concrete and earthworks construction. This is a time -- timeline from 2014 to spring of 2017. As Mr. Strongman mentioned during his portion of the presentation, the general civil contract scope includes the construction of all dams and dikes; what we've referred to as permanent earthworks and the concrete portion of the spillway and powerhouse; what we refer to -- referred to as the permanent structures.

A major milestone on any Hydro job is first concrete which signifies the start of a new phase, which is building the powerhouse complex. Almost all work prior to this is in support of the first concrete milestone. Concrete began at the beginning of May as planned. There was actually a small amount of concrete placed in the fall of 2015 to test the batch plant and systems. Besides the work, a senior off-site project review team was assembled to carry out a review of the general civil contract work

in the spring of 2016 prior to first concrete to ensure that our contractor and Manitoba Hydro were doing everything possible to be successful.

Although this team identified areas of potential opportunity, they were not able to predict the soon-to-be-realized under performance. Concrete colonies were measured daily, and it was evident from the start that production was not meeting plan. At first it was believed that a lag in hiring was the source of the problem and the general civil contractor quickened the rampup of craft labour. It became evident in June that although this slowed the initial production, the plan productivity values were not being achieved.

In June, Manitoba Hydro formally requested a recovery plan which, in simple terms, states the contractor is not meeting their schedule and requires a plan back to get to their original schedule. This plan was developed by our contractor and was put into action in June. You can appreciate the contractor needs some time to prove out whether or not their plan can be achieved and demonstrate they've moved through the learning curve and -- and are able to make a marked improvement, which was expected. The rampup of concrete increased the contractor's

workforce from roughly eight hundred (800) people to over fourteen hundred (1400) people in a few months, requiring specialized tradespeople from across Canada.

By the end -- end of July, it was becoming evident that it was less and less likely to occur for the contractor to achieve the original plan.

At the end of August both performance on concrete and earthworks were roughly one-third of where they should have been at this time.

Slide 55. As a result, Manitoba Hydro began to execute a much broader recovery plan which included three (3) parts. The question that needed to be an answer was to determine how do we move forward? Manitoba Hydro -- the Manitoba Hydro project team aggressively pushed our contractor to improve production, as well as developing an immediate and long-term recovery plan. During the fall, a recovery plan strategy was initiated that includes a call to action from BBE's project team, executive sponsors and CEOs. The immediate plan was focused on getting as much work done in the remainder of the 2016 season. This included a winter concrete plan to continue work up to the Christmas break and continue through the winter months.

The long-term plan was focused on what

needed to be done in 2017 going forward. Key work included identify any root causes that are impacting performance; initiating activities to re-forecast the cost and schedule for the project; undertaken an analysis around contractor's claims; supplementing the commercial expertise of our team. These key activities, our own support of helping us understand what to do next.

Slide 56. As noted previously at the end of August, the general civil contractor had achieved one-third of their plan. By the end of the 2016 season they had achieved 41 percent of the concrete plan and 65 percent of the earthworks -- earthworks plan demonstrating improvement, but certainly not where we need to be.

A separate task force was set up to understand the source of underperformance and that would -- then -- then what could be done to cause positive change. Multiple root causes were identified and mitigation measures were -- began to be developed. The main contributing factors were: Aggressive concrete production assumptions from the contractor's bid could not be achieved in the current marketplace; slower than plan progress during the rampup; and challenges that were posed by the geotechnical and

geological conditions which impacted both concrete and earthworks.

In addition to these root causes, it was evidenced that we had lost the schedule advancement opportunity of nearly six (6) months that we had coming into the 2016 season, and that we could be facing a delay of two (2) to three (3) years or more.

Slide 57. This is a summary of the recovery plan implementation. There's a lot of content to -- to digest in this summary so don't feel like you need to read all. It summarizes the winter work plan, in other words, getting as much work done in 2016 and containing over the winter months when no concrete had been previously planned; understanding the root causes and a plan to develop mitigations and implement them; review of commut -- commercial options that I will describe on the next slide; understanding claims and contractor entitlement; key interactions with BBE senior leadership, which includes meetings with BBE ownership, accountable for the delivery of their contract which are titled sponsor meetings at the bottom of the page. And lastly, a re-forecast of the schedule and cost for both the general civil contract, and the entire Keeyask project.

Manitoba Hydro had to answer the fundamental question, which was: What is the most cost-effective way to proceed? Alternatives were developed. Manitoba Hydro sought out industry experts to provide advice and guidance from KPMG for the overall recovery plan; Revay for claims valuation and management; Borden Ladner Gervais LLP for legal support; and finally, validation estimating for project contingency development.

Slide 59. The thorough review of alternatives demonstrated the best course of action was to amend the existing contract with BBE. Alternatives were carefully examined based on the risks and impact to both project costs and schedule, and all alternatives guaranteed a substantive increase to costs, schedule, and risk. More detail on the evaluation will be provided tomorrow at the CSI session.

Slide 60. If we go back to the timeline, BBE was required to prepare an updated schedule, estimate and execution plan at the beginning of December in 2016. Manitoba Hydro and BBE -- BBE carried out a detailed review of the schedule first and cost second in December and January to ensure the most effective plan was developed.

This joint effort included the design change to extend the steel columns that support the walls and roof of the powerhouse nearly 10 metres deeper into the concrete. The net effect, to save the project well over one (1) additional year in schedule.

Slide 61. This slide shows the column extenders. On the left-hand side is the -- was the original design and on the right-hand side is the new design.

Slide 62. After the schedule and costs were developed, Manitoba Hydro and BBE were able to negotiate a mutual agreement that provides gives and takes from both parties. It is important to note that there was already a contract in place between Manitoba Hydro and BBE. Changing that contract required agreement from both parties. Manitoba Hydro could not unilaterally change the terms of the agreement without being in breach of contract. The net result lowered the overall costs and schedule risk for Manitoba Hydro and re-established a reasonable profit that BBE could earn back based on their future performance.

Foundational to the agreement was in alignment of both parties' interest to deliver at the lowest cost and shortest schedule.

Slide 63. An amending agreement

formalized these changes and included the following features: All potential claims for the contractor were erased or wiped clean; new schedule and cost incentive pools were established for BBE to provide them an opportunity to earn these incentives, at the same time, minimize project time and costs for Manitoba Hydro; general administration and overhead, which is a real cost for all businesses was capped for BBE at the new target price; for potential future claims the ability claim was narrowed; and finally, liquidated damages for late delivery were established.

Slide 64. Negotiations were completed in January and followed immediately with the update to the project control budget. The control budget is made up of two (2) basic parts: The base estimate and contingency. The base estimate includes all costs to build the work and is based on a realistic schedule, which does not consider all risks. The schedule and costs are then evaluated by a third-party expert, validation estimating, to deter -- to determine a possible range of outcomes and the P50, P75, P90 levels of confiden -- confidence are shown.

In early 2017, when Manitoba Hydro revised the control budget, the Keeyask project budget with a P50 contingency was selected. This established

an $8.7 billion control budget to ensure Manitoba Hydro's was proceeding with the lowest cost for execution for the project.

Other alternatives were considered at the time, however, considering the completeness of the project, roughly halfway through the many key risks still remaining, the P50 contingency balances potential costs from the remaining risk and provides a challenge to the execution team.

This approach drives the lowest cost delivery and the most efficient outcome. In addition to contingency, low probability high-impact events were examined to include as project reserves, none were included.

Slide 65. This slide provides a summary of the changes to the Keeyask budget and was included as PUB-MFR-122. It shows a variance from our new control budget established in February 2017 to the control budget established during NFAT of $6.5 billion.

Slide 66. Significant changes were made to cause positive improvement in 2017 for both earthworks and concrete. The concrete works were much more complicated. For example, there was more curved formwork than flat formwork. The work was much higher

off the ground and the amount of formwork was over 50 percent more for each placement than the work that occurred in 2016.

Overall, there was a 12 percent increase in concrete volume and a 90 percent increase in earthworks. In addition, the key milestone dates for concrete were achieved, however, despite achieving these milestones, there was a deficit of approximately 20 percent and 25 percent in volume for concrete and earthworks, respectively. And further improvement is required.

Slide 67. This table summarizes the three (3) milestones achieved in 2017, which include the spillway concrete completion, installation of powerhouse crane and in -- in closing the service bay and powerhouse unit 1.

The next two (2) key milestones are on track which include enclosure of units 2 and 3 by February; as well as work complete to divert the rul - - the river through the spillway which will begin in July after the Sturgeon spawn window closes and we could get back on the river again.

This is a photo of the spillway concrete complete in October. The next phase of work is to install the gates, guys and tower and bridge,

which has been underway since October and is on track and was previous -- previously shown by Mr. Strongman.

Slide 69. This photo shows the installation of the two (2) powerhouse cranes. These cranes are required to install the turbine engine area parts.

Slide 70. This is the same photo that Mr. Strongman showed you on December 15th, just a different angle. It shows a service bay on the right and unit 1 which are enclosed with roofing and cladding. On the far left you can see the structural steel for units 2 and 3, which is nearly ready for roofing and cladding.

Slide 71. This is a photo from September showing the nearly completed first 600 metres of the central dam. On the top right of this photo you can see the tie-in to the spillway structure.

Slide 72. We have and continue to work with BBE to continually make improvements going forward. We know that we need to improve performance by a minimum 10 percent in the general civil contract to meet the control budget of $8.7 billion. And there is still risk to go. However, we've seen improvements in excess of 10 percent in 2017 and are confident that

our team will deliver further improvement. Both Manitoba Hydro and BBE have continued to develop plans to cause positive change in 2018 and are actioning those plans as we speak.

We are not stopping there, and Manitoba Hydro has engaged former Hydro contractors to focus on the general civil contract execution and test these plans to ensure that BBE and Manitoba Hydro are doing everything possible to deliver at the lowest cost and shortest schedule.

As we look forward, the main contributor factors for success in 2018 will include: the 2018 winter work and south dike work which will core -- occur over this winter; continuing to learn from past experiences; earthwork foundation preparation is now complete for 2018 and that work is ready to go as we saw on previous photos from Mr. Strongman. The cold eyes review, which I just referred to, will ensure that we have the best plan going forward.

And finally, Manitoba Hydro and BBE's lead continue to drive improvement at their level of responsibilities for the work.

Slide 73. There are key risks that remain on the project. We are at the halfway point in

terms of dollar spent to date and the halfway point for concrete quantity. There are two (2) critical years remaining for concrete and earthworks and more than four (4) years on the project.

Our top risk include successful execution of the general civil contract; loss of site access; work stoppages; unexpected geotechnical conditions. For example, we haven't uncovered the bedrock or the -- where the future south dam will be; and unseasonal weather. We need favourable spring and fall conditions to maximize the concrete window. We need minimal wind days that could potentially stop the crane from -- cranes from operating and minimal wet weather days that slow or stop the earthwork.

Slide 74. Looking at the project as a whole, our current forecast to completion it was with -- is within our control budget and we are currently forecasting the schedule to be four (4) to six (6) months in advance of the control date.

Slide 75. In summary, I'd like to leave -- I'd like to leave you with these thoughts. Manitoba Hydro is capable of the delivery of this project at the lowest cost and shortest schedule and has effective governance. The decision to amend the contract with BBE was the best path forward for the

project, and yielded the lowest cost outcome and shortest schedule. Improvements were made in 2017 which saw BBE achieve the key milestones to provide the shortest schedule. Plans are being actioned to cause a 10 percent improvement or more, which is required to meet our control budget.

I would now like to pass it to Mr. Midford.

MR. LORNE MIDFORD: Thank you, Dave. So in summary, Manitoba Hydro has a number of capital projects underway with varying levels of -- of completion, and the project team is focused on managing the risks for the project. We've incorporated lessons learned from across the projects that we've been involved in up to this point.

I can tell you that there's a strong team in place which we've supported by external expertise as well. We're here to be open and transparent. We've shared as much information as we can with MGF and answered any questions that they've asked of us.

And we want the Panel, the Intervenors the public all to know where we are, what challenges we face and how we're addressing them. So, thank you.

MS. HELGA VAN IDERSTINE: And now Mr.

Fogg's going to address the Bipole transmission reliability project.

MR ALISTAIR FOGG: Thank you. Good morning, Panel. As mentioned, I would like to walk through the Bipole III transmission reliability project this morning.

On slide 2, just a quick presentation outline of what we'll cover related to the Bible III project. First, we'd like to go over what is HVDC or high-voltage direct current. We'll walk through the existing HVDC system that Manitoba Hydro has that Mr. Midford touched on briefly earlier this morning. We'll provide an overview of the Bible III project and what is included as part of that project. We'll then provide a status update on the project, and where things stand from a construction and commissioning perspective on Bipole III. We'll discuss the remaining risks on the Bible III project. And then the presentation will end with a quick video similar to that of Keeyask that provides some better context of the size and scope of the project itself.

So Slide 79. Why do we use HVDC or high-voltage direct current for a Bipole III project? HVDC is, essentially, a bulk transmission method. If you were to look at AC power, you know, as an example

in the left side of the slide would be similar to that of truck transportation or air. Smaller volumes of material to move but move quickly and can execute from a specialized basis.

HVDC or DC power transmission is more akin to transporting materials on large cargo ships or rail. It's a larger bulk transportation method. There is additional infrastructure required associated with that. But in terms of carrying that amount of material or power, it's more efficient.

Slide 80. So for Bipole III why would we choose HVDC? Essentially, the decision comes down to a breakeven cost analysis on the distance the transmission line needs to cover from the source of the generation of power to where you're trying to deliver that power and the station costs difference between an AC power station and a MR. DAVID CORMIE: or HVDC power station. And what you see in the top left-hand corner of the slide is a picture of an existing HVDC converter station, whereas on the right-hand top corner of the slide is an AC switch yard or station. And as you can see, it provide -- there's a different level of infrastructure and size involved between those two (2) stations.

And considering those two (2) costs and

the distance of the line, essentially, between 600 and 800 kilometres of transmission line is the breakeven distance where HVDC is a more an effect -- cost-effective approach to transmitting power.

Slide 81. Recognizing some of that background on HVDC, we'd just like to walk through the existing Bipole I and II systems within Manitoba Hydro's infrastructure. Now, Bipole I and Bipole II provide a link to -- just around 70 percent of the province's generating capacity.

The picture in the top on the left are the existing Bipole I and II HVDC lines. They are constructed in the same right-of-way and as the picture shows, in some instances are essentially beside one another.

Now, in the picture you can see that each set of transmission lines has two (2) wires, if you will, or cables. Each one (1) of those represents a pole and that is why we would use the term Bipole for each one of those lines as they both carry those two (2) cables.

With -- with recognizing that -- that there's 900 kilometres for each of those lines, and they do traverse both difficult terrain and somewhat inaccessible terrain in the north as well, those lines

terminate at a common station which is the Dorsey HVDC converter station.

Going to the next slide, Slide 82. Again, provides just in the -- reference to the province of Manitoba showing where the existing Bipole I and II lines originate in northern Manitoba near Gillam and terminate at the Dorsey converter station. As you'll note, we've essentially represented both Bipoles I and II, with the same line on the graphic as they are that near each other within the same corridor. You can also see on this picture, the location of the Bipole III project, which originates from the Keewatinohk converter station near Gillam and terminates at the Riel converter station just outside the city of Winnipeg on the east side.

Next slide, slide 83. When we look at Dorsey converter station, the terminus point for both of those existing Bipole III -- or sorry, Bipole I and II lines, we need to consider the reliability risk associated with that station. Because it is the single terminus point for those lines, it is susceptible to significant weather events, and in the vicinity of Dorsey, there have been such events in the past. The picture that we've included on this slide is the Elie F5 tornado which occurred approximately 40

kilometres from the Dorsey converter station. A loss at Dorsey could mean the loss of connection to the Northern generation for up to three (3) years to the specialized equipment involved at that station.

Slide 84 speaks to the supply -- potential supply deficit of a loss of either the Bipole I and II line in the winter, or similarly, a -- a loss of Dorsey. What the graphic is essentially showing is that without Bipole III, there would be a supply deficit of approximately 700 megawatts in the system if Bipole I and II or -- and II were lost in the winter of 2020. In comparison with Bipole III in place in such an event, there would be a 1300 megawatt surplus. In the context of -- of 700 megawatt loss, essentially what it would result in is rotating blackouts for about 140,000 homes, even in the event that we had the new 500 kV import line in place.

Slide 85 relates to that same supply deficit and risk, and what this covers is that the maximum percentage of power through a single facility, and by "facility," we would mean the Bipole I and II lines and the Dorsey converter station. Manitoba has the highest percentage of power concentrated in such a single facility for a major network in the world. It can be best described as too many eggs in one (1)

basket. The graphic below compares Manitoba Hydro's current HVDC system against those of China, Brazil and Hydro Quebec, which are also hydroelectric-based operations and then shows the improvement in that concentration when Bipole III goes into service.

Slide 86. Really, as we've outlined in the preceding slides, Bipole III is related to increasing the reliability of Manitoba Hydro's system and providing a second corridor for the Northern generation. Bipole III would address the supply deficit of 700 megawatts that could occur with a loss of Bipoles I and II. It also provides the additional converter facility at the Riel converter station, eliminating the single-point risk of the Dorsey converter station.

The second benefit of Bipole III is it does also provide increased capacity of 2000 megawatts, and Bipole III will -- will allow for Keeyask and the associated power sales to be transmitted. Again, the pictures on these slides are showing the 1997 wind events near Dorsey. There was -- we were lucky in some respects, is that it occurred near the Dorsey converter station, just off of Highway 6, a relatively accessible area to address these damaged towers and restore connection to the Northern

generation system.

Slide 87 provides an outline of what Bipole III actually includes. Starting from the left-hand side of the graphic, the power originates from the generating stations in Northern Manitoba. That power is collected or put on to five (5) 230 kilovolt lines, which are AC power lines, that bring that power from the generating stations to the new Keewatinohk converter station. The Keewatinohk converter station is -- is one (1) of two (2) stations that form part of Bipole III. It is the northern point on the Bipole III project, and it's about eight (8) -- 80 kilometres northeast of Gillam.

At Keewatinohk, the AC power generated from the generating stations is converted to MR. DAVID CORMIE: power for transmission, and is placed on the Bipole III HVDC transmission line. That transmission line is a 500 kilovolt line that is approximately 1,384 kilometres, which covers from Northern Manitoba to Southern Manitoba, and terminates at the Riel converter station, which is just east of Winnipeg.

At Riel, the power is converted back to AC power from MR. DAVID CORMIE: for use within either the system within the southern part of the Province, or for further transmission south. The

other portions not represented in this picture that are important to note is there is a six hundred (600) person construction camp at the Keewatinohk converter station, and additional AC power infrastructure to allow the tie-in to the southern transmission system.

Slide 88 shows a picture of an actual converter station, and I'd just like to walk through some of the components of that converter station to actually show those different pieces and -- and how that functions to bring the power in and execute the conversion. And if we think about this is the Keewatinohk converter station, the power from the generating stations will come in through an AC switchyard, and that's the location where the power is received.

As part of that, we install equipment that are called harmonic filters. As their name suggests, essentially, what they're there for is to filter the AC power that is being received into that station and provide stability. The pow -- the AC power then goes through HVDC converter transformers. There are eight (8) of those transformers at each site, with two (2) spares at each site as well, so a total of twenty (20) of those transformers.

Those converter transformers pass the

power into the HVDC converter building, where the actual conversion from AC power to MR. DAVID CORMIE: power occurs. And the picture that you now see on -- on the slide shows what we would term converter valves, but simply are the pieces of equipment that execute the conversion from AC power to MR. DAVID CORMIE: power.

Once that has occurred, the power leaves the HVDC converter building through a MR. DAVID CORMIE: switchyard, and then is put onto the HVDC transmission line, or the Bipole III transmission line to be sent to the South to the Riel converter station. One unique aspect at Riel that isn't included at the Northern converter station are the synchronous condensers. There are four (4) synchronous condensers at the Riel converter station. They're essentially generators rotating on a horizontal axis to provide stability to the AC system and they're required because we don't have that rotating inertia, if you will, in the South as we do in the North where the conversion occurs right beside the existing generating stations in Northern Manitoba.

Slide 89 provides an outline of the transmission line. As mentioned, the Bipole III transmission line is a 500 kilovolts HVDC transmission

line. There are three thousand and seventy-six (3,076) towers starting from the Keewatinohk converter station to the Riel converter station, and the length -- you'll note I've -- here, it states 1,388 kilometres. We noted earlier thirteen hundred and eighty-four (1,384). Thirteen hundred and eighty-eight (1,388) represents the actual constructed length now of the line as a result of a number of smaller group modifications that had to occur. So from plan distance to actual, there is an added 4 kilometres to for minor route adjustments that have occurred through the course of construction.

The five (5) collector lines, or 230 kilovolt AC lines are the lines that transfer the AC power from the stations and from the -- specifically from Henday and the Long Spruce generating station to Keewatinohk, from those five (5) lines, they total 165 kilometres, and there are three hundred and eighty-four (384) transmission towers.

Slide 90 shows a picture of the Keewatinohk converter station taken earlier in 2017. What you can see in this picture in the foreground is the AC switchyard that receives the power from the collector lines, then just beyond that are the converter transformers and the HVDC converter

building, and beyond the building, just somewhat more difficult to see in this picture are -- is the MR. DAVID CORMIE: switchyard where the power will then be put onto the HVDC transition line, the Bipole III transmission line.

Slide 91 -- slide 91 shows a similar picture, but now with the Riel converter station, and you'll note quite a bit of similarity between those two (2) stations. Again, this -- this shows us somewhat of a closer picture of the HVDC converter building, where the converter valves are housed, and you can see in that picture as well a better representation of the HVDC converter transformers.

Slide 92 is a picture of the Bipole III transmission line, and in construction and stringing of that line itself, this would be more in the southern part of the Province. What you see in this picture along the ground would be matting, which would provide biosecurity to the crop areas. What it allows for is for trucks and the other vehicles to drive across that matting versus driving through the field itself. As they would exit or enter, they would -- the trucks would be cleaned to ensure that there was no contamination across field to field.

The next slide. This outlines some of

the scope of the history of the Bipole III budget. Shown here is the post-license control budget that was established in 2014 of $4.65 billion, and an in-service date of July 2018 -- end of July 2018. Within that budget, it was a complete project re-estimate from the previous budget for the project. It was based on an updated line routing, an Environmental Act license requirements that had been established at that point. There were updated land acquisition costs included within that budget. The key aspect was it established the LCC, or line-commutated converter HVDC technology that was based on vendor pricing that had been received.

Now, the term "LCC" really relates to just the technology type done for that conversion of AC to MR. DAVID CORMIE: , and would be the same technology used at the Dorsey converter station. As a result of that LCC technology, this budget also included four (4) synchronous condensers at the Riel converter station, and included costs for the community development initiative, or CDI that was part of Bipole III.

If we progress to the next slide, this outlines our current control budget for the Bipole III project of $5.04 billion, and it's still remaining at

an in-service date of July 2018. The updates from the previous 2014 budget included actual transmission line construction costs or unit rates from the marketplace, updated transmission line material costs, and some southern route changes. There was further actual land acquisition cost included within this budget, and an increase to the project contingency from a P50 to a P75.

Next slide, slide 95. This outlines the Bipole III status currently. The converter station construction is 91 percent complete at this stage, and the transmission line construction is 84 percent complete. The Bipole III budget is 79 perspent -- percent spent, and is on target, and we remain on target for our in-service date the end of July 2018. At this stage, we have six (6) months of work left to test and energize thousands of components. And as such, right now, we would say the remaining risks are more an impact to schedule versus budget, and I say that largely as many of our contracts contain set dates with our contractors for completion, and liquidated damages or similar mechanisms to address costs if they do not achieve those dates.

So the next slide, slide 96 is a

further update on the Keewatinohk converter station status. At Keewatinohk, all of the HVDC equipment at the site has been installed, and the AC switchyard construction is all complete, and energization of that AC station is now underway. We've also completed the construction of what we would term auxiliary buildings, and those are buildings at the site that provide water for fire suppression systems, and other -- other similar supporting infrastructure.

The next slide is the Riel converter station current status. As with Keewatinohk, all of the HVDC equipment at Riel has been installed. At Riel, the AC switchyard was being expanded versus built from the ground up, and that expansion is complete, and the AC switchyard has been commissioned at Riel. For the Riel synchronous condensers, three (3) of those synchronous condenser units are on site and are under installation. The fourth synchronous condenser unit remains to arrive at Riel, and is just in the final stages of manufacturing.

Slide 98. This is the transmission line current status for Bipole III. Tower and anchor foundation, installation on Bipole III is at 99 percent complete, or essentially complete. With that tower, erection is at 84 percent complete as well.

The remaining focus on the line is tower -- is conductor stringing, and stringing is at 45 percent complete as of January 1st of this year. The transmission line construction will be complete in March of 2018.

Slide 99 provide a bit more context to what we would call the commissioning sequence, or the sequence with which the different pieces of equipment that we've covered are actually brought into service, and then the Bipole III system itself is turned on, if you will. But as I mentioned, at the Riel converter station, the AC switchyard is energized and commissioned already. At the Keewatinohk converter station, we're partway through the energization and commissioning of the switchyard, and by the end of this month, we'll have an operational AC switchyard at the Keewatinohk station.

Following the energization of the AC switchyard, between February and March of this year, we will commission the filters that we discussed earlier that are associated with both HVDC stations as well as the converter transformers, and two (2) of the four (4) Riel synchronous condensers will be commissioned and energized as well within that time frame. Then proceeding further into March of this

year, we will bring into service and commission the
MR. DAVID CORMIE: switchyard at both converter
stations, and commission and energize the converter
valves within both of the HVDC converter buildings.
And by mid-March of 2018, the MR. DAVID CORMIE:
line, or the Bipole III HVDC line, will be completed
as well. So essentially, by the mid-March 2018 of
this year, all of the infrastructure for Bipole III
will be installed, commissioned, and energized, and
the system will be in place that we will proceed to
test.

Slide 100. As we proceed into that
Bipole III commissioning, it's important to note the
steps that have been taken well before the equipment
actually arrives on the site to ensure that when it's
turned on or put into service, that it -- it will
operate as intended. We've installed quality
insurance mechanisms to ensure that the manufacturing
of all this equipment that we're receiving meets our
technical specifications prior to it ever being placed
in service. This includes equipment that is tested at
the factories to ensure their technical compliance
prior to them being shipped from overseas.

Once on site and once installed, each
of those components of our equipment are tested on

site and then subsystem tests, or smaller system tests are executed to verify their functionality before being connected to the Manitoba Hydro network. Finally, once that infrastructure is in place, we will energize the system and conduct numerous tests to integrate the Bipole III HVDC system into our existing HVDC network.

Slide 101. To talk -- to think about integrating Bipole III into the existing system, it's important to note what we're talking about is integrating a state-of-the-art, digitally-controlled Bipole III into a system that was designed and constructed in the mid-1960s, 1970s. So there -- there is some risk that goes with that, and we've -- taken the steps to mitigate those risks. That includes -- we've done a simulation of the operations of Bipole III at the factory level through over two thousand (2,000) tests through the control equipment before it was sent from Germany to Canada.

We will then conduct equipment and subsystem tests at the site. By equipment tests that would mean tests individually testing, say, the HVDC converter transformer. Whereas, a subsystem test would be a test of several components of equipment connected together. We will conduct over five hundred

(500) equipment tests, and four hundred and fifty (450) of these subsystem tests.

Once all that infrastructure has been tested at that level, and as -- in mid March 2018, we'll be proceeding to conduct system testing of the full Bipole III system, that is both converter stations and line. And there will be approximately two hundred and fifty (250) tests of that system together before it's brought into service. Finally, at the end of that there'll be a thirty (30) day trial operation which our contractor has to execute to ensure that the full system can be put into the Manitoba Hydro network.

Slide 102. As I mentioned earlier, there are remaining risks and they're primarily schedule risks. From the transmission line perspective the risks are related to both contractor performance and weather. We're in the last construction season of the transmission line. As noted, the transmission line needs to be completed by March of this year.

Therefore, there is risk related to ensuring that it's achieved both from a contractor performance or productivity perspective and weather. Weather can be both becoming warm too early, and

making it difficult to construct in winter only construction zones. Or if it becomes too cold then it's difficult to actually stand the transmission towers.

From a converter station perspective, the risk is primarily related to the synchronous condensers and their completion. This is very much connected to a delay in transformers related to those syncs and their delivery. This is probably an important point to tell a small story about the kind of risks that -- that the projects can encounter. With these transformers for the synchronous condensers, they were to be delivered from Italy and there is four (4) of these transformers. These transformers were fully manufactured and the first two (2) were prepared to ship, and we were informed by our contractor that they were no longer able to obtain transportation permits for these transformers.

And on further inquiring learned that because of completely unassociated bridge collapses that had occurred in Italy, the government in Italy had decided to cease issuing transportation permits for larger loads until they could assess the source of those collapses and then also work through the responsibility between municipalities and the overall

government of who would be res -- ultimately responsible for issuing such large load permits to allow the transformers to actually make it to the port.

After several months of working through this and developing mitigation plans our contractor, working with the manufacturer and working with Manitoba Hydro, were able to come up with alternatives to barge these transformers down local rivers and actually get to the sea transportation port which minimized the number of permits that ultimately had to be maintained. And they worked with each local community to obtain those -- that smaller number of permits. It was probably about a three (3) month delay, but ultimately it was mitigated to the point that it does not impact the in-service date of Bipole III.

Finally, from a schedule risk perspective is commissioning, and there is six (6) months of work to test and energized these over thousand components. And there is risk that some of those components still do not operate initially as intended. And we do have mitigation plans to address that as well.

So we'll just show a short video of

Bipole III that shows you both the converter stations and the transmission line and some of the infrastructure in its current state.

(VIDEO PRESENTATION PLAYED)

MR. ALISTAIR FOGG: So slide 104. In conclusion, construction is on schedule, and we are on schedule to be in service by July of this year. Budget is tracking to the control budget of 5.04 billion. This will be an asset that is in operation by the end of this year and will be part of the upcoming fiscal year as an asset in operation, and thus the capital cost will begin depreciating for the Bipole III asset this year.

Thank you. I'd just like to pass it over to an update on the MMTP project.

(BRIEF PAUSE)

MR. DAVID CORMIE: Yeah, I think for clarity we're going to do the GNTL project first. Dave, do you have the slides there for that?

(BRIEF PAUSE)

MR. DAVID CORMIE: Thank you. Thank you, Mr. Fogg. Good morning, panel. This section of the presentation will be on the Great Northern Transmission Line. Unfortunately, the bar has been raised and I won't be able to provide you with a video.

First, as background I think it would be helpful for me to explain the overall 500 kV Manitoba/US interconnection project, its components, its purpose, and how it fits into the -- the big picture. The new interconnection is a crucial part of our development plan to meet the future electricity needs of the province. The plan at its core involves the construction of Keeyask, the new interconnection, and several long-term firm export sales to US and Canadian utilities support the plan, improving its economics, reliability, and robustness.

The new interconnection consists of two (2) component transmission projects. In Manitoba the line being built by Manitoba Hydro is the Manitoba Minnesota Transmission Project, and Mr. Penner will speak to the project shortly. However, in Minnesota the Great Northern Transmission Line project is being built by Minnesota Power. In total, the capital cost for these two (2) projects is approximately $1

billion.

(BRIEF PAUSE)

MR. DAVID CORMIE: So slide 3. So what's the purpose of the new interconnection? From an import perspective, the interconnection will increase our firm import capability from 700 megawatts to almost 1,400 megawatts. To put that additional firm import capability into context. that additional megawatts apply capability from the United States is 25 percent greater than the new capacity that is being added to the system by the construction of Keeyask.

The new import capacity will allow us to access MISO market energy when needed in perpetuity. The new import capability will improve energy security during droughts. As a result, it will defer the need for additional dependable energy supplies in Manitoba in the future by as much as the construction of Keeyask will. The line will also improve day-to-day emergency response and system reliability, as we are strengthening our connection to the entire North American electric grid.

Immediately once it goes into service the line will reduce the cost of low water and drought

to Manitoba Hydro. We will be able to buy significantly more energy at off-peak prices than we currently can. And the prices that we pay for purchased electricity at the border will improve as they will be more aligned with market prices seen in Minneapolis. These benefits will improve Manitoba Hydro's cost structure in perpetuity.

From an export perspective the interconnection will increase our export capability to the United States by 50 percent, from about 2,100 megawatts to about 3,000 megawatts. This increase will allow us to export more electricity, adding to Manitoba Hydro's income in higher water periods. As well, additional revenue will also be earned as a result of the line, because more of our surplus energy will be sold at on peak prices. In addition, export revenue will improve in almost all years as export prices at the border will be closer to the prices seen at the market in Minneapolis.

And lastly, additional firm export revenues will be generated each year, as firm export sales will not have to be interrupted during the routine interconnection outages we experience, as is now the case. And finally, the Great Northern Transmission Line will increase market access into

Wisconsin from about 100 megawatts that we currently have to 600 megawatts. And that will increase bilateral opportunities to a larger US customer base.

Slide 4. The Great Northern Transmission Line involves a forty (40) year deal with Minnesota Power, the foundation of which is the fifteen (15 year), 250 megawatt multibillion dollar power sale agreement. The deal is a complex arrangement involving several agreements between Manitoba Hydro, its subsidiary 6690271 Manitoba Limited and Minnesota Power. These cost-sharing agreements cover construction costs, property and capital taxes, operating costs, and sustaining capital.

As is it's not a Manitoba Hydro project, the construction cost contributions payable by 669 are not in Manitoba Hydro's capital expenditure forecast. However, they are included in the IFF. The cost will be capitalized as an intangible asset and amortized out over forty (40) years. To these annual costs are added 669's ongoing share of GNTL taxes and operating costs, and all of these costs are included in the IFF.

What is important from a risk perspective is that Manitoba Hydro is ultimately

responsible for the majority of GNTL costs, 72 percent. And that -- and given that, most of the costs are incurred during construction. Now is the time during which we need to be most vigilant and active in protecting our interests, and we are doing that to our subsidiary 669.

Slide number 5. Manitoba Hydro established its subsidiary 669 for US tax and liability reasons related to the project. This company is responsible for representing Manitoba Hydro's interests in the development and construction of the line. It raises the capital it needs by issuing shares to Manitoba Hydro.

The GNTL is being built under a facilities construction agreement between Manitoba Hydro, the Midwest independent system operator, and Minnesota Power. The facility construction agreement commits Minnesota Power and 669 to pay for the up-front construction costs of the line.

The other significant agreement is the construction management agreement between Minnesota Power and 669. This agreement appoints Minnesota Power as the construction manager with the responsibility to physically build the line. Importantly, though, it establishes a governance

structure for project decision-making that gives 669 significant oversight and control through consultation and ultimately veto rights, with the independent advice and help from an oversight engineer.

This is slide 6, and it illustrates the governance structure of the project. At the bottom on the left-hand side you can see Minnesota Power is the construction manager. The construction manager reports to the management committee, which has one (1) representative from Manitoba Hydro's subsidiary 669 and Minnesota Power.

The management committee has approval responsibilities in preconstruction, contracting, bidding, and construction areas. The independent third-party engineer also respor -- also reports to the management committee. Should there be a dispute at the management committee, the issue is raised to the executive level. If not resolved there the issue goes to binding arbitration.

Slide 7. As we sit here today, Minnesota Power is active in construction in northern Minnesota with a workforce of over four hundred and fifty (450) people working on all segments of the line. All major permits and approvals are in place. As a large portion of the right away is through very

remote and wet terrain, the project is dependent on favourable winter constriction -- construction weather to minimize access costs. As a result, the project has -- has built an extra year into the schedule to provide for the option of delaying work if a mild winter occurs.

So far, the winter weather conditions have been ideal and significant process is being made on clearing and foundation work. The project is on schedule for in-service on June 1st, 2020. To date the project is on budget with approximately 10 percent of the funds spent. Manitoba Hydro has the expectation that the project will be under budget given the conservative nature of Minnesota Power's budgeting process.

With that I'd like to turn the mic over to Mr. Penner who will now speak about the Minnesota Manitoba transmission project.

(BRIEF PAUSE)

MR. GLENN PENNER: Thank you, Mr. Cormie. Good morning, panel. I would like to take a few minutes to explain a few more details around the Manitoba portion of the project, and as Dave explained

we call the Manitoba portion of the project MMTP or Manitoba Minnesota Transmission Project.

The control budget for the MMTP is $453 million based on the final preferred route, the current schedule, and in service of June 2020. The picture shown here on this slide is the existing 500 kV transmission interconnection. The new line will look very similar using latticed steel structures.

The project consists of 213 kilometres of 500 kV line and modifications at three (3) stations: Dorsey, Riel, and Glenboro. The line begins at Dorsey and follows the existing corridor south of Winnipeg and east almost to Vivian where it takes a southeast path towards the RM of Piney where it crosses the international boundary.

Station modi -- modifications consist of the following: Dorsey, a500 kV line termination to connect the 500 kV line into the Manitoba Hydro system; at Riel, an additional transformer bank will be constructed; and at Glenboro phase shifting transformers and realignment of the transmission line. Glenboro is connected into Rugby, North Dakota, and is another interconnection. This phase shifting transformer is required to move power into the US once the MMTP project is in service.

The 500 kV line can be broken down into two (2) portions. The first is 92 kilometres on existing Manitoba Hydro owned corridor. It's beside other transmission lines. And the second is 121 kilometres in new right-of-way. The existing corridor will contain all self-supporting structures. The new right-of-way will contain approximately 50 percent of self-supporting structures and 50 percent of guide structures. Guide towers are used primarily in nonagricultural and in wetlands. Self-supporting structures are used primarily in agricultural land where a smaller footprint is required to access around the structures.

It is important for project success to have a project execution plan. The plan will define roles and responsibilities for the project and how Manitoba Hydro will deliver the project. The picture on this slide is of a Bipole transmission project during the stringing operation. The Transmission Projects Department at Manitoba Hydro is responsible for project management, which includes preparing and coordinating estimates, preparing schedules, and capital justification documents. They will be responsible to manage the ongoing activities to coordinate design and construction through project

completion.

The Transmission Design Department at Manitoba Hydro is responsible for the design of the overall line, including structures and foundations. They are also responsible to develop all of the drawings, and tender all of the material required for the transmission line.

The Transmission Construction Department at Manitoba Hydro is responsible to put together the construction tender and then oversee the construction and ensure that the contractor hired constructs the project according to the design and meets the requirements and conditions of the environmental license. Station modifications will be designed within Manitoba Hydro and then the majority of the construction work will be completed by an external contractor.

The 2013 budget for the project was $350 million, which was revised to 453 million in 2016. There are a number of factors that influenced the decision to increase the budget. At the time, routing selection was complete, allowing a better estimate of required towers and tower types.

There -- there was an increase to self-supporting towers and a decrease in guide structures

which resulted in a cost increase. Modifications to the phase shift transformers at Glenboro was that an increase to the cost. We updated the market prices based on results that we received from Bipole III, and so it reflected our most recent tender prices. And the estimate was increased from P75 probability estimate, which means that it has a 75 percent chance of being at or below the $453 million estimate.

In the transmission projects group at Manitoba Hydro, we are continually improving and adjusting how we do things based on past experiences. Bipole III is the latest project, which has been under construction for the past five (5) seasons. Prior to Bipole, the team was responsible for the construction of Wuskwatim transmission as well as Herblit transmission projects in the past ten (10) years.

Direct lessons learned, including changes to the routing methodologies, improved indigenous engagement, inclusion of bio-security in Bipole III and in MMTP, evaluating and changing how we do contracting models as well as construction methods. And we've also had opportunity to share some of these lessons learned with Minnesota Power and their GNTL project.

So where we are and where we've come

from. So between 2012 and 2015, we were involved in the environmental assessment and the public engagement process. In 2013 we received an Order in Council issued by the province to proceed with -- with the environmental assessment. In 2014 NFAT recommended this project to proceed. In 2015 we filed our environmental impact statement with the province. In 2016 we filed the application with the National Energy Board.

In 2017 we went through the clean environi -- sorry, the Clean Environment Commission hearing and review. In 2016 and 2017 we started detailed design, material procurement, and currently we are 10 percent of the budget spent, approximately $44 million. In 2017 we started property acquisition. In 2018 we will go through a National Energy Board hearing and review, and we anticipate a provincial license decision sometime in 2018. And we are estimating construction sar -- start sometime in 2018 or '19, depending on when we received regulatory decisions. And we have a June 2020 in-service date.

I will now pass the presentation back to Dave.

(BRIEF PAUSE)

MR. DAVID CORMIE: Thank you, Mr. Penner. This will be the last presentation, and it will be on the Manitoba/Saskatchewan transmission project. The need for a new transmission line between Manitoba and Saskatchewan is the result of an agreement reached in 2016 between Manitoba Hydro and SaskPower for the sale of 100 megawatts of system power. We first advised the Public Utility Board of the sale and the need for the line following the signing of the term sheet in September of 2015.

Energy deliveries will commence on June 1st, 2020, and will continue for twenty (20) years. To put the sale in perspective, it will require the equivalent of 18 percent of the capacity and 13 percent of the average energy production from Keeyask.

MS. HELGA VAN IDERSTINE: Mr. Cormie, can I just stop you for a second? Thanks. Does the panel have the presentation? Okay. Thanks.

MR. DAVID CORMIE: As the majority of the existing firm export capacity to Saskatchewan is reserved for other uses, transmission studies indicated that an additional transmission line was needed to make the sale feasible. The current schedule indicates that the in-service date won't be until June 1st of 2021, for that line which is a year

later than the date when SaskPower needs the capacity and energy.

In the meantime, if the new line is actually delayed by a year the agreement allows for partial delivery using interim firm transmission service that's available to both companies. We are working on plans to ensure that as much of the hundred megawatts of capacity can be made available on June the 1st of 2020 as possible. In its review of the Saskatchewan sale agreement and transmission project, the Board's independent advisor, Daymark, has concluded that both the contract and the transmission line project remain economic.

In Manitoba, Manitoba Hydro will be responsible for building the Birtle transmission project. It's a relatively small project in comparison to Bipole III or the MMTP project. From a licensing perspective, it's a class 2, and Manitoba Hydro is engaged in significant public consultation for the line. The cost, based on a 2015 estimate, is $57 million.

Thank you. That completes my testimonial. I'll now let Mr. Midford summarize today's presentation.

MR. LORNE MIDFORD: Thank you, Mr.

Cormie and thank you to the Board for giving us the opportunity this morning to give you an update on all five (5) of these projects. I've had in my career the opportunity to work with each of these panel members in some way or another, and I can tell you that we are very, very fortunate to have this level of expertise working on our projects.

For all five (5) of these projects a common thread for all of them is that we're committed and -- and some might even say driven to providing these projects at the lowest cost possible, because we know that's the expectation of everybody in this room, and also of our customers as well.

For Keeyask, we are projecting to be on budget and on schedule. We're still four (4) ways away from being in service. And at this stage in the project we think it's appropriate the numbers that we've put forward for our control budget and schedule. We don't believe it's appropriate to overstate those potential costs and to reflect that in the rate base this early.

For Bipole III, as you've heard, we're on schedule and on budget for in-service July of this year. And, of course, that will impact the '18/'19 financials.

For MMTP we're on budget, with a projected in-service date of June of 2020. The Great Northern Transmission Line, you've also heard that the budget may be high, but we are on schedule at this early stage to meet the in-service of June of 2020.

And for the Saskatchewan transmission project, the budget is currently under review and our current in-service is June of 2021.

That concludes our presentation this morning, and if it's appropriate, I'd like to open it to questions.

THE CHAIRPERSON: Thank you, Mr. Midford. In fact, we'll take the lunch break at this moment. We'll break for lunch and return at one o'clock. Thank you.

--- Upon recessing at 12:06 p.m.

--- Upon resuming at 1:03 p.m.

THE CHAIRPERSON: Good afternoon. We're going to have questions from the Panel, Ms. Kapitany, I understand you wanted to proceed?

THE VICE-CHAIRPERSON: Thank you, Mr. Chair. I have a couple questions. One was alluded to by Mr. Strongman who is -- back in the front row. It

was around labour productivity, I believe. You talked about productivity having declined over the last number of years. I just wondered if you could talk a bit more about that. It seems counterintuitive that productivity would've declined.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: So the remarks that were made -- I believe I made reference to productivity having declined in the last twenty (20) to thirty (30) years. The first thing to consider is that the remarks are made in reference to Keeyask, and there was a large gap in time between Manitoba Hydro's last generating station project that was a Conawapa -- excuse me, the Limestone project initiated in the '80s and completed in 1990 -- '92 I believe. And then the next station that was Wuskwatim started in 2006 and completed in 2012 and that fifteen (15) year gap led to a lot of people leaving Hydro industry following the completion of Limestone and not having generating stations on the books in terms of construction projects throughout Canada, actually, not just here in Manitoba, there was a gap in experience and -- and knowledge within Hydro construction.

So specific to productivity on Hydro stations that that's one (1) of the points. And the second is generationally the productivity issues are very different from the previous generation to now, with a wide range of more socioeconomic based explanations behind that. Higher regulatory obligations with respect to environment and -- and safety that has had an impact on productivity and something as simple as every person having an iPhone and not necessarily keeping it off until break time.

THE VICE-CHAIRPERSON: We call it NFAT. We did talk about the lessons learned from Waskwatim and some of those lessons -- Mr. Bowen, I think it might've been you spoke about that. Some of those lessons were then to be transferred to Keeyask.

Could you speak about that a little?

MR. DAVID BOWEN: Are you -- are you asking lessons learned specific to labour productivity?

So -- so in Wuskwatim, I think Jeff -- Mr. Strongman was trying to give us the context of the overall marketplace, and -- and not only in -- in the -- the type of work that happens on a generating station which is a heavy formwork type of work where there's many erosion of productivity that's happened

right across Canada. But the same erosions happen if you look and studied the offshore gulf oil and gas work. It's -- it's the same erosion that's happened from the '80s onwards and it's -- it's -- it's at least a decline by half of the productivity was achieved.

But in terms of -- to your question about lessons learned Wuskwatim, the challenges we had at Wuskwatim were around the attraction/retention of -- - of qualified craft labour and it was really in the generating station build phase. So, the time where we were doing the work we showed in the last two (2) years at Keeyask so the -- the -- constructing the concrete, the formwork, et cetera, and -- and a lot of back in the Wuskwatim time and just go back in -- in -- - in history a little bit is that the Canadian marketplace was very hot and there was a great deal of competition right across the country for labour and -- and when you work at an isolated fly-in/fly-out facility, that -- it's -- it's -- that stress and strain on the marketplace is accentuated.

And so at -- at Wuskwatim we had -- our contractor had challenges with getting really good people there and keeping them there and, to some extent, we haven't had those same challenges at

Keeyask. We've had -- the execution challenges we've had at Keeyask are -- are -- are different and the same.

The -- the mitigating measures we put in place -- when we talk about attraction/retention is one of the first things we did for Keeyask back in 2014 was we actually did a study across all remote northern projects about the -- the labour piece. How much -- how much money is a craft labour worker going to put in their pocket on a weekly basis as they make the decision to either come to a job or stay. And -- and so we actually have a retention bonus that equalized -- raised the Manitoba rates which were the lowest in the country under the Burntwood Nelson Agreement to -- to something better. It wasn't the same as Alberta but it was better and it has an incentive to keep people here. That's one -- one mitigation.

I think other mitigation was this early contractor involvement process to -- to award the -- the scope as -- as Mr. Strongman stated for the earthworks and the concrete together as -- as one (1) contract that wo -- that scope was broken up during the Wuskwatim contract and it -- it was to allow the contractor almost two (2) years to plan out the work

for the concrete, understand the marketplace and -- and -- and get ahead of the potential risk for not only attracting but retaining or training staff.

So those are -- those are two (2) mitigation measures in place that we -- that we put in place. Probably some of the most significant in terms of the strategy piece, in terms of the effectiveness while they haven't -- I guess from a Manitoba Hydro perspective, they haven't been as effective as -- as we had originally planned them to be.

THE VICE-CHAIRPERSON: Thank you. My second question is for you, Mr. Midford. It's from the last page in the slide deck that you presented this morning, under the Keeyask generating station section.

You've got a bullet in there that says:

> "Several opportunities to reset for ratesetting purposes, if necessary."

You didn't speak to that bullet. Could you expand on what you meant by that?

MR. LORNE MIDFORD: What I meant -- so Keeyask in -- where it's at in terms of its phase of execution, there's four (4) years left until it's in-service, and we believe that -- there's a lot of talk about different classes of estimate, P50, P90, P75.

So I -- we believe that the P50 properly reflects the level of contingency at this phase in the project and that that level of our control should be reflected in terms of rate setting.

And the -- as the project continues if there is a requirement to revisit that, then they'll be those opportunities down the road. That was the point of that.

MS. HELGA VAN IDERSTINE: Ms. Kapitany, I think Mr. Strongman wanted to expand on the -- his answer after -- with respect to the first question you asked so if you don't mine.

MR. JEFF STRONGMAN: One (1) thing I would like to add is when we were talking about the -- the generational difference in productivity. One (1) of the key pieces of comparison is the -- the duration of rotation. A crew rotation going in and out of a remote site, historically, has been considerably longer than what current industry norms are. In previous projects that Manitoba Hydro has undertaken decades ago, thirty-five (35) days in a row and forty-two (42) days in a row were normal durations at site. And in the current environment that we're building Keeyask fourteen (14) and seven (7) and twenty-one (21) and seven (7) are the normal rotations.

So on a fixed period of time you have people away longer and greater travel expenses to get them back and forth from home and the -- the job site. So that, again, has an impact on group continuity and another things that erode productivity. Thank you.

THE CHAIRPERSON: Ms. McKay...?

BOARD MEMBER MCKAY: Just trying to understand the person hours that are listed because some are listed in person hours, some are percentages and wasn't quite sure what the total number of person hours was but you indicated on a later slide.

I just wanted to find out about the Indigenous employees, you have 4 million person hours listed, does not include the 2 million person hours for the KCN members?

MR. JEFF STRONGMAN: I -- I believe the -- the numbers that had been provided in the section of the Keeyask presentation that I provided had covered 15 million person hours to the end of 2017, of which 2 million hours were performed by our KCN partners and of which a total of 4 million out of that 15 was performed by Indigenous people.

BOARD MEMBER MCKAY: So let's 2 million plus the 4 million; is that what you're saying?

MR. JEFF STRONGMAN: Pardon me, I think it's slide 25. I'd just like to double-check with the reference.

BOARD MEMBER MCKAY: Yes, it is.

MR. JEFF STRONGMAN: Yes. So slide 25 shows 2 million person hours worked by our KCN partners, our members, and 4 million by the Indigenous employees of any location throughout Canada.

BOARD MEMBER MCKAY: Okay. So that's 6 million in total for Indigenous employees?

MR. JEFF STRONGMAN: Yes, the two is part of the four. Sorry, I wasn't sure that's what meant.

BOARD MEMBER MCKAY: Yeah, I kind of thought that. So, amongst your three (3) groups, there for Indigenous employees, all Manitobans and others? Your Indigenous employees would be the lowest number of person hours, correct?

MR. JEFF STRONGMAN: Sorry, I don't think I understand your question.

BOARD MEMBER MCKAY: Well, the question is, you have 73 percent total hires are Manitobans?

MR. JEFF STRONGMAN: That's correct.

BOARD MEMBER MCKAY: Okay. And 27

percent, I would presume are from outside of Manitoba?

MR. JEFF STRONGMAN: That's correct.

BOARD MEMBER MCKAY: That's 73 percent, I think works out to -- well, it's a total of 10,000 -- 10 million 50,000 so your Other would be 4 million 50,000 and your Indigenous employees would be six thousand (6,000) in total; if I was reading that right.

But it -- it might actually even be lower than because I was assuming that the Indigenous employees -- that the KCN members were not part of the 4 million, you were accounting for -- for Indigenous employees.

I'm just trying to clarify whether the Indigenous population has the lowest number of person hours on the site.

MR. JEFF STRONGMAN: Okay. Let me try and provide some clarification. On slide 28 we've stated that 15 million person hours have been worked on the project to the end of 2017 by all peoples.

Of those fifteen (15) 73 percent of them are Manitoba hires. That doesn't actually refer to the number of hours worked by Manitobans, but it's saying that for everybody hired on this job 73 percent of them have been Manitoba.

So I can't answer your question mathematically the way that you're asking it because we don't have the number of hours worked by the 73 percent of the employees ever hired. I think what you're trying to do is take 73 percent of those 15 million and say roughly 10 million. And then what percent of those are by the KCN and -- and Indigenous but we haven't calculate it that way and I can't confirm that that math is correct.

BOARD MEMBER MCKAY: Can we get an undertaking on that?

(BRIEF PAUSE)

MR. JEFF STRONGMAN: Could you clarify what the undertaking would be?

BOARD MEMBER MCKAY: The breakdown of person hours for the 15 million person hours.

MR. JEFF STRONGMAN: Yes.

--- UNDERTAKING NO. 52: Manitoba Hydro to provide a breakdown of person hours for the 15 million person hours.

BOARD MEMBER GRANT: Can I just get a -- I think it's about the Bipole. I think it's slide 19 of the Bipole slides, sorry.

Now, you mentioned in-service date of July 2018. I was just comparing that to the last bullet where it's a -- whatever risks remain they're about scheduling as opposed to budgets.

So I guess it's two (2) questions. One: What is the risk of not hitting the in-service date of July 2018? And the second one it's just -- it's the juxtaposition of schedule and budget and I'm wondering if these are completely independent of each other. If you miss the in-service date, are there any budget implications whatsoever?

I understand with the generating station there are obvious ways in which a delay affects the budget but, in this case, are there any economic costs to not hitting that in-service date?

MR. ALISTAIR FOGG: Well, I think to -- to probably answer part 1 and part 2 of your question is -- both of those are and, really, in fact related to another.

So, if you would look at the comparison between budget impact and schedule impact, certainly, a project such as Bipole III from a cost-impact

perspective were it to come into service later, would have additional costs, for example, related to interest and escalation or carrying costs before it was capitalized; very similar to a project such as Keeyask would have.

Where some of that may differ from a cost perspective is depending on contract model or contract type. For example, if converter station contracts would be in -- in the fixed-price arrangement, that contractor would still have -- be executing that under the same costs so there wouldn't be their overhead -- additional overheads for those additional time, plus they may be subject to penalty for being delayed, depending on the contract.

BOARD MEMBER GRANT: So if there is any -- so I guess going back to the first question then: What is the risk of not hitting the in-service date and then some order of magnitude or proportion of -- what would be the budgetary consequence; minor, large, sign -- you know?

MR. ALISTAIR FOGG: So in -- in terms of risk of not hitting in-service date, I guess, broadly speaking, the first risk starts to become continued exposure to reliability issues that we've been exposed to to date related to outages on Bipole I

and II or she's at Dorsey. That -- that's what I would say is the -- the primary risk of not achieving the in-service date with Bipole III and extending that -- that risk out as time goes by.

Risks of not hitting that in-service date, otherwise, would -- really would be a balance between those -- those overhead -- sorry, interest and escalation costs counted against any potential amounts we can recoup from contractors for that.

BOARD MEMBER GRANT: Sorry, I wasn't clear in my question. What's the probability that you won't be ready to go by July 2018?

MR. ALISTAIR FOGG: I wouldn't have a specific probability assessment around that date; that being said, certainly based on where we stand right now construction progress wise and -- and the commissioning plan in place, we have a high degree of confidence of achieving that.

There's numerous months to allow for testing and potential issues that could arise during testing and to address those within that timeframe that we're working from today to July 2018.

BOARD MEMBER GRANT: And -- and if you were a month late, beside from interest and escalation, significant economic costs or --

MR. ALISTAIR FOGG: No, I would say in -- no, not significant. It would be some additional internal costs, project management costs. But again, I think we would be looking to recuperate some of that as well.

BOARD MEMBER GRANT: Okay, thank you.

MR. DAVID CORMIE: And, Dr. Grant, one (1) of the benefits of Bipole is the reduction of losses associated with Bipole III. And I'm -- I'm not sure what the megawatt amount was; something less than 100 megawatt. So, the earlier Bipole III comes in; the more power will be available for export.

If you used a thirty dollar ($30) a megawatt hour for a month would be a -- be a couple million dollars of -- of -- of reduced income that we had in the IFF associated with an in-service date of July. Let's say it was in-service date of August, that one (1) month of delay would mean that we would have less export revenue.

BOARD MEMBER GRANT: And sorry, that's because of less transmission loss?

MR. DAVID CORMIE: Losses, yes.

BOARD MEMBER GRANT: Okay, thank you.

MR. DAVID CORMIE: The -- the -- with Bipole III in-service, the MR. DAVID CORMIE:

transmission system is more efficient.

THE CHAIRPERSON: I have a few questions. I don't know who -- I'll just throw them out and whoever wants to answer them can answer them.

Bipole III you show a budget for 2016 of five billion 42 million (5,042,000,000) is that P50 or P75?

MR. ALISTAIR FOGG: That's P75.

THE CHAIRPERSON: Okay. MMTP 216, budget of 453 million. Is that P50 or P75?

MR. ALISTAIR FOGG: That's at P75.

THE CHAIRPERSON: Okay. Keeyask 8.7 billion is P50, correct?

MR. DAVID BOWEN: Correct.

THE CHAIRPERSON: We have evidence in this hearing that P90 is 9.6 to 9.9 billion, depending on the -- the delay, correct?

The evidence was if it's twenty-one (21) month delay it's 9.6 billion, if it's thirty-two (32) month delay it's 9.9 billion; that was -- that was put forward by Mr. McCallum.

MR. LORNE MIDFORD: Okay. From a project perspective, the 9 -- are P90 is 9.6.

THE CHAIRPERSON: Okay.

MR. LORNE MIDFORD: With -- with that

corresponding twenty-one (21) month delay.

THE CHAIRPERSON: Can you explain to me why -- so in your budgets then -- can you explain to me why certain things are shown in your budgets as P75, and other things, are shown as P50?

I'm having trouble understanding why Keeyask is shown as a P50, but these other projects are shown as P75.

MR. LORNE MIDFORD: I'll -- why don't I take a first crack at that and I'll leave it up to other panelists to -- to provide project-specific answers.

When a P50, P75, P90 estimate is developed, it's based on the risk assessment, various risks. There's a risk register for each of these projects given where they are at any given point in time, and each of those risks has a level of probability, and if you can think of it as a -- kind of a distribution curve as such.

So -- and then based on that, there's a mathematical analysis, Monte Carlo analysis, of all of those different permutations, commutations of those probabilities to derive what is perceived to be a P50 level estimate, P75 level, or a P90 level estimate.

So it's really a reflection of the

risks of each of the risk elements within each of the projects. And quite often it's based on understanding of what those risks are and exposure of those risks with -- for each of the different projects.

So for Keeyask, for instance, where we're at in terms of -- about 50 percent spend, and about 50 percent of the concrete that's been placed. With the risks moving forward and four (4) years of construction still ahead of us, we feel that the P50 is appropriate for where we're at in the project at this time.

These other -- some of the other projects are further along, and some of those risks and the risk profiles have changed as they get closer to -- to the in-service date or -- and so that -- so they do their own analysis and develop their own risk profiles.

THE CHAIRPERSON: Mr. Midford, do you have the geotech for the south dam? My understanding is you are still waiting. There's a -- there's a slide, I'm not going to look at it, that talks about that being one (1) of the biggest risk factors is that -- you haven't done the geotech for the south dam.

MR. LORNE MIDFORD: Yeah, the geotech underneath the existing waterway.

THE CHAIRPERSON: Right. So how is it a P50 then if you've got that kind of risk? I'm just -- I'm trying to figure out -- I understand the P50 and the P75 and it deals with risks and risk assessments, but you've identified the geotech as being one (1) of your biggest risks, but the budget given to us is still on a P50.

MR. DAVID BOWEN: I -- I'm going to try and answer the question.

THE CHAIRPERSON: Okay.

MR. DAVID BOWEN: I think you're asking the -- I'll -- I'll take a step back. So the -- the P50 value whether or not the geotech risks exist to the south dam and whether that quantum is 10 million or $100 million, that's what would vary based on the level of confidence. So knowing that that risk occur -- is -- is there just, for example, if that risk value at a P50 was $100 million, at a P75 the value carried in the budget would be something like, say, $140 million and a P90 would be something like $190 million.

So the -- the risk exists there, it's just -- it's how much money we -- we would carry in the budget at -- at a different confidence level. So I'm not sure if that answering your question.

THE CHAIRPERSON: So if you're -- if the geotech has a worst-case scenario, what you're saying is you've already assessed what that would be and relate that to the overall budget and determine whether it's P50 or P75?

MR. DAVID BOWEN: I guess -- almost. What -- what I'm saying is that we know that risk exists, that the amount -- the risk is the probability of occurrence times the impact.

So at a P50 level if the dollar amount in our budget would be the least amount and as we would increase in confidence of not overrunning, it would -- the dollar value would be higher. So that risk event, it's the same risk event that's carried but the dollar amount is higher as we move up from a P50, 75, 90, et cetera.

THE CHAIRPERSON: Okay. Can we --

MS. HELGA VAN IDERSTINE: Before we move on, I think that Mr. Penner might want to comment on --

THE CHAIRPERSON: Okay.

MR. GLENN PENNER: MMTP we do -- we're carrying a P75 estimate currently for it. And I guess the question could be begged that we are not as far along as Bipole III. However, given that we're

working on the heels of Bipole III, we are very confident in what our construction contracts will be and tower steel prices are -- are -- have been pretty stable. So we feel that the P75 estimate is -- is something that -- that -- that makes sense to present at this time where it is in the project.

THE CHAIRPERSON: Thank you, Mr. Penner. Could we go to page -- I have it as number 10. I think it's probably 86. We're using different page numbers. No, sorry -- yeah.

This makes reference to 1997 Wind Events near Dorsey. Was that at -- at a level of an F5 or was that less than an F5?

MR. ALISTAIR FOGG: I don't believe it was specifically a -- a tornado event --

THE CHAIRPERSON: Okay.

MR. ALISTAIR FOGG: -- that occurred but it was -- it was a wind event, essentially, a large wind event that caused that issue.

THE CHAIRPERSON: Okay. And this is Bipole tower that went down? The mangled tower on top, is that a Bipole tower?

MR. ALISTAIR FOGG: Correct that wasn't -- that was in 1996 I believe.

THE CHAIRPERSON: Seven it says.

MR. ALISTAIR FOGG: 1997. And yes, there were nineteen (19) structures on both Bipole I and Bipole II that -- that came down. It was in September and it was a wind event that Environment Canada referred to as a microburst. They did not refer to it as a tornado.

THE CHAIRPERSON: And do you know how far from Dorsey it was?

MR. ALISTAIR FOGG: It was -- it was right at Highway 6 so it was probably 10 kilometres north of Dorsey, kind of in that range, little bit less.

THE CHAIRPERSON: Okay. Maybe you're the one to ask then, Mr. Penner, on page 83, the F -- that's an F5 tornado. It says:

> "A loss at Dorsey could mean loss of connection to northern generation for up to three (3) years."

This was 40 kilometres from Dorsey. I assumed that if it gets that close to Dorsey we're looking at a major problem not only for the lines, but for Dorsey itself; is that correct?

MR. GLENN PENNER: If a tornado were to be a direct hit to Dorsey, there -- there would be major damage. It would be -- it's hard to predict how

much damage, but -- but Dorsey is a very critical piece of infrastructure because until the Riel sectionalization was built, it was the only tie between the HVDC, the 500 kV AC interconnection and the 230 system that is the backbone at Manitoba Hydro.

THE CHAIRPERSON: So if you've got a tower -- if you've got towers within 40 kilometres, which is where this tornado was, and they got -- they were hip by the tornado, I assume that we -- we're going to have problems with those towers?

MR. GLENN PENNER: Correct.

THE CHAIRPERSON: Okay.

MR. ALISTAIR FOGG: And just -- just to add to that, the three (3) years at Dorsey references replacement of -- of equipment such as the converted transformers that we discussed previously. So due to their special nature, the lead time in remanufacturing and having those delivered to Dorsey could cause that three (3) years lost connection.

THE CHAIRPERSON: Okay. Page 82. You've got the map of Bipole and relation of Dorsey. How far is Bipole from Dorsey?

MR. GLENN PENNER: Are you referring to Bipole III?

THE CHAIRPERSON: Yeah, Bipole III,

the line that is west of Dorsey, how far away is that?

MR. GLENN PENNER: I'm not sure exactly how many kilometres but it was planned to be at a distance away and that's why it terminates at Riel and then travels east and south away from Winnipeg and Dorsey. It's certainly much further than 40 kilometres.

THE CHAIRPERSON: Okay. Elie is which direction from Dorsey? It would be west, wouldn't it?

MR. GLENN PENNER: Yes.

THE CHAIRPERSON: Okay. The tornado -- the Elie tornado came from the west; is that correct?

MR. GLENN PENNER: I'm not -- I'm not sure which direction it would've come from.

THE CHAIRPERSON: If I go up further north for Bipole III to immediately west of Jenpeg, what's the difference between Bipole -- what is the distance between Bipole III and Bipoles I and II?

MR. GLENN PENNER: I'm not sure what -- what the distance is between Bipole III and Bipoles I and II at that -- you're talking about that specific location where --

THE CHAIRPERSON: Yes.

MR. GLENN PENNER: -- they get closer.

THE CHAIRPERSON: Yes.

MR. GLENN PENNER: Correct. Yeah, I'm not sure -- I -- we would have to get an undertaking to get --

THE CHAIRPERSON: Well, if I could get an undertaking to determine the distance at that point. I think Mr. Penner --

MR. GLENN PENNER: Yeah, they were just giving you some background on the design requirements for that location. So, in those locations where we had to move as part of the -- the requirements to get closer to Bipole I and II, we pro -- we designed the structures to withstand a higher wind load. So the structures are reinforced in that area, but I -- I don't have the information as to exactly how close those structures are.

THE CHAIRPERSON: Well, could you provide an undertaking to determine what sort of wind it could take and -- and whether it could withstand a F5 tornado?

As I understand it, based on the information here, if an F5 tornado hits at that point, we've lost all the Bipoles, unless somebody tells me otherwise.

MR. GLENN PENNER: No -- I can -- I

can get an undertaking. But an F5 tornado, it -- it can -- it's a very specific and can be very focused in terms of its energy and I guess the best way to describe it is it's not -- it's not like a large wind event that -- that could take out multiple spans.

A tornado is a very specific type of storm and -- and it can be on the ground for very short periods of time. But I -- we can provide some information through an undertaking.

--- UNDERTAKING NO. 53: Manitoba Hydro to provide the distance between Bipoles III and Bipoles I and II at its point immediately west of Jenpeg. Then further to what level of resistance from when they've been built.

THE CHAIRPERSON: Okay. As I look at the -- as I look at the photo -- so the undertaking is that they will provide the distance between Bipoles III -- Bipole III and Bipoles I and II at its point immediately west of Jenpeg. Thank you and -- and I

guess then further to what level of resistance from when they've been built.

Mr. Penner, when I look at the map on page 82, I guess the -- the actual map of the Riel converter station on the right is a better depiction than where it shows on the actual map? I mean, when I look at the -- the sort of the map on the left, it looks like Riel is south of Winnipeg. It's actually more east of Winnipeg, isn't it?

MR. GLENN PENNER: The map -- the air photo on the right is -- it's maybe a better depiction. I think the -- the word "Winnipeg" on that large-scale map may -- there's no dot indicating where Winnipeg is and I think that's -- that may be why -- there's a dot that indicates Selkirk, but there's no dot for Winnipeg.

THE CHAIRPERSON: Yes.

MR. GLENN PENNER: So it's -- it's -- if you -- it's just north of the Deacon's corner where the reservoirs are.

THE CHAIRPERSON: Okay and the -- and if I was going to the United States from Riel I'd go south or southeast of Riel to hook into the United States with GNTL and MMTP; is that correct?

MR. GLENN PENNER: MMTP actually

connects into Dorsey and it goes -- the -- the line actually follows -- it follows south of Winnipeg, but just south of Winnipeg, south of the perimeter and follows an existing corridor and then -- and then it actually comes up past Riel station and follows along an existing corridor just past Anola and you can see that on that page 82, and then it turns south/ southeast towards the RM of Piney.

THE CHAIRPERSON: Okay. Thank you very much.

MR. DAVID CORMIE: Mr. Chairman?

THE CHAIRPERSON: Yes.

MR. DAVID CORMIE: If I could add to the conversation about the risks of the Bipole -- associated with Bipole III. I think it was at our rate hearing last year, Dr. Swatek addressed this issue and provided a -- a comprehensive presentation on -- on -- on the probability of -- of -- of losses with and without Bipole III.

And I think it would help you understand the -- the change in risk profile that we have with Bipole I and II going to Bipole III. We would provide you that. It's -- it's -- it's quite illuminating.

THE CHAIRPERSON: Thank you, Mr.

Cormie, I'd appreciate that. Okay, Mr. Peters...?

MR. DAVID CORMIE: Yes, Manitoba Hydro will provide the presentation Dr. Swatek presented on the risks of reduction associated with the construction of Bipole III.

--- UNDERTAKING NO. 54: Manitoba Hydro will provide the presentation Dr. Swatek presented on the risks of reduction associated with the construction of Bipole III.

CROSS-EXAMINATION BY MR. BOB PETERS:

MR. BOB PETERS: Good afternoon to the Panel. I'd like to start by repeating an off-mentioned admonition that no questions of mine are to seek responses that contain information that Hydro believes is confidential or commercially sensitive.

My questions are only seeking to elicit succinct answers, but if you feel to answer my question properly for the Board that you have to include confidential information or information that Manitoba Hydro has not been required to put on the

public record, please let the Board and your counsel know that you will respond fully to that question when we go in camera tomorrow.

Would that be understood and acceptable, Ms. Van Iderstine and Ms. Mayor?

MS. HELGA VAN IDERSTINE: Yes, that's acceptable, thanks.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: And thank you. So I want to start my questions starting with Keeyask, and we're going to start in Board counsels' volume 6 of the book of documents on page 5. And to get us started, my questions will be for whoever chooses to answer from the panel, recognizing you have your -- your specialties.

The Public Utilities Board was told at the Needs For And Alternatives To review that Keeyask had a starting price at about $6.2 billion as would be seen by following the CEF-13 line item down to Keeyask where they intersect; is that correct?

MR. DAVID BOWEN: During the -- the NFAT, at the start of the NFAT hearing, the budget was indeed $6.2 billion. Before the -- the hearing was concluded, the budget was changed to $6.5 billion.

MR. BOB PETERS: And you told us that on your slide 34, that we don't need to go to Mr. Bowen, but it was during the course of the NFAT that Manitoba Hydro received its bids back from the four (4) contractors who were responding to Manitoba Hydro's tender; is that correct?

MR. DAVID BOWEN: That's correct.

MR. BOB PETERS: And as a result of getting the four (4) bids back, Manitoba Hydro analyzed them, and Manitoba Hydro made a decision to accept a tender from a general civil contractor that resulted in the total cost of Keeyask coming in at 6.5 billion; correct?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And you told us on slide 32 of your presentation what's included in the general service contract -- general civil contract, it's the moving of the earth, the building of the earth structures, the building of the mechanical structures once the concrete is in place; correct?

MR. DAVID BOWEN: That's -- that's a good summary of the scope, yes, correct.

MR. BOB PETERS: And equally what's important is -- and I think you told us this as well, Mr. Bowen, that not included in the general civil

contract for Keeyask would be what you referred to as the Keeyask Infrastructure Project, which included roads, power, there was a camp, as well as the turbines, the generators, the gates, the hoists, and the other hardware that engineers like?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: All right. That $6.5 billion, Mr. Bowen, was the total in-service cost and that includes interest that's been capitalized on all the money that's been paid out; correct?

MR. DAVID BOWEN: That's right, it was our P50 estimate --

MR. BOB PETERS: Yeah.

MR. DAVID BOWEN: -- at the time of the NFAT.

MR. BOB PETERS: All right, we'll -- we'll come to that a little bit later, but the -- the essence of looking now at -- back on page 5 of Board counsels' book of documents, and we can go over to your capital expenditure forecast number 14, follow it down, and we see 6.496 billion that we've rounded off to 6.5; correct?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: That 6.5 billion was supposed to be the all-in cost, if I can call it that;

correct?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And not only did it include interest, it included things like escalation, which was really analogous to an inflation adjustment over -- over the years?

MR. DAVID BOWEN: Once again it was our P50 value at that time.

MR. BOB PETERS: All right. And the 6.5 billion forecast included a first unit in-service on November 2019, if I recall?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: Now on page 6 of Board counsels' book of documents, we move past 2014, and there was no update, was there, and into 2015 and the capital expenditure forecast was not revised; was it, Mr. Bowen?

MR. DAVID BOWEN: Correct. There is no update in 2015.

MR. BOB PETERS: Why was there no update in 2015?

MR. DAVID BOWEN: There was no reason to update the control budget in 2015.

MR. BOB PETERS: Everything was looking at?

MR. DAVID BOWEN: I wouldn't say everything was looking good. A project like this has many risks but we didn't have any reason to believe that we were going too push past the 6.5 million in 2015.

MR. BOB PETERS: All right, but by mid-2016, Manitoba Hydro has engaged a group called the Boston Consulting Group.

You're aware of that?

MR. DAVID BOWEN: I'm aware that when the Manitoba Hydro Board was replaced, the -- one of the first things they did was to engage the Boston Consulting Group on behalf of the Board and that occurred I believe in the May/June timeframe of 2016.

MR. BOB PETERS: Would you be aware, Mr. Bowen, that at the same time the Manitoba Hydro Board or even before that, the Manitoba Hydro Board engaged KPMG Consulting Firm?

MR. DAVID BOWEN: I'm not aware that the Manitoba Hydro Board engaged KPMG.

MR. BOB PETERS: Was it Manitoba Hydro's management that in -- in -- Mr. Midford, can you help me out here?

MR. LORNE MIDFORD: I think you may be referring to the project team hiring KPMG to do a

health check of the project perhaps.

MR. BOB PETERS: All right. And that was in May -- or sorry, that was in early 2016?

MR. LORNE MIDFORD: Yes.

MR. BOB PETERS: It's appended to your rebuttal evidence if you need a date but...

So the difference, Mr. Bowen, is it was Manitoba Hydro's Board of Directors that engaged the Boston Consulting Group, and it was the Manitoba Hydro executive that engaged KPMG at or about the same time.

Have I got that right?

MR. DAVID BOWEN: The -- the project team engaged KPMG.

MR. BOB PETERS: The project team is Manitoba Hydro?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: When you look on slide -- or page 6, I should say, of Board counsels' Exhibit 42-6 and Boston Consulting Group tells Manitoba Hydro that the cost of Keeyask will increase from 6.5 billion to 7.8 billion without any mitigation steps being taken by Manitoba Hydro and that will result in July '20/'22 in-service date; correct?

MR. DAVID BOWEN: Yes, that's what it says on -- on their slide.

MR. BOB PETERS: And you're aware that's what they told Manitoba Hydro or were you not aware of that?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: If Manitoba Hydro was to mitigate some of the concerns, Boston Consulting Group suggests that the in-service cost would still increase from 6.5 billion but would be more in the range of $7.2 billion with an in-service date probably in the August of '20/'21 range, correct?

MR. DAVID BOWEN: Yes, that's what -- that's what their analysis shows.

MR. BOB PETERS: You're aware of their analysis when they were doing it?

MR. DAVID BOWEN: They were working -- yes, they were working with my team at the time they were performing the analysis. However, our team did not perform this analysis. This is an analysis done by BCG.

MR. BOB PETERS: On slide -- sorry, on page 7 of book of documents 42-6, the Boston Consulting Group had some recommendations that would help mitigate the schedule.

You're aware of that, Mr. Bowen?

MR. DAVID BOWEN: Yes, I'm aware of

that.

MR. BOB PETERS: Did -- did Boston come up with those on their own or was it really Manitoba Hydro telling Boston that these are the steps that would mitigate the concerns?

MR. DAVID BOWEN: I would say the items identified here really came from our Manitoba Hydro team.

MR. BOB PETERS: All right. And not to get in any great detail but I think you mentioned in your slide this morning, Mr. Bowen, that to install powerhouse columns to enable parallel construction was really putting, and this is in my words, metal girders on cement at a lower stage of the cement construction so that something could be built on the top of those metal girders while somebody also worked underneath them on the cement -- or concrete?

MR. DAVID BOWEN: What I was just trying to say is that, yes, we could lower the elevation of the concrete and -- and for giving -- for correcting the structural steel columns and -- and really what -- what it enables to do for the site is that the -- the work is constrained by the winter months. So being able to get the columns up sooner and, of course, the cladding and roofing on sooner

allows work to -- to continue over the winter months and allows us to mitigate schedule.

MR. BOB PETERS: And you told the Board this morning, Mr. Bowen, that that mitigated the schedule by as much as twelve (12) months?

MR. DAVID BOWEN: Yes, without -- without using column extenders we -- we would be facing another one (1) year delay or more.

MR. BOB PETERS: Was there a similar or some comparable time savings to using the backup power to replace the short-term need for the auxiliary building?

MR. DAVID BOWEN: It -- no, no, this was -- this is showing for the spillway structure and so, no, the -- the timesaving was not nearly as great.

MR. BOB PETERS: Was there, in fact, any timesaving to the overall schedule?

MR. DAVID BOWEN: I'd -- I'd have to -- to check to see what exactly that was. I don't have that answer on my fingertips.

MR. BOB PETERS: All right. Well let's look at the third -- the third performance improvement really focused on improving the general civil contractor's productivity and effectiveness; correct?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: How does Manitoba Hydro do that?

MR. DAVID BOWEN: That's a -- that's a really big question. And I -- so I think the question you're asking is: How does the Manitoba Hydro make sure that our contractor, in this case, a general civil contractor is providing the best result for Manitoba Hydro.

There's a number of things that we do and, really, I'll go back to the beginning and I'll go back to the GCC procurement. So I think what Mr. Strongman noted originally in his -- in his presentation was that at the time the general civil contract was put to tender, we went through an exhaustive two (2) year process. We engaged experts. We -- we attempted to match the risk that the marketplace would use -- would -- would be able to take at that time, and to ensure that we could get the best price for all -- all of Manitobans.

At the same time, we engaged a company called Chant Construction. Chant actually did a shadow bit at the same time to help validate our cost; to make sure that when those prices came in that they closed. There's -- there's one (1) example.

Really, other examples in terms of effect we manage risk. We -- we went through the process for the early contractor involvement where we brought our BBE, general civil contractor, in early in the process to help mitigate risks. It's -- it's -- it's hard to say -- because we don't have the project going on at the same time without doing the ECI compared to -- with the ECI, it's hard to provide an apples-to-apples comparison. But really, it's -- it's a best in class procurement methodology that's used in industry to help the contractor to mitigate risk and be ready for construction.

Those are just a few examples of what Manitoba Hydro is doing to provide the best value -- value for Manitobans.

MR. BOB PETERS: Thank you, Mr. Bowen, we'll come to some more of that. Before I leave page 7 of Board counsels' book of documents number 6, that chart, does that show the Board in a graphic how far behind the concrete placement was in those various years?

MR. DAVID BOWEN: So I believe you're referring to slide 7 in the book of documents --

MR. BOB PETERS: Yes.

MR. DAVID BOWEN: -- and you're --

you're referring to the graph on the bottom right corner, which shows the volume of concrete in April '16, May, et cetera.

So, yes, it shows, for example, if we look at May '16, there was plan to place 42,000 cubic metres of concrete at that time, and by month end we had 13,000. So it -- it shows that deficit, yes.

MR. BOB PETERS: All right, I've got some further questions about that, but I wanted to just cover the price at a high level, and we're going to leave the Boston Consulting Group prices of between 7.2 and 8.5 billion, Mr. Bowen, -- let me rephrase that.

It was Boston who quantified the in-service costs of Keeyask to be between 7.2 and 7.8 billion; correct?

MR. DAVID BOWEN: That's what the report says on slides -- slide 6, yes.

MR. BOB PETERS: And that's what they told Manitoba Hydro?

MR. DAVID BOWEN: Yes, that's what they told our -- our board.

MR. BOB PETERS: And your board didn't accept that because on page 8 of the book of documents, we see your board chair, I believe makes an

announcement that the control budget of Keeyask is $8.7 billion, and that announcement was in approximately March 7th of 2017; correct?

MR. DAVID BOWEN: Yes, that's correct.

MR. BOB PETERS: Can you explain to this Board why the Boston Consulting Group's price forecasts were not accepted by Manitoba Hydro?

MR. LORNE MIDFORD: The board hired Boston Consultants to come in and they evaluated the -- the project in the very beginning of the construction where the concrete was being placed in May, June and part of July.

So Boston Consulting did a forecast based on that initial sliver of time looking at the productivity and they did their best to forecast where the project could end up.

That wasn't a change in the control budget or control schedule, that wasn't a detailed analysis of all the risks associated with the project, which is what the project team did at the -- at the end of the construction season. And then with that new information, they updated the control budget with a direct recommendation to our Manitoba Hydro Board with the -- with the new control of $8.7 billion.

MR. BOB PETERS: Thank you, Mr.

Midford. On page 11 of Exhibit 42-6, MGF Services provides what I'll call a waterfall diagram to depict what's happened in the Keeyask generating price going from 6.5 to $8.7 billion.

Do you see that, Mr. Bowen?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And the largest increase to get from 6.5 to 8.7 was due to which contract?

MR. DAVID BOWEN: The general civil contract.

MR. BOB PETERS: And we can see that on the next page as well, on page 12, that schematically the general civil contract was driving the majority of the cost increase taking Keeyask from 6.5 to $8.7 billion; correct?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: Now, Mr. Bowen, you personally didn't want to accept that $8.7 billion cost from the Manitoba Hydro Electric Board. So it looks like on page 13 of Board -- of Board counsels' book of documents that you challenged your construction team to bring Keeyask in at $8.2 billion, with only an eleven (11) month delay.

Do you see that? It's going to be on

the right-hand side of this -- and I'm not sure how --

MR. DAVID BOWEN: I see it, yes.

MR. BOB PETERS: All right. And -- and when I said "you," I guess it was personal you; was it not?

MR. DAVID BOWEN: This -- on Exhibit 13, this is what we call our Keeyask project manager -- project manager update. So Manitoba Hydro, as the project manager, provides this publication about quarterly mainly to our KCN partners to provide information on the project.

MR. LORNE MIDFORD: I might just add that this -- we consider this to be a stretched target for the project team and that was presented to our board at the same time that the new control budget was approved.

So the project team itself has a -- has a target to better the existing control budget and schedule.

MR. BOB PETERS: But Mr. Midford, it's not accepted by the Manitoba Hydro Electric Board?

MR. LORNE MIDFORD: It's considered a -- a stretch target.

MR. BOB PETERS: Okay. I'm not familiar with that concept, does that mean it's --

MR. LORNE MIDFORD: You're striving to achieve that, yes.

MR. BOB PETERS: Striving to achieve it. It's still considered realistic; is that correct?

MR. LORNE MIDFORD: (No Audible Response).

MR. BOB PETERS: As -- as we sit here today is that cost estimate still valid?

MR. DAVID BOWEN: By the math -- as I mentioned in my presentation, we require a 10 percent improvement in the general civil contract work this year. And we -- we can't have any major risk come true in order for it to -- for us to meet our control budget.

In order for us to do -- to push down towards $8.2 billion, that is significantly a -- a stretch goal, we would have to have upwards of a 30 percent improvement in our general civil contract to come close to that right now.

MR. BOB PETERS: So if we turn just quickly to page 50 of Board counsels' book of documents, we'll see a chart with a schedule of dates that was prepared not by Manitoba Hydro but I want to understand when we look at this schedule, Mr. Bowen, the October 17, 2020 in-service target is no longer

the -- the stretch target or the plan date.

Would you accept that?

MR. DAVID BOWEN: Sorry, can you repeat the question?

MR. BOB PETERS: Let me ask it this way, Mr. Bowen. If your stretch target could be achieved and you've now indicated that to achieve it you'd need a 30 percent improvement in this next year, when would the first unit come in service?

(BRIEF PAUSE)

MR. DAVID BOWEN: I was just trying to make sure I got my math right here. So the -- we -- we would need over a 30 percent improvement, as I previously noted. The -- the stretch goal that we referred to, the 8.2 billion, has a first unit -- first unit in-service date of October of 2020.

MR. BOB PETERS: Would it be realistic at this point, Mr. Bowen, to conclude that that's not going to happen?

MR. DAVID BOWEN: Certainly from a -- from my perspective and our team's perspective, we are going to continue to drive to have the lowest cost and shortest schedule. I guess it depends who you ask

whether or not it's realistic. It is a very tough goal that we are going to continue to work at, and I'd be happy to report back here at the end of this construction season and -- and give you a real answer of how realistic it is or not.

MR. BOB PETERS: All right, we'll make a date. No, it's certainly not an undertaking.

In the discussion you had with the Chair just after the lunch recess today, the understanding is that the $8.7 billion is the P50 number, and you stressed that repeatedly, Mr. Bowen; correct?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: And just for the record, the -- the designation P50 indicates that there's a 50 percent chance the cost will be lower, and also a 50 percent chance the cost will be higher than 8.7 billion?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And catching up to what the Chairman talked with your President and CFO about on page 15 and 16 of Board counsels' book of documents, maybe we'll see it over the top of 16, we can see that with no in-service delay beyond '20/'21, the P90 would be 9.6 billion but that would increase

to 9.9 billion if there was a further delay; correct?

MR. DAVID BOWEN: Yes, that's what's shown here.

(BRIEF PAUSE)

MR. BOB PETERS: Mr. Bow -- sorry, Mr. Bowen, your slide 64 from your presentation this morning...

(BRIEF PAUSE)

MR. BOB PETERS: I just want to make sure the -- the Board here is clear that going from Manitoba Hydro's P90 on page 64, your slide 64, that contemplates a delay of not only eighteen (18) months, but an additional eleven (11) months as noted above that, correct?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: So that's a twenty-nine (29) month delay from what was first estimated?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And if -- if the P90 number was calculated based on what I believe was being spoken about in response to this information

request of a further delay or a thirty-two (32) month delay, that thirty-two (32) month delay is, in essence, only three (3) additional months from Manitoba Hydro's P90 of April 22 -- April of 2022, and a nine point six (9.6) number?

MR. DAVID BOWEN: So -- so to clarify, the -- the P90 value provided on slide 64 has a twenty (20) minu -- twenty-nine (29) month delay. In the reference books of documents here on -- on item 16, there is a farther three (3) month delay noted to move the twenty-nine (29) month delay to thirty-two (32) months, and there is additional interest and escalation that that would attract. I haven't run the numbers personally, but the -- the values show here that it would increase from 9.6 to $9.9 billion.

MR. BOB PETERS: Thank you. And you -- you answered better than I asked it, but you can confirm that to go from Manitoba Hydro's P90 of $9.6 billion to the P90 at $9.9 billion, that's an additional three (3) months and only three (3) months, according to the information?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: Thank you, sir. Mr. Bowen, is Manitoba Hydro in the process of updating its Keeyask cost estimate?

MR. DAVID BOWEN: No. No, we have -- we have monthly construction cost reports, and we have our contract -- our -- our staff are continually projecting, but we're not going through a formal update at this time.

MR. BOB PETERS: Is there an update being done for the schedule?

MR. DAVID BOWEN: Yes. Yes, the schedule is driven by the general civil contract work. Because there's been change in the schedule, it impacts the entire job. Right now, as we speak, our Manitoba Hydro site team is working with BBE to update the Keeyask schedule based on expected progress for 2018. Once that occurs for the general civil contract work, of course, there is a knock-on effect to other site contracts, and that work will happen and exp -- expected to happen and be complete in -- in the next month.

MR. BOB PETERS: By the end of February, 2018?

MR. DAVID BOWEN: Correct.

(BRIEF PAUSE)

MR. BOB PETERS: Mr. Bowen, can you

through your counsel undertake to provide that information to the Board when it's received?

MR. DAVID BOWEN: It's -- just want to confirm what you're asking. You're asking for our updated control schedule at the end of February?

MR. BOB PETERS: Or as soon as it's received, yes.

MR. DAVID BOWEN: I -- we -- we can provide that.

MR. BOB PETERS: Thank you, sir. Mr. Bowen, your undertaking was to -- to provide through your counsel the Public Utilities Board with an update of Manitoba Hydro's schedule for the completion of Keeyask?

MR. DAVID BOWEN: Yes. Yes.

--- UNDERTAKING NO. 55: Manitoba Hydro to provide the PUB with an update of Manitoba Hydro's control schedule for the completion of Keeyask at the end of February or as soon as it's received

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: And, Mr. Bowen, if that schedule either adds more days or subtracts more days, does that impact the cost?

MR. DAVID BOWEN: Absolutely.

MR. BOB PETERS: And will Manitoba Hydro take steps to update its Keeyask cost estimate after it gets its schedule estimate?

MR. DAVID BOWEN: So the -- the schedule I'm referring to, we have our control schedule, and -- and I think everyone recognizes what the control schedule is. So our first in-service date is -- for our control is August of 2021. We have what we call a working schedule, and the working schedule is dynamic, and this working schedule is the schedule I was referring that's being developed with the general civil contractor as we speak.

This schedule will outline the work that's going to happen this year in the 2018 sea -- season. Once -- once the -- we establish what work happens under the general civil work, we'll then look at what work happens under the turbine engineer work with Voith. We'll look at the intake, et cetera, to make sure everything is knitted together, and -- and we have all the logic ties, right? So -- so normally we would not do an update of our cost estimate unless

there was a significant change to the working schedule. From -- from what I know right now is that we -- we were -- the -- the change is going to be such that we do not plan to do an update of our costs based on the schedule.

MR. BOB PETERS: Thank you for that, Mr. Bowen. If we turn to page 50 again in Board counsel's book of documents, Exhibit 42-6, Mr. Bowen, I want to make sure the panel is with you on that last answer. Manitoba Hydro's control data is shown as August 2021, correct?

(BRIEF PAUSE)

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: And that's for the first unit to be in-service and operational?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: Even with this updated schedule done with the general civil contractor, Manitoba Hydro is not planning to change the control date of August, 2021?

MR. DAVID BOWEN: I just want to make sure we're -- we're talking correctly, the terminology. The control date references our $8.7

billion control budget. Our working schedule is that our team's goal is to achieve the work -- to finish the work as quickly as possible to mitigate costs. Of course, we're not going to give up on safety, the environment, quality, and our -- and our commitments under the JKDA. So -- so I would expect the information that I received back from our construction team will be in advance of the control date, because that's what everyone's working to is to -- to come in at the -- the shortest amount of time.

MR. BOB PETERS: Thank you, sir. I'd like to turn to an issue to explain to this panel the increase in prices for Keeyask that wen -- went from 6.5 to 8.7 billion with my next questions. And probably the best way to start, Mr. Bowen, is to pick up some of your comments by looking at page 25 of Board counsel book of documents. At the end of 2016, Mr. Bowen, there were problems that were identified by Hydro by the Boston Consulting Group, and I suppose by KPMG, correct?

MR. DAVID BOWEN: Yes, it was evident at the end of 2016 that we had done -- like it says here, it was actually about 40 percent of our planned concrete work, and about 60 percent of our planned earthworks.

MR. BOB PETERS: And when we try to drill down with this question as to what was the reasons for that, Manitoba Hydro had three (3) main reasons. The first was the labour productivity was a problem. There was also a slower than planned ramp-up on site, and then there was some geotechnical issues and concerns, correct?

MR. DAVID BOWEN: That's correct. And -- and if -- if the Board likes, I'd be prepared to talk at more detail on -- on these items tomorrow.

MR. BOB PETERS: All right. You're inviting the Board to -- you want to provide something to the Board -- and that wasn't very cryptic, but in the -- in the in-camera session?

MR. DAVID BOWEN: Yes, I'd be willing to provide greater level of detail tomorrow.

MR. BOB PETERS: All right. So I'll just ask Ms. Van Iderstine, or Ms. Mayor to make a note of that and they will ask you the appropriate question in-camera. That would be acceptable. Thank you.

(BRIEF PAUSE)

MS. HELGA VAN IDERSTINE: Yes, we will

do so.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: On the public record, Mr. Bowen, which of these three (3) main issues is the largest driver of the increase in costs of Keeyask going from 6.5 billion to 8.7 billion?

MR. DAVID BOWEN: I would say let me look at these three (3) -- three (3) bullets. The -- the difference between the bid and the actual production achieved -- product to be achieved is the -- - is the largest driver.

MR. BOB PETERS: So that's the productivity factor that's mentioned in -- in one (1) of those three (3) bullets?

MR. DAVID BOWEN: Yes. Yes, in the first bullet.

MR. BOB PETERS: And is it the productivity for both the startup of the concrete placement in 2016, and also the actual productivity for concrete placement once the contractor got mobilized in 2016?

MR. DAVID BOWEN: The -- the actual productivity achieved from startup right through the season was -- was far greater than what was expected.

MR. BOB PETERS: I'm sorry, I'm not sure I heard your answer correctly.

MR. DAVID BOWEN: The -- the productivity rates achieved, the person hours per unit of work, they were much larger than the bid from the start of the construction season throughout the entire construction season.

MR. BOB PETERS: What you're saying is Manitoba Hydro's expected productivity never materialized from the general civil contractor?

MR. DAVID BOWEN: Well, what I'm saying is that both Manitoba Hydro's expectation and our contractor's expectations were not achieved.

(BRIEF PAUSE)

MR. BOB PETERS: Mr. Bowen, where did Manitoba Hydro get its expectations as to productivity with concrete and earthworks?

MR. DAVID BOWEN: In terms of where -- where we derive our productivity rates from, it comes from our past historical experience. So from Limestone, Wuskwatim, Pointe du Bois. It comes from working with other utilities across Canada, and it also comes from, in this case, I mentioned the -- the

shadow estimate that was done during the general civil contractor bid. So it comes from all those different areas.

MR. BOB PETERS: Did Manitoba...

(BRIEF PAUSE)

MR. BOB PETERS: Mr. Bowen, can you indicate whether Manitoba Hydro, in its original contract with the general civil contractor, use the same productivity rates for concrete and earthworks that Manitoba Hydro actually achieved when it constructed Wuskwatim?

MR. DAVID BOWEN: No. The rates for lower.

MR. BOB PETERS: Manitoba Hydro's expectation of productivity was lower -- let me rephrase the question. Manitoba Hydro expected there to be greater productivity on Keeyask than Manitoba Hydro achieved on Wuskwatim?

MR. DAVID BOWEN: That's correct.

MR. BOB PETERS: So where in Manitoba Hydro's past history did Manitoba Hydro achieve the productivity rates that it was expecting in its contract with the general civil contractor on Keeyask?

MR. DAVID BOWEN: The -- the rates provided by the general civil contractor would have been during the Limestone era.

MR. BOB PETERS: So for the panel to understand, the general civil contractor included in that bid productivity levels that were similar to what would have been achieved by Manitoba Hydro in the Limestone construction?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: Did Manitoba Hydro verify how the general civil contractor could achieve those productivity levels?

MR. DAVID BOWEN: During the -- the bid analysis phase, this was a -- obviously a -- a topic of concern and discussion. It was one (1) of the reasons why we carried a significant labour reserve in our original control budget, albeit it -- in hindsight, it wasn't adequate, but yes, yes, we looked at that in -- in earnest.

MR. BOB PETERS: What you're telling this Board is that when you received the general civil contractor's bids for productivity, a red flag went up that caused Manitoba Hydro to want to check into that further?

MR. DAVID BOWEN: Correct. As part of

our bid evaluation, we -- we look at the prices, and -- and certainly this one was a concern for -- for the team doing the analysis during the procurement phase.

MR. BOB PETERS: And the contract, the general civil contractor that Manitoba Hydro -- Hydro hired was a joint venture consortium of -- you told us this morning -- Bechtel Canada, Barnard Canada, and EllisDon, correct?

MR. DAVID BOWEN: That's correct.

MR. BOB PETERS: Have -- and -- and it's all -- its shown as BBE, and perhaps that's the legal name that they use? Is that how it's known?

MR. DAVID BOWEN: Yes. It's much easier to say.

MR. BOB PETERS: Thank you. Did BBE construct other Hydro projects that Manitoba Hydro could verify their productivity levels on?

MR. DAVID BOWEN: Bechtel was part of a joint venture that was involved with Limestone, so that was a Bechtel/Kumagai joint venture. Barnard has done some Hydro work, albeit quite a bit smaller in -- in the US. And -- and EllisDon, they're -- they don't have direct experience within the -- the Hydro marketplace, but certainly, they have more experience within the Canadian construction marketplace.

MR. BOB PETERS: And the three (3) of them haven't joined together to do any Hydro project that Manitoba Hydro is aware of?

MR. DAVID BOWEN: I'm not aware of that JV doing any other -- other Hydro projects like -- like this, no.

MR. BOB PETERS: So help the Board understand that once Manitoba Hydro saw that the productivity level being quoted in the general civil contract proposal by BBE, was it -- was it -- was similar to what was achieved back in the Limestone days, what investigations did Manitoba Hydro do to determine whether that was reasonable going forward?

MR. DAVID BOWEN: I think the -- the largest investigation we did was bringing on -- doing a -- the shadow estimate that I talk -- just talked about by having a contractor do a shadow estimate on the bid to help verify those values.

MR. BOB PETERS: Was that shadow contractor doing that work before the bids were received from the four (4) proponents?

MR. DAVID BOWEN: Yes. I -- you're -- you're testing my memory, but I believe that the estimate from the shadow estimate was received at the same time that the bids were -- were closed.

MR. BOB PETERS: And you're prepared to share what those bids are tomorrow with the panel?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: All right. Thank you for that, sir. Mr. Bowen, in some discussion you had just after lunch -- lunch with the Vice Chair, you've previously told not only the Vice Chair, but the members of the Board who were on the Needs for and Alternatives rou -- review panel that there were lessons that Manitoba Hydro had learned from the Wuskwatim construction, and that was going to give Manitoba Hydro greater confidence when it embarked on Keeyask, correct?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: And one (1) of the -- and I'm looking on page 34 of Board counsel's book of documents. One (1) of the reasons for that greater confidence was because dealing with Keeyask, Manitoba Hydro had already awarded the general civil contract by the time the Needs for and Alternatives review was being conducted. Do you recall that?

MR. DAVID BOWEN: Yes, I do.

MR. BOB PETERS: And the essence of that, Mr. Bowen, is because the general civil contract had been issued for Keeyask and was included in that

$6.5 billion number, that gave the Utility, Manitoba Hydro, greater confidence that this project would come in close to $6.5 billion?

MR. DAVID BOWEN: I think, as discussed with the other projects here today, one (1) of the first risks of any major -- major project is getting -- securing pricing from contractors. At this point in time, the general civil contract, it's the largest risk on Keeyask. We had secured that price, and it gave us more confidence in the potential outcome.

MR. BOB PETERS: With the benefit of hindsight, we can say that that really didn't turn out the way it was expected correct?

MR. DAVID BOWEN: Yes. We're at 50 percent complete right now. Our control budgets increased from six point five (6.5) to eight point seven (8.7). We are doing everything we can to come in lower than that, and that's what we'll keep doing, But -- but yes, we look back over the last two (2) years, that's -- that's exactly right.

MR. BOB PETERS: Another one (1) of the concerns -- or lessons that was learned from the Wuskwatim project was that from the point in time in which the general service contractor had been engaged

until the end of the project, costs increased between 10 and 13 percent on the Wuskwatim project, correct?

MR. DAVID BOWEN: Yes, it was in that ballpark.

MR. BOB PETERS: And back on page 31 of Board counsel's book of documents, the -- the suggestion then, Mr. Bowen, is because for Keeyask the general service contract had already been awarded, the cost increases that you saw in Wuskwatim after the general civil contract was awarded would lead you to believe that the risks would probably be less than 10 or 13 percent more for Keeyask?

MR. DAVID BOWEN: Correct. At that time, we -- we believe that -- that the risk represented here, and what we knew, we would be within our control or -- or much closer to control. But as you've already mentioned, is that hindsight is 20/20, and the -- the project has incurred a -- a substantial cost increase.

MR. BOB PETERS: And if we -- if we go back, Mr. Bowen, to page 11 and look at that waterfall in the MGF project services report, leaving aside the general civil contract, and I suppose the contingency, a lot of the other contracts fluctuated, but probably within the percentage range that you were expecting

after Wuskwatim. Would that be fair?

MR. DAVID BOWEN: The general civil contract drives the project -- the schedule for the work drives the project, so if we're on site longer, if we have more person hours and more people in camp for longer, generally all our costs go up because of running the -- operating the town of Keeyask, if you like. So -- so, yes, there's a knock-on effect, and -- and it's driven through being there longer and -- and more person hours driven by this work.

MR. BOB PETERS: All right. I -- I appreciate the clarification. What you're telling this panel is that because the general civil contract was the largest source of cost increase and delay in schedule increase, that had a -- an effect on many of the other items that are listed on page 11 in the -- the waterfall?

MR. DAVID BOWEN: That's right.

MR. BOB PETERS: All right. I've got your point. Thank you. Now for Wuskwatim, Mr. Bowen, do you recall if Manitoba Hydro included a labour reserve or an escalation reserve?

MR. DAVID BOWEN: I don't believe we had either for Wuskwatim.

MR. BOB PETERS: But you did have for

Keeyask, correct?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And you had both a labour reserve and an escalation reserve?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And as you've previously told me about ten (10) minutes ago, that labour reserve just turned out to not be large enough in -- in light of the productivity challenges that the project has faced?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: One (1) of the other mitigating factors that Manitoba Hydro was thinking would give a higher level of confidence was because it had a comprehensive schedule that linked the design, procurement, and construction together.

Do you recall that?

MR. DAVID BOWEN: Sorry, can you repeat the question?

MR. BOB PETERS: The essence of the question is that Manitoba Hydro had confidence in its Keeyask price because with Keeyask, it had a comprehensive schedule that linked design, procurement, and construction?

MR. DAVID BOWEN: Yes, we had a -- a

well-developed schedule that links all the different parts of the work together, and -- which is required for any of this work, and -- and the -- yes, it -- it's fundamental to carrying out any estimate and providing confidence in what you're doing.

MR. BOB PETERS: And Wuskwatim didn't have that, did it?

MR. DAVID BOWEN: I -- I didn't say that. Wuskwatim had a comprehensive schedule developed as well.

MR. BOB PETERS: To the same degree as Keeyask's?

MR. JEFF STRONGMAN: If you don't mind, I'll jump in on the Wuskwatim question.

MR. BOB PETERS: Absolutely, Mr. Strongman.

MR. JEFF STRONGMAN: Wuskwatim's schedule was not as well-developed as Keeyask. We certainly learned a lot in -- in the scheduling aspects of executing Wuskwatim, and we incorporated many of those lessons into what we're now doing for Keeyask. So the status of our Keeyask schedule is certainly an improvement upon what we had for Wuskwatim.

MR. BOB PETERS: Even though the

comprehensive schedule existed, Mr. Strongman, it -- it was such that it -- it hasn't been complied with such that a new schedule's had to be developed?

MR. JEFF STRONGMAN: Are you referring now to Keeyask?

MR. BOB PETERS: I was, yes.

MR. JEFF STRONGMAN: Yes. Well, I think referring to the BCG chart that I identified, the variance between plan versus actual concrete production, the order of magnitude of the variance was such that the schedule was very quickly no longer effective in managing the work in 2016.

MR. BOB PETERS: All right. You're referring back to pag -- page 7 of Board counsel's book of documents, and you're telling this Board at the bottom right-hand corner, there is a chart, and the performance on -- and the productivity on concrete got behind so much, so quickly, so early that Manitoba Hydro wasn't able to recover from that?

MR. JEFF STRONGMAN: Precisely.

MR. BOB PETERS: Now, with Keeyask in the general serv -- civil contract, Manitoba Hydro had a labour risk strategy that included a premier camp to attract and retain the craft labour, Mr. Bowen, and you talked about that with the -- with the panel after

lunch today?

MR. DAVID BOWEN: That's correct.

MR. BOB PETERS: Was that labour risk related to productivity?

MR. DAVID BOWEN: I'll be more specific. The labour product -- productivity risk, it's about attraction and retention, so we wanted to provide a top-quality camp so people working away from home in a remote environment would -- would stay not only state our job, but come to our job. So, yes, that was part of our attraction and retention strategy, which is highly important for anyone whose care network and a remote project department anywhere in the world.

MR. BOB PETERS: Has the labour risk strategy been successful or unsuccessful with the hindsight?

MR. DAVID BOWEN: Some of it's been successful, and some of it hasn't.

MR. BOB PETERS: What part has not been successful?

MR. DAVID BOWEN: The part that hasn't been successful was that we are spending more person hours per unit of work than we originally planned.

MR. BOB PETERS: Mr. Bowen, on page 37

of Board counsel's book of documents, on the transcript from the Needs for and Alternatives to review, the Wuskwatim labour productivity was lower than expected, correct?

MR. JEFF STRONGMAN: The Wuskwatim labour productivity was definitely less than what was expected.

MR. BOB PETERS: And even with that knowledge, Mr. Strongman, the productivity rates in the Keeyask contract were greater than what was in the Wuskwatim arrangement?

MR. JEFF STRONGMAN: I -- I just want to caution it's -- for clarity purposes, it's actually misleading to say greater than or less than when -- man hours per cubic metre of concrete. As you spend more man hours per cubic metre of concrete, you're actually less productive. So just to try to help with that basic understanding.

MR. BOB PETERS: Thank you for -- I think you were correcting me. I thought I had said it actually correctly, but however many person hours are needed at Wuskwatim, even more person hours ended up being needed at Keeyask. Have I said that right?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And even though

Manitoba Hydro knew that the person hours used at Wuskwatim weren't meeting the target, the target for Keeyask was for fewer person hours than it was at Wuskwatim, correct?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: Turning to page 40 of Board counsel's book of documents, this was a slide presentation made to Manitoba Hydro's Board of Directors. And I take it, Mr. Midford, you were probably a part of that? Or maybe Mr. Bowen, I don't know.

MR. LORNE MIDFORD: Sorry, what's the -- the date of this presentation?

(BRIEF PAUSE)

MR. BOB PETERS: We -- we're arguing over it. I think it's November of 2013. Does that help?

(BRIEF PAUSE)

MS. LOIS MORRISON: So, at that time, I wasn't -- I wasn't there at that time.

MR. BOB PETERS: Okay. Thank you,

sir. Let's not dwell on the date unless it's important to the witnesses, and -- and certainly, we'll -- we can try to track that down. But on this slide presentation, there's a contingency breakdown provided, and labour productivity is identified as a concern, but it's not included in the contingency. Have I -- have I got that right?

(BRIEF PAUSE)

MR. DAVID BOWEN: It doesn't appear to be here. I'd have to -- I -- I'd say yes, but subject to check.

MR. BOB PETERS: Okay. I'll accept that. Thank you, Mr. Bowen.

(BRIEF PAUSE)

MR. BOB PETERS: If we turn the page to page 41, a provision was added for Keeyask for a labour reserve as part of a management reserve, correct?

MR. DAVID BOWEN: Yes, that's correct.

(BRIEF PAUSE)

MR. BOB PETERS: So the labour productivity concern was not going to be addressed by the contingency, but it was going to be addressed by what is called a management reserve?

MR. DAVID BOWEN: Again, subject to check, I've been told by my colleague that this presentation was provided to our Hydro Board back in February of 2014. At that time, it clearly indicates that we're looking to -- may potentially have to access a labour reserve. I don't know whether or not contingency monies were allocated for labour at that time.

MR. BOB PETERS: Thank you.

(BRIEF PAUSE)

MR. BOB PETERS: Did Manitoba Hydro seek to get the productivity performance of the contractors that were constructing --

MS. HELGA VAN IDERSTINE: Mr. Peters, I just wanted to correct the date on that presentation. It appears to have been November 2013, so.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: And -- and thank you, Ms. -- Ms. Van Iderstine. If we scroll ahead to page 59 of that same document, we see that there's a similar presentation using the same graphics made in February of 2014, correct?

MR. JEFF STRONGMAN: That appears to be correct, and that the timeline that we're referring to right now, it -- it proceeds involvement of each of the three (3) panelists in their current positions, just for clarification.

MR. BOB PETERS: Okay, thank you -- thank you very much. That's helpful, Mr. Strongman. And before Ms. Van Iderstine's point, I was asking the witnesses whether Manitoba Hydro contacted the general civil contractors constructing other Canadian Hydro dams to find out the productivity levels that were being achieved in the Canadian market?

(BRIEF PAUSE)

MR. JEFF STRONGMAN: Would you please repeat the question?

MR. BOB PETERS: Mr. Strongman, the -- I'm wondering if Manitoba Hydro, on receiving the productivity quotes from the general civil

contractors, contacted any other Canadian utilities or Canadian general civil contractors working on programs of Hydro construction for their productivity rates.

MR. JEFF STRONGMAN: So yes, Manitoba Hydro is in -- in communication and collaboration with other Hydro utilities across Canada on a regular basis. Specifically referring to the time in question, I don't know specifically if the receipt of bids had prompted any communication, but certainly, we have tracking of project metrics across Canada from other utilities that would have served as a basis for comparison.

MR. BOB PETERS: Did any of those comparisons show as favourable as those bid by the BBE joint venture?

MR. JEFF STRONGMAN: So let me qualify my answer before making it. The information that we're getting into right now is -- is considered to be highly confidential, and each of the utilities across Canada that would have been a part of the communication would have taken steps to ensure protection of the information that would delve into a great level of detail. So, really, just high-level productivities would have been subject to discussion and -- and breakdowns or specifics would have been

avoided at that time.

MR. BOB PETERS: All right. Thank you. I accept that, Mr. Strongman.

Mr. Bowen, one (1) of the other reasons that Manitoba Hydro gained confidence in the Keeyask project costs that were disclosed at the Needs for and Alternatives to review was because Manitoba Hydro had essentially locked down 80 percent of the contracts, correct?

MR. DAVID BOWEN: Yes, that's correct.

MR. BOB PETERS: And that really meant there was only 20 percent left to be tendered and to be awarded, and so that, Manitoba Hydro expected, would minimize the need for any increase in costs?

MR. DAVID BOWEN: As I spoke of earlier, one (1) of the major risks, again, is the tender of -- of contracts. And yes, we had got through our big ones at that time, and we were confident at that time.

MR. BOB PETERS: Manitoba Hydro for Keeyask also had a much better estimating process, would you accept that, than it did for Wuskwatim?

MR. DAVID BOWEN: I would -- I would say yes. We continued to improve, and -- and we continue to apply lessons learned and refine our --

our estimating process. So, yes.

MR. BOB PETERS: And another factor, Mr. Bowen, was that the regulatory review of the Wuskwatim project, that was conducted by the Clean Environment Commission, correct?

MR. DAVID BOWEN: I wasn't personally involved in that process, so I -- I believe that's correct, but I --

MR. BOB PETERS: And that -- that review happened -- Mr. Williams remembers that, but -- or at least his younger brother does. That Wuskwatim review happened much earlier, or actually years earlier, before the actual construction started compared to Keeyask, correct?

Ms. Mayor may be the one who has to assist on that.

(BRIEF PAUSE)

MS. HELGA VAN IDERSTINE: Yeah, we'd have to get back to you on that. I'm not sure that anybody's got that information at their -- at fingertips.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Thank you, Ms. Van Iderstine. I'm not going to ask for that as an undertaking, but the point I want to try to see if Mr. Bowen agrees, or Mr. Strongman agrees is for Wuskwatim, there was a lag between getting the regulatory approval and putting shovel in the ground.

Do you accept that as correct, that leg could have been several years?

MR. DAVID CORMIE: Mr. Peters, I was involved in this -- this process, and I -- your -- your premise is correct.

MR. BOB PETERS: And so, Mr. Bowen, with the Keeyask project, it looked like the ink was barely dry on the PUB's Needs for and Alternatives review before there was something being done in the river, the cofferdam was being constructed, correct?

MR. DAVID BOWEN: Our first -- our -- our start of construction in 2014 was pushing the first rock in the river, which happened on July 15th, which was very close to when the NFAT process closed.

MR. BOB PETERS: Within a matter of a few weeks after the Board's issued its -- its NFAT report?

MR. DAVID BOWEN: That's -- that's my recollection.

MR. BOB PETERS: All right. And Mr. Bowen, the whole point of going here is that gave Manitoba Hydro confidence that because of the relative duration between the regulatory approval and the actual construction, that, too, would serve to keep construction costs lower than they otherwise could be?

MR. DAVID BOWEN: Correct. I think -- I think what your -- point you're trying to make is that any delay to the construction would push back the contr -- the -- the project schedule, and there is a very large and significant cost for interest and escalation, and -- and yes, it would make it cost more.

MR. BOB PETERS: All right. Thank you, sir. Mr. Chair, if this suits the Board, this would be an appropriate time for an afternoon break.

THE CHAIRPERSON: Thank you. We'll break for fifteen (15) minutes.

--- Upon recessing at 2:47 p.m.

--- Upon resuming at 3:06 p.m.

THE CHAIRPERSON: Mr. Peters...?

MR. BOB PETERS: Thank you, sir.

MS. HELGA VAN IDERSTINE: May I just

jump in. We have -- at the outset of the hearing this afternoon Panel Member McKay had asked a question which seemed quite simple to answer and we're having a challenge with it, but it actually was a little more complicated, which is why we waited and now Mr. Strongman has the answer.

MR. JEFF STRONGMAN: So I believe the question was relating to the number of hours worked. So I've -- I've got the data handy to respond to the question.

The milestone that was celebrated back in June of 2017 of 2 million hours and 4 million hours for KCN employees and Indigenous employees respectively that, as I said, was the summertime. By year's end of 2017 the total KCN hours worked was 2.3 million and the total Indigenous hours worked in -- on the project by the end of 2017 was 5.8 million, on a total -- total labour hours worked of 15.3 million.

So the Indigenous proportion of the total was close to 40 percent, and the remark that I'd made previously was that this proportion is unprecedented in megaproject work within Canada.

I believe that was responsive to the question you'd asked.

THE CHAIRPERSON: Mr. Peters...?

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Thank you. On slide 56 of Manitoba Hydro Exhibit 120, one (1) of the issues raised for the cost overruns related to geotechnical issues, correct?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: In one (1) of the reports that was obtained, it was in the MGF report specifically by the contractor KCB, Klohn Crippen Berger, they found that the quantities of earthworks and excavations were close to forecast.

Do you recall them saying that, Mr. Bowen or Mr. Strongman?

MR. JEFF STRONGMAN: Yes, I recall that. I think the comment was in relation to concrete work. They were remarkably close and on earthworks the net sum was very close with some expected deviation according to different classes of excavation.

MR. BOB PETERS: Your memory's better than mine. And on that note, then, Mr. Strongman, why did the geotechnical issues cause problems if, as KCB found, the quantities were very close to what was forecast?

MR. JEFF STRONGMAN: Good question.

In the slide deck that I presented earlier this morning, I attempted to lay the groundwork, if you done mine the pun, for the answer to that question. There's a couple of slides and one (1) of them made reference "to dinner plate clean." It's on slide deck number 17.

Do you see the pictures here? You can see on the left that the -- the undulations of the bedrock are quite substantial and as the people are standing in the high and low spots there's a variation of -- of a number of feet in this picture and many metres over a long stretch of -- of ground.

On the right side you can see a picture showing where rock material has been placed at the base and in the -- in the foreground of that shot where there has yet to be any material placed. And with such significant variation on the bedrock, one of the means of leveling the surface before preparing it for the high-volume machinery with higher productivity levels would be to add in what we call dental concrete. Dental concrete is a lien mix of concrete. It's -- it's less expensive than structural concrete. There's less cement there, but it's really used to fill up all the voids.

And our estimation of -- of how much

dental concrete was going to be required on this job was minimal and as the ground conditions have dictated, it's been one (1) of those concrete -- sorry, one (1) of those quantities where substantially more has been required to date.

MR. BOB PETERS: Can you quantify the dollar and schedule impacts from that dental concrete issue?

MR. JEFF STRONGMAN: The dental concrete issue itself, I can quantify saying that we assumed 1 or 2000 cubic metres of concrete and I think by the end of the second year we had already used at least 10,000 with two (2) more years of earthworks to go. I'd have to check to confirm those numbers, but those pop to mind.

The actual cost impact of that? I would hold back from quantifying because I don't have certainty on what the number is.

MR. BOB PETERS: But in term --

MR. JEFF STRONGMAN: Probably what is more significant is the impact to the overall productivity of having to spend considerably more time getting off the rock -- sorry, is that better?

(BRIEF PAUSE)

MR. JEFF STRONGMAN: So I tried to quantify the -- the volumes. I'm not sure if that was well understood. In any event, the -- the impact from volume and costs is substantial but probably even more impactful is the schedule delay associated with taking considerably more time than planned to clean the surface of the rock to ensure that the base of the earth structures are well founded, and that there is no potential water path or seepage path once the impoundment takes place.

MR. BOB PETERS: While you haven't put a dollar value on the record, Mr. Strongman, by how many weeks, months was the project delayed because of difficulty in getting this dental concrete in place?

MR. JEFF STRONGMAN: It's a good question. Before being able to answer the question, there needs to be an understanding that there is multiple parallel paths of critical work happening. So the earthworks that's taking place, if we just talk about earthworks in exclusivity, we would be measuring the delay experience from getting off the rock in a number of months. On the North dam, for instance, which is nearing completion, we might have spent three (3) to six (6) months longer than planned in preparing

the base before we could work up.

The central dam which is approximately a third completed, we would've had a similar impact there.

And for the south dam which has yet to be constructed because that's currently the path of the -- the river and won't be constructed until, at the very earliest, after next year, there's no measurable delay there yet.

Now, as the earthworks are proceeding we're also building concrete works and concrete has had its own different challenges. So saying what the effect of this earthworks issue has to the overall project schedule, it's happening at the same time as -- as we're experiencing some delays on concrete. So it's -- it's hard to be specific about exactly what that number is.

MR. BOB PETERS: Is Manitoba Hydro attributing any of the delay in the schedule to the dental concrete?

MR. DAVID BOWEN: If I could just add to Mr. Strongman's comments, the -- the concrete works right now is driving the schedule, the critical path. So -- so right now the earthworks is a shorter duration and -- and we should not be waiting for the

earthworks structures to water up and -- and to energize our -- our units.

So if that assumption holds true for the remainder, then the earthworks will not delay our critical path because the concrete path is longer.

MR. BOB PETERS: Were the cost increases addressed for this dental concrete in the original contingency amount set aside for the original general civil contract?

MR. DAVID BOWEN: I would say that, no, there's been a lot more dental concrete work that's been performed than originally anticipated.

MR. BOB PETERS: So that answer really means, Mr. Bowen, that the original contingency amount was insufficient for this -- for this problem?

MR. DAVID BOWEN: Correct. The -- the undulations shown here, I believe that some of the Panel members, when you -- they came to site this past summer on the central dan, we -- there was a -- a pretty significant fault that was right in the middle of the central dam where we've had to go around that -- those conditions to the act -- that -- to that extent weren't anticipated and -- and -- and they're costing more than we originally anticipated.

MR. BOB PETERS: All right. Let's

move us along the timeline, gentlemen, that before the end of the 2016 construction season Manitoba Hydro's management and Board of Directors had concerns about the -- the productivity at Keeyask; that's correct?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And we know that Manitoba Hydro engaged KPMG in May approximately of 2016 to help address some of the problems; correct?

MR. JEFF STRONGMAN: That's correct. The KPMG engagement was self-directed assessment of the Keeyask project's systems and processes to identify opportunities for improvement and then act on those recommendations.

MR. BOB PETERS: And in mid to late 2016 -- 2016, the Manitoba Hydro Board of Directors made a decision to proceed with both Bipole III and Keeyask?

MR. LORNE MIDFORD: Yes, that's right.

MR. BOB PETERS: And that was after Manitoba Hydro's Board of Directors considered whether they should cancel construction on both of those megaprojects; correct?

MR. LORNE MIDFORD: Yes.

MR. BOB PETERS: And moving forward, Manitoba Hydro developed the BBE recovery roadmap in

late 2016; is that also correct, Mr. Midford?

MR. LORNE MIDFORD: Yes, that's -- that's correct.

MR. BOB PETERS: And then as a result of that recovery roadmap, a recovery plan was prepared by Manitoba Hydro in late 2016 or early 2017?

MR. LORNE MIDFORD: Yes, that's -- that's accurate.

MR. BOB PETERS: And I understand from previous answers that the consulting firm KPMG, who's provided a letter as appendix A to Manitoba Hydro's rebuttal, KPMG provided the services to help with that recovery plan?

MR. DAVID BOWEN: That's right.

MR. BOB PETERS: Is KPMG still providing services on Keeyask?

MR. DAVID BOWEN: Yes, they are.

MR. BOB PETERS: Can you tell the Board briefly what KPMG is doing?

MR. DAVID BOWEN: KPMG's providing advisory services to the pro -- to project management for the construction of Keeyask and so much like Mr. Peters has just stated, they were heavily involved with the recovery plan, which began initiated back in September 2016, but they're providing ongoing support

to our team for various issues as they arise on the -- on the construction.

MR. BOB PETERS: Did KPMG also assist on the assessment of the Bipole III project?

MR. ALISTAIR FOGG: Sorry, Mr. Peters, in terms of the Bipole III project from the proceed or not proceed perspective or...?

MR. BOB PETERS: Mr. Fogg, I understand that KPMG was engaged on approximately May the 2nd, 2016. Can you accept that as accurate?

MR. ALISTAIR FOGG: For Keeyask or for -- for Bipole III?

MR. BOB PETERS: No, for the engagement of KPMG engagement entirely. And maybe what I could do is I could ask Diana to find Manitoba Hydro's rebuttal evidence and we'll turn to I guess 59 might be the first page of the -- it might be a KPMG letter. No. If we follow page 58 of 58, a couple more pages ahead, Diana, please. All right, thank you.

(BRIEF PAUSE)

MR. BOB PETERS: This is what I was thinking of is that KPMG was engaged by Hydro on May

the 2nd and they provided a review of the Keeyask generating station project and they talked about development and implementation of a recovery plan, correct? Mr. Strongman or Mr. Midford?

MR. LORNE MIDFORD: Yes, that's correct.

MR. BOB PETERS: My question then, Mr. Fogg, was: Did KPMG also have any role to play since May the 2nd, 2016, in respect to Bipole III?

MR. ALISTAIR FOGG: KPMG has not have -- had an active role on Bipole since May 2nd; earlier to that they were involved on Bipole III conducting, I believe the term has come up, for a health check on the project processes and services.

MR. BOB PETERS: Are these -- Mr. Fogg, was this an extensive health check? Is this an annual medical or is this just a walk-in clinic view?

MR. ALISTAIR FOGG: I wouldn't context it as a trip to the ER necessarily. It was a thorough review of our processes and standards for Bipole III and with some areas of recommendations for improvement.

MR. BOB PETERS: All right. Perhaps the better way for the Board to assess the duration and the scope of their involvement, Mr. Midford, could

you undertake to provide the Board with an indication of how much Manitoba Hydro has paid KPMG since May the 2nd on the Keeyask project and, likewise, how much they've paid KPMG related to the Bipole III project?

MS. HELGA VAN IDERSTINE: We'll take that under advisement, Mr. Peters.

MR. BOB PETERS: All right, thank you.

--- UNDERTAKING NO. 56: Manitoba Hydro to provide the Board with an indication of how much Manitoba Hydro has paid KPMG since May the 2nd on the Keeyask project and, likewise, how much they've paid KPMG related to the Bipole III project. (TAKEN UNDER ADVISEMENT)

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Any costs of these third-party consultants would be included in the control budget; is that correct, Mr. Midford?

MR. LORNE MIDFORD: Yes, that's right.

MR. BOB PETERS: Thank you. In this

process, Mr. Midford, did Manitoba Hydro management consider the cost to walk away from the Keeyask project, in essence, shut it down?

MR. LORNE MIDFORD: I'm not sure what you're -- are you referring to the KPMG engagement or the BCG from the Board? Sorry.

MR. BOB PETERS: Let me rephrase the question. During this review process and just prior to preparing the recovery roadmap and the recovery plan, Manitoba Hydro, as I understood the evidence of your president, had considered on a couple of occasions whether to stop construction on Keeyask entirely; correct?

MR. LORNE MIDFORD: The Manitoba Hydro Board hired BCG in, as you know, in '16 to -- to review the projects and -- and provide that recommendation to them in terms of the -- the economics of continuing or looking at other alternatives going forward. And so that was the main focus of the BCG review. So that was provided to the Manitoba Hydro Board towards the end of '16, I believe.

Since then, internally we've done a refresh of that review which I think was provided in earlier testimony with the new control budget of the

$8.7 billion. And so -- so I believe what our CEO was referring to was the refresh of that analysis in the spring of 2017 by Manitoba -- internally by Manitoba Hydro staff.

MR. BOB PETERS: Has Manitoba Hydro calculated what the cost of stopping work on Keeyask would be and what it would mean for ratepayers?

MR. LORNE MIDFORD: Sorry, Mr. Peters, can you just repeat that.

MR. BOB PETERS: I'm wondering, Mr. Midford, whether Manitoba Hydro had calculated the cost of discontinuing work on Keeyask, together with any ratepayer impacts that might have?

MR. LORNE MIDFORD: Yes, I believe that was done.

MR. BOB PETERS: And are those -- is that information something that Manitoba Hydro can provide to this Board on the public record?

MS. HELGA VAN IDERSTINE: I think -- I think we -- yeah, I don't think the detail of that has been provided, Mr. Peters. It was provided at a high level I think, in -- either in an MFR or an IR, so, we'd have to check into that and whether that's determ -- we can provide more detail.

MR. BOB PETERS: All right, if you

could undertake then, Ms. Van Iderstine, to advise the Panel of Manitoba Hydro's calculation of the costs for stopping construction on Keeyask entirely, together with what, if any, rate impacts that would have.

That would be appreciated.

MS. HELGA VAN IDERSTINE: Excuse me, if that -- if that's been done then I -- we'll look into it and if it's possible to produce it, we will. But I'm not entirely certain it's been done in that entire -- in that detail.

MR. BOB PETERS: Thank you.

--- UNDERTAKING NO. 57: To advise the Panel of Manitoba Hydro's calculation of the costs for stopping construction on Keeyask entirely, together with what, if any, rate impacts that would have.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: In terms of Manitoba Hydro's recovery roadmap, one (1) of the options to go forward was to start with a new general civil

contractor; is that correct?

MR. DAVID BOWEN: That -- that's what's shown there, yes, on slide 57 of my presentation this morning.

(BRIEF PAUSE)

MR. BOB PETERS: Is it correct for this Board to understand, Mr. Bowen, that when Manitoba Hydro was developing the recovery roadmap, the general civil contractor that we've called BBE was not interested in continuing under the old contract?

MR. DAVID BOWEN: I'd like to provide the most complete answer today, but I would request that be able to provide more information tomorrow. Certainly BBE was aware of the challenges they were having and, certainly, they wanted to do everything they could to -- to help Manitoba Hydro and continue with the project.

MR. BOB PETERS: But it's a matter of public record, is it, Mr. Bowen, that one (1) of the options considered by Manitoba Hydro was to part company with BBE and proceed in a different direction?

MR. DAVID BOWEN: Yes, that's what's shown on slide 57.

MR. BOB PETERS: The other option would be to reduce the scope of work for BBE and bring in some additional contractors to help?

MR. DAVID BOWEN: We -- we considered descoping, yes.

MR. BOB PETERS: And descoping for those of us who aren't all that familiar with the word really means, put a new contract together with BBE but also bring in somebody else to do some of the work that BBE wasn't given in the new contract?

MR. DAVID BOWEN: More -- more or less, it would -- it would change the scope of work they had and would bring in different parties to execute portions of that work.

(BRIEF PAUSE)

MR. BOB PETERS: Let's jumped to when Manitoba Hydro decided to continue the relationship with BBE as the general civil contractor, Mr. Bowen; that meant Manitoba Hydro had to, in essence, renegotiate with them to continue?

MS. HELGA VAN IDERSTINE: Excuse me, Mr. Peters, I just --

MR. BOB PETERS: I'm sorry.

MS. HELGA VAN IDERSTINE: -- wanted to have a quick chat with -- with Mr. Bowen. I -- I know he's concerned at this point to some of the questions are getting quite close to things that he'd be concerned about relating -- that affect the relationship with some of the parties and would otherwise be CSI so.

We want to be as open as we can in this process so that the public is aware of what's going on and response of -- it's getting too close.

MR. BOB PETERS: Since that, Ms. Van Iderstine, and I move to a new topic if -- if that permit -- but if I am encroaching and that sensitivity arises again, please, don't hesitate to -- to let us know.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: I wanted to turn, Mr. Bowen, to Manitoba Hydro having made the decision to continue with BBE as the general civil contractor; that meant that there had to be a new negotiation with that contractor; correct?

MR. DAVID BOWEN: Correct, based on the -- the challenge we had and -- and the problems that, yes, we need to negotiate a new path forward.

MR. BOB PETERS: And I'll put the question out and you'll tell me if I'm getting too close to the line, but under the original contract the cost overruns due to the productivity problems had a negative impact on BBE's profits?

MR. DAVID BOWEN: I'd like to discuss that tomorrow --

MR. BOB PETERS: All right.

MR. DAVID BOWEN: -- if I may.

DR. BYRON WILLIAMS: Mr. -- Mr. Chair, just -- Byron Williams for the Consumers Coalition. I'll just note that if one goes to the KPMG letter attached to Manitoba Hydro's rebuttal evidence, there's a fair bit of information in there and -- and certainly our client always is interested in as much information on the public domain as possible.

I'm not as confident as Manitoba Hydro that we are coming close to -- close to that line. This is important public information.

THE CHAIRPERSON: Thank you, Dr. Williams, and -- and I'm sure that in your cross-examination, if it's on the record already, you may go to it.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Mr. Bowen, in late 2016 or early 2017 both Hydro and BBE signed what is known as Amending Agreement Number 7?

MR. DAVID BOWEN: Yes, that occur -- occurred in early 2017.

MR. BOB PETERS: And essentially, that's the new general civil contract going forward and that's the one that's in place today?

MR. DAVID BOWEN: Correct, that agreement amended the existing original contract.

MR. BOB PETERS: And under this Amending Agreement 7, there was a recalibration of the productivity required from BBE and the profit to be allowed to BBE?

MR. DAVID BOWEN: That's correct.

MR. BOB PETERS: And there was a new target price for the completed contract?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And there was a new profit amount determined that would be available to BBE?

MR. DAVID BOWEN: Correct.

MR. BOB PETERS: Can you indicate whether BBE would also receive overheads and general

administrative cost allowance?

MR. DAVID BOWEN: Yes, general administration, overhead applied.

MR. BOB PETERS: Would be fair for this panel to understand, Mr. Bowen, that the new contract with BBE looked a lot like the old contract?

MR. DAVID BOWEN: Well, certainly, the -- the technical scope and the scope of work was -- was mostly unchanged. The commercial points of it, though, there are some pretty substantive changes.

MR. BOB PETERS: And those are the points you're going to tell the Panel about tomorrow?

MR. DAVID BOWEN: Yes.

(BRIEF PAUSE)

MR. BOB PETERS: All right. Are you able to tell the Board today, Mr. Bowen, that in addition to any contingency reserve in the Amending Agreement 7 whether there are management reserves?

MR. DAVID BOWEN: As I noted in my presentation, there were no management reserves contained in the control budget.

MR. BOB PETERS: Can you indicate why that's the case?

MR. DAVID BOWEN: I -- I tried to articulate that earlier. The -- the reason for -- management reserves are low probability/high-impact events and one (1) event could be if there was a major safety incident that, basically, stopped work in the powerhouse complex for months on end, which would have a direct impact on the scheduled date completion, of course, lots of costs.

At this point in the contract, in the project, we chose not to -- to choose these events to -- to put in the budget because of their large dollar value and -- and the low likelihood of occurrence.

MR. BOB PETERS: Keeping it at a high level, Mr. Bowen, we can fast-forward to the MGF services report in these proceedings, and there is an extract on page 43 of Board counsels' book of documents and MGF -- I'm sorry, I suggested it was a report, it's actually in response to an Information Request.

MGF indicates that the Amending Agreement Number 7 is not being performed at an acceptable level. And as an example, more money is being spent for less process -- progress and revised productivities in Amending Agreement Number 7 are not being met.

Do you see that?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: Is that factually accurate?

MR. DAVID BOWEN: In -- in my presentation today, we talked about the -- the quantity deficits for both concrete and earthworks. So if we go back to the -- remind everyone of that conversation is that, we saw improvements to concrete production and to earthworks, but we had a deficit of 20 percent in the concrete and 25 percent in the earthworks.

The -- the work on the concrete, the -- the costs are higher than the amending agreement right now, and certainly we've seen some cost growth in other areas of the contract. So, those are some challenges that we're actively working on with our general civil contract as we speak to -- to bring those costs back in line with -- and improve upon them based on what was signed in the amending agreement.

MR. BOB PETERS: And so with that answer, Mr. Bowen, you're acknowledging as said by MGF that revised productivities in Amending Agreement Number 7 are not being met; correct?

MR. DAVID BOWEN: I'm -- I'm

qualifying the answer. In earthworks this year, we -- we saw an improvement overall. In -- in concrete we did see an improvement. I would -- I would characterize that improvement as a 20 percent improvement overall but if you look at the person hours, the dollars per person, yes, it's cost more than the -- than the amending agreement, but there is a complexity factor to consider as well.

MR. BOB PETERS: All right, thank you. And to complete the Keeyask cost estimates that are on the public record, MGF on page 45 of Board counsels' book of documents indicates that the order of magnitude estimate range to complete Keeyask, according to MGF, is between 9.5 billion and 10.5 billion.

You see that, sir?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And Manitoba Hydro understands that the $9.5 billion number from MGF is if MGF -- is if Manitoba Hydro takes some mitigation steps that MGF has indicated are needed in the MGF report?

MR. DAVID BOWEN: The first thing I'm always concerned about, various consultants throwing out range of values. I think we've seen a history of

that on the Keeyask project to date. We --we've -- we've provided -- Manitoba Hydro's provided our best estimate of where the project could end up. Certainly others can have other opinions and -- but it's -- it's -- it's challenging and dangerous to make opinions based on limited knowledge.

MR. BOB PETERS: I'll take that as a polite way of Manitoba Hydro disagreeing with MGF's view and you provided your written reasons in Manitoba Hydro's rebuttal, Mr. Bowen?

MR. DAVID CORMIE: Well, to be clear, the -- the P90 value for Manitoba Hydro's control budget was 9.6 billion which is in the range. We -- we did look at reserves with our budget and -- and certainly we're not disputing that we can -- the project has risks that could put us in this range. So I'm not disputing that fact, but I -- I don't -- we have difficulty understanding how MGF arrived at these numbers.

MR. BOB PETERS: All right, I have your point. Thank you. Now, you've already in your last few answers repeated what we heard in your presentation to the effect that more concrete was placed in 2017 than in 2016 and, likewise, more earthworks were completed in 2017 and 2016, correct?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: And you'll agree with me that -- and I think your answer may have contained the germ of the point I'm getting to -- is that just because more quantity of concrete and earth was placed in the prior years that doesn't mean Manitoba Hydro and BBE were more productive than in 2016; does it?

MR. DAVID BOWEN: To be clear, we saw a productivity improvement on the earthworks. The -- the earthworks is very easy to measure. For the concrete, the concrete work this year if we go back to the slides that Mr. Strongman showed of the work completed in 2016 compared to 2017. In 2016 we were metres off the ground. Whereas in 2017, we were tens of metres and lots of work was accessed by scaffolding. So it -- the work was higher, more -- more complex. The formwork we saw the draft to forms and we saw the top of the scroll case, all that formwork surround -- circular formwork compared to flat formwork.

So the complexity of the work, what I was trying to illustrate was the complexity of the work in 2017 was a fair bit more complex than in 2016. So overall, the productivity values, the dollar -- the person hours per unit to work, it did cost more, but

when you weigh it with the complexity factor, there was certainly improvements that were made.

MR. BOB PETERS: Even with those improvements, Mr. Bowen, 2017 productivity for both concrete and earthworks were below the targets in the 2017 Amending Agreement Number 7?

MR. DAVID BOWEN: So I'll just -- I'll just correct the language for the -- for the record. The production targets which means the total volume of work completed were both less for concrete and earthworks and that was a 20 percent deficit for concrete and a 25 percent deficit for earthworks.

MR. BOB PETERS: From a productivity perspective, Mr. Bowen, was both the productivity for concrete and earthworks below target levels set in Amending Agreement Number 7?

MR. DAVID BOWEN: The earthworks improved and the concrete eroded based on the complexity factor I noted.

MR. BOB PETERS: And the complexity factor you note, and this is a non-engineering explanation, but you're telling the Panel that it was harder to pour the concrete in 2017 than it was in 2016?

MR. DAVID BOWEN: I'll try not to be

too much of an engineer. If you imagine each concrete placement, basically, you're putting up a wood box. You're putting in rebar. You're putting in a -- a water stop to prevent water from leaking through the dam. You're putting in a bunch of pipe, mechanical pipe. That whole cycle from starting with forming to actually placing the concrete in there and letting it harden, that's a whole cycle. So -- so, yes, that whole cycle was more challenging in 2017.

MR. BOB PETERS: Mr. Bowen, if productivity continued exactly going forward as it did in 2017 for both concrete and earthworks, does it mean that the MGF cost estimate is a possible result?

MR. DAVID BOWEN: We require a 10 percent improvement in our productivity for GCC and no major risk materialized to reach our control budget. If we saw a 0 percent increase, so just straight line, it would -- it would push us north of $9 billion and -- and would push us closer to the bottom of the MGF range.

MR. BOB PETERS: That 10 percent increase by the general civil contractor was for both concrete and earthworks?

MR. DAVID BOWEN: The -- the 10 percent improvement's required across the board. So I

would characterize it as improving the productivity so the person hours per unit of work improving the production, so getting more volume of work, and improving the costs. So overall, the costs come down by 10 percent.

MR. BOB PETERS: And there's no management reserve for productivity in Amending Agreement Number 7, is there, Mr. Bowen?

MR. DAVID BOWEN: No, no, as I noted earlier, the -- there's no management reserve in our control budget and there is no management reserve in the amending agreement with the general civil contractor.

MR. BOB PETERS: So a lack of productivity drives up the cost just like it did when Manitoba Hydro had to go from the original BBE contract to the Amending Agreement Number 7?

MR. DAVID BOWEN: Certainly, the -- the productivity rate will dictate whether the costs goes up or down for -- for this work, yes.

And -- and as I noted earlier, we have a number of mitigation plans in place with BBE, our contractor, and Manitoba Hydro to improve upon those results and drive down the costs.

MR. BOB PETERS: Let's turn, if we

could, to discuss the types of contracts in a bit more detail. Starting on page 54 of Board counsels' book of documents, we have an extract from the MGF report. I don't know if it's a colloquialism or something, but it -- in construction time is money. In traditional fixed contracts time is the contractor's money and in cost reimbursable contracts, time is the owner's money.

Do you see that, Mr. Bowen?

MR. DAVID BOWEN: Yes.

MR. BOB PETERS: Have you heard that before?

MR. DAVID BOWEN: Yes, I've heard it from a few engineers in the past.

MR. BOB PETERS: Is it true?

MR. DAVID BOWEN: It's in there -- it's a very narrow view. Certainly at face value, yes, it's absolutely true. In the context it's presented, the -- we do not have a cost reimbursable contract. We have a target price contract and so I -- I think in the context it's presented that it's -- it's misleading.

MR. BOB PETERS: Okay, let's -- let's go there. In terms of which of those three (3) most closely aligns or which -- sorry, which of those two

(2), the fixed contract or the cost reimbursable aligns with Hydro's original contract with BBE. Most closely, it would be the cost reimbursable contract; would you accept that?

MR. DAVID BOWEN: I'd say it's somewhere in between --

MR. BOB PETERS: All right and what about --

MR. DAVID BOWEN: -- the fixed --

MR. BOB PETERS: -- the Amending Agreement Number 7, is that closer to a cost reimbursable contract --

MR. DAVID BOWEN: Yes --

MR. BOB PETERS: -- than a fixed contract?

MR. DAVID BOWEN: Pardon me, it's -- it's somewhere in between.

MR. BOB PETERS: Would you be more comfortable, Mr. Bowen, if Manitoba Hydro's contract was called a cost reimbursable contract with a target price?

MR. DAVID BOWEN: Yes, that's indeed what it's called.

MR. BOB PETERS: On page 55 of Board counsels' book of documents, there are some slides

that were presented at one (1) of the meetings with Manitoba Hydro's Board of Directors.

So, Mr. Midford, if you saw it it was probably this February 14th version. Have you seen it before?

MR. LORNE MIDFORD: Yes.

MR. BOB PETERS: All right. So let's -- subject to anybody checking, and I'm not sure it matters, but this was a presentation made to the Manitoba Hydro Electric Board of Directors; correct?

MR. LORNE MIDFORD: That's my understanding.

MR. BOB PETERS: All right, did anybody on this panel present it to the Board of Directors? I'm seeing shaking heads so --

MR. LORNE MIDFORD: No.

MR. BOB PETERS: All right. I'd like to move quickly through it, but I want the panel, the witness panel, to explain to the Board Panel exactly how a cost reimbursable contract with a target price works. So we start on page 55.

And on this chart, the actual cost of work is on the bottom axis and what the contractor is paid is cont -- is identified on the vertical axis, correct?

MR. JEFF STRONGMAN: I'll attempt to answer your questions in this region.

MR. BOB PETERS: All right.

MR. JEFF STRONGMAN: However, having said that, I'm -- I'm not familiar with the references to these charts. But certainly I can explain the contract model.

MR. BOB PETERS: And that's -- that's really what I want to do is explain it with these documents, if I could, Mr. Strongman --

MR. JEFF STRONGMAN: Okay.

MR. BOB PETERS: -- and to the extent you can help. So on page 55, we start off, there's the initials TP or -- that stands for Target Price up at the top of the chart?

MR. JEFF STRONGMAN: Agree.

MR. BOB PETERS: And that's Manitoba Hydro's target price that would intercept the horizontal access at some dollar value, correct?

MR. JEFF STRONGMAN: Correct.

MR. BOB PETERS: And we knew that that dollar value was $6.5 billion when the first contract was -- was let.

MR. JEFF STRONGMAN: Just to be clear, the -- the project budget was 6.5 billion, but the

contract value would have been considerably less than that, given it was a component of the overall project.

MR. BOB PETERS: All right, I perhaps didn't word the question properly.

What you're telling the Panel is the general civil contract is only a portion of the total $6.5 billion total price?

MR. JEFF STRONGMAN: That's right, in my earlier presentation, I think I said there was two hundred and thirty-nine (239) contracts awarded; of those, the general civil contract is the largest and it is the form of contract that we're currently discussing.

MR. BOB PETERS: All right, on page 6 -- 56 of Board counsels' book of documents, we progress along a time continuum here and we see that the contractor has been paid their actual cost of work, correct?

MR. JEFF STRONGMAN: Page 56 we're just presuming some hypothetical cost of work component?

MR. BOB PETERS: Yes, we are.

MR. JEFF STRONGMAN: Yep.

MR. BOB PETERS: And so you're agreeing that the contractor has been paid their cost

of work?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: That's the actual cost that the contractor would charge to Manitoba Hydro, if this applied to Manitoba Hydro?

MR. JEFF STRONGMAN: Yes, this theoretical example appears to be so.

MR. BOB PETERS: It's not tied to a unit or a -- or a fixed price, it's based on what the actual cost is by the contractor?

MR. JEFF STRONGMAN: But the actual cost of the work that complies with the cost reimbursable requirements within the contract.

MR. BOB PETERS: What you're telling the Panel is there's a maximum amount this contractor's going to receive under a cost reimbursable contract with a target price. But until that -- that target price is met, the contractor is going to be paid their actual cost of doing work?

MR. JEFF STRONGMAN: That's right.

MR. BOB PETERS: So maybe let me try it this way and let's bring it back to Keeyask. We've heard of evid -- excuse me, we've heard evidence that the contractor was not meeting the productivity levels in the placement of concrete; correct, Mr. Strongman?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: Even though the contractor wasn't meeting those productivity levels, that means the contractor was actually taking longer to do what they were supposed to be doing?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And by the contractor taking longer to do work, the contractor was getting paid more because that was their actual cost of work?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: So even though the contractor was -- had a productivity target, they weren't meeting it, they were still getting paid for their actual cost of work?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: And on top of being paid for their actual cost of work, the contractor was also getting a separate cheque representing their profit?

MR. JEFF STRONGMAN: The provisions within the contract specify the general administrative and overhead expenses that are a potential markup on top of the cost, subject to limitations, as well as a profit percentage that would be a markup on top of the actual cost of the work, subject to a separate range

of limitations.

MR. BOB PETERS: All right, and that's what this is showing on page 56 is that the actual cost to work being done is being reimbursed to the contractor and the contractor's getting on top of that some profit and what's not shown is the overheads and general administration costs?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: And so now on page 57, there is a continuing actual cost of work being done by the -- by the contractor and while the contractor is doing more work, they're still being paid the same as they were on the slide 56?

Mr. Strongman, that's your understanding?

MR. JEFF STRONGMAN: One moment please.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: Mr. Peters, if -- if you don't mind, I'll take a crack at explaining the basics of the contract without making specific reference to the charts because I find them less than clear in terms of the questions that you're asking me.

I think I can give you the information that you're seeking if you don't mind. Okay.

MR. BOB PETERS: Let's try.

MR. JEFF STRONGMAN: In a cost reimbursable target price contract, Mr. Peters, was explaining that the contractor is reimbursed for costs incurred to do the work.

How the target price comes into play is the contractor's bid for all the different units of work and the quantities to be performed times the prices that he submitted as his estimate to do the work creates an extension of all the line items, fifty (50) or sixty (60) odd different line items times the prices that he's quoted and that becomes the target price.

So if we just assigned a number to it, let's say, it's $100. Through the execution of the work, the contractors entering monthly invoices of one (1) or two (2) or three dollars ($3) a month all the time performing work and being reimbursed for those costs.

We're constantly comparing the unit costs that the contractor's engaging in and comparing those to what the bid price was to understand long before we're at the end of the job whether or not

there is a positive variance happening, a negative variance or they're on track.

So, if the contractor's work is happening and it's costing more expensive than what their bid price is, we are obligated to reimburse them according to the terms of the contract but we're very quickly tracking the fact that we're seeing a variance take place and should things continue to the end, there would be a projection of an overrun and, therefore, the provisions of the contract would indicate that the contractor's expected profit would be eroded by that overrun.

Our contract says that for every dollar overrun we experience the contractor's cost beyond the target price, their profit would be eroded by eighty cents ($0.80) on the dollar. Conversely, if they proceed to spend and incur less cost to complete the work, and they end up saving us money, then Manitoba Hydro pays less for the work to be accomplished, and we also share in the savings with the contractor. So we give them, in effect, an incentive to reduce cost and -- and perform better than planned.

I think what Mr. Peters is driving at is through the course of execution of the work, the contractor is reimbursed for the cost. They also have

their markup for general admin, and overhead, and profit, and that all works out fine unless you start seeing a variance. And then you account for that variance by either triggering the general admin and overhead provisions that cap, or a profit erosion looks to be probable, and then you start modifying how the profit would be paid. And there's a reconciliation at the end of the job on the assumption that those are all close.

In our case, through 2016, the variance between plan and actual was so significant, we didn't need to wait to the end of the job to know that the variance was causing a problem on simply executing the work. And that triggered many of the recovery plans, and development and implementation of the recovery, and -- and negotiation of the contract terms that we've been describing today.

How was that, Mr. Peters?

MR. BOB PETERS: That was, I'll say, excellent and I appreciate that. So to help the Board understand your -- your latter comments on Tab 60 of the Board counsel -- or page 60 of Board counsel book of documents. And if this is -- this is an example where there's a cost underrun, and if you're not comfortable, Mr. Strongman, answering it, I don't want

you to go there, but in an example of a cost underrun between the actual cost of work done and the target price, there's a sharing of the surplus monies, correct?

MR. JEFF STRONGMAN: Yes. If we use the hundred dollar job cost, that I threw out there, if the contractor's cost of doing the work is only ninety (90) at the finish and they, therefore, save ten (10), Manitoba Hydro would keep eight (8) of that ten (10), and give the contractor two (2) of it as an incentive for beating the target price on the work.

MR. BOB PETERS: So let's take that, Mr. Strongman, and let's go to page 61, in an example where there's a cost overrun. And how does that work under this cost reimbursable arrangement with the target price?

MR. JEFF STRONGMAN: Okay. So if we had the same hundred dollar target price, but this time, the actual cost of the work exceeds, and it costs us a hundred and ten (110), Manitoba Hydro has paid the hundred and ten (110) as an incurring cost to do the work, but the contractor's profit will be eroded at a rate of 80 percent of that ten dollar ($10) overrun, such that Manitoba Hydro is effectively clawing back cost of work payments that have already

been made but to reconcile on the profit to ensure that the terms of the contract relating to profit are fulfilled. That would probably be done at the end of the project, but we're still talking in a hypothetical.

MR. BOB PETERS: All right. And while the contractor would bear the pain of that 80 percent of the cost overrun, Manitoba Hydro would bear the other 20 percent of that pain?

MR. JEFF STRONGMAN: That's right. So when we paid out a hundred and ten (110) to get the work done, we would then recover eight (8) out of the ten dollar ($10) overrun by removing that from the contractor's profit entitlement. We would still be out a couple dollars beyond the hundred dollar project budget, because that was our 20 percent that we own from the contract term.

MR. BOB PETERS: All right. And the example I -- I want to turn to is on page 62. And in the situation in which the actual cost of work exceeds the target price and also exceeds the profit that was to be paid to the contractor, what happens in that instance?

MR. JEFF STRONGMAN: Okay. Well, this is the scenario that most closely relates to Keeyask

in 2016 prior to amending agreement number 7. However, just to qualify that comment, we were basing on a projection because we were nowhere near the end of the job, but the job was projecting to be in the situation that is described here on page 62, where actual cost of the work exceeded the target price as well as the limitation of liability from the contractor's profit.

So in other words, the job costs were going to be so far beyond the plan that even after clawing back the contractor's profit, we would still be incurring costs that we had no recourse for.

MR. BOB PETERS: Could you repeat that last -- last response? You'd be clawing back --

MR. JEFF STRONGMAN: We would be recovering a portion of the costs from the contractor's exposure to liability by reducing their profit, but -- and once that profit was fully recovered, the contractor's limit of liability is no more. We have no recourse to penalize or effectively recover any costs. We were on the -- on the hook for the 100 percent of the costs beyond the contractor's profit. It's a scenario that clearly, we did not envision and see as a -- a likely outcome. However, we found ourselves there.

MR. BOB PETERS: Mr. Strongman, we saw in Manitoba Hydro's slides that contracts for things like -- I think it was the -- the turbines and generators were a fixed-price contract. Are you aware of that?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: But even if there's a fixed-price contract, that may end up costing Manitoba Hydro more money if the project is delayed, as I understood you when we were talking about the waterfall?

MR. JEFF STRONGMAN: Right. So the form of contract does not necessarily insulate you from changed conditions or substantial deviations from plan.

MR. BOB PETERS: That wasn't my question. My question was: You're now going to have to pay somebody to -- with whom you've entered into a fixed-price contract more than the fixed-price contract because the general civil contractor caused a delay.

MR. JEFF STRONGMAN: Pardon me.

MR. BOB PETERS: Do you understand my question?

MR. JEFF STRONGMAN: Okay. Sorry. I

understand your question now.

MR. BOB PETERS: All right. And in that instance, Mr. Strongman, who is responsible for paying that additional cost under the fixed-price arrangement?

MR. JEFF STRONGMAN: The owner would be responsible.

MR. BOB PETERS: That doesn't get charged back to the general civil contractor who caused the delay that caused the fixed-price contract to escalate?

MR. JEFF STRONGMAN: Not typically. That would typically be an interface that the owner retains responsibility for. So earlier, Dave talked about the knock-on effect when a -- the general civil schedule has affected and impacted other work subsequent to the concrete and earthwork structures being completed.

The service contracts that are a req -- a requirement for our -- our construction site, providing security, catering, et cetera, they're all function of time. So when the schedule takes six (6) months longer than expected, all of those contracts' duration are extended by six (6) months, and we would then incur costs equivalent to six (6) months'

extension.

If we had a -- a fixed-price contract like a gates, guides, and hoist installation, if that would be impacted by the work of a previous contractor, we would then need to work out some form of resolution with the impact.

MR. BOB PETERS: Mr. Strongman, on page 63 of Board counsel's book of documents is an extract from the MGF project services report. This is a portion that was, I believe, authored by Klohn Crippen Berger -- Berger? Do you have that, sir?

MR. JEFF STRONGMAN: I have page 63 in front of me.

MR. BOB PETERS: And -- well, you know them as KCB, do you, as --

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: And that's the company that constructs Hydro dams?

MR. JEFF STRONGMAN: Yeah. I don't have much direct experience with them, but I understand them to have worked a fair amount of Western Canada.

MR. BOB PETERS: On Hydro generating stations?

MR. JEFF STRONGMAN: Yeah.

MR. BOB PETERS: And in their review of the 2014 contract, they too called it a cost-reimbursable model, and your -- you'd like that to be corrected to say cost-reimbursable with a target price?

MR. JEFF STRONGMAN: Yes, I believe that's how we addressed our rebuttal.

MR. BOB PETERS: And in this particular review, KCB was trying to understand how the project could be as far over budget, because the variances and quantities didn't appear that high, and the initial unit prices were, in fact, low.

Do you see their statements?

MR. JEFF STRONGMAN: I see them highlighted here, yes.

MR. BOB PETERS: And you've already told this panel that the variances and quantities was not that high, correct?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: But on the next page, 64, KCB focuses on a section of the contract where it seems that actual costs that are paid to the contractor by Manitoba Hydro is not qualified by the quantities times the unit prices. Do you see that?

MR. JEFF STRONGMAN: I do.

MR. BOB PETERS: And so when KCB speaks of the actual costs, you've already acknowledged that Manitoba Hydro had to pay BBE the actual costs for the work that they actually did?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And that actual cost was not tied to any specific quantity times a unit price?

MR. JEFF STRONGMAN: Save for the explanation I -- that I gave to how the cost of the work compares to the target price and the profit component.

(BRIEF PAUSE)

MR. BOB PETERS: KCB, then, in the middle of page 64, focuses in on the all actual indirect and direct costs incurred by the contractor or BBE in performing the work are reimbursed to the contractor, correct?

MR. JEFF STRONGMAN: That is definitely what it says.

MR. BOB PETERS: And they're quoting from the contract that Manitoba Hydro has with BBE?

MR. JEFF STRONGMAN: I presume so, but

I haven't confirmed.

MR. BOB PETERS: All right. Will you take that subject to check?

MR. JEFF STRONGMAN: Sure.

MR. BOB PETERS: All right. It -- and then want to take you to below the quote of that section. Their comment from KCB that there's no connection between actual costs and the quantities and unit prices in the bill of quantities, that's accurate, is it not?

MR. JEFF STRONGMAN: Well, I would say the same response as I did a moment ago. I -- I don't feel it's a hundred percent accurate, because in a target price contract, the linkage is through the comparison of actual cost to the target price and then the influence on the contractor's profit and GA & O as -- as an outcome. So I -- I disagree with that. It demonstrates to me that KCB did not fully understand the target price component of the contract.

MR. BOB PETERS: So long as the general civil contractor is below or underneath the target price, this statement would then be actual -- would be factual, correct?

MR. JEFF STRONGMAN: Well, not necessarily just below, below or above, within the

range of influence from the provisions relating to the profit, that 80 percent, plus or minus.

MR. BOB PETERS: Once the target price has been exceeded, and the profit margin has disappeared for the general civil contractor --

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: -- is there any incentive for BBB -- BBE to actually perform the work?

MR. JEFF STRONGMAN: No. The incentive perversably (sic) flips. In other words, there -- there appears to be more incentive to drag it out as opposed to finishing, subject to limitations on the GA & O cap.

MR. BOB PETERS: And that perverse incentive is because by dragging it out, BBE would be paid their actual costs of construction?

MR. JEFF STRONGMAN: Correct.

MR. BOB PETERS: They wouldn't be getting additional profit at that point in time?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: But they would be getting paid their actual costs of their workers?

MR. JEFF STRONGMAN: Yes. They would also get an -- a GA & O markup until that ran out, as well.

MR. BOB PETERS: Right, and you haven't put on the public record when that happens, but that would be a factor that would determine at what point they're totally -- have little incentive to perform the work?

MR. JEFF STRONGMAN: That's correct.

(BRIEF PAUSE)

MR. BOB PETERS: Mr. Midford, I don't know if you can answer this, but did Manitoba Hydro have a preference for a unit price contract for Keeyask rather than the cost reimbursable contract with the target price?

MR. LORNE MIDFORD: The original contract or the amending contract?

MR. BOB PETERS: Let's start with the original contract.

MR. LORNE MIDFORD: I'm -- I think that both Mr. Bowen and -- and Mr. Strongman provided kind of the environment when that contract was awarded, and based on the market conditions at the time, I think they've stated that there was -- and based on their experience in the award of Wuskwatim, that the unit-based approach wasn't an approach that

they thought would be successful.

MR. BOB PETERS: In that answer, Mr. Midford, are you telling this panel that Manitoba Hydro did not put out a unit price contract tender for Keeyask?

MR. LORNE MIDFORD: Yes, that's my understanding.

MR. BOB PETERS: Did Manitoba Hydro put out a tender for Keeyask other than a cost reimbursable contract with a target price?

MR. LORNE MIDFORD: No.

MR. BOB PETERS: Now, in Manitoba Hydro's rebuttal, Mr. Midford, Mr. Bowen, and Mr. Strongman, I believe pages 6 and 7 of 58, there's an explanation that Manitoba Hydro did try to put out -- or did, in fact, put out a unit price contract when Wuskwatim was going out to tender, correct?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And that yielded, Mr. Strongman, one (1) and only one (1) bidder that came back with a proposal?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: Manitoba Hydro wasn't obligated to accept any bid, and did not accept that one (1) bid, did they?

MR. JEFF STRONGMAN: That's right.

MR. BOB PETERS: Now, in the rebuttal, there's an indication that the unit price bid would have nearly doubled the engineer's estimate. Do you recall that being in your rebuttal?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: At what stage was the engineer's estimate back in, I suppose it was 2001 or 2002, as the Wuskwatim review was filed before the Clean Environment Commission sometime in 2003? Do you know?

MR. JEFF STRONGMAN: No, that predates my involvement by about a decade. Let me check.

MR. BOB PETERS: I indicated earlier that Mr. Williams's younger twin brother would be able to answer that, but...

(BRIEF PAUSE)

MR. BOB PETERS: Were you able to determine whether or not the engineer's estimate was at a refined stage, or was it just a preliminary calculation?

MR. JEFF STRONGMAN: I have not been able to definitively --

MR. BOB PETERS: All right.

MR. JEFF STRONGMAN: -- provide that, no.

MR. BOB PETERS: Can you tell this Board how the unit price bid for the general civil contract on Wuskwatim compared to the actual final price paid by Hydro on the general civil contract?

MR. JEFF STRONGMAN: Yes. I can say that the -- the bid provided values considerably more than the final cost outcome.

MR. BOB PETERS: So for the general civil contractor on Wuskwatim, had Manitoba Hydro proceeded on a unit price basis, they would have paid more than they actually did under a cost reimbursable with a target price contract?

MR. JEFF STRONGMAN: Yes, that's correct.

MR. BOB PETERS: And are you able to say how much more?

MR. JEFF STRONGMAN: I can't with certainty. My recollection is between 50 and 100 million more.

MR. BOB PETERS: So when we go back to -- I hate to do this, but back to page 5 of Board counsel's book of documents, and we look for

Wuskwatim, and let's just look at the very top line on this chart, because that's the Wuskwatim generating station, correct, not including the transmission?

MR. JEFF STRONGMAN: Okay. Page 5?

MR. BOB PETERS: Yes.

MR. JEFF STRONGMAN: Could you repeat the question?

MR. BOB PETERS: I'm suggesting that to -- to understand your last -- or second last answer to me, we have to look at that Wuskwatim GS line, or generating station line at the top of the chart on page 5 of Board counsel's book of documents?

MR. JEFF STRONGMAN: Okay.

MR. BOB PETERS: And by the time this project had gone to the Clean Environment Commission in 2003, Manitoba Hydro had already determined, did it, that it was not going to go out on a unit price contract?

MR. JEFF STRONGMAN: So I joined the project in 2009, approximately two (2) weeks before the first concrete by the general civil contract, O-N-E, on Wuskwatim. And the history prior to 2009 predates me, but I had done some checking in anticipation of this question, and I found that Manitoba Hydro tendered for the general civil contract

in 2006, and received the one (1) bid for unit price in early 2007, determined that bid to be cost prohibitive and did not proceed. Then we went to a second procurement process through 2008 for the general civil contract. We had four (4) prequalified vendors who submitted proposals, and ultimately we selected one (1) to proceed.

MR. BOB PETERS: All right. Let's go back, then, Mr. Strongman, to 2006. That's the year in which the unit price contract was put -- a tender was put out and one (1) party responded, correct?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And that response was considered unacceptable because it was nearly double the engineering estimate for what the general civil contractor should have been asking for?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And so of that $1.1 billion, are you able to indicate the approximate percentage of that that would have been related to the general civil contractor, or is that something that can't be put on the public record?

MR. JEFF STRONGMAN: I would just be guessing. I -- I can't recall the exact engineer's estimate of the proponent --

MR. BOB PETERS: All right, but --

MR. JEFF STRONGMAN: -- or the percentage.

MR. BOB PETERS: -- on the generating station, the general civil contract was the largest contract for that project?

MR. JEFF STRONGMAN: It might be a third (1/3), 40 percent-ish?

MR. BOB PETERS: Okay. So if we say it's $300 million, are you with me on that?

MR. JEFF STRONGMAN: As a ballpark, yes.

MR. BOB PETERS: As a ballpark. If -- even if that bid had come back and was an extra hundred million dollars, it would have meant that you would have paid $400 million for the general civil contractor, correct?

MR. JEFF STRONGMAN: Are you talking about a hundred million worth of change conditions and executing the work?

MR. BOB PETERS: I was using the hundred million that you gave me about five (5) minutes ago.

MR. JEFF STRONGMAN: Okay. Well, we should also account for the change conditions in

executing the work if we're going to take the theoretical path of proceeding with a lump sum contractor or a unit price contract right out of the gates.

MR. BOB PETERS: Okay, but let's -- let's stick with this unit price bid. Would it not be correct for this panel to look at the cost in 2006 of $1.1 billion and say, Even if it was an extra hundred million dollars, that's still coming in considerably lower than what it otherwise would have cost?

MR. JEFF STRONGMAN: Okay. Let me back up, then. So in the 2006 time frame, where the project budget was one point one (1.1) our engineer's estimate would've been a third (1/3), so we would have expected roughly a general civil contract value of in the neighbourhood of three hundred (300). And as the procurement process evolved and only one (1) bid was received, we would have considered that noncompetitive. But the value for that one (1) bid was exceedingly expensive, and by that, I mean close to double, so we would not have chosen to proceed.

Had we proceeded, we would have then made an award for a contract somewhere between 5 and 600 million, and through the execution of the work, we would have had to account for change conditions, and

that would have increased the price through the three (3) to four (4) year construction phase.

(BRIEF PAUSE)

MR. BOB PETERS: And so, cut to the bottom line, it -- it came in at 1.4 billion. What would it have been under the hypothetical, had you accepted the unit price with those change conditions?

MR. JEFF STRONGMAN: So we finished the project just under 400 million with the general civil contract. I think three ninety-six (396) is the number that comes to mind, but I'd -- I'd have to confirm that.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: We're trying to compare two (2) scenarios where one (1) is actual and the other is a hypothetical. So to the degree that we can, we're trying to make them comparable where change conditions may or may not affect the execution.

MR. BOB PETERS: And that's exactly correct, Mr. Strongman, and I have your -- I have your point, and --

MR. JEFF STRONGMAN: Okay.

MR. BOB PETERS: -- I think you've helped us understand that I may have misunderstood a -- a previous answer of yours that led to that clarification. So thank you.

MR. JEFF STRONGMAN: Okay.

MR. BOB PETERS: Back to Keeyask, is Manitoba Hydro able to indicate to this Board whether BBE has been paid for general, administration, and overheads in 2016?

MR. JEFF STRONGMAN: Are you referring to the period of time prior to amending agreement number 7?

MR. BOB PETERS: I am.

MR. JEFF STRONGMAN: Yes, GA & O would have been paid.

MR. BOB PETERS: It's not clawed back?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: Was it paid prior to the renegotiation of amending agreement 7?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: Can you indicate on the public record whether BBE has been paid any amount for profit on the 2014 original contract?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: You can, and yes, they have?

MR. JEFF STRONGMAN: That's correct. Both.

MR. BOB PETERS: Does the fact that BBE received profit on the original contract indicate that Manitoba Hydro took remediation steps before the contract was in a -- an -- a cost overrun position?

MR. JEFF STRONGMAN: Let me just confer with someone who has the details.

MR. BOB PETERS: Thank you.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: I'm prepared to answer.

MR. BOB PETERS: Thank you. I was asking whether BBE was paid any amount for profit on the original 2014 contract?

MR. JEFF STRONGMAN: Yes. So through 2014, '15, and most of '16, the profit markup would have been included in the contractor's monthly draw. Towards the end of the year, when Manitoba Hydro recognized the need for implementing the recovery plan, the profit payment was stopped, and further than

just stopping it, a clawback took place in advance of the end of the year. I believe it was November 2016. So the profit that was viewed as having ove -- been overpaid was reconciled with one (1) of the monthly draws sub -- subsequent to October 2016.

(BRIEF PAUSE)

MR. BOB PETERS: So, Mr. Strongman, you've been good at helping this panel navigate some hypothetical questions, but if we go forward from today from amending agreement number 7, and perchance if the target price in that document is exceeded, and again, there is no more profit for BBE to earn, does Manitoba Hydro have a -- a plan to renegotiate a further amending agreement with a new target price?

MR. JEFF STRONGMAN: So no. The first question is no, we don't have a -- a plan to renegotiate another amendment, but a more fulsome answer is the possibility of a repeat of what has already taken place was in our minds during the negotiations of the amending agreement number 7, and we attempted to narrow the window of possibility for that, having come to light. We are prepared to talk a little bit more about those details as the provisions

that were negotiated in-camera tomorrow.

(BRIEF PAUSE)

MR. BOB PETERS: Do I take from that answer -- and thank you, Mr. Strongman -- that Manitoba Hydro is, instead of negotiating a -- a revised agreement on top of the amending agreement number 7, is prepared to expend up to the P90 number under the current arrangement?

(BRIEF PAUSE)

MR. JEFF STRONGMAN: Would you clarify the question?

MR. BOB PETERS: Well, certainly. What -- there have been the different cost estimates put on the record of these proceedings, and you've already seen the one that MGF project services has put on the record, and -- and what I'm asking is, rather than renegotiate a revision to amending agreement number 7, should this Board take Manitoba Hydro's strategy be -- to be to continue it through recognizing that the P90 number is -- is something Manitoba Hydro is prepared to pay rather than

restructure the agreement yet again?

MR. JEFF STRONGMAN: One (1) moment, please.

MR. BOB PETERS: Certainly.

(BRIEF PAUSE)

MR. JEFF STRONGMAN: Manitoba Hydro is not intending on renegotiating another amending agreement.

(BRIEF PAUSE)

MR. BOB PETERS: Thank you. I'm going to turn to a new area, unless the panel wants a short recess at this time. And I'll keep going.

I want to turn ahead to page 114 on Board counsel's sixth book of document -- number 6 book of documents. This relates to a -- a matter, Mr. Strongman, you and Board member McKay were discussing, and it also talks about breakdown of the -- the total number of hires.

And on page 114, Mr. Strongman, this is the information Manitoba Hydro has with respect to the Keeyask project, correct?

MR. JEFF STRONGMAN: The numbers look correct, yes.

MR. BOB PETERS: And when Manitoba Hydro says, as they do on page 114 of Board counsel's book of documents, that there's been a total of thirteen thousand one hundred and sixty-five (13,165) hires, that doesn't mean there's been thirteen thousand one hundred and sixty-five (13,165) different people involved, does it?

MR. JEFF STRONGMAN: That's -- no, you're right. It doesn't.

MR. BOB PETERS: And does that imply, then, that one (1) person could be hired multiple times?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And on the Keeyask project, I suppose the chart at the bottom of the page might be better than what I can see on the pie charts at the top. What you were telling the Board before was of the total hires, Manitoba Hydro has the data to determine if that individual was hired and it was a member of one (1) of the KCN partners, correct?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: And -- or some other Indigenous peoples rather than KCN, correct?

MR. JEFF STRONGMAN: Yes.

MR. BOB PETERS: And is that done on the basis of the self-declaring, or is there a -- a questionnaire that's provided, or how -- how is that determined?

MR. JEFF STRONGMAN: We have a contractor employment database that relies on information provided to Manitoba Hydro from the contractors executing the work, where on a monthly basis, they provide reports on who is on their payroll and various other pieces of data.

MR. BOB PETERS: All right. Can we go to the -- the pie chart at the top of page 114, please. Scroll back up to the top of the page. Please scroll back up to the top of the page.

And of these hires, the database from the human resource personnel are able to determine how many of the hires come from Northern Manitoba and how many come from other parts of Manitoba?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: And for the Northern Manitoba, again, this is where the data has been broken down specifically for KCN members and for Northern Manitobans that are non-KCN members, but other Indigenous peoples?

MR. JEFF STRONGMAN: That's correct.

MR. BOB PETERS: The same information I think is on page 112. We might as well do it right now, Mr. Bowen, dealing with Bipole III, although Mr. Mr. Fogg might want to weigh in here as well.

Sir, again, on Bipole three, the twelve thousand three hundred and fifty-two (12,352) hires on the project do not represent individual people. It could be the same person hired more than once?

MR. ALISTAIR FOGG: That's correct. It could be a rehire.

MR. BOB PETERS: Can you give an example as to why a person would be hired more than once on the -- on a -- on a project?

MR. ALISTAIR FOGG: There are a couple situations where that could occur. The best example I could think of is a person would be rehired if they were working for one (1) contractor on a phase of work, that work was completed, they applied for a position with the contractor doing the subsequent phase of work, so they'd be rehired to the project with that other contractor.

MR. BOB PETERS: And the same breakdown in terms of the hires for Bipole III is provided as it was for Keeyask, Mr. Fogg?

MR. ALISTAIR FOGG: Correct.

(BRIEF PAUSE)

MR. BOB PETERS: In someone's presentation today, there was mention that the hiring was done as a result of the Burntwood Nelson agreement, correct?

(BRIEF PAUSE)

MR. DAVID BOWEN: Yes, the -- the Bursment -- Burntwood Nelson Agreement applies to both Keeyask and the Keewatinohk converter station, and the Burntwood Nelson agreement is effectively the -- what we call the project labour agreement for -- for the work, and all craft labour that contractors use on both those project sites, there's hiring preferences within the -- the BNA that they need to follow.

MR. BOB PETERS: That BNA, or Burntwood Nelson agreement that you're referring to doesn't apply to Bipole III, does it?

MR. ALISTAIR FOGG: To clarify, that applies to the Keewatinohk converter station as part of Bipole III -- the Bipole III transmission line is

under the transmission line labour agreement, and then the Riel converter station does not have a labour agreement.

MR. BOB PETERS: Did the Board understand your evidence correctly, if the -- understood that the wages in the Burntwood Nelson agreement are above the market rates in Manitoba?

MR. DAVID BOWEN: For -- for Keeyask, the wages in the Burntwood Nelson agreement generally piggyback the wages of the collective -- the CLRA in Southern Manitoba. Early on in -- for the Keeyask project, in the -- towards the end of the 2014 year, we did a analysis of wages for remote projects across the country, and what we found is that the wage rates for -- in the BNA were amongst the lowest in the country, and the that's when I mentioned that we -- we provided a -- an increase. I believe the increase was about 13 percent, and it's -- it's only earned if -- if the person continues employment for a -- and renewed quarterly, so that's -- that's what I was referring to.

MR. BOB PETERS: Can you indicate, Mr. Bowen, whether the Burntwood Nelson agreement has contributed to the cost overruns on Keeyask?

MR. DAVID BOWEN: Certainly, I'd be

willing to explore this in farther detail tomorrow, but labour is a -- a major cost for the Keeyask project, and -- and there -- there have been some challenges to date.

MR. BOB PETERS: I'm going to turn to some questions on the Bipole III, and Mr. Penner, I don't have a direct line of sight, which you don't have to complain about, but if -- if you're comfortable there, or else I could ask that --

MS. HELGA VAN IDERSTINE: If you've stopped asking questions of Mr. Strongman, he can slip into the back row and we can bring him --

MR. BOB PETERS: No, I liked his answers. He -- he gives good answers, Ms. Van Iderstine, maybe he should -- well, he can -- he can slip back for a minute. I'm going to turn to the Bipole, and then hopefully move into the MMTP, and maybe touch a couple of Mr. Cormie's as well.

(BRIEF PAUSE)

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Mr. Fogg and Mr. Penner, I want to talk about Bipole III, and I want you to appreciate that this is a project that hasn't

been before the Public Utilities Board for a Needs for and Alternative review. Is that your understanding?

MR. ALISTAIR FOGG: Yes, that's my understanding.

MR. BOB PETERS: Is it also your understanding, Mr. Fogg, that the in the beginning, Bipole III was to bring down power from Northern Manitoba related to what no doubt Mr. Cormie had a hand in, which was selling energy from Conawapa to Ontario Hydro?

MR. ALISTAIR FOGG: I'm somewhat aware, probably not as much as Mr. Cormie, of some of the history of -- of that --

MR. BOB PETERS: And he's certainly welcome to assist in any way he can.

And Mr. Penner, you were probably an engineer in training way back then, but the initial routing for the Bipole was to come to -- on the east side of Lake Winnipeg? Do you recall that?

MR. GLENN PENNER: Yes, yes, I do.

MR. BOB PETERS: And when the Ontario sale didn't continue, Conawapa didn't continue, and then Bipole III, at that point in time, didn't continue either, did it?

MR. GLENN PENNER: That is my

understanding.

MR. BOB PETERS: All right. And the while we think one (1) of your slides today was misdated, but in approximately September of 1996, there was a inclement weather, or a wind event, I think was the word used, that affected the Bipoles I and II, correct?

MR. GLENN PENNER: Yes, that's correct. The slide said 1997, and -- and my recollection was nine -- September 5th, 1996.

MR. BOB PETERS: All right. So we'll blame the person who prepared the slide. The purpose of the Bipole III is to provide redundant transmission line to mitigate the risks of the outages, correct, outages on Bipoles I and II?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: And way back when, and on page 5 of Exhibit 42-6, Board counsel's book of documents, I think the earliest indication here on this chart was Bipole III, under the capital expenditure forecast in 2003, was -- was penciled in at $360 million on an East side routing. Was that your understanding?

MR. ALISTAIR FOGG: Yes, that --

that's correct. And -- and just to clarify, it was a Bipole III East side routing, and did not include any converter stations at that point in time.

MR. BOB PETERS: And -- and that's an interesting comment, Mr. Fogg, because would Bipole III need converter stations regardless of whether there was additional generation in Northern Manitoba?

MR. ALISTAIR FOGG: I think that the key aspect of that question relates to the single terminus point at the Dorsey converter station, and without -- Bipole III would still require the Riel converter station to truly provide the redundancy that we're -- we're seeking to provide the reliability.

MR. BOB PETERS: Well, the redundancy is that -- Dorsey is the redundancy for Riel, and Riel is the done -- redundancy for Dorsey. Would you understand it that way?

MR. ALISTAIR FOGG: I guess I would explain it as Riel provides a -- a second point -- a separate point, or terminus point for a Bipole III line. So essentially, yes.

MR. BOB PETERS: So when I asked was a converter station needed regardless of the routing of the Bipole, and regardless of whether there's a new generating station in Northern Manitoba, your answer

is, It has to end at a converter station somewhere?

MR. ALISTAIR FOGG: That's correct. It -- as an HVDC transmission line, it would need to end at a converter station.

MR. BOB PETERS: And I'm sure technically, it was possible for it to terminate at Dorsey, but Manitoba Hydro made a decision that rather than put, I think your words are, All their eggs in one (1) basket, you were going to move over and build the Riel converter station on the other side of the city?

MR. ALISTAIR FOGG: I believe to terminate at Dorsey still would have required additional infrastructure to accommodate Bipole III. However, you're correct in saying that from a reliability perspective, the decision would be to build Riel and the second terminus point.

MR. BOB PETERS: All right. And on that page 5 that's in front of us, we see that in that the capital expenditure forecast in 2005, the Bipole has about a 1.8 or $1.9 billion placeholder, at least, correct?

MR. ALISTAIR FOGG: That's correct.

MR. BOB PETERS: And at this point in time, Mr. Fogg, it includes a Northern and a Southern

converter station, correct?

MR. ALISTAIR FOGG: That's correct.

MR. BOB PETERS: And at this point in time, it also includes a Western Manitoba routing as opposed to an Eastern Manitoba routing?

MR. ALISTAIR FOGG: I believe it -- this estimate does include a -- a Western routing, however, I -- I would believe it would be contexted as a -- as a placeholder value, as it has not been significantly analyzed in terms of the costs associated with that routing. This would have been an initial point of changing from an East side to a West side, and an initial value would have been put into the estimate before me -- more detailed costs could be assessed.

MR. BOB PETERS: What you're telling the panel is Manitoba Hydro's engineers were -- were doing planning as if it was going to be an East side routing, but they also came up with a placeholder if it was going to be a West side routing?

MR. ALISTAIR FOGG: I think what -- just to clarify what I'm saying is that Manitoba Hydro's engineers would be planning an East side Bipole III but had been asked to look at alternatives to that, and that -- at that point in time, in 2005,

it would have looked at a placeholder cost of what a West -- West side Bipole III would look like.

MR. BOB PETERS: And if we go back to page 124 of Board counsel's book of documents...

(BRIEF PAUSE)

MR. BOB PETERS: Let's make that page 130. That's the end of a letter that Manitoba Hydro's Board of Directors received from the minister responsible for Manitoba Hydro, on or about September 20th of 2007, Mr. Fogg?

MR. ALISTAIR FOGG: Yes, that's correct.

MR. BOB PETERS: And the essence of that was that there was a policy decision by the Manitoba government that Bipole III should be rooted on the west side of the province, correct?

MR. ALISTAIR FOGG: My understanding would be a decision requesting alternatives to an east side Bipole III line be examined.

MR. BOB PETERS: And so those alternatives could have been the west side of the province or they could have been through the Interlake corridor?

MR. ALISTAIR FOGG: The alternatives could been a west side line or other alternatives for fal -- to provide the anticipated reliability, be it gas generation or other options such as that.

MR. BOB PETERS: So did Manitoba Hydro pursue a natural gas generator in southern Manitoba?

MR. ALISTAIR FOGG: The specific analys -- economic analysis of that would have been before my involvement on the project. But my understanding is those options were considered along with a western rooted Bipole III, and it was found that the western rooted Bipole III remained the most economical option to provide the required reliability improvements.

MR. BOB PETERS: And so while the provincial government was saying, in essence, don't use an eastern or east side of Lake Winnipeg routing, find an alternative routing, or alternative to even the Bipole III.

Manitoba Hydro determined that the best option was a Bipole III, but routed on the west side of the province?

MR. ALISTAIR FOGG: That's correct.

MR. BOB PETERS: And we see on page 131 a sketchy little map of the province that shows an

east side routing or a west side route, as well as in Interlake corridor route, correct?

MR. ALISTAIR FOGG: That's what it shows, that's correct.

MR. BOB PETERS: And at this point in time -- this, Mr. Fogg, I should've identified was -- I believe it was -- it was in the Boston Consulting Group report, although the source of it indicates, in the bottom left-hand corner, at Teshmont, 2006?

MR. ALISTAIR FOGG: That appears to be what it states, yeah.

MR. BOB PETERS: And you're familiar with Teshmont being an engineering firm in the city?

MR. ALISTAIR FOGG: Yes, I am.

MR. BOB PETERS: As a result of the west side routing, it appears that the physical distance is longer. And I know you put on the record this morning the exact distance, but it's clear on this map that Bipole III on the east was 855 kilometres, and the Bipole III on the west side would be 1,341 kilometres, correct?

MR. ALISTAIR FOGG: Yes, I believe the graph says 885 kilometres for the -- the eastside, and then 1,341 kilometres for the west.

MR. BOB PETERS: Thank you, if I

misspoke, for correcting me. And I believe, but I don't have the number handy, it was within a few kilometres, the actual length, correct?

MR. ALISTAIR FOGG: Sorry, for the -- the current west side line?

MR. BOB PETERS: Yeah --

MR. ALISTAIR FOGG: It would be a 1,388 kilometres actual -- actual built length, correct.

MR. BOB PETERS: And it stands to reason that longer distance will mean more towers, more conductors, or longer conductors and wires, correct?

MR. ALISTAIR FOGG: Correct.

MR. BOB PETERS: And as a result of those decisions to go down the west side, what does Manitoba Hydro estimate to be the increased costs for Bipole III as a result of the west side routing and not a routing on the east side of Lake Manitoba?

MR. ALISTAIR FOGG: If you could just give me one (1) second.

MR. BOB PETERS: Certainly.

(BRIEF PAUSE)

MR. ALISTAIR FOGG: Mr. Peters, I don't have that number specifically at hand. That was -- would be something I'd have to look into. But gen -- generally speaking, you could look at those distances and -- and you would expect a longer distance would be more expensive.

MR. BOB PETERS: While you don't have those numbers at hand, Mr. Fogg, do you -- are you able to undertake to provide them to the Board?

MS. HELGA VAN IDERSTINE: I'll jump -- I'll jump in. We'll take it under advisement at the moment. I'm not certain that those numbers are available or if they are relevant to the hearing at this moment, so.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Well, Mr. Fogg, on page 132 of Board counsels' book of documents, again, it's a slide from the Boston Consulting Group.

Were you familiar with that?

MR. ALISTAIR FOGG: Yes, I am.

(BRIEF PAUSE)

MR. BOB PETERS: And on this page,

halfway down on the left side, the cost estimate used in 2011 EIS, do you know what that was?

MR. ALISTAIR FOGG: Yes, the Environmental Impact Statement.

MR. BOB PETERS: And that was prepared by Manitoba Hydro?

MR. ALISTAIR FOGG: Correct.

MR. BOB PETERS: And is it correct that Manitoba Hydro quantified the route on the west side to be approximately $900 million more expensive than the east side of Lake Winnipeg?

MR. ALISTAIR FOGG: That's what the slide say.

MR. BOB PETERS: And I'm asking you if that was -- if that's factual.

MR. ALISTAIR FOGG: I'm not specifically familiar at that number. I would -- that would have to be confirmed.

MR. BOB PETERS: You'll take that subject to check?

MR. ALISTAIR FOGG: Yes.

MR. BOB PETERS: And so when you're looking to tell this Board whether Manitoba Hydro has an estimate for the additional costs for Bipole III to be on the west side of Manitoba, as opposed to the

east side, you can indicate whether this $900 million number that Manitoba Hydro provided in their environmental impact statement is also accurate.

Would be acceptable?

MS. HELGA VAN IDERSTINE: I'm just going to clarify, what do you mean by "accurate" in this context? I mean, if that's the number that -- I wasn't at the environmental impact -- the -- or didn't -- involved in that environmental impact statement. But I'm presuming if the number was presented at that time, it was accurate at that time.

MR. BOB PETERS: That's what we want to confirm, if we could, Ms. Van Iderstine --

MS. HELGA VAN IDERSTINE: You're not looking --

MR. BOB PETERS: -- and if you --

MS. HELGA VAN IDERSTINE: -- for anything else?

MR. BOB PETERS: Pardon me?

MS. HELGA VAN IDERSTINE: But you're not looking for anything else?

MR. BOB PETERS: Not related to this number, no. But I did ask Mr. Fogg earlier if Manitoba Hydro had a -- a calculation at this point in time of what that number would be, and you we're going

to take that under advisement.

MS. HELGA VAN IDERSTINE: Yes. I'm -- I'm pretty concerned about relevance, so.

MR. BOB PETERS: All right. Thank you.

(BRIEF PAUSE)

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: On page...

(BRIEF PAUSE)

MR. BOB PETERS: I've been asked to -- to put on the record, Mr. Fogg, Ms. Van Iderstine, what the request was that the Manitoba Hydro has agreed to take under advisement. And I was asking Manitoba Hydro to provide the Board with its current estimate of the additional costs of Bipole III being on the western side of the province compared to the eastern side of Lake Winnipeg.

And included in that was a request to review the number that Manitoba Hydro put forward at the Clean Environment Commission proceeding, and confirm that it was accurate when given.

MS. HELGA VAN IDERSTINE: That's a whole -- a whole bunch of questions. I'm going to take all of them under advisement. And I suspect that we'll be able to answer the ones that I have identified earlier, but rather than try to parse them now, I think that's the easiest way to address it.

MR. BOB PETERS: All right. Let's proceed then.

--- UNDERTAKING NO. 58: Manitoba Hydro to provide the Board with its current estimate of the additional costs of Bipole III being on the western side of the province compared to the eastern side of Lake Winnipeg; and to review the number that it put forward at the Clean Environment Commission proceeding, and confirm that it was accurate when given. (TAKEN UNDER ADVISEMENT)

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Mr. Fogg, on page 137 of Board counsels' book of documents, Manitoba Hydro responded to an Information Request at a prior General Rate Application, and carried forward the cost of Bipole III from $3.2 billion to $4.65 billion, correct?

MR. ALISTAIR FOGG: Correct.

MR. BOB PETERS: And in this -- in this Information Request, Manitoba Hydro was able to break down the transmission lines and keep that separate from the converter station costs. Also correct?

MR. ALISTAIR FOGG: That's what it shows us, correct.

MR. BOB PETERS: And then, in terms of the converter station costs, let's keep that 2.6 or $2.68 billion number in mind and turn to page 140 of Board counsels' book of documents. Actually make that page 141.

The converter station costs that are now on Manitoba Hydro's capital expenditure forecast have gone up from the $2.68 billion, they've gone up by $105 million, Mr. Fogg?

MR. ALISTAIR FOGG: That's correct.

MR. BOB PETERS: And I'll come back to that point. But let's do the same here on the transmission line, on page 140.

The transmission line was initially budgeted at $1.65 billion, and that has gone up another $302 million, correct?

MR. ALISTAIR FOGG: That's correct.

MR. BOB PETERS: And so that puts the overall project for Bipole III increasing from $4.65 billion to $5 billion?

MR. ALISTAIR FOGG: That's correct.

MR. BOB PETERS: And the causes of the converter station increase, I think can be seen on page 144, Board counsels' book of documents. Well, it can't be seen that well.

Below the redacted waterfall chart from the MGF report, Manitoba Hydro indicates that contributing to the converter station costs were costs that Manitoba Hydro had to pay to upgrade a couple of provincial roads.

Is that correct?

MR. ALISTAIR FOGG: There were costs that were -- were previously assumed to be shared with the Conawapa project that is not proceeding, that were now to be funded by the Bipole III project for those

provincial roads, yes.

MR. BOB PETERS: We can scroll down to the bottom half of the page.

Mr. Fogg, I understood your answer to say Manitoba Hydro had to upgrade Provincial Roads 280 and 290, correct?

MR. ALISTAIR FOGG: We contributed funds to the upgrading of those provincial roads, yes.

MR. BOB PETERS: And you contributed funds because you wanted to use that road should Conawapa come in-service, but you also needed it for the Bipole III project?

MR. ALISTAIR FOGG: The Provincial Road 280 -- upgrades, Provincial Road 280, serves the Bipole III project and also the Keeyask project. So there would be upgrades required to that road to address construction traffic for those projects.

Provincial Road 290 serves the Bipole III project and would've served the Conawapa project, as well. And that road, similarly, as a result of Keewatinohk construction, would require upgrades due to the construction traffic.

MR. BOB PETERS: So whatever was included on the Conawapa side of the ledger, you've transferred that all to the Bipole III side?

MR. ALISTAIR FOGG: Correct.

MR. BOB PETERS: And on the Provincial Road 280, are all of the costs on Bipole III, or did some of that stay with Keeyask?

MR. ALISTAIR FOGG: I believe Keeyask has some of those costs as well.

MR. BOB PETERS: And when you talk about the Conawapa access road upgrades, those again were costs that used to be on Conawapa's ledger, but are now transferred over the Bipole III?

MR. ALISTAIR FOGG: Those would have been shared costs with the Conawapa project. That is the private road that Manitoba Hydro owns that accesses the Keewatinohk site, that would've also accessed proposed Conawapa generating station site.

MR. BOB PETERS: And the Chairman talked with you about this as well earlier after lunch today. One (1) of the reasons for increasing the converter station costs was to increase to a confidence level of -- of P75, correct?

MR. ALISTAIR FOGG: That's correct.

(BRIEF PAUSE)

MR. BOB PETERS: In turning to the

causes for the $300 million increase on the transmission line, I'd like to go to page 147 of the book of documents, please, and below the chart.

What we're telling the public here, Mr. Fogg, is that the $300 million of additional costs were in some way related to increases for the transmission line itself, correct?

MR. ALISTAIR FOGG: I believe, yes, there were increases to the transmission line costs. I believe, on page 148, the reasons for those increases are further documented.

MR. BOB PETERS: And that includes the line being longer, more land needing to be acquired, more legal fees being incurred?

MR. ALISTAIR FOGG: Mr. Peters, I -- I'm not sure I would say more land needing to be acquired, necessarily, but the actual costs to acquire that land was incorporated into the budget.

MR. BOB PETERS: And when you say Bipole III transmission line vehicles, what additional cost is that for?

MR. ALISTAIR FOGG: Those would be construction site vehicles.

MR. BOB PETERS: And again, on the contingency, we're talking about additional costs on

the line going from a P50 to a PS75?

MR. ALISTAIR FOGG: Specific to the line, when we've looked at the contingency for the Bipole III project, we have looked at converter stations and transmission line separately, and then have combined them together as a whole.

Bipole III project -- as it notes here, there is an increase to the transmission line contingency from P50 to what would amount to P80, but essentially the Bipole III project perspective that's a -- it's a P75 estimate currently.

MR. BOB PETERS: Turning to page 150 of Board counsels' book of documents.

The risks that materialized for Bipole III that contributed to the $400 million overall increase in costs, Mr. Fogg, only one (1) of the risks identified had a dollar impact in excess of $20 million, and more than a six (6) month delay in the project.

Is that correct?

MR. ALISTAIR FOGG: That's what the table shows, yes.

MR. BOB PETERS: And that unforeseen risk was geotechnical?

MR. ALISTAIR FOGG: That's correct.

It was a geotechnical risk at the Keewatinohk converter station.

MR. BOB PETERS: That schedule -- that schedule risk was mitigated, and there's no delay as a result of this, is that also true?

MR. ALISTAIR FOGG: That's correct there. The -- the scheduled risks associated with this, these unforeseen conditions, was mitigated, and there's no impact to the Bipole III schedule.

MR. BOB PETERS: But there was an impact to the Bipole III budget?

MR. ALISTAIR FOGG: There is a cost impact to this risk event, and -- and the final value of that impact is still being assessed and negotiated.

MR. BOB PETERS: On Bipole III, Mr. Fogg, it appears on page 155 of Board counsels' book of documents, that Manitoba Hydro used at least three (3) forms of contracts, that being a lump sum, a unit price, and cost reimbursable, correct?

MR. ALISTAIR FOGG: That's correct. The project uses all three (3) of those forms of contracts.

MR. BOB PETERS: And that's for both the converter station as well as the transmission line?

MR. ALISTAIR FOGG: That's correct.

(BRIEF PAUSE)

MR. BOB PETERS: Before we leave that tab, on page 156, the conclusions and recommendations from MGF were that Hydro's choice of compensation mechanisms was appropriate for the contracts required. And that was for the converter stations, and was a sensible allocation of risk as between Hydro and its contractors.

Do you see that?

MR. ALISTAIR FOGG: Yes, I see that.

MR. BOB PETERS: Manitoba Hydro doesn't disagree with that, does it?

MR. ALISTAIR FOGG: We don't disagree with that, no.

MR. BOB PETERS: Okay. On page 163 of Board counsels' book of documents is a chart, in terms of the completion, out of one of Manitoba Hydro's quarterly reports.

(BRIEF PAUSE)

MR. BOB PETERS: On page 162. I

apologize.

We see at the right side of this schedule, Mr. Fogg, the in-service date that you told us about is -- we're seeing July of 2018?

MR. ALISTAIR FOGG: It would be the end of July, 2018, yes.

MR. BOB PETERS: And MR. DOUGLAS SMITH: you told the Board earlier this morning, that schedule is still valid?

MR. ALISTAIR FOGG: That's correct. That's -- we are still on target to achieve that in-service date of July, 2018.

MR. BOB PETERS: And the transmission line itself is to be completed in March of 2018, if I read this correctly?

MR. ALISTAIR FOGG: That's correct.

MR. BOB PETERS: And one (1) of the risks related to the transmission line was weather. But, perhaps, in the perverse or inverted way, Manitoba Hydro needs cold weather in which to construct the Bipole III line.

Is that correct?

MR. GLENN PENNER: We need cold weather, but not too cold.

MR. BOB PETERS: Why do you need cold

weather?

MR. GLENN PENNER: Most of the northern access is on a winter trails, and warm weather tends to make it very difficult to get between sites.

MR. BOB PETERS: And so the weather risk is Manitoba Hydro needs cold weather to complete the northern portions with frozen ground or frozen earth?

MR. GLENN PENNER: That's correct.

MR. BOB PETERS: And we're in the middle of January. Is everything running according to schedule at this point in time, with respect to the transmission line construction?

MR. GLENN PENNER: We are targeting March 1 on many of our segments, which gives us a few weeks buffer. We feel that usually -- we can usually expect winter weather until the end of March, so we are currently on schedule.

MR. BOB PETERS: On page 112 of Board counsels' book of documents is an extract, I believe -- no...

(BRIEF PAUSE)

MR. BOB PETERS: On page 16 -- on page 165, Board counsels' book of documents, MGF raises a risk, Mr. Penner, and that relates to the performance of one (1) of your contractors on the Bipole III line, correct?

MR. GLENN PENNER: That is correct.

MR. BOB PETERS: Have those performance concerns manifest themselves?

MR. GLENN PENNER: Yes, we -- we descoped a portion of the Rokstad's contract, and we have awarded that to a -- a third contractor. So there is now another contractor working on a portion of Bipole.

MR. BOB PETERS: And so on -- on page 168 of Board counsels' book of documents, in the top part of the page, MGF raises a concern that if the construction was not completed, it will cost on the schedule an additional year, correct?

MR. GLENN PENNER: That's what they have said, yes.

MR. BOB PETERS: And because Manitoba Hydro has descoped one (1) of your contractors and hired a -- an additional contractor, has all of that risk been mitigated?

MR. GLENN PENNER: We are continuing

to closely monitor all of the work on the project, and I think we -- we continue to -- to make decisions to ensure that we will be complete by the end of this winter season.

MR. BOB PETERS: That meeting March 2018?

MR. GLENN PENNER: Correct.

MR. BOB PETERS: Is there an additional cost component as a result of descoping one (1) contractor and engaging another?

(BRIEF PAUSE)

MR. GLENN PENNER: There are additional costs to -- to add another contractor. However, we had sufficient contingency within the current control budget to cover that.

MR. BOB PETERS: So the real risk is for schedule, as opposed to cost?

MR. GLENN PENNER: That's correct.

(BRIEF PAUSE)

MR. BOB PETERS: At page 49 of Exhibit 42-6, Board counsels' book of documents, we see from

the MGF report for the Bipole III transmission line, that the critical paths for both of two (2) contractors are slipping, which jeopardizes completion in August of 2018, correct?

Mr. Penner, do you see that?

MR. GLENN PENNER: I do see that, yes.

MR. BOB PETERS: This raises not only one (1) contractor but two (2) of the contractors.

Have -- have -- has whatever work been slipping been corrected?

MR. GLENN PENNER: Our other contractor is on track to -- to completion, and we don't have significant concerns about their performance.

MR. BOB PETERS: Thank you. I want to turn to the Manitoba-Minnesota Transmission Line. And perhaps to orient the panel, if we flip back to page 5 of Board counsels' book of documents, we can see at the bottom of the chart, near the bottom of the chart, the price for the Manitoba-Minnesota Transmission Project was $350 million in Capital Expenditure 13, which would have been used at the Needs For And Alternatives To review.

Is that correct?

MR. GLENN PENNER: That is correct.

MR. BOB PETERS: And what level of project definition was that $350 million based on?

MR. GLENN PENNER: Can you clarify?

MR. BOB PETERS: Well, we've seen in some of the other evidence, that Manitoba Hydro's capital projects are quantified under various levels or degrees of estimates and planning.

Are you aware of that?

MR. GLENN PENNER: And so, in -- in general terms, I would say it was a -- it was a -- a higher level estimate without a probability associated with the contingency.

MR. BOB PETERS: That means that -- well, let's turn to page 171 of Board counsels' book of documents.

Here's some Manitoba Hydro rebuttal, this time to the METSCO company, and it talks about at the time certain projects were conceived the process required the budget to be estimated and approved prior to any engineering or planning being done to define the project scope. Hence, the initial budget estimate was created without a clear definition of scope.

Do you see that in the rebuttal from Manitoba Hydro?

MR. GLENN PENNER: Yes, I see that.

MR. BOB PETERS: Does that apply to the Manitoba-Minnesota Transmission Line Project, back in 2013?

MR. GLENN PENNER: One (1) moment.

(BRIEF PAUSE)

MR. GLENN PENNER: So for the $350 million estimate, we -- we didn't have a final preferred route, we didn't have any of the environmental conditions, and we didn't have any design work completed on it. So you -- you could say it was -- was a more preliminary estimate.

MR. BOB PETERS: And just so this panel understands that, Mr. Penner, those preliminary estimates are still submitted for approval to the executive of Manitoba Hydro through the capital proce -- project justification process?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: And Manitoba Hydro's executive is aware as to what level those costs have been engineered or -- or planned?

MR. GLENN PENNER: Yes, they would be.

MR. BOB PETERS: In the file -- in the

September of 2017, if we go to page 172, we see that the cost of the Manitoba-Minnesota Transmission Line Project increases up to $453 million, correct?

MR. BOB PETERS: That's correct.

MR. BOB PETERS: And that's your most current cost estimate?

MR. GLENN PENNER: That is our most current cost estimate.

MR. BOB PETERS: And that 30 percent increase is partly related to a more and a better refined scope and engineering for the project?

MR. GLENN PENNER: Correct. We have -- we have a final pref -- or a final preferred route. We -- we know more about the construction costs based on our most current Bipole III construction tenders.

MR. BOB PETERS: And we see on page 175, the capital project justification addendum, that increases the cost up to -- up a hundred million dollars to 453 million, and the various components of it, correct?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: Now, it appears that licensing and environmental assessment went up $17 million, on page 175, correct?

MR. GLENN PENNER: Correct.

MR. BOB PETERS: That was before the National Energy Board decision requiring Manitoba Hydro to pursue a certificate rather than a permit for this project?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: Can you tell this Board how much more it will cost for certificate than a permit?

MR. GLENN PENNER: One (1) moment.

(BRIEF PAUSE)

MR. GLENN PENNER: We don't have those additional costs. However, we don't expect that they -- they will be as significant as the -- the CEC hearing process.

MR. BOB PETERS: Sorry, I didn't understand that. The -- the additional cost to get a certificate will be less than it would be if you had to do a Clean Environment Commission proc -- proceeding in Manitoba?

MR. GLENN PENNER: Yes, because what we did -- we started in 2012, and we did all of our --

our CEC process begins long before the hearings. And we do our -- our public consultation, we do our environmental assessments, and we submit that information. And then we go through the hearing process.

All of that work is -- at least my understanding is that that work is submitted as evidence into the NEB process. So we're not doing, at this point, any additional environmental studies, and all those kinds of things.

So we're -- we're going through now an IR process with the NEB, leading up to a hearing sometime this spring.

MR. BOB PETERS: On page 179, flipping over to 180, is the Clean Environment Commission Report on the Manitoba-Minnesota Transmission Project correct?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: And there are recommendations that have been reproduced, starting on page 180, carrying through to 182.

You're familiar with those?

MR. GLENN PENNER: Yes.

MR. BOB PETERS: Have all of those

recommendations been accepted by the Government of Manitoba.

MR. GLENN PENNER: We have not heard yet.

MR. BOB PETERS: If any of those recommendations are accepted and required to be done by Manitoba Hydro, does that mean Manitoba Hydro has to spend more money on the Manitoba-Minnesota Transmission Project.

MR. GLENN PENNER: No, we've reviewed these recommendations and -- and feel that, for the most part, they're within the -- the within the budget and typical are expected.

MR. BOB PETERS: Did the Clean Environment Commission recommend any changes in the route?

(BRIEF PAUSE)

MR. GLENN PENNER: I'm not aware that the CEC made any recommended changes to the route. However, it's pointed out to me that nine point four (9.4) is an open-ended recommendation that -- that could cause some problems around planting trees to -- to screen the view of -- of the transmission line.

MR. BOB PETERS: Manitoba Hydro hasn't taken that into account in the project cost?

MR. GLENN PENNER: No, it's not taken an account in -- in the project cost.

MR. BOB PETERS: Is it covered by the P75 figure?

MR. GLENN PENNER: It's an open-ended recommendation that we don't fully understand.

MR. BOB PETERS: All right. Let's turn to page 173 and look at a map. I think we saw this in your slide deck as well, Mr. Penner. The bottom of the page there's a map for the Manitoba-Minnesota Transmission Project.

That's the projected route, is that correct?

MR. GLENN PENNER: Yes.

MR. BOB PETERS: And I believe in conversations with the Chairman after lunch today, you indicated that the transmission starts over at Dorsey, on the west side of Winnipeg, goes around the south end of the city, close to the Riel station, and then heads straight west, correct?

MR. GLENN PENNER: Correct.

MR. BOB PETERS: And when we look at that line going straight west of Riel, it's to

approximately to -- as far as a Anola, correct?

MR. GLENN PENNER: Yeah, just past -- just east of Anola.

MR. BOB PETERS: How many kilometres or miles would that be?

(BRIEF PAUSE)

MR. GLENN PENNER: I would estimate it's about 30 kilometres.

MR. BOB PETERS: I'm sorry, I was not listening.

MR. GLENN PENNER: I am estimating approximately 30 kilometres without doing any measurements.

MR. BOB PETERS: All right. Thank you. I was listening now.

I'm looking at this map on the screen, and the Board will note that there is a dotted black line that also comes out of this solid blue line of the MMTP route, correct?

MR. GLENN PENNER: That's correct.

MR. BOB PETERS: That dotted line represents the -- is it the Dorsey-Forbes line or whatever it's now called?

MR. GLENN PENNER: Yes, it -- it used to be known as Dorsey to Forbes RD602F, and now it -- it terminates at Riel, and now it's referred to as M602F.

MR. BOB PETERS: In any event, regardless of what it's called, it appears to be how -- how far apart is it from the MMTP project?

MR. GLENN PENNER: It lies in the same corridor for that distance.

MR. BOB PETERS: So for the 30 kilometres or so that you estimated, those two (2) transmission lines are in the same corridor or just metres apart?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: Why would you prefer that routing to something separate, when the whole theory of the Bipole routing is to provide separation as between major transmission lines?

(BRIEF PAUSE)

MR. BOB PETERS: Mr. Chair, while the witnesses are conferring on this topic, I would beg indulgence for another thirty (30) minutes, if the

Board was so inclined. But if the Board had other commitments, I will try to find the time tomorrow morning after my colleagues opposite have had the microphone.

I apologize for not raising it sooner. I would like to cover a couple more topics, but if not today, then tomorrow. And if the panel would like to stand down for a short break, I'm amenable as well, but that's fine.

THE CHAIRPERSON: Yeah, we'll -- we'll break for ten (10) minutes.

MR. BOB PETERS: All right. Thank you.

--- Upon recessing at 5:28 p.m.

--- Upon resuming at 5:40 p.m.

THE CHAIRPERSON: Mr. Peters...?

MR. BOB PETERS: Thank you, Mr. Chairman.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: Mr. Penner, you were seeking some counsel with your colleagues at the time of the recess, did you have an opportunity to discuss

with them?

MR. GLENN PENNER: Yes.

MR. BOB PETERS: And your answer then to the information you were seeking?

MR. GLENN PENNER: So yes, while it does parallel existing infrastructure, it -- it -- it was looked at very carefully by our system planning engineers and it meets in their reliability standards and some of the factors that weighed into that were that it's an east-west portion of the line. Most of the weather events occur with a westerly winds, so, there's a -- there's a change in -- in that and so that's significant.

And the other component to it is -- that it's very easy to access and very quick to have to go back in and -- and put transmission towers up, if they were to come down as a result of a major storm.

MR. BOB PETERS: So compounding that answer, Mr. Penner, is Manitoba Hydro has in that one (1) corridor -- you gave it a fancy number M602F.

Have I got that right?

MR. GLENN PENNER: Yes.

MR. BOB PETERS: Do you guys really give it numbers like that, that's incredible. That's

how it's known?

MR. GLENN PENNER: That's correct. The 'M' and the 'F' refer to the stations that it starts and stops and the -- the digits in between kind of -- can tell you what line designation and the voltage class.

MR. BOB PETERS: Obviously. But on this same map that we're looking at where we see the blue line coming from Riel going as far as -- just past Anola, is the Panel correct in understanding that Bipole III is also going to join that corridor?

MR. GLENN PENNER: Bipole III is also in that corridor for a short duration as well.

MR. BOB PETERS: So a short duration, shorter than 30 kilometres?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: And so now you've got two 500 kV and the Bipole III all on the same corridor?

MR. GLENN PENNER: That's correct.

MR. BOB PETERS: Thank you. Couple of quick -- let me finish...

You told the Chairman after lunch that the $453 million in-service cost was at a preliminary

stage because that's before any shovels are in the ground; correct?

MR. GLENN PENNER: No, I think I referred to the three fifty million (350) as a preliminary budget. We refer to the four hundred and fifty-three (453) now as a P75 estimate.

MR. BOB PETERS: All right but that P75 estimate or that $100 million increase from three fifty-four (354) to four fifty three (453) is before any contracts are signed for any of the work to begin on the construction of the MMTP line?

MR. GLENN PENNER: Yes. So there are no construction contracts. They haven't been signed. We haven't even put the construction contracts out to tender yet.

MR. BOB PETERS: If we compare the stage that this project is at to where Bipole III is at, isn't it correct that once the Bipole III bids were received between the bids to the actual price there was a 17 percent increase in the transmission line?

You take that subject to check?

MR. GLENN PENNER: We tendered the project in phases and the last piece -- the last half of the project was -- was actually awarded after the -

- the budget was raised to the 5.04.

MR. BOB PETERS: Okay, I've got your point on that. We heard that Hydro is committed to the June 2020 in-service date for this MMTP; correct?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: And we talked about the National Energy Board requiring Manitoba Hydro to seek a certificate; correct?

MR. GLENN PENNER: Yes, that's correct.

MR. BOB PETERS: And typically how long will it take to get a certificate compared to how long it would take to get a permit?

MR. GLENN PENNER: Maybe I could answer the question this way. The -- the process that the NEB has identified is that there -- they have fifteen (15) months, and they've deemed that -- their -- their timeline to be March 2019.

MR. BOB PETERS: That is, the project will be -- will have gone through the certificate process and will have been concluded by March 2019?

MR. GLENN PENNER: Yes, they have fifteen (15) months from the time they deemed that the documents are complete to the time that -- that they

need to prepare a recommendation.

MR. BOB PETERS: Can Manitoba Hydro construct the Manitoba Minnesota transmission line in thirteen (13) months?

MR. GLENN PENNER: I think it would be difficult. We are, however -- however, hopeful that once the -- the hearing is complete sometime later this spring or early summer that we would get a recommendation sooner than the March 2019 date and -- and so that we -- we are hoping that that's a possibility.

MR. BOB PETERS: Well, I had heard earlier that hope is not a plan but you're telling me that that's what you're relying on now for the Manitoba Minnesota transmission line is hopefully getting an early ruling?

MR. GLENN PENNER: I wouldn't say we're relying on it. We are not prepared to change our June 2020 in-service date until we determine that we cannot achieve a 2020 -- a June 2020 in-service date. And so we have to look at all of the factors as we move forward. Right now, it's -- it's a hypothetical to determine other than that June 2020 in-service date.

MR. BOB PETERS: All right. I've got

your point. On page 183 of Board counsels' book of documents, in the MGF report Manitoba Hydro's costs were measured against a benchmark provided by MGF and Stanley Consulting.

You're aware of that?

MR. GLENN PENNER: Yes.

MR. BOB PETERS: You're aware of the industry benchmarked used by Stanley Consulting and MGF?

MR. GLENN PENNER: I have had a look at their -- their industry benchmark, yes.

MR. BOB PETERS: Do you agree with the industry benchmark that was used?

MR. GLENN PENNER: I think it can be difficult to determine exact line -- per kilometre line costs. I -- I think it's -- it's very hard to compare the different lines across North America.

MR. BOB PETERS: Can you explain to this Board, why Manitoba Hydro's cost is 25 percent lower than the benchmark?

MR. GLENN PENNER: I think historically Manitoba Hydro has been able to build transmission lines for less than -- than other Utilities. Primarily it -- transmission lines can vary in cost depending on the density of population if

it's travelling in -- in urban areas. If there's a lot of line angles and it. So there's -- there's a variety of -- of different factors that -- that weigh into it. The type of structures that are used.

In this case where we use guide structures, I think our transmission line costs are -- are less expensive than -- than typical industry standards.

MR. BOB PETERS: In my haste I glossed over page 115 of Board counsels' book of documents and we should go back and if it was Mr. Strongman who has to give an answer, I'll -- I'll let the panel decide.

On page 115, there's an indication and I'll just read into the record that:

> "Manitoba Hydro advised MGF that they have had great success with local Aboriginal labour. However, they have exhausted all availability."

Have I read that correctly? Mr. Bowen or Mr. Strongman from the back?

MR. JEFF STRONGMAN: Hi. I see the quote that is being referred to. In fact, this quote was subject of some discussion between Manitoba Hydro and MGF because Manitoba Hydro believe that although

MGF advised that they had been -- they had received this as a direct quote from one (1) of our project staff, Manitoba Hydro's view of this topic is that while we have had some success with some of the smaller communities within our partnership, Manitoba Hydro's position is that we continue to look for more opportunity and that we have not necessarily exhausted all availability.

So Manitoba Hydro believes that going forward we will continue to review with our partners employment opportunities and that we are not at the point where we can't do better. We will continue to do better.

MR. BOB PETERS: What efforts has Manitoba Hydro taken to source all available local Aboriginal labour?

MR. JEFF STRONGMAN: Within the Joint Keeyask Development Agreement, there are three (3) subcommittees that are active on a monthly basis. One of which is dedicated specifically to employment and Manitoba Hydro and the four (4) partners meet regularly to identify people within the communities that are currently looking for work and Manitoba Hydro and its contractors intend to act on those as opportunities.

MR. BOB PETERS: So Manitoba Hydro is of the understanding that there is still available employment in northern Manitoba with local Aboriginal labour being available?

MR. JEFF STRONGMAN: Yes, that's correct. I mentioned earlier that with some of the labour hours that we had quoted, roughly, 40 percent of our labour hours worked on this job by the end of 2017 were performed by Aboriginal employees and that statistic is unprecedented across Canada. We still believe that we can do better.

MR. BOB PETERS: And what steps are you taking to do better?

MR. JEFF STRONGMAN: Could I confer with my colleagues? I'm at the different table here.

MR. BOB PETERS: Yes, absolutely, Mr. Strongman, I appreciate. Thank you.

MR. DAVID BOWEN: I'll just add to Mr. Strongman's answer. He spoke about the AGE committee, the Advisory Group on Employment. So that's one (1) committee that has all our contractors. It has the folks that work at the job referral service. So really, the -- if you want to apply for a job for Keeyask, you have to submit your name within the -- what's called the JRS, the job referral service.

It has that within each of our -- our four (4) partner committees, there's a JRS worker who's -- is really for -- for lack of better words, look -- hoping to source the talent within that community to link with the province and the JRS with our contractors hiring and, of course, our Manitoba Hydro staff help that process. So that -- that is at -- continuing -- continually at work.

Some of the other efforts that are -- are other ways that -- we've typically in the last two (2) years have gone to each of the four (4) partner communities to do a job fair with the contractors working at site to make sure people are aware of what the job opportunities are and -- and help -- help get people to the site.

Other examples, we've had, of course, high school students come to site. We've actually had -- I believe it's for a -- don't quote me on this one, but it's a -- there's a work experience option where we had about just over ten (10) -- ten (10) people from the communities come to Keeyask for -- for a number days to see what it's like to -- to be at camp, see what it's like to potentially work at the camp and so -- so those are just some of the -- the efforts that are being weighed -- made to -- to increase the

employment for our partner communities and, of course, Indigenous people in the north.

MR. BOB PETERS: Mr. Bowen, maybe your last comment covered this, but I understood there was a job referral service worker from each of the four (4) KCN partners; is that what I've understood?

MR. DAVID BOWEN: That's correct.

MR. BOB PETERS: And so the question becomes: For the communities that aren't part of the KCN partnership, how is Manitoba Hydro recruiting additional Aboriginal workers?

MR. DAVID BOWEN: Our -- our focus is certainly on our partner communities, and that's -- that's our -- that's our primary focus. Certainly, there's -- there's word of word-of-mouth. We have linked -- the other piece that I didn't mention was that we have linked with the -- what's called the -- the trades coordinator for the -- Partnership Manitoba. We -- there's an Aboriginal coordinator within the Thompson area to -- to get the word out and to help -- help potential people looking for work to -- to get employment Keeyask.

MR. BOB PETERS: All right. Thank you. If in your discussions with Mr. Strongman you have additional information to add, I'd ask you to put

that on the record. I won't ask for that as an undertaking but you can discuss with him when you're in closer proximity than you are now.

Would you do that, sir?

MR. DAVID BOWEN: Yes.

(BRIEF PAUSE)

MR. BOB PETERS: Thank you for that. Mr. Cormie, finally, six o'clock. Thank you for patience.

In the information provided at page 195 of Board counsels' book of documents, are the Great Northern transmission line project information as provided; correct?

MR. DAVID CORMIE: Yes. Yes, I see that.

MR. BOB PETERS: And in this -- in this document, the capital cost estimate is at $677 million as of December 31st, 2015 and if we could go to the top of the page we'll see, Mr. Cormie, what I was referring to in terms of the quarterly update?

MR. DAVID CORMIE: Yes, that's the publicly available estimate that Minnesota Power has provided Manitoba Hydro.

MR. BOB PETERS: And can you tell the Board if that cost estimate includes an amount on account of contingency?

(BRIEF PAUSE)

MR. DAVID CORMIE: Yes, Mr. Peters, that includes the -- the contingency and that's the amount that's included in the facility's construction agreement.

MR. BOB PETERS: Turning to tab -- to page 197, Mr. Cormie, MGF in their report has benchmarked the costs of the Great Northern transmission line against Manitoba Hydro's Minnesota -- Manitoba/Minnesota transmission project, as well as a -- an industry benchmark.

Do you see that?

MR. DAVID CORMIE: Yes, I see that.

MR. BOB PETERS: And likewise, on page 202 of Board counsels' book of documents, we see just on the screen in front of you, based on the metrics the Great Northern transmission line project is significantly higher than those project metrics seen for other projects; correct?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: And can you indicate to the Board at this time, why Manitoba Hydro's costs appear to be significantly higher than metrics for other projects that are benchmarked?

MR. DAVID CORMIE: Were you asking me whether Manitoba Hydro's project or Minnesota Power's projects?

MR. BOB PETERS: I have your clarification. I'm going to -- I'm talking about the Great Northern transmission line project. And you correctly are reminding me that that's Minnesota Power's project?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: So in terms of the information that Manitoba Hydro has provided and in terms of its comparability to other transmission lines, is Manitoba Hydro able to provide an answer as to why the cost, according to MGF, for the Great Northern transmission line appear higher than other similar industry projects?

MR. DAVID CORMIE: Yes, I can provide that. Minnesota Power always intended their estimate to be conservative and at the time the estimate was prepared it -- like, with the MMTP project, they did not have a final route, and they recognized that there

was a long period of time between the time and the estimate was prepared and the in-service date.

And so they deliberately chose a -- a conservative number for the purposes of the forecast. And we believe now that -- that that -- that number is -- still believe that that number is conservative. Minnesota Power has yet to finalize some of its contract costs. And once those contract costs are finalized, we will be updating the budget to recognize market prices, but as of now we're comfortable to have a cushion in our -- our budget and we're -- we believe that we'll leave -- leave that there -- Minnesota Power will leave that there until they're more confident in what their actual costs will be.

MR. BOB PETERS: When you say "conservative," Mr. Cormie, you mean that the Minnesota Power's costs for the Great Northern transmission line are on the high side of what will actually come in?

MR. DAVID CORMIE: Yes. To date, the contracts that have been let by Minnesota Power have been as forecast or underforecasts. But as I indicated in my direct testimony this morning, only about 10 percent of the cost of the projects have been spent to date and we believe it's premature to assume

that we can rely on that in order to lower the estimate. Better to be underforecast than to be caught short.

MR. BOB PETERS: I'm not sure I -- I agree with your -- your terminology, Mr. Cormie. "Better to be underforecast," what you mean to say is better to have your forecast showing a higher price than what you expect will actually come in.

MR. DAVID CORMIE: Yes, unfortunately, Minnesota Power doesn't use the probability based. They haven't given us a probability associated with their forecast. They've indicated it is a conservative forecast. So they -- they believe and our -- our analysis of their estimate is that -- that it is probably conservative and, with time, we will get a revised estimate that will be more -- more likely to be closer to what we actually expect to spend.

MR. BOB PETERS: Mr. Cormie, while the revisions, if any, to the in-service costs of that budget are considered confidential in these proceedings, Manitoba Hydro's public position is that if the capital costs of the Great Northern transmission line exceed $1 billion, then Manitoba Hydro will not proceed.

You're aware of that?

MR. DAVID CORMIE: I think you're referring to my testimony at NFAT where I indicated that if the cost of the Great Northern line came in at $1 billion, the project would not be viable. We are not anywhere close to spending $1 billion on the Great Northern transmission line.

MR. BOB PETERS: And -- and Mr. Cormie, I was quoting you put on page 204 of Board counsels' book of documents, it was from the 2015 General Rate Application, but other than that, I'll accept your answer, if that's satisfactory to you, sir.

MR. DAVID CORMIE: Yes, I stand corrected.

MR. BOB PETERS: Now, Mr. Cormie, in September of 2016 the Boston Consulting Group was asked to review the business case on the Great Northern transmission line.

You're aware of that?

MR. DAVID CORMIE: Yes, we contracted with them to help us make a final decision -- commitment to construct the line in the fall of 2016, and -- and given that they had worked through the summer for our board on the Keeyask project, they were

well capable of providing that service.

MR. BOB PETERS: And on page 231 of Board counsels' book of documents, we see the engagement letter; correct?

MR. DAVID CORMIE: Yes, I see that.

MR. BOB PETERS: And on page 235 of Board counsels' book of documents one (1) of the benefits associated with the Great Northern transmission line project, Mr. Cormie, is Manitoba Hydro's access to the Wisconsin markets; correct?

MR. DAVID CORMIE: Yes, the --

MR. BOB PETERS: And -- I'm sorry.

MR. DAVID CORMIE: When we requested transmission service associated with the Great Northern transmission line, MISO provided us access -- additional 500 megawatts of export access into Wisconsin as -- as part of our transmission request.

MR. BOB PETERS: And from your evidence this morning, the suggestion was that Manitoba Hydro should be able to extract higher export prices if they ship energy into Wisconsin?

MR. DAVID CORMIE: What I indicated in my testimony was that in the bilateral market for the long -- sale of long-term firm power, Wisconsin is a higher cost market than Minnesota and so it creates

opportunities for Manitoba Hydro to sell long-term firm power over the firm transmission associated with the -- with the project. So those are the opportunities.

Spot market electricity is priced at the border, whether it goes into Wisconsin or Minnesota. So the opportunity market doesn't make any difference, but from a bilateral perspective, it -- it provides more -- a larger customer base.

MR. BOB PETERS: Mr. Cormie, have the higher prices for bilateral agreements in Wisconsin been reflected in Manitoba Hydro's export revenue forecast?

MR. DAVID CORMIE: There are two (2) contracts in the export revenue forecast for the sale of firm power to Wisconsin public service. One that we're currently engaged in delivering to, and one that commences in 2021 as a result of the construction of Keeyask. Those are very attractive prices for Manitoba Hydro.

MR. BOB PETERS: Those prices are included in the export price forecast?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: And so are there any additional bilateral agreements in Wisconsin included

in the export forecast other than the two (2) that you've referenced?

MR. DAVID CORMIE: No, we're -- we're building -- building the market in Wisconsin as we speak.

MR. BOB PETERS: Mr. Cormie, on your slide, which I think is part of Manitoba Hydro Exhibit 120, I believe it's on page 117, if I've got this right. I don't.

I'm looking for the Great Northern transmission line project, Mr. Cormie, and your slide number 3. I don't know if you gave that as a separate -- a separate PDF. It would relate to the...

(BRIEF PAUSE)

MR. BOB PETERS: Perhaps 106, if we could try that page. All right, we are -- one more page forward I believe will be where we want to go.

MR. DAVID CORMIE: The US interconnection objectives?

MR. BOB PETERS: Yes.

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: Thank you very much, Diana, with putting up with my searching.

On this page, this morning, Mr. Cormie, you talked about reducing import costs once the Great Northern and the Manitoba/Minnesota lines are constructed; correct?

MR. DAVID CORMIE: Yes, Mr. Peters.

MR. BOB PETERS: And that reduction in import costs occurs for what reason?

MR. DAVID CORMIE: It -- it occurs when we're importing. There is congestion between the MINNHUB price and the Manitoba border. And so prices at the Manitoba border are higher than if we were to buy that electricity in Minneapolis.

Now, you're build -- you're building a bigger transmission network, so, power can more easily flow from Minneapolis to the border, therefore, the price at the border is lower when we're purchasing. So import costs are reduced. And conversely, the same thing happens when we're exporting because you have now a larger transmission network delivering electricity in Minneapolis, the price at the MISO node, the pricing note at the border, goes up and approaches the price that you would receive at the market.

Right now there's about a -- on average, a 2 to 5 percent difference in those prices

and so they'd be price improvement for exports and price reductions for imports which add value to all of Manitoba Hydro's exports and reduces the costs for all our reports.

MR. BOB PETERS: Has that 2 to five percent difference in the value that that spins off, Mr. Cormie, been included in Manitoba Hydro's export price forecasts?

MR. DAVID CORMIE: I don't believe so. I believe that we are still relying on the historical ratio between -- that exists on the existing interconnection. We have not yet reflected in the IFF the additional revenue that would be associated with that improvement.

MR. BOB PETERS: All right. On the bottom part of this page in front of us, the increased export capability, an extra 900 megawatts, has that been included in Manitoba Hydro's export price forecast?

MR. DAVID CORMIE: It's in the IFF because the export capability doesn't change the price, it just makes -- allows us to export more electricity rather than spill it when the existing transmission line is fully loaded.

MR. BOB PETERS: All right, thank you.

Mr. Cormie, I want to turn with you to the last subject that I have today is the SaskPower sale and transmission line.

The matter you spoke to this morning as well, sir?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: Currently, Manitoba Hydro has a 25 megawatt sale to SaskPower on the books from 2015 to 2022?

MR. DAVID CORMIE: That's correct.

MR. BOB PETERS: A seven (7) year contract, sir?

MR. DAVID CORMIE: I think it's six (6) years.

MR. BOB PETERS: Okay, and it's on existing transmission?

MR. DAVID CORMIE: Yes, it is.

MR. BOB PETERS: Is it also correct that Manitoba Hydro has a 500 megawatt term sheet with SaskPower?

MR. DAVID CORMIE: No, that is incorrect. We have a 500 megawatt Memorandum of Understanding that allows the companies to explore opportunities.

MR. BOB PETERS: And that Memorandum

of Understanding is that related to both energy, as well as transmission interconnections?

MR. DAVID CORMIE: Yes, it has quite a broad scope, including a lot of different activities, including the exporting of surplus electricity and the study of additional transmission facilities.

MR. BOB PETERS: It is, Mr. Cormie, for nonlegal terms, it's -- it's just a precursor to possible future agreements.

Would that be how you understand it?

MR. DAVID CORMIE: Yes. One (1) of the purposes of a Memorandum of Understanding is to define the scope of the discussions that take place between the Utilities and to create a confidential context so that we agree to share our confidential information and -- and allow those conversations to take place.

But there is non -- it's a nonbinding, nothing can happen under that agreement, except the study.

MR. BOB PETERS: Is this 500 -- sorry, is this 100 megawatts sale that you've spoken about with SaskPower between June of 2020 and May of 2040 part of that 500 megawatt Memorandum of Understanding?

MR. DAVID CORMIE: Yes, it's a child

of that process.

MR. BOB PETERS: I take it you're the father? Mr. Cormie, to complete the 100 megawatts sale, each Utility is responsible to construct the transmission in their respective provinces?

MR. DAVID CORMIE: That is correct.

MR. BOB PETERS: Does the power flow both ways on this transmission line?

MR. DAVID CORMIE: Contractually the power is only designed to be exported. The -- the power flow will be in both directions, depending upon the -- the -- the network flows a power at the time. So it -- it -- it is designed as an export line, it's not designed to provide any firm import capability into Manitoba.

MR. BOB PETERS: And on page 251 of Board counsels' sixth book of documents, the project cost, Mr. Cormie, is quantified at $57 million, perhaps now $56.5 million?

MR. DAVID CORMIE: Yes, that was our estimate in 2015. And I believe that estimate is under review, and the -- and the -- we expect an update in that in the next capital expenditure forecast.

MR. BOB PETERS: All right, thank you

for that. On page 253 of Board counsels' book of documents, would the Board be correct in understanding, Mr. Cormie, that Manitoba Hydro in 2015 conducted an economic evaluation of this sale?

MR. DAVID CORMIE: Yes, as part of the approval process for sales, something that outside of my scope of responsibility is an economic evaluation and that was done.

MR. BOB PETERS: And the economic evaluation was done on both a 100 and a 140 megawatt sale option?

MR. DAVID CORMIE: Yes, we offered SaskPower the option of taking an additional 40 megawatts, and so we had to be prepared for them to accept the -- the extra 40 megawatts, and so the valuation was done on that basis as well.

MR. BOB PETERS: And both options required new transmission lines?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: And the economic evaluation included both capacity and energy charges, Mr. Cormie?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: And the environmental attributes were transferred to SaskPower and included

in the price?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: And we see on page 258 of the Board counsels' book of documents that Manitoba Hydro's evaluation or mini NFAT, or Needs For an Alternative review on this project, it looked at three (3) scenarios, sir?

MR. DAVID CORMIE: That is correct.

MR. BOB PETERS: Has Manitoba Hydro's executive committee, and Manitoba Hydro's Board of Directors, provided approvals for this, Mr. Midford or Mr. Cormie?

MR. DAVID CORMIE: Yes, these -- this sale agreement was approved by the Manitoba Hydro Electric Board.

MR. BOB PETERS: Was Manitoba Hydro required to obtain approval from the government of Manitoba to proceed with the transmission line and the sale agreement?

MR. DAVID CORMIE: All sales agreement that require the construction of capital projects requires approval by the province of Manitoba.

MR. BOB PETERS: And that approval is provided by way of the province borrowing money tp support the project?

MR. DAVID CORMIE: No, there'd be an Order in Council associated with the sale agreement.

MR. BOB PETERS: When does construction begin, Mr. Cormie?

(BRIEF PAUSE)

MR. DAVID CORMIE: I'm sorry, Mr. Peters, I didn't hear the question.

MR. BOB PETERS: I was asking when Manitoba Hydro will begin construction on the transmission line.

(BRIEF PAUSE)

MR. GLENN PENNER: After the CEC approval. We have the probably a year or maybe more to construct.

MR. BOB PETERS: Has the Clean Environment Commission process been established?

(BRIEF PAUSE)

MR. GLENN PENNER: We haven't submitted yet. So no, the dates have not been

completely identified.

It's a Class 2. So typically Class 2 would not require a hearing, so there is time.

MR. BOB PETERS: On page 262 of Board counsels' book of documents, Daymark Energy advisors, who are probably in town right now and coming here tomorrow, have indicated -- and I thought, Mr. Cormie, you put that in one of your presentations, that Daymark concluded that it is in the best -- it is in the interest of Manitoba Hydro and its ratepayers to proceed with the project, correct?

MR. DAVID CORMIE: Yes. Daymark did a -- quite a robust review of the -- of the project, and came to the same conclusion that Manitoba Hydro did.

MR. BOB PETERS: And you say a robust review based on the report that you reviewed?

MR. DAVID CORMIE: No, it was based on an updated information of the report that -- that we referred to previously was done at the time the sale was recommended to the Manitoba Hydro Board. Daymark has re -- has reviewed it in the current context.

MR. BOB PETERS: Yes, and you said it was a robust review. So let's just make sure the Panel understands that Manitoba Hydro's initial review was back I believe in 2015, Mr. Cormie?

MR. DAVID CORMIE: Yes.

MR. BOB PETERS: And in 2015, Manitoba Hydro was making various assumptions and those assumptions have changed under current conditions?

MR. DAVID CORMIE: Yes. I think Manitoba Hydro's load forecast has changed. Our export price forecast has changed. And there been changes to the cost estimate of the project. And so we reflected all the up-to-date information, and provided that to Daymark for their analysis.

MR. BOB PETERS: All right. On page 263 there is indication that even if the project is delayed, Mr. Cormie, the power agreement provides for interim deliveries for most of the power on the existing transmission system.

Do you see that?

MR. DAVID CORMIE: Yes, I do.

MR. BOB PETERS: You spoke to that this morning and can you explain to the Panel for how long this agreement would remain valid if the project was delayed?

MR. DAVID CORMIE: As I indicated in my testimony this morning, the Utilities have allocated the existing transmission service available between Manitoba and Saskatchewan for other uses. For

short-term purposes, they are willing to relax those uses in order to make available as much of the hundred megawatts of power as possible.

And in our conversations with Saskatchewan Power, the -- we believe that most, if not all, of the power can be delivered using interim arrangements and we have talked about a -- doing that for a year. We haven't talked about doing it for in perpetuity, but it -- it is something that we know that in order to meet the construction schedule that Manitoba Hydro has there will have to be a little bit of flexibility in the use of the existing transmission service. And -- and so far with the 2021 in-service date that Manitoba Hydro is projecting, we're able to agree to -- to that interim service use.

MR. BOB PETERS: Thank you, Mr. Cormie. Before I close off the microphone, Mr. Chair, I would like the assistance I believe I'm going to pick on Mr. Midford.

To go back to Board counsel, page 144 with my last question, and it deals, Mr. Midford, with something we talked about on the Conawapa. We talked about Conawapa and -- and Bipole III, and the costs related to it.

In earlier portions of this hearing,

Mr. Midford, we have heard from Manitoba Hydro who has proposed a method to deal with what I'll call the sunk costs of the Conawapa generating station.

Are you generally familiar with that, sir?

(BRIEF PAUSE)

MR. LORNE MIDFORD: I'm not intimately involved in that, Mr. Peters.

MR. BOB PETERS: No and I -- I greatly appreciate that. Manitoba Hydro has put before this Board a future proposal as to how Manitoba Hydro wants to deal with the costs related to Conawapa.

Would you -- are you generally aware that that's the case?

MR. DAVID CORMIE: Is that the amortization over thirty (30) years, Mr. Peters?

MR. BOB PETERS: Yes.

MR. DAVID CORMIE: Yes, I'm aware of those.

MR. BOB PETERS: And -- and my only question, Mr. Cormie, and it may result in an undertaking is that we heard related to Bipole III that the costs that were previously attributed to

Conawapa were going to be brought over to Bipole III and not charged through on Conawapa.

Do you remember hearing that this afternoon?

MR. DAVID CORMIE: Yes, I remember the discussion.

MR. BOB PETERS: And so we would like confirmation, please, that the road costs that are attributable to Conawapa are not included in the $380 million that Manitoba Hydro wants to amortize over the thirty (30) years.

Could you take that as an undertaking and find somebody on the revenue requirement panel to assist you with that?

MR. DAVID CORMIE: Yes, we will -- we will undertake to determine what those Conawapa road costs are and how they're being handled.

MR. BOB PETERS: That would be satisfactory if your counsel agrees and I thank you for that.

MR. DAVID CORMIE: Okay.

--- UNDERTAKING NO. 59: Manitoba Hydro to provide confirmation that the road costs that are

attributable to Conawapa are not included in the $380 million that Manitoba Hydro wants to amortize over the thirty (30) years

MR. BOB PETERS: Mr. Chair, it's been a long day, and I've contributed to the -- the duration. So I want to thank the Board Panel for their indulgence. I also want to thank the witnesses from Manitoba Hydro for their responses to my questions.

I will be turning the microphone over in the morning to Dr. Williams, but only after counsel for the General Service Small, General Service Medium and KAP have their fifteen (15) minutes of questions of this panel first thing at nine o'clock tomorrow.

After the Consumers Coalition will be -- the Consumers Coalition is estimating approximately no more than forty-five (45) minutes and likewise, Manitoba Industrial Power Users group is estimating approximate forty-five (45) minutes.

So the in-camera session would begin tomorrow from 11:00 till perhaps as late as 12:30

tomorrow and we should be relatively on track to hear from Daymark on the SaskPower matter which we expect will not take the balance of the day as long as it has been today.

THE CHAIRPERSON: Thank you all. It's been a long day. Thank you very much and we'll adjourn until nine o'clock tomorrow morning.

(PANEL RETIRES)

--- Upon adjourning at 6:26 p.m.

Certified Correct,

_____

Cheryl Lavigne, Ms.