MANITOBA CLEAN ENVIRONMENT COMMISSION

BIPOLE III TRANSMISSION PROJECT

PUBLIC HEARING

VOLUME 1

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Transcript of Proceedings

Held at Fort Garry Hotel

Winnipeg, Manitoba

MONDAY, OCTOBER 1, 2012

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APPEARANCES

CLEAN ENVIRONMENT COMMISSION
Terry Sargeant - Chairman
Pat MacKay - Member
Brian Kaplan - Member
Ken Gibbons - Member
Wayne Motheral - Member
Michael Green - Counsel to the Board
Cathy Johnson - Commission Secretary

MANITOBA CONSERVATION AND WATER STEWARDSHIP
Tracey Braun
Elise Dagdick

MANITOBA HYDRO
Douglas Bedford - Counsel
Janet Mayor - Counsel
Shannon Johnson

BIPOLE III COALITION
Brian Meronek - Counsel
Karen Friesen
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CONSUMERS ASSOCIATION OF CANADA
Byron Williams - Counsel
Gloria Desorcey
Aimee Craft

MANITOBA METIS FEDERATION
Jason Madden - Counsel

MANITOBA WILDLANDS and SAPOTAWEYAK CREE NATION
Gaile Whelan Enns

GREEN PARTY OF MANITOBA
James Beddome

PEGUIS FIRST NATION
Robert Dawson - Counsel

TATASKWEYAK CREE NATION
Ian Cluny
Shaun Keating

APPEARANCES CONTINUED:

PINE CREEK FIRST NATION
Charlie Boucher
Warren Mills
John Stockwell

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Monday, October 1, 2012

Upon commencing at 9:00 a.m.

THE CHAIRMAN: Good morning. I'd like to call these proceedings to order. Good morning and welcome. My name is Terry Sergeant. I'm the chair of the Manitoba Clean Environment Commission, as well the chair of the panel that will be conducting these hearings.

With me on the panel, to my left Brian Kaplan and Wayne Motheral; to my right, Ken Gibbons and Patricia MacKay. In addition to the panel, I'd like to introduce some of our staff and advisers who are assisting us with this review, starting with Commission secretary, Cathy Johnson. At the back of the room at the administration table, the Commission's administrative secretary Joyce Mueller, our legal counsel, Michael Green, and our rapporteur, Bob Armstrong.

We are here today at the request of the Minister of Conservation and Water Stewardship to commence public hearings respecting the Manitoba Hydro proposal for the development of the Bipole III transmission line.

On December 5th of last year the then Minister of Conservation wrote to me asking that

the Clean Environment Commission hold public hearings on this proposed project. The terms of reference attached to the Minister's letter asked that the Commission review and evaluate the Environmental Impact Statement, as well as the proponents of public consultation summary. It also asked us to recommend whether an Environmental Act licence should be issued to Manitoba Hydro for the Bipole III project; and if so, to recommend measures proposed to mitigate any potential adverse environmental, socioeconomic and/or cultural effects resulting from the project, as well as how to manage residual effects, and also to recommend any future monitoring that may be required.

In the ensuing ten months since the Minister's letter much activity has taken place. A participant assistance program was initiated ultimately approving six applications for a total of more than $900,000. Two rounds of information requests were conducted with over 500 questions submitted to the proponent seeking further clarification or explanation. A number of pre-hearing meetings have been held, as well as a motions hearing at which this panel heard argument

in respect of three motions.

Today we begin what we expect to be eight weeks of hearings. We have scheduled 27 and a half days for those hearings. We are in this room for this week. Next week we will be in Gillam, the following week in Thompson and The Pas, and the week after that in Dauphin, Portage la Prairie and Niverville. We will return to Winnipeg on October 29th for the final four weeks.

The Manitoba Clean Environment Commission is an arm's length Provincial agency that encourages and facilitates public involvement in environmental matters. One way in which we do this is by conducting hearings such as these we are about to begin. These hearings are but one of a number of key steps in approving an application for an environmental licence. These steps include, but certainly aren't limited, to the proponent's application for the licence, the preparation of the Environmental Impact Statement under the guidance of the Environmental Approvals Branch of the Department, the Commission's recommendations and advice which come out of these hearings, and finally Ministerial approval and the issuance of a licence with attached conditions.

The purpose of the hearings is to provide an open and accessible and transparent process, to allow for public input into decision-making, which will assist the Commission providing recommendations to the Minister as to the merits of the proposal. This in turn will assist the Minister, as the ultimate decision-maker, by providing him with diverse, well-reasoned and well-informed perspectives of the merit of the proposal. To achieve this we strive as much as possible, as much as reasonably possible, to assure a thorough and comprehensive review.

The Commission operates under the authority of the Manitoba Environment Act. We are also directed to conduct the hearing in general accordance with our process guidelines respecting public hearings. These ensure that the hearings remain fair and open forums for the exchange of information and ideas.

We strive to be as informal as possible, however, recognizing that hearings about a project as complex as Bipole III require some structure. Thus our process guidelines include a number of practice directions and guidelines that

all parties to this proceeding will be expected to be aware of and to follow.

We recognize that fairness must not only occur, but that there must be a perception of fairness and impartiality during the hearing process. We also recognize that participants, in particular members of the public, do not have the same access to expert advice and resources available to the proponent. And we recognize that critical questioning of all aspects and merits of the proposed project contribute to a positive process. So flexibility and common sense will be given preference over rigid bureaucratic rules. The panel will be the final arbiter of procedural fairness in adapting to the circumstances that might arise.

Let me say a few words about what will ensue over the next few weeks. A schedule of the hearings is available at the registration desk but I'd like to review it quickly. After opening procedures this morning, we will hear from the proponent and registered participants who will make brief statements, brief opening statements, setting out the nature of their participation in these proceedings. Following that the proponent,

Manitoba Hydro, will begin to describe its proposal. We expect that the rest of this week will be taken up with this presentation and the cross-examination and questioning of Manitoba Hydro.

The community hearings over the following three weeks are designed to hear concerns from members of the public in those communities. Each community session will begin with a brief overview of the project presented by Hydro. Following that, community members will be given an opportunity to ask questions relevant to the project and to make oral presentations expressing their views. What the panel hears in the community hearings will become part of the record as well as being part of our deliberations just as much as everything we hear during sessions in Winnipeg.

When we return to Winnipeg in late October, we will continue with the presentation and examination of Hydro evidence. Following that, participants will present their evidence, which will be subject to cross-examination and questioning by Hydro, the panel, and other participants.

We will provide opportunities for members of the public with their own concerns to be heard. Two evening sessions have been scheduled in Winnipeg primarily to hear presentations from members of the public. Upon demand, we may or more likely will hear public presentations during daytime sessions. Members of the public will be allowed to ask questions of Manitoba Hydro following the participants.

I should also note that public presentations are not subject to cross-examination. Only the panel members may ask questions for purposes of clarification.

Once the participant evidence is concluded, Manitoba Hydro will be given an opportunity for rebuttal, followed by final arguments by the participant and the proponents. After the hearings end and the record is closed, the panel will begin its deliberations.

And finally, the Commission will make a report containing advice and recommendations for the Minister of Conservation. The Environment Act allows 90 days following the closure of the hearing for this report to be submitted. Following submission of the report, the Minister

will determine the date upon which the report will be released to the public. Ultimately, it is the Minister's decision as to whether a licence is issued and on what conditions.

Just a few more words that deal with some housekeeping matters. First, in regard to registration, members of the public wishing to make a presentation must register at the desk by the entrance to this room. As well, if you wish to receive a copy of the final report, you must register for that. Although nowadays we prefer to post them online and have people access it that way, but we will still make a printed copy available if requested.

Second, we will make best efforts to post verbatim transcripts of each day's proceedings by the following day. We can't always guarantee it, particularly when we are out of town, but they will be up fairly quickly after a day's sessions. These will be posted on our website. Cecmanitoba.ca. We will also post to our website all written submissions and presentations as quickly as we can, with some limits on overly large documents.

Third, cell phones, those of you who

have been through hearings or meetings with me before have heard me say this. We are terribly impatient about cell phones going off in the room. So please turn them off, turn them on to vibrate. If you have to take a call, leave the room. Just show some courtesy to all of those around you.

Last, most of you will know, or those of you who have also been through previous hearings and pre-hearing meetings with me, I'm a stickler for starting on time. In the morning, after breaks and after lunch, when we set a time, please be back in here and be prepared to go at the time that we have set. And I enforce time limits just as strictly. Where you are bound by a time limit, I will give five and two minute warnings.

So in conclusion, just let me say that our task in the next few weeks is for each of us to play a role in ensuring that the proposed Bipole III project, if it is to go ahead, does not result in any serious and ongoing damage to the environment of our province. In all hearing processes the challenge for the panel is to have a complete and understandable body of evidence upon which to base our recommendations to the Minister.

The challenge for the proponent, in this case Manitoba Hydro, is to assure that that record is complete, and that the panel as well as the public understand the conclusions set out in the Environmental Impact Statement. And the challenge for the participants is to vigorously test the positions and arguments put forward by the proponent, in this way assisting the panel in its understanding.

While the test in Manitoba is not to determine whether the project is in the public good, if we all succeed in these challenges, we will be looking out for the environment of our province and that is in the public good.

Thank you.

We'll now move to some comments that need to be read into the record by the Commission secretary, Ms. Johnson.

MS. JOHNSON: Thank you, Mr. Chairman. I think you have summarized the Minister's letter quite well, so I'm not going to read it word for word. It was dated December 5th, and it was at that time signed by Mr. Chomiak, who was the Minister at the time, as well as the terms of reference, which the chairman summarized the

highlights, to review and evaluate the Environmental Impact Statement and the proponent's public consultation summary. I am entering these documents into the record. This will be CEC number one and two, as well as the French version which will be three and four.

(EXHIBIT CEC-1: Minister's letter, December 5th, signed by Mr. Chomiak)

(EXHIBIT CEC-2: Terms of reference)

(EXHIBIT CEC-3: French version of Minister's letter, December 5th, signed by Mr. Chomiak)

(EXHIBIT CEC-4: French version of terms of reference)

THE CHAIRMAN: Thank you. I will now call upon the director of Manitoba Conservation and Water Stewardship and the Environmental Approvals Branch to make a presentation.

MS. BRAUN: Good morning, Mr. Chair and Commission members. For those of you in the audience who don't know me, my name is Tracy Braun and I am the director of Environmental Approvals with Manitoba Conservation and Water Stewardship. I'm going to be giving you a short presentation today that outlines the environmental assessment

steps that have been accomplished to date for the Bipole III project in advance of these Commission hearings.

As director, I am assigned responsibility for the environmental assessment regulatory process under the Manitoba Environment Act.

In Manitoba the environmental assessment and licensing process is regulated by the Provincial Environment Act. Bipole III includes an electrical transmission and transformer station greater than 233 kilovolts. The classes of development regulation under the Environment Act is defined as a class three project and must follow section 12 of the Act. Class three licensing decisions are made by the Minister of Conservation and Water Stewardship.

In the case of Bipole III, as mentioned by the Chairman, the Minister has asked the Clean Environment Commission to conduct hearings and to make recommendations for consideration in making his licensing decision.

The environmental assessment regulatory process for this project commenced on December 14th, 2009. The proposal was accompanied

by a draft environmental assessment scoping document. It was advertised for public review, both on line and in 13 newspapers across Manitoba between January 2nd and the 8th, 2010, including local newspapers and the Winnipeg Free Press.

Copies of the proposal and the draft scoping document were placed in 14 public registry locations identified in the advertisements. Public comments on both documents were requested by February 10th, 2010. Copies of both documents were provided to members of the Technical Advisory Committee, also known as TAC, for review with the same requested dates for comments. Public and TAC comments on the draft environmental scoping document were subsequently provided to Manitoba Hydro. The scoping document was finalized in June of 2010.

The scoping document was deemed equivalent to guidelines for the preparation of an Environmental Impact Statement because it had the same content and it followed the same public and TAC review process as the guidelines would have done.

Based on the approved scoping document, an Environmental Impact Statement was

prepared by Manitoba Hydro and filed with the Environmental Approvals Branch of Manitoba Conservation and Water Stewardship on December 2nd, 2011. The public and TAC reviews were done in parallel as is the usual process.

Comments, the EIS was placed in the public registries and advertised for public review in the same 13 newspapers between December 10th to 22nd, 2011. Comments on EIS were requested by March 16th of 2012. The EIS was circulated to TAC members, as mentioned before, with the same requested date for comments.

Following receipt of public and TAC comments on the EIS, additional information was requested, so an iterative information request process ensued. And this took place in parallel with the information request process being undertaken by the Commission.

At the end of the IR process, which took place during the spring and summer of 2012, the Environmental Approvals Branch identified four short segments of the route where minor re-routes are anticipated to avoid wildlife impacts.

The Clean Environment Commission was advised by the Environmental Approvals Branch on

August 31, 2012, that the available information was satisfactory to commence public hearings, and that's where we are today.

I am not going to read out all of the websites here, but the material is available on Manitoba Hydro's website as well as the website of the Environmental Approvals Branch. We also have binders of information which we have brought to the hearing that can be made available if requested.

So in closing, I'd just like to say I appreciate the efforts of the Commission in reviewing this project and ensuring that it receives a thorough evaluation, as I know it will. And the Environmental Approvals Branch looks forward to hearing public comments on the project during the hearings, and we also look forward to the Commission's recommendation to the Minister of Conservation and Water Stewardship following the hearing.

Thank you, Mr. Chairman.

THE CHAIRMAN: Thank you, Ms. Braun.

MS. JOHNSON: Mr. Chairman, as Ms. Braun is making her way back to her seat, her presentation is MCWS number one.

THE CHAIRMAN: Thank you.

(EXHIBIT MCWS-1: Presentation of Tracy Braun)

THE CHAIRMAN: Well, this is amazing. We are ahead of schedule. How long do you think that will last?

We're turning now to opening statements, and in this case there will be time limits on these. Each of the proponent and each of the participants will be given 15 minutes to describe briefly the approach they are going to be taking in these hearings over the next eight weeks. I'll call upon Mr. Bedford for Manitoba Hydro.

MR. BEDFORD: Good morning Commissioners, participants, colleagues from Manitoba Hydro, consultants and members of the public. My name is Doug Bedford, I am legal counsel at this hearing to Manitoba Hydro. At this table I am joined to my left by my colleague Ms. Janet Mayor from the law department of Manitoba Hydro. To my immediate right, Mr. Edward Tymofichuk, the vice-president of transmission and distribution for Manitoba Hydro; to his right, Mr. Gerald Neufeld, division manager for

transmission planning and design; to Mr. Neufeld's right, Ms. Shannon Johnson, the manager of the licensing and environmental assessment department within the transmission division of Manitoba Hydro.

We at Manitoba Hydro recognize that the Bipole III project has been and will continue to be controversial. We do understand that the need for this project is not well understood by all. And ironically that is because we have done, over the years, such an excellent job of meeting the demand of Manitobans for electrical energy that we suspect that Manitobans take for granted the reliable supply of that energy.

We do understand that the costs of this project are obviously significant, and accordingly there is an obligation upon us to be prudent and rigorous in our planning and in our advancement of this project. And we do understand that environmentally it is a challenge to assess and to predict the biophysical and socioeconomic impacts of a project with such distinctly different components.

This project requires that we build two concrete and steel converter stations, each of

which will take some six years to construct once a licence is issued.

In addition, this project requires that we build some 2600 steel towers with conductors through a right-of-way that will stretch 1,384 kilometres, and we will have to do that over a period of two to four years, though, in the case of the towers and the conductors, we will be in any one location no more than a period of days to weeks.

We have certainly heard the criticism of the Environmental Impact Statement that we filed for this project. Our purpose as a proponent over the next eight weeks will be to demonstrate that, in fact, we have done our work in planning and assessing this project, that we have done our work responsibly and professionally, and we are confident that the project and our work will be tested and treated just as responsibly and professionally.

Given the criticism, we have decided to bring to this hearing to testify as many as is feasible of the men and women who did the planning and who did the assessments and who have made the predictions that make up the substance of the

Environmental Impact Statement and the responses to some 900 information requests that we have received and answered. And we invite each of you who still believe that they did not do their work, that they did not follow best practices, or that they missed some impact, to put such concerns to them and listen to their answers, and then judge whether or not they have done their work responsibly and professionally.

In this province, we at Manitoba Hydro are the most experienced and competent in building and operating electrical transmission systems. That is our business. But we do not suggest that we are necessarily also the most skilled or most competent in assessing and predicting the impacts our projects can or may have on the environment, nor are we necessarily the most knowledgeable about how best to mitigate those impacts.

Accordingly we look forward, indeed we expect that a process such as this will generate constructive and practical suggestions that will make the Bipole III project better.

And it is with that thought in mind that I note that the work of planning this project did not end on December 1, 2011, when we filed the

Environmental Impact Statement. It has carried on each and every week since then.

One important aspect of that work, largely unknown to the public at large, is the meetings we have each week with First Nations, with the Manitoba Metis Federation and other parties with interests in the vicinity of the proposed facilities for this project, in order to work through with them what constructive and practical roles they can play in making this project better. And inevitably in those meetings we continue to hear from them concerns about their perceptions of how this project will affect their lives.

A wealth of information creates a poverty of attention. Each of us can handle and process only so much information at any one time. In the next eight weeks you are going to have to cope with too much information. You already have, I suggest to you, too much.

Accordingly, I suggest as a tool to use in maintaining perspective on the quantum of evidence that you keep five questions before you. Number one, did we as Manitoba Hydro engage the public and did we respond in a constructive and

practical way to what we heard? Number two, did we identify the correct valued environmental components and the right issues? Number three, are our conclusions regarding the significance of impacts sound? Number four, given that the route by the electoral decision of the people of Manitoba is to be a west route, have we successfully balanced all of the competing restraints of such a route? And number five, can we at Manitoba Hydro manage this project responsibly, professionally and successfully going forward? Where in specific instances your answer is no, there you ought to recommend to the Minister of Conservation and Water Stewardship. Our work on this project began years ago. Now, it is your turn. Thank you.

THE CHAIRMAN: Thank you, Mr. Bedford. Next is the Tataskweyak Cree Nation. Please introduce yourself for the record and proceed?

MR. CLUNY: Thank you Mr. Chairman. My name is Ian Cluny. I am one of Tataskweyak Cree Nations legal counsel. Primary counsel, Douglas McKenzie, is unable to be present today, so I'll be delivering TCN's opening statement. With me today and seated at the TCN table is

Mr. Shaun Keating of Hobbs and Associates, which firm is an advisor to TCN.

At the outset TCN wishes to acknowledge the assistance provided by the Commission to participate in these Bipole III hearings.

Tataskweyak Cree Nation is participating in these hearings in order to comment on its assessment of the impacts of the project upon TCN, and to protect its constitutional rights and its interests under existing agreements negotiated with Manitoba Hydro. By participating in these hearings, TCN seeks to ensure that any licence issued to Manitoba Hydro addresses these impacts, rights and interests.

TCN believes that the impacts of the Bipole III project are and will be substantial and must be addressed. This conclusion is grounded upon TCN's decades long experience with substantial hydroelectric developments within its traditional territory, which experience started in 1957, and the unique Cree world view which is expressed through the Mother Earth model. The Mother Earth model emphasizes harmony and balance

and is the touchstone for TCN's evaluation of the impacts of the Bipole III project.

It is the hope of Tataskweyak Cree Nation that through the hearing process the Commission will fully understand the extent of hydroelectric development in TCN's traditional homeland, currently some 35 projects occupying 124,000 acres of land, including flooded lands, dewatered rivers and lakes, all of which have greatly disturbed TCN's relationship with its lands and waters and plants and wildlife found thereon or therein.

The members of Tataskweyak Cree Nation have lived with the very significant disruptions caused by these developments on a daily basis for more than 50 years, and the harmony and balance they have strived to maintain with Mother Earth have been profoundly and negatively affected. The roughly 400 kilometres of the transmission lines associated with the Bipole III project will further fragment its resource area. Additionally, the Keewatinoow converter station and associated facilities will disrupt even more of TCN's traditional homeland.

TCN's constitutional rights must be

addressed in connection with the Bipole III project. Since these rights will be discussed in detail in a written submission to be filed, I do not intend to make any further comment upon them at this time.

As already mentioned, Tataskweyak Cree Nation's interests under existing agreements must also be addressed. The 1992 agreement with Canada, Manitoba and Manitoba Hydro implemented long outstanding provisions in the 1977 Northern Flood Agreement. The 1992 implementation agreement established joint processes with Manitoba Hydro to resolve potential adverse effects of future Hydro projects. It was the spring word for negotiation of the development of the Keeyask generating station. Manitoba Hydro has indicated that these processes do not apply to Bipole III project. TCN believes otherwise. In its view they fully apply to the project now under consideration. In spite of this sharp difference of opinion, however, negotiations between the parties have proceeded, although at a general level and without expressed recognition of TCN's assessment of the impacts of the Bipole III projects or its rights and interests.

Having said this, TCN does acknowledge that Hydro has provided it with the opportunity to conduct its own independent assessment of the Bipole III project, and that Hydro has rerouted the 500 kilovolt DC transmission line at two locations at TCN's own end in an attempt to mitigate impacts.

TCN also acknowledges that its two Aboriginal traditional knowledge reports form part of the Environmental Impact Statement submitted by Hydro. However, since the Environmental Impact Statement submitted by Manitoba Hydro determines that potential impacts from the Bipole III project, including cumulative effects, will not be significant, it would appear that Hydro and its experts either do not fully understand the substance of TCN's Aboriginal and traditional knowledge reports or discounted seeing them reaching a conclusion expressed in the EIS. As a result, TCN does not believe that the EIS properly assesses the totality of hydroelectric development impacts to date, nor the additional impacts to be caused by the Bipole III project. Moreover, Tataskweyak Cree Nation believes that the Environmental Impact Statement does not provide

for benefits or compensation commensurate with the very significant impacts identified by TCN.

I can advise that Tataskweyak Cree Nation's written submission will elaborate on all of the matters touched upon in my comments. It will include a legal analysis explaining the nature of TCN's rights and interests with respect to the Bipole III project.

TCN believes its two Aboriginal knowledge reports will speak for themselves and will reflect TCN's assessment of impacts of the Bipole III project and the ways to address them. However, TCN elders and resource harvesters may testify as to impacts of Hydro development, past, present and future, on the traditional homeland of TCN.

In closing, I understand that in accordance with the terms of reference, the Commission can make recommendations with respect to measures proposed to mitigate any potential adverse environmental, socioeconomic and cultural effects resulting from the Bipole III project. I trust the panel will give full consideration of the TCN submission when such recommendations are made.

Thank you for your time this morning.

THE CHAIRMAN: Thank you, Mr. Cluny. Next up, Pine Creek First Nation.

MR. BOUCHER: Thank you very much. My name is acting Chief Charlie Boucher, Pine Creek First Nation. Our population in Pine Creek is 3600 people, approximately four and a half hour ride from here, north of Winnipeg. We live along the lake of Lake Winnipegosis.

Mr. Chair, with me today I brought my council, Nancy MacKay, Sylvia Chartrand. Also we have our technical people, John Stockwell and Warren Mills, that's assisting Pine Creek First Nations. We are here. We wanted to bring concerns that Pine Creek has, our food sources, the blueberries that we eat, on a daily, yearly basis, the economics of our people. Today we are losing the blueberries.

The hunting impacts, the trappers have great concerns. The fishery is what we also depended on, our livelihoods.

All water sources that are coming up so quickly, why is that? Surface water, ground water, the creeks and the streams. In 1999, fish floating around in Lake Winnipegosis, beaches

filled with fish. We need proper answers, the water quality, the health and safety of our people, and most important, our future.

We have great concerns about the herbicides used by Bipole III, more impacts going to wash down to where we live. There's five streams and rivers. Every year, every spring we had flooded homes, roads washed out.

I also recognize, I have to say that, the importance of Bipole III to this province. But I need to hear comfort. I need to reach out to my people and my future to tell them alternatives, better resolutions.

We are governed by the Indian Act. Where is our regional offices, our representations from the Federal Government as First Nation people? The original people of this land, we are still sovereign, we are still connected. The species is slowly disappearing. We depend on the species.

I want to echo some things that the present -- who just spoke about our tools, the sweat lodges, our sacred pipes, our grandfathers, our grandmothers, our elders today that remind us, Mother Earth speak for your waterways, your

watersheds, you must be accountable. Who is monitoring? If these permits are going forward, who is going to make them accountable? Who is going to enforce them? Today's legislation, do they honour our treaties?

Again, for me I had been around for 12 years in council. My portfolios helped. The environment is a high priority, that department is a high priority for me. My council brings it forward as high priority. My elders tell us, you must speak for the waterways.

Our traditional territory, why hasn't Pine Creek been reached out to as offered in the economics? We are capable. We know how to come to the table and negotiate a partnership. I feel this process that's existing right now is not meaningful.

If Pine Creek is going to flood, I need to assure my people. I need to tell them when are we going to flood. Because as Anishinaabe people, as I said off the bat, I know what I see, I know what's coming. Our tools tell us that, our religions tell us that.

Over the last four decades there have been a number of projects that has been consulted

on. There are outstanding licences for Lake Winnipeg and the Churchill River diversion. We believe that this integrated power system and water regulation process that allowed the province and the Crown corporations to generate revenue is affecting our community.

We haven't been involved in that. So now you are asking us how Bipole III is going to affect us. It's going to affect us negatively. It's more watersheds going to be opening up than what's existing.

Where is the plans to relocate my people? What we just witnessed in some of the first nations here in 2011, 100 percent I do not support. There has to be new implementations, changes in this Province of Manitoba legislation that's going to accommodate a fair balance. What's the future going to look like with the cost of Hydro? For us with what's existing, the contribution agreements we signed with our trustees, the Federal Government, what are they doing to provide and develop new alternative solutions?

I wish Bipole III the best, but you have to hear our voices also, as Anishinaabe

people. As I said, in 1999 fish disappearing, floating around.

With that, I thank the Commission for allowing Pine Creek First Nation to come and do a presentation. We want to be a part of the solution. We want to be there with honour, not outlawed. I need to speak for my children. Thank you very much.

THE CHAIRMAN: Thank you, chief. Next on the agenda, Mr. Mills?

MR. MILLS: If we can have a few minutes?

THE CHAIRMAN: Well, these are opening comments, Mr. Mills. You will have plenty of opportunity in the future processes to address all of the issues that come before us. Thank you.

Next on the agenda, Manitoba Metis Federation.

MR. MADDEN: Good morning, Mr. Chairman. My name is Jason Madden, I'm counsel for the Manitoba Metis Federation, also known as MMF. Since 1967 the MMF has represented the Manitoba Metis community at the local, regional and provincial levels at the Province of Manitoba.

Of course, the story of the Manitoba Metis didn't begin in 1967. The Metis nation called this territory home long before Manitoba was Manitoba and Canada was Canada. In the words of Supreme Court of Canada in a case called RV Blade, the Manitoba Metis were negotiating partners in Confederation, bringing this province into Confederation. During the course of this hearing, we may also receive the Supreme Court of Canada's decision on whether the land based promises made to Manitoba Metis as Canada's negotiation partners were actually fulfilled.

I raise these points not to repeat a history lesson that I'm sure every Manitoban knows well. I raise these points to emphasize the deep history connections the Manitoba Metis have to the lands that Bipole III's approximately 1300 kilometre route will disturb, affect and change for generations.

Throughout the hearing you're going to hear from the MMF about how the Metis community continues to use and rely on that territory impacted by Bipole III. It has unique impacts that are different from other stakeholders as well as other Aboriginal peoples.

You are also going to hear repeatedly about the significant impacts of the final preferred route on the Metis, which Manitoba Hydro has not considered, assessed or adequately mitigated in the MMF's perspective.

The MMF also wants to restate its concern that we do not believe that the current EIS is sufficient in order to undertake an effective assessment. We think there are significant gaps. The June 2010 scoping documents requirements have not been met.

We also raise a strong objection to the issue that this review is going forward while the Manitoba government itself acknowledges that re-routing is ongoing and those discussions are occurring before -- between Manitoba Conservation and Manitoba Hydro. Based on the August 29th letter, there will be re-routing to parts of the final preferred route, yet the CEC is reviewing the EIS based on the current project. We say this situation puts into question the reliability of the review to effectively consider and recommend mitigation measures for the project. We asked how this can be done when the CEC doesn't know what the final project is actually going to look like?

One of the roles of the CEC is you are going to have to make mitigation measures based on balancing, based on your assessment of the entire record. And the idea that we are looking at a route that may -- I know Manitoba Conservation says minorly affect. Those minor effects dramatically change about how that balancing of different interests will be done. Our belief is that a public process must be public. The review can't be achieved by Manitoba Conservation and Manitoba Hydro meeting behind closed doors and altering the project that is being reviewed through the public process.

We say such an approach defeats the underlying purpose of the CEC hearing, and we would ask that the CEC of its own initiative adjourn the hearings until the Manitoba Hydro and Manitoba Conservation conclude those discussions and we have an understanding before us what the final route and what the final project actually looks like.

Related to these concerns, the MMF will put forward evidence that many of Bipole III's impacts on the Manitoba Metis community can't be mitigated. There needs to be a

significant route change to the final preferred route. You're going to hear that from us, and it's not just minor adjustments and tweaking.

If the routing is not undertaken, the project should not be recommended from the MMF's perspective.

Other impacts on Metis rights, interests and way of life that could potentially be mitigated have not been. Manitoba Hydro's proposed mitigation measures and environmental protection plan fall significantly short on many fronts and are non existent on others. For example, and I'm just going to touch on a few, there's going to be many that we're going to elaborate on much further over the next eight weeks. Manitoba Hydro recognizes that there are socioeconomic impacts of Bipole III on Aboriginal peoples in the north, which include the Metis, but it has not included the Metis in those discussions. Further, Manitoba Hydro -- and I think this is going to be something you're going to hear a lot from us about, there is a map that we will hand out.

The final preferred route dissects what the Metis community calls its large animal

bread basket, on the west side corridor of the province, without any regard to the significance of this area to the Metis and the challenges this area is already under. In particular, this west side corridor which is generally outlined on the map that we have asked to have distributed, is already under so much pressure that it's subject to game hunting area closures for moose hunting, with the consent of the Manitoba Metis, on the basis of we're in it to protect the resources for future generations as well. And we understand that in addition there may be additional closures in this area.

As you may have read about over the weekend, the Manitoba Metis and Manitoba Government concluded a harvesting agreement which recognizes that the Metis community have constitutionally protected harvesting rights in that area. But the area isn't just recognized because of the historic importance to the Metis on the west side, but for the locational importance of this area to the exercise of Metis harvesting rights, in particular animals such as moose and elk. Yet Manitoba Hydro's preferred, proposed and preferred route cuts directly through the heart of

the bread basket without any regard to the sacrifice the Metis, as well as other Aboriginal communities, are already making with respect to not exercising their constitutionally protected harvesting rights in those areas already.

For the Manitoba Metis this route selection contributes to what we call a perfect storm that is already creating increased pressures on Metis harvesting and resulting in the loss of moose harvesting opportunities on the west side.

I want to emphasize a quote from the Supreme Court of Canada on consultation and accommodation cases. It's a case called Mikisew out of Treaty 8 in Northern Alberta. But this is the three words they say, "location is important." And I want to stress that. This cuts directly through a location that is important that Manitoba Hydro has not understood or assessed or even contemplated seriously in its selection of this route.

This location is more important, or increasing -- I don't want to say more important, I want to say significant for the Manitoba Metis, because unlike Indians in the province who have natural resources transfer agreement rights under

the 1930 NRTA Act, the Metis have no other option about where they are going to get this harvest. And I think what we will continue to illustrate in our presentations is why we call it the perfect storm. If you layer this upon all of the factors, a right cannot be made meaningless. That agreement that was signed on the agreement shouldn't be a me fool you, sure, we recognize that you have rights there, but it's going to be almost near impossible for you to exercise them because you have no other locations to go to.

We want to make this clear that the Metis are here, and we accept with rights come responsibilities, but the same thing goes for the government and the same thing goes for its Crown agent, Manitoba hydro.

Throughout this hearing the MMF will continue to focus on these issues and concerns, amongst others, that the Manitoba Metis have about this project. However, based on the current EIS and the IR responses, the MMF's position is the project should not be recommended by CEC at this time.

At the end of the general assembly that was held over the weekend, close to 2000

Metis delegates who largely live along the proposed route voted to, and I am quoting, "oppose Bipole III as it is currently being proposed unless the impacts on Metis rights, interests and way of life can be addressed and meaningfully mitigated as well as accommodated.

Clearly, from the Metis perspective this project does not have a necessary socio licence, and we're going to talk more about this. It is the people who are most directly affected do not agree with where the route is going. It's not in the public interest to approve a project that's not supported by a majority of the communities that are significantly impacted along the route.

Moreover, throughout this hearing the MMF is going to put forward evidence that you don't have the requisite data, information, or mitigation to grant an environmental licence either -- and we recognize you aren't granting the licence but to recommend one that is to be granted.

My last point, I am going to talk just a bit about the Crown's duty to consult and accommodate, and I want to make this point. The MMF had previously indicated that it was going to

bring a motion on these issues. In our understanding from the interchanges that we have had with the Chair in the past, we thought that it was not necessary to bring a preliminary motion because our understanding is that we're going to be allowed to present evidence on the impacts on Aboriginal rights. I'm just going to go back to September 11, 2012, at page 39 of the transcripts where I actually posed the question to the Chairman about whether aboriginal rights will be able to be raised throughout the proceeding. And the response was:

> "That's correct. I think there are a number of issues that relate to Aboriginal communities in respect to their ability to exercise their harvesting rights, in particular, I'm not saying exclusively, that fall under the purview of the EIS, as long as it's not in the context of the duty to consult under section 35. Does that answer your question?"

So I think our understanding is that we're able to present this information. And in addition, what we do not agree with, though, is

that this -- the CEC does not have to consider the honour of the Crown and the duty to consult in the context of its final decision. We will, when we submit our evidence, make arguments about why that needs to be understood. We haven't brought a preliminary motion on it because we're going to be able to bring forward our evidence on that. And if we aren't, then we're going to bring a motion at that time. But the CEC has asked for authorities for this. We would point to, and will argue this further on, the Paul case from the Supreme Court of Canada which clearly recognizes that independent quasi-judicial tribunals have the ability to answer questions of law related to Aboriginal rights related issues.

We also want to point to a case that is extremely on point with what is at issue in this case. And it is Kwikwelam First Nation versus British Columbia Utilities Commission, and it's a case from the British Columbia Court of Appeal in 2009. We're going to provide these cases, but we think it's extremely on point and it's a very -- I think that in the decision that was presented on Peguis First Nations' motion, there was a question of, where is the legal

authority for this? We point to these cases as the legal authority for why this Commission will need to consider the duty to consult, in addition to other arguments that we'll make. We don't necessarily think those need to be made now. As long as we're able to provide evidence, we think that in your decision-making you have to make your decisions consistent with the honour of the Crown. Thank you.

THE CHAIRMAN: Thank you, Mr. Madden. Bipole III Coalition?

MS. JOHNSON: Mr. Chairman, I'd just like to add that the map that Mr. Madden was talking about will be distributed shortly and this will be exhibit number MMF number one. I would also like to remind the proponent and the participants, any documents that you bring in here, I also need the electronic copy. Thank you.

(EXHIBIT MMF 1: Map)

THE CHAIRMAN: Thank you.

Mr. Meronek?

MR. MERONEK: Thank you, Mr. Chairman, members of the Commission. My name is Brian Meronek. I'm here representing the Bipole III Coalition, which is a coalition made up of

engineers, retired Manitoba Hydro executives, farmers and concerned rural residents, approximately 350 in number.

Just to correct the record, there was an unfortunate characterization of this coalition as being a political party at the pre-hearing. I just want the record to show that we are not a political party. We don't have a political agenda, and we probably don't even have the members to have -- to constitute a political party. But we have had a longstanding concern over this project. Manitoba Hydro, I guess through the government, for reasons which it will eventually have to answer to, chose to traverse some of the most productive agricultural land in the province, if not in Western Canada. There are a lot of numbers being batted about, but agricultural and agricultural related land approximates 585 kilometres.

Now, this isn't in the vein of sour grapes, but I just want the record to show from a historical perspective that we had an original mandate that challenged the merits of the Bipole route being down the west side versus the east side. That is not on the table any longer.

We then pursued a course to demonstrate that down the west side there is an issue as to whether or not Bipole needed to be built at this time. And that mandate was vetoed by the government at the recent terms of reference clarification letter from the now Minister of Conservation. The legitimacy of these decisions to render these important issues out of scope no doubt will be fought in another forum at a different time.

It's our understanding through the pre-hearing conferences that therefore needs for alternatives to discussions of Bipole III are off the table, along with related issues of cost and reliability. Nevertheless, like a bad rash, we won't go away. We have a residual concern over issues of agriculture.

The Commission is probably well aware by now that there are thousands and tens of thousands of pages of all aspects of environmental impacts of this project, technical reports that are too numerous to read. And yet the agricultural component has comprised of several pages in the Environmental Impact Statement, and a hundred plus pages of the agricultural technical

report.

Agriculture is the backbone of this province, and has been forever and will be forever. Yet for the prodigious length of right-of-way through southern Manitoba, Manitoba Hydro sums up the impact as thus, and I'm quoting from chapter eight, page 248: The agricultural productivity impact of this line from direction is negative, from magnitude is small, from geographic extent, project site/footprint 50 hectares, as I understand the evidence. And I did the conversion, that's about 123 acres. The duration short to medium term, and the overall, in bold, not significant. But we have a good portion of 750 landowners who might be affected who beg to differ.

The overwhelming concern of the landowners is that whatever ails the landowners can be handled through compensation measures. In other words, let's get the licence and we'll worry about the landowners after that.

Through questioning of Manitoba Hydro's witnesses and through our own evidence, we expect to probe some of the following items that -- it's not complete -- but one, the route

site selection and criteria employed, especially respecting the portion of agricultural land affected, the consultation process as it related to landowners, the compensation policy of Manitoba Hydro, including the compensation packages that are being offered, especially as it relates to future damage. And let me be clear on that, there will be future damage, it will be long lasting.

There will be issues needed to be addressed with respect to specific items such as aerial spraying and the importance of the challenges Bipole III represents to that essential tool for farmers. Irrigation and the importance it plays now and in the future, and the specific logistical difficulties such a line imposes on the use of pivot irrigation systems, livestock and the specific difficulties associated with liquid manure management as a nutrient and the implications it has on cattle farmers. It is radically different from crop farming. You will hear about the rapid change in agricultural methods in technology which may make today's considerations obsolete from a farming, and thus a routing perspective. You will hear about safety concerns from an agricultural perspective.

Other environmental concerns that we will be addressing relate to caribou. And let me pause here. We're not here to dump on Manitoba Hydro. Where Manitoba Hydro has done a good job in our estimation, we will identify that because it's only -- this isn't an advocacy hearing, this is about the Commission getting the true goods. So while we say that the Environmental Impact Statement with respect to caribou was wanting, the supplemental report was much more informative and empirical. Still there are routing issues related to that. There are survival concerns with respect to caribou. There is an issue of monitoring as a measure of mitigation for caribou. There are issues with climate changes on the survival of caribou, and the interaction with predators and other animals such as moose on caribou. You'll see that it's a very, very complex and intricate interrelationship.

We will be dealing with matters of birds, especially migratory birds, and a concern over the heavy losses which can be expected through bird strikes. We will examine the measures chosen by Manitoba Hydro to mitigate those bird losses. We will also explore the issue

of sustainable development and the socioeconomic impacts, especially in the agricultural industry. And we'll want to address issues of cumulative effects and examine those effects from an agricultural perspective, and from birds and caribou.

And finally, this hearing is a work in progress. What you hear now may not be what you will hear later on. So we ask the Commission to be patient. The final assessment of the Commission will begin when the last witness has spoken and the last oral argument has been addressed. That's when your job really begins.

There is a plethora of information, as Mr. Bedford has indicated, that has been produced. It won't be an easy task to decipher, assimilate and make sense of. We will do our best to assist the Commission in that regard. Thank you.

THE CHAIRMAN: Thank you, Mr. Meronek. Consumers Association of Canada?

MR. WILLIAMS: Yes, good morning Mr. Chairman. And just before I proceed, hopefully the panel has received a couple of documents from CAC Manitoba, one entitled the Bipole III Legacy and the other Bipole III initial

legal regulatory framework.

THE CHAIRMAN: We have.

MR. WILLIAMS: Again, good morning, my name is Byron Williams. I am representing the Consumers Association of Canada, the Manitoba branch. And at the table behind me is, of course, Ms. Gloria Desorcey of the Consumers Association, as well as my colleague, Ms. Aimee Craft of the Public Interest Law Centre. Given my obligations in another hearing, you will not be seeing much of me this week, maybe to your pleasure. Ms. Craft will be ably filling in for me for this week. I will be around much more frequently the week of October 29th.

Mr. Chairman, just starting with the Bipole III Legacy and our client's outline, our client has been asked many times on this hearing, what is your position? And the traditional position of CAC Manitoba is, wait 'til the hearing is over, we'll tell you then. Certainly that will be, from the perspective of CAC, they do not take an initial position on the merits of this project. They see their role to be to ask respectful and thorough questions and to present expert evidence that will assist this panel to ensure that our

Hydro developments meet the test of best practices.

And at the bottom of page one of the outline, you see the question, really the theme of this presentation is, do environmental assessment best practices matter? And there was perhaps the most interesting discussion of the August 16th, flipping to page 2 of the outline, of the August 16th pre-hearing conference was really a dialogue between Mr. Bedford and the Board Chairman hinging on the discussion of minimally acceptable standards. And our client's answer to whether best practices matter is, really it depends whether this is a licensing proceeding or an assessment exercise. And we put before you some quotes from Manitoba Hydro. Really, certainly we interpret them to mean that they see this as a licensing exercise. And minimally acceptable standards are those that are set out in that key regulation 163.88. But the Chairman asked a critical question. He asked:

> "But surely we would have to have something, an environmental, we would want to have something, an environmental assessment that exceeded

minimally accepted standards."

And Hydro's response was that should be a desirable target, but -- and then the transcript doesn't finish. And our clients dearly would have loved to have heard Manitoba's Hydro response to that question. And certainly we invite them today to make it clear that this isn't about minimally accepted standards, this is about environmental standards, best practice standards, that create a legacy for these projects, that create a legacy from how environmental assessment in this province moves forward. And if Manitoba Hydro is still deliberating in terms of whether this should be about minimally acceptable standards, or best practices our clients are going to offer in the next few pages some arguments why they think this hearing should be about best practices.

And going to the next page of the outline, our clients say that best practices matter because this is a landmark project. Bipole III will cut a 1384 kilometre swath through the province from the northeast, down the west side, and back to the southeast. As we have heard from First Nations today and also from the Bipole III Coalition, it's going to have potentially

important impacts upon our biophysical environment, upon the people who depend on its resources, and upon the communities and the province in which they live. And certainly from our client's perspective, this landmark project and how we treat it will say something profound about the environmental, social and economic priorities of our province, both to us as Manitobans, but also to outsiders.

And if you flip to the next page you'll see that our clients also think that best practices matter, because of the potential cumulative impacts of Manitoba Hydro's legacy projects. Bipole III is inextricably linked with a number of other major projects which have been referenced again by Tataskweyak Cree Nation this morning. Obviously there's Bipole III, there's the Keeyask hydroelectric generating station, there is significant interconnections to the United States, and coming down the pike in the middle part of the next decade is the big one, Conawapa. Collectively, these projects are designed both to promote reliability in the transmission of power from the north to the south and to the U.S., and also to enhance Manitoba

Hydro's export revenues.

And we put a quote down at the bottom of this page to just highlight how inextricably linked these projects are. Keeyask cannot proceed without Bipole III, nor can Conawapa. So while the individual impacts of these projects are significant, our clients certainly will highlight the importance of best practised cumulative effects assessment and the importance of scenario testing in this massively uncertain family of projects and their impacts upon the biosphere and upon the people who rely upon it.

Flipping to the next page of the outline, our clients also say that best practices matter because Manitoba Hydro has a history. And again that was adverted to by a number of speakers this morning. When we look at cumulative effects, we're looking not only at Bipole III and the legacy of future projects, but the past projects, the ones that Tataskweyak Cree Nation and Pine Creek has spoken so eloquently on this morning, that have had profound impacts, stressing the environment, stressing the communities in which they live, also important economic effects. So Manitoba Hydro has a history, through the

Churchill River Diversion, Lake Winnipeg Regulation, the Nelson River projects, and the Winnipeg River projects that it now owns.

Manitoba communities and Manitoba's environment have tasted the mixed legacy of past decisions, and given that history, and both the good and the bad, from our client's perspective, with Manitoba's Hydro's history best practices are particularly important.

Our clients say as well -- going to the next page -- that best practices matter because the cumulative legacy of this family of projects is not yet certain. What will their legacy be? Will it be a reliability legacy? Will it be an economic development legacy? Will it be a legacy of impacts upon endangered species such as Woodland caribou, lake Sturgeon, or the moose on which the MMF spoke, not an endangered species but in certain parts of the province apparently in precipitous decline. What will be the legacy of its impact upon hinterland communities, including our remote first nations? What will be the legacy in terms of the perception of Manitoban Hydro as a good corporate citizen and the image of the power that it sells into the US? What will be the

legacy of the perceptions of this province, and upon consumers? We don't get to do this over again. And certainly from our client's perspective, that's why environmental assessment best practices are so important.

If you flip to the next page, our clients have another reason that I think best practices in this hearing are so critical. That's because good corporate citizens and the experts that we have retained tell us that there are both significant opportunities associated with environmental assessment and significant risk. And best practices, we're not going to get it right, but best practices are certainly from our client's perspective essential to taking our best shot. And we are very proud, with the assistance of the province, for the participant funding agreement, of the rich mixture of experts that our clients have brought before you. On the wildlife side, we're bringing the self-described grizzled veteran, Mr. Douglas Skinner, now working for a major multinational, but who spent a lot of his career working with business, with government, and with First Nations on wildlife issues. He's got a particular affection for Woodland Caribou and a

strange affection for wolverines, which I don't quite understand, but he'll talk about both of those during the course of this proceeding.

We brought together some of the foremost human health and health impact assessment experts in Canada and we would suggest in North America. From our client's perspective, this is a very impressive team. Dr. Gordon Brown, Dr. Murray Lee, and Ms. Marla Orenstein, and they are going to talk about an analysis that in our client's initial view is somewhat lacking in terms of a health risk assessment and human health impact assessment. And these are some of the foremost practitioners in North America in these fields.

And one thing before we leave this page, I want to make clear about these experts. They are experts who have really spent a lot of time working in the field for proponents, for government, and also to some degree with First Nations. In a sense these are the people who have been through the school of hard knocks, but who have thought carefully about what environmental assessment is, what its weaknesses are and what its opportunities are.

On the next page we highlight some of the other experts that we have obtained. Cumulative affects assessment will be critical and we are very pleased to recently retain Professors Gunn and Noble from the University of Saskatchewan. They have written in this area extensively and also had some material involvement in the field. They are going to ask whether Manitoba Hydro's cumulative effects assessment presents an accurate or reliable presentation in terms of the impacts of this family of projects.

And then finally, mindful of the broad mandate of this Commission in terms of mitigation, in terms of future governments, and monitoring, we brought Professors Dudick and Fitzpatrick from the University of Winnipeg, experts in adaptive environments, and they will be talking about whether Hydro meets best practices and also about the importance of independent monitoring.

So really compared to the first page, the grizzled veterans are more cutting edge researchers on leading edge environmental assessment practices.

What the Commission will hear from these witnesses cumulatively is, with the mixture

of experienced practitioners and cutting edge researchers, they have taken different routes to similar conclusions. And these are set out at the next page. They will tell you that environmental assessment offers many opportunities to create a positive legacy, but that these opportunities are often squandered due to results driven analysis. They will tell you that analysis matters at least as much as conclusions, especially when we get to cumulative effects. And they will tell you that we need to ask more of environmental assessment than minimally accepted standards. Finally, they will tell you that a best practice environmental assessment should set the foundation not just for licence, but for robust structure to respond in an independent fashion to inherent uncertainty.

Just to conclude, Mr. Chairman, our clients also say yes, that best practices matter because the law demands more than the licensing regulation asks. And I have certainly been at the Court of Appeal enough over the last couple of years on matters relating to Hydro and Manitoba Public Insurance where the Court of Appeal has sent a clear message to us. They have said, don't just look at and treat legislation as being in a

silo, look at the entire legislative intent. And our client notes with concern that not once in Manitoba Hydro's opening statement today did they mention the Sustainable Development Act. And our client suggests that when we look at the environmental licence, at the Environment Act in the context of the Sustainable Development Act, there is a clear message there that best practices not only matter but are demanded.

The handout that we have also provided, I won't go through it, it's a document that we will use throughout this hearing. It really highlights -- it's called the initial legal and regulatory framework -- how our clients see the interaction of the regulation, the Environment Act, and the Sustainable Development Act.

Mr. Chairman, in closing, our clients thank the province for its support for participant funding and they look forward to offering their comments and debates in the course of this proceeding. Thank you.

THE CHAIRMAN: Thank you, Mr. Williams. We are going to take a 20 minute break. We will come back and hear the final four, I believe it's four opening statements, at which

time I would propose we'll probably start the lunch break then rather than start Hydro's presentation half an hour before lunch. And I assume it will be no problem for Hydro to start at 1:00 after lunch.

MS. JOHNSON: Just a second, we have to enter these exhibits. The Bipole legacy will be CAC number 1, and the proceedings document will be CAC number 2. Thank you.

(EXHIBIT CAC-1: Bipole III Legacy)

(EXHIBIT CAC-2: CAC proceedings document)

THE CHAIRMAN: Thank you. So please be back to start at ten to 11:00.

(Recessed 10:29 a.m.)

(Reconvened at 10:50 a.m.)

THE CHAIRMAN: We'll return to opening statements. We're going to have a slight change in the line up from the schedule. You may have picked up we'll hear first from Manitoba Wildlands followed by the Green Party, Peguis and Sapotaweyak. Manitoba Wildlands Ms. Gaile Whelan Enns, please.

MS. WHELAN ENNS: Gail Whelan Enns, Manitoba Wildlands. Checking the sound.

Good morning to the panel, to the

proponent, to all the participants this morning and in particular to those individuals from Aboriginal and First Nation organizations and communities.

Manitoba Wildlands will be present in these hearings for Bipole III as a logical extension of our involvement in Bipole III reviews under the Environment Act which we began to participate in, in early 2010. As a public interest research group, Manitoba Wildlands is here to assist as we were unable as an unfunded participant to provide information in respect of context for all of us in these hearings. This includes using our cumulative experience over 20 years with CEC hearings, Manitoba Hydro projects, EIS reviews and so on, in order to monitor, observe, ask questions and report on these proceedings.

Our goals for participation in these hearings include steps to see improved notice, transparency, community participation and improved EIS content and products, review periods when necessary and capacity overall for participation in the further upcoming Manitoba Hydro project reviews and proceedings. These would be at the

very least then Lake Winnipeg Regulation, the Keeyask Generation Station and Transmission, the Conawapa Generation Station and Transmission. And there are, of course, two other new upcoming transmission stations in Southern Manitoba.

Another goal is to see for the whole official and licensing and EIA review record to become part of the required proceedings. Now that sounds like a really obvious statement, but we have had a lot of things happen since the EIS was filed in December 2011. So we are particularly focused on the importance of the scoping document and the process of the terms of review of the scoping document, and feel that comparison of all steps to arrive at the EIS is important, including then the scoping document and the EIS standards to previous sets of standards for generation and transmission.

We are also very interested in previous CEC recommendations with respect to recent hydro projects, and hope that they will be on people's minds and taken into account in these proceedings. And that is with reference to the Wuskwatim projects report. Among these goals also is for all of the elements of the hydro project to

be in one Environment Act proposal, and together in all reviews and all proceedings, as was done for the Wuskwatim projects. That is not an endorsement, though, of what was referred to as a combined CEC and PUB hearing. That's not an accurate comparison, but that's not an endorsement of that.

I think we always, as Manitobans, and each of us in our roles in reviews and proceedings regarding a class III project should always be looking at what was last decided, most recently recommended, licensed and said about previous and similar projects. We are also concerned about the staged pieces and bits, and delayed pieces and bits of the Bipole III project that are currently moving through tenure and land access and permitting without being a part of the reviews and licensing EIS and CEC proceedings. Not absolutely absent but also not absolutely present would be the examples that come to mind, and that is the work for tenure to conduct test drill holes for the 26 or 2800 towers, and the undertaking that's going on right now that started in the second and third week of July to provide easements for the right of way for the corridor outside, if you

will, a variety of earlier steps where they could in fact have been part of that process.

We are concerned overall about late, delayed or nonexistent notification to affected parties and communities with respect to the Hydro project. That's in the record already. And we are also concerned overall about the quality of the EIS, as it doesn't compare well to the Wuskwatim materials. We are concerned about again the delayed or late or still not received EIS materials.

I'd like to also take a short opportunity to say that it's very welcome in this room, I hope by all of us, and certainly by Manitoba Wildlands, to hear the Consumers Association of Canada's counsel talk clearly about how we are doing more than licensing here. And it's particularly important when we think about the amount of or extent of public lands and waters, public funding, public decision-making, public service from our hydro system in this province, and that we're basically all, if you will, shareholders in the decision-making and in the hydro system in the province. I wanted to basically say that I think that the Consumers

Association is right on mark in this regard. And that when, to put it in a simplistic kind of way, when the government or the Crown is in fact doing public works and licensing themselves and all of ourselves at the same time, that the ideal is to be on best practices. The ideal is to in fact learn and improve on what has been done before and why and how and what the basis has been for the proposal, the EIS, but also the decision-making and then access construction, maintenance, operation and decommissioning. Thank you.

THE CHAIRMAN: Thank you, Ms. Whelan Enns. Green Party of Manitoba, Mr. Beddome.

MR. BEDDOME: James Beddome, Green Party of Manitoba. Members of the Clean Environment Commission panel, representatives of Manitoba Hydro, fellow participants and members of the public at large, I thank you all for being here. I think this review, or at least I hope can be a very important process of a thorough review, but I am reminded of the words of Ani DiFranco, if you don't ask the right question, every answer seems wrong.

And the problem, I think, as I see it or as the Green Party of Manitoba sees it in terms

of this review is that we're not asking the right questions. And analytically the way that we're reviewing it is problematic.

Essentially to look at Bipole III as a single, stand alone project is problematic. As it necessarily ties into both past projects and future projects. There is essentially no other way to analyze it correctly. And if we fail to analyze it in any other way, then I would suggest that it jeopardizes the ability of this review to actually be a review rather than a rubber stamp.

Now, I would just second a couple of the comments that have been brought forward. I think I would definitely agree with the position put forward by the Manitoba Metis Federation, that the EIS does not meet the scoping document. And in response to some of the motions that were made on August 16th, I highlighted some of this. The EIS does not deal with the commissioning, yet the scoping document indicates that it will. I think perhaps most important, section 4.0 at page 6 of the scoping document that says it will both look at the need to improve reliability and the requirement for additional transmission capacity for future generation stations in Northern

Manitoba. I think it's perfectly fine that Manitoba Hydro's EIS plan, as it's stated, indicates, for instance, we are going to build the work site close to the proposed Conawapa site, in terms of timing it to future generation projects. However, they can't have their cake and eat it too. They can't say this is being licensed solely as a reliability project, and then also indicate how it ties into future generations. It needs to be -- if this was solely a reliability project, then we do need to particularly look at a variety of things that thus far I have found the proponent to be perhaps somewhat flippant on their response.

An example would be in response to one of the information requests, they said we are not going to wade into the difficult and complex world of forecasting demand into the future. Certainly there are some difficulties, and I will agree with Mr. Bedford that Manitoba Hydro has some particular expertise on this. However, if this project is about reliability, then the issue of demand is tied into it. And it must be. And we have rights to ask questions as to, well, what are these demand projections based on, particularly if we consider some very large industrial users in

Manitoba have shut down? What does that do for long-term demand load management? And to the extent of saying it was done within the scope of the hearings, because I appreciate that there is some attempt to clarify the terms of reference, but with respect I think they only muddy things further. The terms of reference still indicate that the principles and guidelines of sustainable development are to be incorporated into this review.

And the venerable chairperson himself saw fit to write a letter to the Director of Environmental Licensing on April 24, 2010, and in that letter at page 12 under section 9.0 sustainability assessment, he writes, the Commission requests that the proponent address each and every principle and guideline under the Sustainable Development Act and specify how they were addressed. Special attention should be paid to discussion of full cost accounting and how it was applied in this project.

If you go through each and every one, you can see integration of environmental and economic decisions. We have to look at this in context together. If this is purely about

reliability and has nothing to do with future generation projects, then we need to know what is the cost to consumers. In the alternative, as we heard during the election campaign, and I guess I'll comment to Mr. Bedford's comment that an election campaign isn't an environmental review process, so I don't think that it replaces the need to ask some of these broader questions, and I would suggest the minister wouldn't have called, then Minister of Conservation Chomiak, wouldn't have called hearings so quickly after the submission of the EIS if he knew there were still questions that needed to be asked.

If we look at that, we consider it just as reliability or as was put forward in the election, that future exports were going to pay for this project, then that needs to be put forward. It needs to be analyzed in that broad contextual frame. Because in our opinion if it isn't analyzed, we're failing to see the whole picture. If we sink $4 billion or three and a half billion dollars into a 20 billion-dollar development plan, then we have made the first step, and it's going to prejudice future -- it's going to prejudice future decisions, because we

have already spent the money, we need to understand the relation of Manitoba Hydro, obviously to the importance to the economy in Manitoba, but also the fact that it is a Crown owned utility, and there are some inter-linkages between Manitoba Hydro and the government.

We have put forward the letter written by the Green Action Centre that was sent to the CEC process that highlights, and I think it is worth highlighting this, we note that unlike some other utilities, for example, B.C. Hydro, Manitoba has opened up the process, including outside experts, public consultations and public hearings for creation and vetting of its power resource plan. The PRP is generated internally by Manitoba Hydro with direction and input from the Manitoba government. They go on in point three to note that the negative consequences are lack of a window for introducing and testing energy alternatives other than those originating in Manitoba Hydro. An inadequate exploration of a broad sweep of alternatives, insufficient qualitative and quantitative detail, expenditures -- this is point C which is important -- expenditures of hundreds of millions

of dollars on alternatives preferred by Manitoba Hydro without any public review and approval process. This sum of money and organization of corporate priorities prejudices future review processes. I'm not going to read any further of that, but you were forwarded that letter. I'm assuming you have read it and looked at it. You understand that if we don't review this in the broad context of our entire hydro development plan, then we're not properly reviewing it.

And certainly this goes forward, you put forward recommendations to the Minister, and there's only so much that can be done, but we have heard references to Wuskwatim. And in terms of Wuskwatim, there were some recommendations that haven't been acted on, but were at least put forward by this Commission that stand there to point out some of the shortcomings, and we hope that the Commission is going to once again see fit to wade into those broader issues. I would argue it is part of their mandate, it's in the terms of reference, specific references to the Sustainable Development Act, and the Sustainable Development Act and the principles and guidelines thereunder need to mean something.

Now, on a matter of sort of formality, the Green Party of Manitoba does not intend to be calling any witnesses, however, we will intend at some point to cross-examine and prepare and deliver closing statements.

We also just want to highlight that there has been now an additional request for commitment documents from the Clean Environment Commission. There has been a large volume of information that has been piled in to participants. And as an unfunded participant we'd like to highlight that to the Commission. I think the MMF did a great job of pointing it out, if we are readjusting the route, then what are we assessing? To a certain extent this is preliminary and that we perhaps should wait until the full record is in and allow time for people to assess them, because we think procedurally that is going to create some issues, that we are going to get yet another document on the 30th of October or thereabouts, in terms of the commitments document from Manitoba Hydro.

And, of course, we have seen supplemental caribou reports, supplemental socioeconomic information, numerous information

requests, and now we're looking at routing changes that we won't even be able to look at until after hearings are completed. So I think that that creates some procedure issues.

So to quickly wrap up, because I don't think we need to take much more time, the reason that we're here is to ensure that we ask the right questions, to ensure that Manitobans are protected and we consider this as an entire development plan, not a stand alone project. It is inappropriate for prudent planning to licence these projects one piece at a time, and to a certain extent we have already done that with Bipole III, licensing the Riel converter station before the entire project, which once again significantly limits any routing logistics included could not be considered. So we need to look at the routing questions. That's why we're here and we continue to look forward to asking the broader questions, and look forward to receiving more responses from Manitoba Hydro so the public can benefit from more transparent access to information from a company that essentially we all own together. Thank you.

THE CHAIRMAN: Thank you, Mr. Beddome.

I'd just like to comment very briefly on your comments about the commitments document, because other participants have raised this issue as well. This is not -- we do not see this as new information, it's simply a gathering in one place of information that is existing in a number of different places throughout the environmental impact statements.

MR. BEDDOME: Can I comment to that?

THE CHAIRMAN: I'm not debating this. No. You can do that once we get into the meat of the hearings, but not at this point. Thank you.

MR. BEDDOME: Okay.

THE CHAIRMAN: Next is Peguis First Nation.

MR. DAWSON: Good morning, Mr. Chairman. My name is Robert Dawson. I'm the lawyer for Peguis First Nation, and good morning to the other members of the panel. I can indicate that it was the intention of the Chief of Peguis First Nation, Chief Glen Hudson to be here. I understand that he's been detained by an urgent matter at the First Nation. I understand that I might be interrupted at some point with news that Councillor Mike Sutherland of Peguis First Nation

is in the room, and if he is, he will follow my brief remarks with his own even briefer remarks, still keeping us within the 15 minutes.

Of course, these proceedings derive from the direction of the Minister who has required that this Commission hear from stakeholders about the proponent's application. And par excellence almost, Peguis First Nation is definitely a stakeholder in every sense of that word.

I'll just outline at least three quick reasons why this application has caught the attention of Peguis First Nation. First, of course, the proposed transmission line itself crosses through Peguis First Nation's traditional territory. Secondly, the transmission lines also come into Peguis First Nations Treaty Land Entitlement claim area. And many of these words I know may be new, and to the extent that they are, we would intend, in the course of our direct evidence, to explain all of this.

And the third one, of course, relates to the proposed Riel converter station which would of course be situated within Peguis First Nation territory. Indeed, the proponent acknowledges

that the entire project, that is the transmission line and the converter station, plus the supporting infrastructure that will be necessary to construct and later operate and maintain the project will, of course, touch upon, relate and affect Peguis First Nation lands. In addition, the proponent has acknowledged that the entire project has environmental, social, economic and cultural impacts that, among other groups, will especially affect Peguis First Nation. And so this is why I suggest that Peguis First Nation is in essence a stakeholder and properly before this panel as a participant in these hearings.

The participation of Peguis First Nation has two very broad goals, at least as far as is consistent with the process here at the Commission. First and foremost, Peguis First Nation seeks to bring its own particular perspectives as a stakeholder in order to help the panel consider and assess the proponent's application. And the goal, of course, is so that the Commission in turn can make the best recommendations and give the soundest advice to the Minister when it makes its report.

To work towards this goal that Peguis

has, its first goal, that is to help the Commission, Peguis First Nation intends to, of course, test and challenge through cross-examination the evidence that Hydro puts before this panel, both in writing as well as in its oral witnesses. You can expect that Peguis will also introduce its own evidence in the form of some reports, but particularly in terms of oral evidence offering specific information that will further assist this Commission in understanding that the proponent simply has not put forward the full picture. And there are specific examples that I can give, even at this early stage, that I suggest the evidence that Peguis will put forward will support.

First, I'd say that the proponent has simply not engaged the public, despite its submissions to the contrary, especially when the public includes Aboriginal groups and that was at the design stage of this project. Secondly, the proponent has not correctly formulated the issues for consideration by this Commission, including the components that comprise each of those issues.

It follows from all this, and this will be my third problem, that the proponent's

conclusions about the impact of this project are therefore flawed, and it further follows from that that its conclusions about the future operations and maintenance of the project are equally flawed.

So Peguis's first goal then, as I say, is to help the Commission do its job.

There is a second goal that Peguis has in participating in these processes. The application by the proponent profoundly triggers treaty and constitutional rights and entitlement. Peguis First Nation believes that it is required to come forward as an honourable participant in the overall process. Now, I'm mindful that this Commission is not the Court of Queen's Bench, and I am further mindful that this Commission has already issued reasons for decisions on issues that relate to this panel's view as to its role in treaty and constitutional contexts. And accordingly, Peguis First Nation, I'm sure it will be a relief to the panel, does not intend to use this hearing or any part of it to try and re-argue that motion or readvance that position. I simply state for the record that in not continuing to advance that argument or to object at various points of this proceeding, it is out of respect

for the process and recognition of the earlier decision that this panel made, and it's not intended as a waiver of my client's right to re-argue or put forward that argument at a later time in a different place.

Finally, and also on an administrative point for the record, I have to return to something that occurred on August 16th at the conclusion of the hearing of the motion that Peguis First Nation brought. After the submissions by Peguis First Nation, there was an opportunity that the panel kindly offered to all of the participants to make comments. One of the opportunities was extended to the Consumers Association, at which time Mr. Williams indicated it was his client's intention to make comments on our submission, but because there was then a motion pending by the Manitoba Metis Federation, on what might be described as a related issue, it was discussed between Mr. Williams, as well as the panel on the record, that his submissions would wait. For reasons that did not involve me or I understand Mr. Williams, an arrangement was reached whereby the MMF would not come forward with its motion, but at the same time the

opportunity for Mr. Williams to make his submissions on my argument was never given. And for the record, I note that this seems to be a denial of the opportunity to be heard.

On that note, I am happy to say that someone who will not raise arguments of a legal nature is in the room, and I'd like to introduce to the panel to conclude the presentation of opening remarks, Mike Sutherland who is a councillor of the Peguis First Nation and I'll yield my seat to him.

THE CHAIRMAN: Councillor Sutherland, there's about six minutes left in the opening time slot.

MR. SUTHERLAND: Thank you, Mr. Chair. Thank you, panel, for hearing us out here today. I guess I'd like to refer to the three questions that are in place here. You know, the first question is why is Peguis here at these hearings, you know. And, Mr. Chair, I think I can go back to July, at one of our first meetings where one of our legal representatives that works in our TLE office, Mr. Stevenson, was there and you asked us a question, why is Peguis here? Well, why isn't Peguis here? I mean the dams that Manitoba Hydro

built may be in the north and, you know, the line that's going to transfer the energy to the south runs on the west side of Lake Manitoba, the west side of the province, but everything is going to finish here, Mr. Chair, right in the heart of our traditional territory. And why shouldn't Peguis be here? I think out of all the First Nations that are involved with this, we are one of the main players in this game, because you have to finish your project within the heart of our traditional territory.

If we weren't here to represent our First Nations, then what would happen? We already seen what happened with Bipole I and II. We have already seen all the energy that's transferred south. We already see all the money that's given away. As a First Nations person, coming from a community where we have poverty, low housing rates and everything else, and we can't share in none of the revenues that are generated from this, for us we see that we are very, very important and we should be sitting at this table to discuss this whole issue of Bipole III, along with the Clean Environment Commission hearings.

Now, when the EIS first came out, we

weren't properly notified. In fact, if you take a look at the whole issue, the fact of the matter is that we have a TLE notification zone within the direct line of the completion of this hydro line. We should have made Manitoba Hydro, the Provincial Government and everyone else aware that Peguis should be notified immediately. But it didn't happen. You know, and what does that tell us? That we are very -- or little or no concern to the province or to Manitoba Hydro.

You know, the Clean Environment Commission hearings and the Environmental Impact Assessments that are done, you know, we have seen these, and they always come prior to consultation. And we never approve of any environmental assessments until consultation is done first. Because as soon as an indication that somebody wants, some government industry or so on wants something out of your First Nation or your traditional territory, that's a trigger of consultation. Not after the EIS is done, or the Clean Environment Commission hearings are over. It's first. The Supreme Court of Canada stated that.

I think, Mr. Chair, you of all the

people at the table should understand the trigger of consultation and what starts it, and how it begins. It doesn't come after the fact when everything is done. That's not the norm. That's not what we have seen across Canada.

What are Peguis's goals at these hearings? We want to be heard, we want to be understood. We want to make sure that Manitoba and the rest of this country and this province understands our stand here, and what we expect from these hearings, and the way we want to be treated.

We have the Riel converter station. Where did it come from? Did somebody all of a sudden just put it there? Did they just plop it down? No. But were we consulted in the establishment of that converter station? No. And here is a commonality. We come to you after the fact. Well, why couldn't we have been consulted and advised of this whole, this issue of this setting up this converter station at the beginning, as other things that are done? You know, that's quite a concern.

You know, it even goes back to Keeyask and Bipole III, these Riel converter stations.

They are all connected here. But here we are fighting to be represented, to be heard. You know, for 30 years we have been flooding, and a lot of it is contributed to the levels of Lake Winnipeg, compounds the flooding in our community. But it all affects -- the dams, the station -- it all affects, you know, the way, the outcomes of our community every spring and every rain storm.

You know, you take a look at our request to take part in the CEC hearings. We followed the steps like everybody else. Yet other members that are participating get $200,000 subsidy to go through this. Why do we get 35,000? Again, very unfair treatment, very disrespectful to a community that's huge, that has traditional territory in two Treaty areas, that has a TLE notification zone that's not even respected. Yet Manitoba Hydro and every other government department has a copy of that notification zone within their organizations.

One of the things that we have to look at here is that as we move forward, we talk about our natural resources revenue sharing. This is all talk at the table from the Ministers, your various levels of government, within the regional

departments, but we are never a part of those discussions. And if we are, we're never included in them. And these are the things that have to change, Mr. Chair. And I think a lot more respect has to be shown to our First Nations communities from the government, from Hydro, and from your departments as well, if we want to proceed fairly and in an honourable manner. Whether this be, whether you consider this consultation or not, I think there are still that word there that has to be respected, and that word is honour. And that's something that we are not seeing. But I hope after today that we can move forward and we see some of that, so that we can benefit from this as well. Thank you.

THE CHAIRMAN: Thank you, councillor. Let me assure you that Peguis is as welcome in this room as any other group and we're glad that you're here. We look forward to canvassing thoroughly all of the issues that you have.

Mr. Mills, in fairness, since we heard from two people from Peguis, I will give you a few moments to conclude. I should assure you, though, that there was only three minutes left on the time, so...

MR. MILLS: I'll move quickly. Thank you, Mr. Chairman, I appreciate that.

Warren Mills, Pine Creek First Nation. Bipole III cuts a 66 metre by 90 swath perpendicular to the north/south Duck, Slater and Pine waterways, all of which flow through the Pine Creek basin.

The Pine Creek First Nation is currently a saturated community with record levels of ground, surface, river and stream and high lake levels. The water problems which were brought to a head with the 2011 flood have left the community with immeasurable water caused damages. The community has a tremendous concern that the clear-cut swath through their watershed will have a negative effect on the First Nation. We have read Hydro's assurances and we continue to reread them.

The community's taste for this is tainted by the cause and effect of the Grand Rapids work which occurred long before most of our time. But as a result of that work, Pine Creek believes that the First Nation's ecosystem was tragically affected, and as a result of a variety of issues in the last short period of time, the

First Nation has lost its three traditional food sources, the fisheries in Lake Winnipegosis is toast. The Lake Winnipeg report confirms that. The Minister has confirmed that as recently as a year ago. Just recently the province has closed moose hunting for Aboriginals in the Duck Mountains which has had a tremendous effect on the community. And as a result of the water problems I described, particularly the surface flooding, the blueberry fields that the community looks to are gone. The First Nation has lost their three traditional food sources and they are troubled by the effect that Bipole will have on their watershed.

There is a secondary, although significant concern to the community, due to the fact that the Bipole cut is perpendicular to their four waterways and herbicides that will be used and that will flow down into the community are of grave concern.

In closing, the community is affected by the previously issued 219 1(e) permit that this process went through, and the fact it's apparent the permit has been photoshopped and that there has been little enforcement by the Province. And

perhaps our gravest concern is that when you add up the literally millions of assurances that Manitoba Hydro will make through this process, is this process going to provide or encourage the Minister to give the province the staff and the teeth to enforce all of those promises? Promises made are one thing, Mr. Chairman. Promises kept are Pine Creek's concerns. And their history of promises kept troubles them, and we look forward to this committee encouraging the Minister to provide the funds to the province to allow all of these terrific promises we're going to hear be in fact honoured. Thank you.

THE CHAIRMAN: Thank you, Mr. Mills. I am not sure if there's anyone here yet from Sapotaweyak?

MS. WHELAN ENNS: Mr. Chair, I spoke to the chief a couple of minutes ago. If I may relay that conversation?

THE CHAIRMAN: You may. I would note for the record that Ms. Whelan Enns does have some consultative relationship with Sapotaweyak, so we will let her speak at this point.

MS. WHELAN ENNS: Thank you very much. I was about to say that this short comment then is

from my role in Whelan Enns Associates and that association with Sapotaweyak. So Chief Nelson Genaille is not here to make opening comments. We went through them over the phone and he asked me to not make opening comments at this time for the First Nation, given his absence. Thank you.

THE CHAIRMAN: Thank you very much. I believe that brings us to the end of the morning proceedings. We're still running ahead of schedule. Let's keep this up.

We will adjourn for lunch. We will be back here ready to start at 1:00 o'clock sharp. At that time Manitoba Hydro will begin its presentation. We are adjourned.

(Recessed at 11:30 a.m.)

(Reconvened at 1:00 p.m.)

THE CHAIRMAN: On this afternoon's agenda, it's the beginning of the presentation by Manitoba Hydro. Mr. Tymofichuk, are you taking the lead?

MR. TYMOFICHUK: Yes, I am.

MS. JOHNSON: Mr. Chairman, should we have them introduce themselves and be sworn in?

THE CHAIRMAN: As you will be presenting evidence, we will ask you to take an

oath, all three of you, to promise to say only honest things. So I'll turn it over to the Commission secretary.

Hydro Panel

Ed Tymofichuk, Ron Mazur, Gerald Neufeld (sworn).

THE CHAIRMAN: You may proceed, Mr. Tymofichuk.

MR. TYMOFICHUK: Thank you and good afternoon Mr. Chairman, commissioners, participants and members of the public. I am Ed Tymofichuk, vice-president of transmission for Manitoba Hydro. I will tell you a little bit about myself. I am an electrical engineer, graduated from the University of Manitoba in 1966. I joined Manitoba Hydro upon graduation and have been in various positions since then. I started in Winnipeg, moved to Thompson in 1972, where I had, among other responsibilities, responsibility for transmission and line maintenance in the north.

In 1973 and for the next five years I was based in Brandon as engineering manager, western region. In 1978, I assumed my first role in transmission and I have been in various transmission roles since. Mostly, I held

engineering managerial positions and oversaw numerous transmission projects in Manitoba and interconnections to Saskatchewan and the U.S., the most significant being the 500 kV AC interconnection to Minneapolis.

I also oversaw the completion of Bipole II converter stations to full capacity and other numerous projects associated with the HVDC system. In 1996, I was appointed division manager of transmission system operations, including system control.

In the mid 1990s, when the U.S. Federal Energy Regulatory Commission issued orders to deregulate the electricity difference between the U.S. by introducing transmission wholesale open access and the creation of independent system operators, I lead efforts on teams in Manitoba Hydro to expand our transmission market reach in the U.S., firstly in the mid area continent fire pole known as MAP, and then in 2001 with the new midwest transmission independent system operator, MISO, which is a large reliability and market operator covering 16 States in Manitoba, based in Indianapolis and Minneapolis, St. Paul.

I have appeared at FERC and have

served on governance committees and boards mainly as vice chair and chair of the stakeholder advisory committee of the NERC board two years ago, and as vice chair and board chair of the Midwest Reliability Organization ending in 2011.

NERC is a North American electric reliability organization that sets reliability standards for all of North America, which includes Manitoba Hydro. The Midwest Reliability Organization, MRO, is one of the eight regions of NERC responsible for compliance, monitoring of reliability standards in its region, including Saskatchewan and Manitoba.

I became vice-president of transmission in March 2009 and currently hold this role and responsibility.

Beside me on my left is Gerald Neufeld and on my right, Ron Mazur. Both of these gentlemen will introduce themselves more formally later. Collectively we represent a hundred years of utility experience. We're all electrical professional engineers, graduates of the University of Manitoba and very proud Manitobans.

Thank you for this opportunity for me to share with you an overview of this critical

Bipole III project. As you can see on the screen, I will be talking a lot about reliability. Later in these proceedings Gerald and Ron and others will elaborate in more detail.

I will start with opening remarks and present my slide video presentation and then close with some brief remarks. In all, we are here to let you know how vulnerable our HVDC system is, what catastrophic consequences look like, and why and how we're acting to rectify the situation, why we need to do something about it.

Mr. Chairman, commissioners, we have invested the last four years on the site selection and environmental assessment to determine the best routing for the transmission line and for associated other facilities. We have engaged numerous stakeholders, specialists, experts and First Nations throughout the process. We were and remain open and transparent.

In December 2011 we filed an extensive Environmental Impact Statement with Manitoba Conservation. We have responded to hundreds of IRs through two rounds. And now we are here to provide more understanding and clarification as we seek the licence for Bipole III, the licence we

need to proceed this coming winter with some northern field work that will protect our schedule for an in-service date of fall 2017.

Historically, public policy planners, utility planners and decision-makers have made valuable major decisions for the public good, but at times only after a disastrous event and with abundant reliance on lessons learnt. Let's consider the eastern ice storm of 1998 in Quebec, Ontario, parts of New England. One month with no electricity in the dead of winter. We all remember media images of the suffering and devastation of human and animal lives, the temporary emergency shelters, the scenes of elderly people being moved out of institutions on stretchers and wheelchairs to temporary emergency centres, and many other scenes of the hardships inflicted on that society. People and animals died because of this catastrophe. Diesel locomotives were driven down main street to Montreal for hooking up emergency power to facilities such as hospitals.

After the fact, Hydro Quebec reinforced its transmission system with new transmission lines designed to withstand higher

wind and ice loads, and also added redundancy to the system in that ice belt. I am reminded that a U.S. utility sued Hydro Quebec over breach of contract for failing to deliver on its obligations.

Closer to home on April 4th and 5th, 1997, a blizzard moved into North Dakota just as a late spring thaw swelled the big river. The images of people sandbagging in Grand Forks during the blizzard are still engrained in my mind. Media reported snowfall amounts ranging from 10 to 24 inches throughout the State, adding up to 2.7 inches of moisture to areas already inundated by spring run-off. The previous fall the ground was saturated from light rains and froze going into the winter. The storm created life threatening conditions, caused massive power outages, as transmission lines and distribution lines collapsed and shut down road systems throughout the State. More than 30,000 North Dakota households were without power. A combination of freezing rain and high winds toppled government and commercial radio and television towers leaving many North Dakotans without access to emergency information. Both

flood and winter storm conditions caused evacuation of hundreds of North Dakotans from their homes. No electricity, no pumps, flood waters and the fires in downtown Grand Forks are images still fresh in people's minds.

In Manitoba, in spite of the close call with the flood of the century, we dodged a huge bullet. I say this because had this blizzard with freezing rain turned into an ice storm like the one in North Dakota and continued to move northward in the Red River Valley towards Winnipeg while the flood of the century was building up, and had we lost power lines, we would have had a much bigger disaster on our hands. Pumps in basements, pumping stations and other critical electricity dependent services would not have been able to function.

August 14, 2003, the eastern blackout covered eight States, Ontario, and left all without power for four days. We know why this happened, there are numerous reports on the reasons, the immediate actions taken and the preventive steps to avoid recurrences. But the Ontario government was deeply concerned and asked Hydro One, the transmission company in Ontario,

what would have been the situation and consequences if this blackout occurred in the dead of winter and lasted for days?

Mr. Chairman, commissioners, every power grid relies on many components and skilled staff to restart or black start the power grid. One of the critical components in every major substation, every converter station and every generating station are large DC batteries that should last up to eight or 12 hours, depending on the specific battery type. This is not a long time in a days long blackout. This DC, usually at 129 volts, is used to control and operate devices such as oil filled outdoor circuit breakers independently of the AC grid power, for the very reason that if the grid power is off, this independent DC source is available. But if the power is off for days with no heat in the battery rooms, the batteries deteriorate quickly in minus 30 degree or lower temperatures. A simple analogy is the battery in our vehicles. It's needed to start our engines. If it is discharged, we're not going anywhere.

On the power grid, if the batteries are low or discharged, we are in trouble. There

may be enough juice to operate a breaker once or twice, but then there is no more juice.

In response to the government, Hydro One implemented actions, but there are real limits to protecting everything against a winter blackout.

In New Orleans the risk of the dyke and pumping system failing was known for some time, but actions were taken only after the devastation by Hurricane Katrina in 2005.

In Japan the utility and government were purportedly warned years ago by external nuclear power experts that the Fukushima nuclear plant was at risk to certain hazards. We know how terribly people suffered in that post Tsunami event of 2011.

In New Zealand in mid-February 1998, the Auckland area suffered a power failure for three weeks and shortages for another month when two undersea 110 kV cables failed between the two islands.

This past summer the Washington DC and Virginia area were without power for weeks due to storm damage, all during temperatures that exceeded a hundred degrees Fahrenheit with high

humidity. No air-conditioning, spoiled food, no frozen or fresh groceries in stores or malls.

In winter or summer, society suffers when the lights go out for a long time.

Here in Manitoba an historic after the fact 1950 flood decision was made that gave us the floodway completed in 1968. After the fact, 1997 flood of the century, decisions were taken to mitigate future disasters and today we have a safe city and public with a higher capacity floodway.

Mr. Chairman, commissioners, catastrophic events, consequences, close calls or near misses and lessons learned have caused corrective actions to be taken, and likely will cause future actions to be taken as well. There are other examples. The point of my examples of events and lessons learned from such events need to be reminders for everyone that opportunities exist to be more proactive than reactive.

We need to look ahead through the front windshield and be well prepared for emergencies and catastrophic events. We need to heed, and we do learn and improve from lessons learned in and outside our province.

The Manitoba Hydro HVDC system is

comprised of Bipole I operating at plus/minus 450 kV DC and Bipole II operating at plus/minus 500 kV DC, and three converter stations. Radisson for Bipole I in the north, and Henday for Bipole II in the north, but a single southern converter station, Dorsey, housing both Bipoles I and II.

This is the backbone of our power system in Manitoba. It has remained relatively unchanged since the mid 1980s, other than replacing aging equipment, most notably replacement of Mercury arc valves in Bipole I with modern solid state valves during the 1990s, and various converter transformers and line smoothing reactors due to failures or imminent failures. We also replaced thousands of devices on the lines themselves. These devices are called spacer dampers and I'll talk about it a little later. And there's a good sample there at the back of the room for people to observe.

About ten years ago thousands of spacer dampers on both DC lines were replaced with new or rehabilitated dampers. These dampers provide spacing between the two wires on each pole on each sides of the DC towers, and they provide damping of the vibration of the wires, which is

usually caused by low wind speeds. This phenomenon is known as Aeolian vibration. Unchecked, in time the wires can fatigue and fail. Using helicopters and carts on the cables, while the DC lines remained in service and energized at a half million volts, workers replaced 56,000 of the old dampers with new and rehabilitated ones, over two summers. This was hazardous work. I will show more later in the slide presentation.

We had to do this hazardous work because we do not have the redundancy or flexibility to take a Bipole line, or even a single pole, meaning half a Bipole, out of service for long periods of time. The DC lines are loaded up and lengthy outages are not possible for maintenance work.

As our existing equipment continues to age, we plan to replace the converter valves in Bipole II approximately in the years 2020 to 2023. Again, having future redundancy in the DC system with Bipole III will allow us to rehabilitate these valves.

As I stated earlier, the HVDC system is the backbone of the Manitoba Hydro power system, as it delivers more than 70 percent of the

northern hydro generation to southern Manitoba. It is a critical infrastructure and is a lifeline for Manitobans for the health of the provincial economy. I refer to it as the umbilical cord of Manitoba's economy as it powers and supports the economy in real time. Catastrophic failure of Dorsey would be devastating to Manitoba's economy and society, leaving unwanted lasting legacies. Failure of both DC lines will cause temporary hardships lasting several weeks. We are exposed to these potential consequences, and as load continues to grow in time, the impact becomes greater and greater, and we are acting and moving along the path to fix this problem.

Let's look at this from our Hydro vantage point and the challenge of losing Dorsey. We came ever so close on September 5th, 1996. Regardless of the cause, and without Bipole III, we would be left with a severely damaged and broken system on our hands to operate and to manage the loads for a long time. We would need to operate this broken system and manage the load always balancing in real time, minute by minute, second by second, hour by hour, to maintain electrical stability in the system and prevent

future outages. This could last for up to three years, the time estimated to rebuild Dorsey.

Operating in this fashion would be severely challenging in the winter months from November to the end of March, for three consecutive winters. Because there would be an estimated deficiency of supply at peak of up to 1500 megawatts by 2017. This amount can power the equivalent of 300,000 homes.

Mr. Chairman, Commissioners, I was in Serbia three times just over a decade ago when a consulting consortium on an international project funded by CEA to provide advice to the state utility on the restructuring and the evolution of competitive markets. It was after the end of the Balkans War in June 1999, which saw the electricity infrastructure severely damaged. I learned from the system operators at the state utility firsthand how extremely difficult it was for the utility to operate their power system and keep the lights on in 1999 after NATO bombed critical facilities to gain advantage and bring a stop to the Balkans War. This was an onerous demanding operation that worsened at times, with more outages and blackouts, as equipment failed

from frequent operations or fragile or damaged equipment.

Generation must always be in real time balance with the demand or the load to maintain electrical system stability. This is governed by the physics of electricity and power system dynamics. When there is a deficiency of supply, meaning generation, in any system, automatic actions and operators' hands-on actions must be taken to keep the system balanced and to keep it from deteriorating.

In our case, when all Manitoba Hydro generating units are deployed, when all imports are maxed out, when public appeals to cut discretionary use of electricity are in effect, and when remaining operating tools are deployed, the last remaining tool to keep the lights from going out are rolling blackouts. Losing Dorsey or the two DC lines would cause the condition and operation for rolling blackouts in southern Manitoba, including the City of Winnipeg, for three years during the winter months.

The rolling blackouts would generally be in 200-megawatt blocks every two hours. The impacts of those rolling blackouts on our

customers, residences, institutions, farms, factories, traffic lights, the Internet, and many other dependencies and interdependencies on electricity would be devastating. Very critical loads such as hospitals are kept out of the rolling scheme. Our society would suffer immensely. Witness historical real events around the world in North America and in Canada when that has happened.

Rolling blackouts can exacerbate the original cause of the blackouts because Hydro's equipment such as circuit breakers, switches and other devices are opened and closed in extremely cold conditions far more frequently than normal. Equipment will break down and cause further problems and outages.

We can relate to this by visualizing starting a vehicle that has been sitting unplugged in 30 below weather on a bitter January day. The difficulty in starting and driving the vehicles, because fluids are cold, batteries run down, metals are cold, and when it does start one can hear and feel the sound of square tires. Most wintering Manitobans have had those experiences.

Care and feeding through maintenance

and upkeep of the HVDC system is a high priority each year. In the last 12 years we have spent approximately $400 million on various capital replacements and upgrades at the three converter stations. In the last five years, for example, we have also spent an average of two and a half million dollars annually on line maintenance. These are priority expenditures just to maintain the infrastructure, no increase in capacity is rendered.

Mr. Chairman, commissioners, with this backdrop I would now like to proceed with the slide and video presentation that illuminates the critical need to proceed with Bipole III as expeditiously as possible and to achieve the 2017 in-service date.

As I said earlier, I'm going to be talking later about reliability, so I'll try to move as quickly as I can.

These are the topics I am going to cover, the history of Bipole I and II, I'm going to talk about critical infrastructure, the vulnerabilities and exposure of our HVDC system, a series of near misses, close calls and other events in Manitoba. I'm going to talk a little

bit about neighboring provinces, the consequences of those kinds of events, and the present need.

This is a map of Manitoba with our key facilities starting in the north, our generating stations and our two converter stations, Henday and Radisson. This orange line represents the two Bipole lines through the Interlake built on a common right-of-way and terminating at Dorsey just to the northwest of Winnipeg. The green lines are 230 kV network in Manitoba, and we have three 230 lines to Saskatchewan. There is a smaller one in the Flin Flon area but it really is insignificant. We have two 230 lines to Ontario and a small line to Kenora which is also insignificant. And the big tie lines are to the U.S.

The first line was built to Grand Forks in 1970, a 230 line. In 1976 we built a line to Duluth. And in 1980 the 500 kV line that terminates all the way to Minneapolis. We only built to the border, of course, in Manitoba. Our counter parties built from the border onwards. In 2002 our fourth line was built from Glenboro to Rugby, North Dakota, so a total of four lines to the U.S.

Both Bipoles I and II were built at

the same time, we believe for economic reasons. At that time, in the early 70's, Kettle Rapids went on line in 1972. I was the area manager based in Thompson at that time and recall specifically the opening ceremonies at Kettle Rapids. Initially, for almost a year, three conductors of the four, of the two DC lines, were connected to the AC system to transmit some power while the converters were being finalized. The initial DC operation was at 150 kV, and gradually by staging the buildup of the converters in valve group blocks 450 kV was achieved on Bipole I and 500 kV on Bipole II in 1984. Load growth in those days was around 7 percent, much greater than now. So with that kind of load growth, more generation was required to serve Bipole, and that was the thing, and therefore an economic decision to build both lines on the same corridor, anticipating a third Bipole shortly thereafter. Bipoles I and II were developed in economic stages from the early 70's to the mid 1980s, matching the needs of load growth. This Nelson River HVDC scheme put Manitoba Hydro on the world leader map.

In fact, the growth and forecast in the early 70's were such that the day was

perceived where all hydro potential would be developed, and that Manitoba Hydro actually started preliminary studies for a possible nuclear plant. Preliminary sites were identified and two senior engineers dispatched to New Brunswick to go to Point Lepreau nuclear plant to learn nuclear power technology firsthand. That, of course, did not come to fruition.

I'd now like to talk about Dorsey and all the other facilities that comprise the HVDC system, the most critical of our critical Bipole infrastructure.

So here is an aerial view of Dorsey. This is the main DC Dorsey footprint. The DC lines, two DC lines come in from the north. This is north. On the south side of this road we built the 500 AC station when we built the line to the U.S., the 500 line to U.S. So that line comes out, I have better slides to show you, more specific. It comes past Dorsey and then turns eastward across Red River and southeastern Minnesota. This is PR 221. It goes through the Town of Rosser.

The Winnipeg Airport and Centre Port are over to the right some miles inside the

Perimeter Highway.

The next three slides will show different views of Dorsey. So I'm going to talk about the AC side of Dorsey. This is looking south. Over here is the 500 kV AC station where the U.S. line starts from. And if you look closely, you'll see the towers of that line as it hits northward and turns east.

The converter transformers are next to the Bipole converter buildings. So there's one of them in that circle there. There are rotating machines called synchronous condensers necessary to provide full stability to the AC system. There are nine such rotating machines located at Dorsey. There are filter banks to do their tasks. And this area is the 230 AC switchyard from which a number of 230 AC lines emanate into our grid in Southern Manitoba. So that is a quick view of the AC portion.

Now I'll talk a little about the DC side. So here we're looking from the north. These are the two Bipole buildings. Here is one of the DC lines, Bipole I, and Bipole II lines very faint here, and this is a 230 double circuit line. I just want to remark about the change in

technology. When we did Bipole I with Mercury arc valves we needed a lot of building space for those large pieces of equipment. When we did Bipole II, it's much smaller. And I used the analogy of vacuum tubes and transistors. That's how technology changed quickly in the 70's going into the '80s.

This is the 500 AC yard again, and I'll move onto another slide. This is another look. This is north. This is south. That's a the 500 AC termination yard for the line to Minneapolis, and this is the whole the Bipole I, II buildings, the DC area, and here the AC area.

We get a little closer look at the Bipole I building, the Bipole II building, synchronous condenser machines stacked in here, the converter transformer machines next to the buildings, and the AC yard here. I want to point out this little white building, it's known as a relay and control building. It's essentially the nerve centre of this portion of Dorsey. If something happens to this building, we're in deep trouble. And we recognize that, and I'll speak later in my presentation, what we have done to minimize losing that building from events like

tornadoes and bad weather that could take it out of commission.

This is a picture of a single valve group, and my colleagues will speak a little more to that in their presentations.

One more look at Dorsey from on high, again, Town of Rosser, PR, the two DC lines coming in from the north, the mauve line is the 500 AC line going by and then turning eastward. We also have two electrode lines necessary for each one, for each Bipoles I and II, and then there are other 230 lines on this side and, again, the 500 AC yard south across the road.

I'd like to talk a little bit about critical infrastructure. So what is it? It's a term used by governments to describe assets essential for the functioning of a society and economy. The Canadian government has identified ten sectors. The U.S. government has 18 sectors. And over in Europe, the European Union has an operator security plan identifying important assets, risk analysis of major threat scenarios, vulnerabilities of assets and counter measures.

Let's look at the Canadian sectors. Energy and utilities, which includes electricity,

finance, banking, insurance companies, and anything to do with finance, the food industry, transportation, air and ground, governments, information and communication technology, including the Internet, the health sectors, water, which includes sewer systems, safety and security, and manufacturing. All nine of these infrastructures from finance to manufacturing are electricity dependent.

The electrical infrastructure is deemed to be the most critical in that it enables and supports all other critical infrastructures. Failure of electrical infrastructure diminishes the other infrastructure sectors that depend on electricity, and so societies and economies suffer. After the storm damages in Saskatchewan this past June, in the post mortem meeting of 21 provincial agencies, 19 of those Saskatchewan agencies agreed that the electric infrastructure was the most critical.

The eastern ice storm in Quebec and Ontario and upper New England in January 1998 caused tremendous hardships, as I had mentioned. Lives lost, and it brought everyone's attention as to how critical electricity is when it is not

available for a long time in the winter. But also in the summer, as people found out this summer in Washington DC and Virginia.

I'm going to start moving north of Dorsey. I just want to point out this is Bipoles I and II, we have got two Bipoles. They are all built from north to south with guyed structures. This is not the plan or the intent for Bipole III in agricultural areas. We'll only use guyed structures in non agricultural areas.

We'll talk a little bit about DC, as in batteries. If we were to measure the voltage from this point to ground, we would measure 450,000 volts, and here to ground, 500,000 volts. Across is a million volts. There are two wires on Bipoles I and II. Perhaps you can't see them but you can see the little dots here, those are the spacer dampers. So there's two wires here, two wires here, a ground wire or a sky wire on the towers to protect from lightning, and similarly here, two wires on each side of the tower.

We're moving a little further north. As I said, guyed towers are for non agricultural areas for Bipole III only. Self-supporting towers will be used in the agricultural areas. So these

guys are grounded into the soil, depending on the strength of the soil will determine what depth the guys going into the ground.

Moving along further north, this is an area that is pretty common, north of Ashern, and we have the two Bipole lines and two 230 lines from Grand Rapids into the Winnipeg area. And that is very typical moving northward until we get off the area of Provincial trunk highway number 6 and swing northeastward.

And this is the area heading northeast, very typical, difficult terrain, difficult access. There are many miles of both DC lines that traverse bogan terrain, isolated and removed from all season roads. The only way to get in are helicopters, and hopefully it's frozen in the wintertime to use ground machines. A significant failure of both lines in these areas would require up to two months to fully repair, and that's a conservative estimate. Eleven years ago a single 500 kV AC tower on the Dorsey/U.S. line failed in a swampy area in Minnesota in the summer. It took eight and a half days to repair the single tower. Access roads and a stable work area for heavy cranes to work on the tower had to

be pre-built.

In July 1983, a tornado took down the same line near Warroad. A total of 12 towers, 3 miles of line was damaged in the dry swamp. I was there the day after. It took 21 days to effect repairs. Access was good. The same contractor that built the line did the repairs along with Northern States power crews.

Just moving back to the south again, this is Bipoles I and II, and you can see the guys with some guards at each guy location on the ground to provide protection for people working around the towers. This is a 230 kV tower, but it resembles very much what self-supporting towers on the proposed Bipole III line would look like.

Bipole III towers on average will have a footprint base of 62 square metres for most of the towers in the agricultural areas.

Now we go way up north. These are two different scenes of the same location. It's the crossing of Bipole II line, very close to Henday across the Nelson River. This is the lineman's foot. He's up at the top of the tower looking down. These are trees down below, these are one side of the tower, and a lot of hoar frost on the

tower.

These are -- this is the largest crossing we have on our system, very high towers and a very long span. This is the same crossing. Here's the tower on the banks of the Nelson River and going to the south side. So what's the problem here? The south side of the Nelson River is very boggy. Should something happen to that crossing, we couldn't get the necessary cranes and machines on the south side of the Nelson to effect repairs until late in the winter, when the ground conditions are frozen and can support that type of equipment. We realized way back after Limestone came on line that we could not leave this crossing without reinforcing it in some way, otherwise failure would bottle up Limestone for eight months, and some additional power as well, until we waited for frozen conditions.

The next slide illustrates what we did. It's the same location, Henday is over here, and the crossing of the Bipole line is at the Nelson River right here. There are other 230 kV crossings as well. So the first thing we did was we reinforced the towers on each side of the Nelson River on the Bipole II line with more

steel. And then we built another line at 500 kV, crossed the Nelson River to this side, and then it is sitting there unenergized. In the event there is a problem here, it wouldn't take our people long to reconnect at the Henday area and reconnect on this side to get power flowing again.

I talked about spacer dampers a few minutes ago. Here is a scene of a special helicopter with rotors and other equipment designed specifically for this kind of work. He is hovering very close, the line is energized, very close to the line, and the lineman is in the cart accepting tools and spacer dampers and whatever else, maybe lunch, he needs to work on the line. This is the lineman here in the cart, right at the tower with the insulators here. He's got his bucket, he's got his spacer dampers, and his job is to remove the old dampers and then install new or rehabilitative ones as he moves along.

So this is the lineman's view from the cart. There is the spacer damper. The problem was the neoprene drummets or inserts, after 30 years of being stressed at 500 kV, cold winters and hot summers, that neoprene gets brittle and it

loses its damping ability.

I'll just talk for a moment about what that damping is about. Laminar winds at moderate speeds that flow across perpendicular to the conductors can cause a low amplitude high frequency vibration. There is a sample of a conductor. Unchecked, over a long period of time, the stranding in these conductors will fret and fatigue. That's not something we want to wait to find out. We have to be proactive to stay on top of that. So much research and testing was done at that time, 10, 12 years ago, to develop the right material choices and to rehabilitate or provide new spacer dampers as work proceeded through those two summers. So in all, 56,000 dampers replaced in two summers.

I don't suppose anybody would want to ask to go for a ride with the lineman next time.

I want to talk a little bit about vulnerabilities and the exposure of our DC system as a whole.

So we have two Bipole lines, 900 kilometres long on a common right-of-way. These two lines at the southern Dorsey station transmit 70 percent of our northern hydro generation. In

short, Dorsey has most eggs in one basket. No utility in the world transmits so much power through one critical facility.

Let's look at this another way. As we restate the problem. In the Hydro Quebec system, the maximum that they put through a critical facility of their entire system is 10 percent. In Brazil the maximum is 20 percent, and in China at Three Gorges it's less than 20 percent, it's between 10 and 20 percent. Our system is here, 70 percent through one critical facility of our entire northern hydro generation. With Bipole III, we move to this point. Nowhere near Three Gorges, Brazil, or Hydro Quebec, but a significant improvement.

I'd like to talk about close calls and near misses. I'll talk a little bit more about September 5, 1996, a down burst event just north of Dorsey, a major storm, two storms collided over Winnipeg in July of 2006. In June of 2007, the first of five tornadoes recorded in Manitoba. On August 9th, 2007, a storm hammers Dorsey. And then in May of 2008, forest fires in the Marchand area; a month later, north of Grand Rapids in the Buffalo Lake area. And then something we had

never expected, and I'll speak to that later, flood waters and ice buildup on 117 kilometres of DC right-of-way, the Bipoles I and II right-of-way, and structures in the remote area of Northern Manitoba where 50 towers and 400 associated guys were encased in 3 feet of ice. And I want to make clear that it's the bottom end of the towers. And then this year in May, forest fires in southeast Manitoba, and then at the end of July, that big wind storm in the St. Laurent area.

The closest call I believe was on September 5, 1996. Recalling when my phone rang that night, it had been a hot windy day and night, I was restless. 2:00 o'clock the phone rang. As I sat on the edge of my bed in darkness, I thought for a fleeting second that I was having a dream or a nightmare. Listening to the first words from our system control manager, I realized it was real when he said, Ed, all the DC is down on the ground north of Dorsey. The power engineer's worst nightmare. Without dressing I made a few quick calls to our president and our two vice-presidents. Then I called our civil design manager and said, Andy, get up, get dressed, take

your boots and rain gear, fill your car with gas and get yourself to Dorsey, we have work to do.

I then dressed, left and went straight to the gas station and then over to Dorsey. I'll tell you more in the next slides.

Down bursts, tornadoes, wind, lightning storms, forest fires, plow or straight line winds and ice storms have all rained havoc on our systems.

So here is what happened in September 1996. I'll go over the slide but I want to talk a little bit about microburst. This is a wind event that can cause severe structural damage due to its intense low level outflow. This particular storm would sustain winds of a hundred kilometres per hour, ran approximately 75 kilometres from Poplar Point to Stony Mountain. It is believed that microburst gusts of 150 to 180 kilometres per hour in a storm were responsible for bringing down one of the towers. The additional strain of this tower failure plus the sustained winds of a hundred kilometres per hour caused the collapse of 18 additional towers along the line, mostly south of provincial trunk highway six and just north of Dorsey. By sunrise on the

next day, man, machines and materials were already arriving. Later in the day a temporary tent office was set up in nearby Grosse Isle. Using wood pole structures to bypass the damage zone, a temporary rebuild was achieved in four and a half days and full power was re-established. All power from the north had to be interrupted intermittently for the next two weeks as we transitioned to the new permanent towers.

People had reported seeing funnel clouds west of Dorsey the night of September 5th.

So here we have the Dorsey complex, the DC complex and the AC complex. This is the 500 kV line to the U.S. This line represents the two incoming DC lines, Bipoles I and II. Then there's the ground electrode lines and other 230 kV lines emanating from the south side of the station. This dotted zone is the damaged zone. This is highway six. So there were a couple of towers to the north, most of them were in this zone. This shows how close this event came to the overall Dorsey complex. And overall I include the line to the U.S., and the AC on this side and the DC on the north side of the Dorsey complex. And one of the electrode lines was damaged. Here you

can see towers leaning and hanging on, the tops bent over and others are down on the ground. You may not see very closely, but Dorsey is right there, right past those towers. That's how close that event was.

We'll talk a little bit about how lucky we were. Before I do that, the down burst is a condition in the atmosphere where suddenly a vertical bursts to the earth, and you can see by the evidence the wind will splay out in all directions. If you look closely you will see round hay bales and straw bales rolling in all directions. This is just one photo, we have many others, you can very clearly see the effect of that kind of downburst.

Here is one of the towers. It was harvest time. So this barely missed Dorsey, luck number one, the 500 kV station and 500 kV line. The time of night, lucky again because power instantly flowed from the U.S. That's just the physics of electricity. Power flows to where there is a demand, and we lost our whole generation, so U.S. generation came forward. The weather was perfect for the next few days. Storm was over, the sun came out, the wind blew, and the

muddy fields turned to something like hard concrete with the heavy traffic over the next few days. And that location was very close to our main hydro equipment storage areas. And of course access off highway six was excellent. So lucky five times over.

I want to talk a little bit about the time of night. As I said, power flowed instantly on the three U.S. power lines, some from Saskatchewan, some from Ontario, yet no customers in Manitoba suffered an outage, then or in the ensuing weeks. Nobody woke up with their clocks blinking. People didn't even know what happened. So why not? Well, because the time line's reverse flow, and because of subsequent actions taken by our operators to secure emergency power contracts for hours, for a day or two, to get through this event. Would it have been different if this event occurred at 6:00 p.m. during system peak? The answer is yes. And it likely would have resulted in blackout in Southern Manitoba or more.

A few months ago a landowner on the Bipole III proposed route called me to discuss various issues. And during this discussion on the phone, the landowner brought up this event. I

relayed to the land owner that the three lines to the U.S., some of which are similar to Bipole III like the 500 AC line, some are smaller, some are two pole wood structures, the others are self-supporting, but there are more of these towers on these lines per mile because they are smaller lines. Those lines saved our day I told this person. And they are mostly on farmland or adjacent to farmland. And I said somehow Manitoba Hydro and the landowners in 1970, 1976 and 1980, or just before that, were able to negotiate easements and rights to place transmission lines on their land. If they had not, I dare say we would have had a much bigger problem in September of 1996. So we owe them a debt of gratitude, at least in my opinion.

July 17, 2006, two vicious storms collide over Winnipeg. Around midnight my wife and I were at a wedding at Bellacres facility, and as guests were leaving for the parking-lot, I could tell there was a vicious storm to the west -- and you know what's west of Bellacres -- just about to hit the area when staff suddenly ordered everyone in and into the basement, including the bride, the groom and wedding party.

Trees were bent over horizontally, large branches were flying through the air, and in minutes the parking-lot looked like a war zone.

When it was safe we drove detours to get to the Perimeter Highway, and I stopped at our control centre. It looked like a battle was going on to keep the system stable as extra staff were already in the control room assisting the duty staff. The tension in the room and sweat beads on their foreheads was quite evident. What happened? These two storms collided over Winnipeg. Although the light show was magnificent, multiple transmission and other lines tripped. System operators battled hard to maintain stability. And they would still say today that was one very close call. Along McPhillips Avenue and in Transcona area, hundreds of trees and branches blocked traffic, hydro poles shattered, wires on the ground, and many flooded basements. It took several days to clean up the mess.

June 2007, first recorded F5 tornado hits Elie. The tornado touched down north of the TransCanada Highway around 6:30 p.m., and slowly moved southeast where it picked up a tractor trailer before it headed south and severely

damaged the towns flour mill causing over a million dollars in damage. Then headed southeast towards Elie where it destroyed four houses, flipped cars, and even tossed one owner's Chrysler Fifth Avenue onto a neighbour's roof. The tornado wavered over the same area of Elie for approximately four minutes before it cut sharply to the south and rapidly dissipated. The tornado traveled about six kilometres and was 300 metres wide at its widest during its 40 minute lifespan. The tornado repeatedly struck essentially the same area of town, destroying most of the structures and vehicles in the area. The people in Elie were prepared and took the necessary precautions during the event. Many others were at a graduation event in a facility that was spared.

I will now show a video of this in a short bit. Before I get there -- so here is Elie and over here we have Dorsey, 25 kilometres away.

(Video shown)

Damages to Elie were $39,002,007. I'm now going to show you a little satellite imagery of the same storm. So you can see Lake Winnipeg here, Lake Manitoba, the Ontario border, the U.S. international border and the Saskatchewan border.

It gives you some sense of the breadth and width of that storm. Several other tornadoes were reported south of Elie. And that's a close-up of one of the homes. This was a close call as tornadoes can travel long distances, and seeing the damage in Elie reinforces how much damage would be done at a facility like Dorsey.

Two months later the storm slams into Dorsey and damages equipment associated with Bipole I. In total we lost 1348 megawatts of power, had all this damaged equipment, seven valve groups tripped off and three lines tripped off in the same event. When supervisors and managers arrived in the morning they couldn't believe their eyes, at first thought we might have a thousand megawatts locked out for a long time.

As a result of this event, six valve groups locked for a loss of 1348 megawatts, three synchronous condensers tripped, the 500 kV U.S. line tripped, and the line between Ritcher and Birds Hill tripped, and the Dorsey to Brandon line tripped, all because of this event.

There was an emergency call for 550 megawatts to the U.S. for power, and a reduction in the transmission loading, because we

have lost all this transmission we could not maintain transmission to the U.S. Grand Rapids, Brandon generating station and Bipole II generation was increased. And about an hour later, another valve group locked due to rain water leaking into the leak detector system. Several hours later the system was normalized.

Good planning or luck? We had two of the smoothing reactors that were the damage areas on each pole of each of the two Bipoles. By erecting temporary structures we were able to bypass the damage zone of the first reactor in the damage area and return Bipole I to service with a single reactor rather than two in series. The final rebuild of this area took over six months.

That's just another scene of the carnage from that storm, and another two here. And I believe we have a sample at the back of the room for folks to look at on their time, free time.

Cauchon Lake, south of Kelsey on Nelson River. It was a very wet fall in 2010. This is a swampy area. Here is Kelsey, here's Thompson, here's Cauchon Lake, and this is the Nelson River. This blue line is Bipoles I and II

corridor. So we are going to be talking about this area here.

It was a wet fall and this winter ice cover developed on the Nelson River. The ice was rough and caused the water to pile up in the river upstream of Kelsey, spilling perhaps slowly over the banks into the low lying area around Cauchon Lake. This was detected when our line maintenance crews began working late January 2011, blading access winter roads for right-of-way brush clearing. By then the ice was three feet thick, over 117 kilometres along the right-of-way encasing the lower portions of 50 towers and 400 associated guys. As water continued to flow under this ice, it lifted it upwards and strained the guys and towers. As long as it was frozen in the ice, the towers didn't topple over.

The steel was buckled and some towers were lifted off their foundation structures. As ice settled, it also caused further strains and buckled. In most cases the only way to know the damage and failures was to send a diver with video and audio feeds under the ice to do the inspection. I have a short video which I will show shortly.

At one location had a tower failed and fallen into the remaining standing Bipole line, it would have taken both Bipoles down, and this failure could have caused a blackout in January. So here is what our creative people, our engineers, technicians and field people designed and built structures to grab the tower and to stabilize it on the frozen ice. So this structure was designed and produced very carefully for all those towers that were in jeopardy.

Here we see a diver heading to do his job with his camera and video feed. Here is an anchor in ice. Not knowing exactly what was under the ice, we cut holes in the ice and dropped large concrete blocks attached to guyed wires to create a second anchor point. Because we really didn't know what the condition was under here. This is the standing tower, bottom end of the tower in frozen ice in this location. So here we'll take a few moments to see what happens with our diver.

(video shown)

This activity didn't subside until May of 2011, started in late January. We had staff, contractors, helicopters and swamp machines, a temporary camp, fuel, and concrete anchor blocks

moved to site over the four months, with 24 hour surveillance, until we were certain after the spring summer melt revealed the situation and the work we had to accomplish going into this past winter.

I don't have to tell you, Mr. Chairman and commissioners, that given this location, difficulty of access and poor ground conditions, we would have had a very long outage -- a close call in one of the worst places. A failure or collapse in the line could have caused cascading failures up or down the line. And to make things even more interesting, we normally depend on 700 megawatts of import from the U.S. in the winter. But due to equipment forced out on the U.S. side of the 500 kV line, the import level was actually reduced to 400 megawatts. So if we were in big problems, our imports were down as well. Our staff referred to this event as the ice wars, as the activity and the effort resembled a small war zone of a different kind.

The Buffalo Lake fire north of Grand Rapids. Here is Grand Rapids, the DC lines and 230 kV lines northward and southward from Grand Rapids, and this is Buffalo Lake, forest fire in

this area. The fire affected Bipoles I and II. Three of the four poles tripped off, meaning three-quarters of the total power from the DC system was gone. It was noticeable immediately in the U.S. marketplace and in the reliability regimes. U.S. regulatory agencies, FERC, the U.S. DOE, FERC and MISO all requested supports because of the huge loss of megawatts. Here is another scene of that fire, and another one here.

We learned from that experience. We have much better alerts from government departments that look after forest fire events. We also have real time monitoring in our control room of every forest fire in Manitoba and its progress. So learning from those events, we are getting better in that sense.

I want to go back to the summer of 1964 when forest fires near Kelsey tripped the only two lines from Kelsey to Thompson and to the INCO Mine. We could not re-energize the lines because of the contamination of the soot on the insulators. Crews of linemen were sent up to climb each tower and scrub and wash each insulator before the lines could be re-energized. Soot and electricity don't mix, hot air and smoke don't mix

with electricity. Hot air is ionized air, and ionized air will cause electricity to jump across the insulator. When it does, the line trips off and we don't have any power flow.

This was in May of this year in the southeastern area of the province, and it took out our U.S. line. Same reason, smoke, soot and ionized hot air. And there is some of the battle scenes. Again, we had to call for emergency power from the U.S. and do the kind of things we did when the storm hit Dorsey back in 2007.

Ice storms, April 27, 1984. I distinctly remember it was a beautiful April, not unlike this past weekend. Temperatures were in the low 20's, some crops were actually up. And then somebody got mad at us, the weather changed, freezing rain storm moved in suddenly. And for the first time ever we lost 12, 230 kV AC steel towers near Oakville.

More recently we had icing on the HVDC lines in March of 2009. Icing along the southern DC corridor resulted in us having to reduce voltage on the DC lines, and we can do that because we have the blocks of 500 kV, 250, and on Bipole I, 150, 300 and 450. Less power but we can

still keep the system operating. And we asked for 2250 megawatts of emergency power from the U.S.

Ice storms in 1977, 1983, 1984 and 1991 caused significant distribution damage and lengthy outages to our customers. I'm requesting to show you a short video on a phenomenon called galloping. I talked about Aeolian vibration, this is another phenomenon.

A little bit of ice coated on conductors that has a -- not necessarily a concentric shape but maybe an egg shape with a little tip on it. If you really wanted a cross-section of that, it looks like an airplane wing cross section. The condition is, we get a moderate wind going perpendicular to the line to cause lifting. That's what causes airplane wings to lift, similar conditions. So observe the video and then I'll talk a little bit more about it.

(Video shown)

Our people observed in this event -- this is a 500 AC line -- our people observed that point to point amplitude of the wires was in excess of 30 feet movement up and down. Some years earlier in the U.K., in the Midlands, this kind of galloping phenomena lasted for hours.

There was bent steel, broken bolts, loose bolts, it did a lot of damage. And as long as that energy is sustained for long periods of time, it's amazing what can happen to those structures.

There was ice on the DC lines in this event. The fortunate thing was, when wind blows parallel to the line, it doesn't cause the galloping. It has to blow roughly perpendicular in order to get this kind of action.

I'm going to stop it there.

1998, northeast ice storm in New England, Ontario, parts of Ontario, and large parts of southern Quebec. I'm sure many of you recall these images where thousands of customers were without power during the month of January.

In June of this year, in the Saskatchewan Power Corporation system, another downburst, eight towers, double circuit towers that feeds Prince Albert failed, flat on the ground, and took power out for the whole city. Within a day, well, it took a day, Saskatchewan power crews and contractors able to put up temporary wood poles there and re-establish first power in 24 hours once they got to the site. Again, it was fortunate because they had good

access. Winds were recorded at 140 kilometres per hour, eight towers were down. Further west ten kilometres in the same storm, a 230 kv line failed between North Battleford and Meadow Lake due to cascading. And in total 11 transmission lines failed in that storm. This storm moved into western Manitoba but most of the damage was on distribution systems.

My counterpart in Saskatchewan Power told me a couple of weeks ago that this past summer was the worst in terms of frequency and severity of storms in his entire career.

I have related today to you, Mr. Chairman and commissioners, several instances of severe events that demonstrate the vulnerability of exposure of our DC system and why we need to act. I would like to elaborate a little further.

Catastrophic consequences of DC lines failing. A maximum outage of two months to restore is a conservative estimate, it depends on the season and the location. And I hope I have demonstrated some of the tough terrain that we would have to deal with the further north we go.

In winter, between November and March,

rotating outages in Southern Manitoba, two hours at a time. In the summer, the southeast and west interconnections and all local generation may supply Manitoba load. A catastrophic outage at Dorsey, we would lose 3600 megawatts from Northern Manitoba. The time to restore or rebuild the entire converter station at Dorsey is estimated to be three years. This would be devastating to the provincial economy, our society, public safety, integrity and reputation, and it cannot be tolerated.

We started constructing Riel from the green field from the spring of 2009 and we will finish in 2014, working year-round with multiple contractors. And this is the re-termination of the 500 kV line only, five years. So a complete rebuild of Dorsey after a catastrophic event puts that in a conservative perspective.

So the problem we have today is a lack of redundancy in the HVDC system and insufficient emergency backup resources, load serving deficiency under catastrophic contingencies. And this deficiency gap continues to grow with time due to load growth and the resources capacity remaining relatively constant. This shows that

graphically.

The bottom line is the relative constant resource capacity from this point in time to 2025. Yes, there are some increases, but in relative terms, not a great deal. This is the actual load growth, and from here it's a forecasted load growth. So we project out to 2017, and we lose Dorsey, we'd be 1500 megawatts short.

My colleagues will go through all the details in their presentations on all the discrete points on that graph.

Our Manitoba Hydro Act states very clearly, the purposes and objectives of this Act are to provide for the continuance of a supply of power adequate for the needs of the province. This was taken in June of 2010 at Dorsey.

I mentioned a relay building at Dorsey early in my presentation. Recently an outer concrete shell was constructed over that existing building. It is designed to withstand an F3 class tornado. There were other significant upgrades done to the DC and AC power supplies in that building, the HVAC system and the fire protection system as well. And the roofs on both Bipole

buildings were upgraded. But these are only incremental reinforcements of a few components at Dorsey. There are many others remaining exposed and vulnerable.

The funnel cloud in this photo was taken just west of Dorsey on June 10th -- sorry, in June of 2010, just a little over two years ago.

I'd like to make my closing remarks, Mr. Chairman, commissioners. As I have indicated very clearly today, the power grid is one of the most critical of all infrastructures, and this is underscored by the Hydro Act. Like every modern and progressive utility in the world, we plan, design and operate our system to withstand or tolerate sudden forced outages of critical elements, regardless of cause, such as a single network transmission line, a major transformer, or a generator unit, without causing loss of load or a cascading situation widening the effect of the disturbance and the initial outage. In other words, our system has to ride through the initial disturbance and not affect load to customers.

In simpler terms, we plan and operate the system to prevent failures, but they do occur, and when they occur, to contain the effects of the

failures from spreading or cascading, and to mitigate as quickly as possible. From the very smallest to very largest emergencies, we are in the business of being emergency ready and responding so that we can fulfill our mandate to keep the lights on in Manitoba.

The identification of the Bipole III project is the best solution to improve the reliability of the Manitoban Hydro system, and the security of electricity supplied to Manitobans was the result of work done over many years.

Manitoba Hydro proceeded to develop and carry out an extensive program of public consultation about the project, and commenced many specialized biophysical and socioeconomic studies which were required by the EIS. As part of the assessment of the project, Manitoba Hydro contributed its own expertise and experience, having constructed, operated and maintained over the last 60 years over 18,000 kilometres of AC transmission lines, and over 1800 kilometres of DC transmission lines and three converter stations.

We delved far deeper in preparing the EIS than previous transmission projects, EIS's. Team work was essential throughout the work of

designing the environmental assessment, and every significant conclusion required for design in the environmental assessment came only after debate and analysis by the particular staff and consultants whose particular skills and knowledge was relevant to whatever topic was under consideration.

I am proud of the Environmental Impact Statement filed by Manitoba Hydro in December of last year and of those many people who contributed to it.

Mr. Chairman, commissioners, thank you for your patient attention.

THE CHAIRMAN: Thank you, Mr. Tymofichuk.

MR. BEDFORD: I have one question of a procedural nature for Mr. Tymofichuk, if I may.

Mr. Tymofichuk, do you on behalf of Manitoba Hydro adopt as evidence in these proceedings the Environmental Impact Statement that has been filed with the Clean Environment Commission, the supplementary filings to that document, and the answers to the information requests that had been provided to the Clean Environment Commission?

MR. TYMOFICHUK: Yes, I do.

MR. BEDFORD: Thank you.

THE CHAIRMAN: Do you wish to proceed with the presentation or do you need a break?

MR. TYMOFICHUK: As you wish.

THE CHAIRMAN: Okay. Let's carry on.

Just before we move to Mr. Neufeld, Mr. Tymofichuk, I'm not sure if I have fully or correctly heard what you said in one small point in your presentation. Did you say that you started construction of the Riel conductor station in 2009, and it will be completed in 2014?

MR. TYMOFICHUK: Mr. Chairman, I said that we started the Riel project, which is the sectionalization of the 500 kV line. There is no work on the converter station.

THE CHAIRMAN: Thank you.

MR. TYMOFICHUK: Thank you.

MR. NEUFELD: Mr. Chairman, commissioners, participants and members of the public, my name is Gerald Neufeld. I work at Manitoba Hydro as a division manager for transmission planning and design. I have been in this role for ten years. By training I'm an electrical engineer. I graduated from the

University of Manitoba in 1985, and started my career with Manitoba Hydro immediately thereafter. I have been with Manitoba Hydro for 27 years and have spent almost all my career in transmission, and from an organizational perspective, I report to Mr. Tymofichuk.

The topics that I'd like to review here today include a brief overview of the existing system, a project description as it relates to Bipole III, the environmental assessment process, sustainable development, construction planning, and a linkage on Bipole III as it relates to a solution to our energy shortfall problem, which you have just heard Mr. Tymofichuk cover.

So for starters, I'll begin with the existing system. You'll be familiar with this slide from Mr. Tymofichuk's presentation, and you'll recall he talked about Bipole I and II quarters, as represented by the orange line, Radisson and Henday in the north, Dorsey in the south. The green is our 230 kV transmission infrastructure. And where I'd like to take you is to operation of our DC system, which functions very separately and independent of the AC system.

So the DC system, which is the northern termination of Bipole I and II, has supplied -- is supplied by the generating stations on the Nelson, which include Kettle, Long Spruce and Limestone. These are the big units in our fleet and they are dedicated fully to the DC system.

The AC system is supplied by different generators. For example, Kelsey, Wuskwatim, which is not fully on line, we have got two units running, two of the three, Jenpeg, Grand Rapids, the Winnipeg River plants, and the generation at Selkirk and Brandon. When we lose Dorsey, we lose the supply of the three big plants in the north. So if Dorsey is out for three years, the three big plants in the north are isolated, and what remains in terms of the supply of energy is from the AC plants, Wuskwatim, Kelsey, Jenpeg, Grand Rapids, Winnipeg River, and whatever we can get on imports, along with Brandon and Selkirk.

And I can tell you that for a significant percentage of a year, for significant times of every month, if we were to lose Dorsey and the supply from these plants, there wouldn't be enough power around for all of us in Manitoba.

On the next slide I want to show you details about the amount of transmission we have in our system. We have referred to this legend on the right-hand side, the high voltage transmission lines that we have in our system, we have over 1800 kilometres of either 450 kV or 500 kV high voltage DC lines, 209 kilometres of 500 kV AC. And you'll recall on Mr. Tymofichuk's presentation he showed that section of the station directly south of the Dorsey converter station, the 500 kV line to the border is 209 kilometres. We have 5,000 kilometres of 230 kV AC, 1400 kilometres of 438 kV AC, and 2900 kilometres of 115 kV AC.

So perhaps I might pause there and just provide a brief description of what kV means. KV means kilovolts, it's in the thousands of volts. So when we talk about 115 kV, it's 115,000 volts is the voltage rating.

As Mr. Tymofichuk indicated, we have installed over 18,000 kilometres of AC transmission in Manitoba ranging from 33 kV to 500 kV in the last 60 years.

So when it comes to addressing environmental work for transmission facilities, we have a licensing and environmental assessment

department who are assigned to work on transmission facilities. They are a department of professionals, of experts in the environmental sciences, ten in total, who are dedicated to conducting environmental assessment for transmission projects. These people are well trained in the environmental sciences and they manage this important work for Manitoba Hydro and are dedicated to transmission facilities. In addition we utilize numerous experts who assist us as consultants in the environmental assessment work.

We have successfully developed and managed the high voltage transmission system, including regulatory review and licensing of numerous large scale transmission projects in both northern and agricultural Manitoba, since enactment of the environmental legislation which took place in March 31, 1988.

That legislation required assessments to be done on transmission lines 115 kV and over.

During this process, we have grown in knowledge about licensing in the environmental assessment process. We have a long history in assessment, development of transmission lines, and

a successful record of obtaining environmental approvals. And you see the list before you of the environmental approvals we have received for transmission facilities since 1988.

Next I want to talk to you about the Bipole III project. So the northern converter station, which has been named Keewatinoow converter station, is about 79 kilometres northeast of Gillam, and although it's called a converter station, to be technical, it's a rectifier station. And a rectifier is somewhat similar to this device which you'll be familiar with, typically used for blackberries. You plug it into AC, the rectification happens in here. And what I have on here is a mini USB port which puts out five volts DC, so AC in, DC out. Scalability is the only difference.

We move to the south at Riel, the Riel converter station which is just outside of Winnipeg immediately north of Deacon's corner. The purpose of that converter station is just opposite of what you find in Keewatinoow, it's purpose is to convert from DC back to AC. And again, I bring you to a Canadian Tire product, which is plugged into the cigarette lighter. DC

in, and on this particular unit there's two AC plug-ins, so from DC to AC. This is the inverter. Again, scalability is the big difference.

And the Keewatinoow to the Riel DC transmission line, Mr. Tymofichuk described that each pole has a measurement of 500,000 volts for Bipole II, a million volts from one pole to the next. And I bring you a D sized battery. If you were to have a measurement tool to measure the voltage difference between the bottom and top terminal, those of you who use this for flashlights will know it's got one and a half volts. So to stack about 300,000 of these batteries one on top of the other and you're running close to 500,000 volts. It's that simple.

The environmental assessment chart that you see on my PowerPoint is exactly the same one that is behind -- at the front of the room. And the final preferred route is 1384 kilometres long as we have measured it, with -- it has already been mentioned, a right-of-way width of 66 metres. We cover 931 kilometres or 67 percent of that full distance of the line in Crown lands, and 454 kilometres, or 33 percent on private lands, privately owned lands. And that represents 436

private landowners.

The study area, that area shown in yellow, covers 20 percent of the Province of Manitoba. Environmental assessment for this project has entailed going through a comprehensive site selection and environmental assessment process. It has entailed embracing engagement with the public through four rounds of consultation. It has also entailed use of the input of public consultation to improve routing decisions and avoid effects, all the time building on knowledge accumulated in the licensing of projects since legislation in 1988.

We have committed to an assessment period covering four years. You will hear more about these topics in Mr. McGarry's presentation later this week, where he will present together with some of his colleagues.

Some final comments relative to the environmental assessment process. We start with a broad study area as shown in yellow, and we fine tune the routing as we go along, fine tune the corridor as we collect information, both through consultation and through research. So that's a summary of the process. Start wide, collect the

information, get feedback, and start to narrow it up, as we gain more knowledge.

Next I'd like to talk to you about a specific area where we were challenged with route, which is in the Wabowden area. You'll see here the existing Bipole I and II corridor, the proposed final preferred route for Bipole III. The brown is a reflection of the Thompson nickel belt area of interest. And in this area some of the key considerations were the mining interests, Woodland Caribou, and a reduced separation between the existing Bipole I and II corridor and the proposed new corridor. In fact, over a span of over 30 kilometres length of line, the spacing was the order, or less than 20 kilometres.

We are currently revisiting the routing of this area at the request of the Manitoba Conservation and Water Stewardship. According to their letter dated August 29, 2012, you heard a bit about that this morning. And you'll hear more about the Wabowden area later in presentations.

I would now like to talk to you about the environmental assessment methodology we followed for this project. This flowchart you see

on the screen is representative of the methodology we followed with respect to route selection and evaluation. And again, you'll hear more details about what the significance of each of these activities in the flow charts are in upcoming presentations. We respect there are a myriad of issues to account for in routing a transmission system of this magnitude, and we believe that we have selected the route with the least impact on the environment and on the communities and residents along the proposed path of the transmission line, and a route that meets Manitoba Hydro's needs for reliability and technical feasibility.

And now I'd like to talk to you about sustainable development. Bipole I and II, we follow 13 principles as you see on the right-hand side of the screen. Manitoba Hydro is committed to incorporating sustainability in all aspects of its operations, and Manitoba Hydro makes every effort to meet the needs of the present without compromising the future. Mr. Osler will be discussing sustainable development in greater detail with his presentation.

And what I'd like to do at this

opportunity is to highlight two of these principles and give you an example of how they were integrated into the work that we have done.

First of all on item number 3, integration of environmental and economic decisions. The detail behind that principle I'd like to read to you.

"The corporation will treat technical, economic and environmental factors on the same basis on all corporate decisions from initial planning to construction, and to operations, to decommissioning and disposal. To the extent practical, we will include environmental costs and economic and financial analysis."

And as I move to the next slide, I'll give you an example of how we incorporated that.

The other one I'd like to talk to you about is public participation. The details behind that is the corporation will provide opportunities for input by potentially affected and interested parties when evaluating development and program alternatives and before deciding on a course of action. So to move to those two examples.

On number three, the goal of site selection process was to balance environmental, economic and social considerations in identifying alternative routes and ultimately selecting the final preferred route. And you'll hear the details behind that bullet as we move into the week.

With regard to public participation, an extensive four rounds of consultation were undertaken with governments, stakeholders, Aboriginal groups and the public to assist in the selection of the preferred route and to identify issues to be addressed in the environmental assessment of the preferred route.

So those are two very brief examples of how we followed the sustainable development principles.

Next I'd like to provide some introductory comments on construction planning for this project. So with reference to the Keewatinoow station at the end of the arrow on the northern part of the province, and the Riel converter station, Mr. Elder will be describing the construction planning associated with both these facilities in his presentation. The

transmission line which you can see here follows -- the final preferred route follows this green line. What you'll note on the diagram is we have broken the line into eight construction segments, there are four representing the north, one and two and three and four; two for the central area and two for the southern area. Mr. Penner will be getting into the details of -- on these planning segments in his presentation later.

We will work with stakeholders and the public during project construction and after to ensure expectations and commitments are met. And again, you'll hear more about this in upcoming presentations.

Some final comments relative to the transmission line construction process. One starts at a course level with drawings showing approximate tower locations. Exact tower locations aren't committed at the time of design. That's the way it works. Fine turning in terms of exact tower spotting occurs in the field during the phase of construction, and taking into account ground constraints and construction logistics and any additional input from landowners or other

stakeholders. So, for example, we're working with Manitoba Infrastructure and Transportation right now to afford quarries of interest to them, by positioning the towers or providing slight deflections of the line as needed. So that happens later. It's important not to finalize the details of exact tower locations too early and too quickly. This is similar to what I described with the environmental assessment process.

So on my next and final slide I want to tie a link between Mr. Tymofichuk's earlier presentation and the need for Bipole III.

So what we have here, to recap, is a chart which on the green line represents the load growth in Manitoba. So you can see on the scalability, this is in units of 1,000 megawatts. On the blue curve we have the supply capability of Manitoba, in the event we lost Dorsey. So when we get to 1996, just in terms of details so you can start to get an appreciation for what these transmission segments mean on the lower curve, in 1996, there is a drop of 132 megawatts right in that segment as a result of retiring Brandon units one to four. Okay. So we move ahead here, and we add 360 megawatts capability on the energy supply

side by commissioning Brandon unit six and seven.

If we move ahead here, this represents 235 megawatts of added generation resulting from Wuskwatim, the Wuskwatim generating station currently under construction. As I noted earlier, there are two units currently running.

And on this next line, this is the Riel sectionalization which will allow for a greater import capability, and Mr. Mazur will talk more about that in his presentation.

As we move along here to 2019, there is a forecasted retirement of Brandon unit five, which will drop our energy supply capability by 105 megawatts.

So this put some takes on this line, while at the same time as Mr. Tymofichuk described, the load continues to grow, and by 2017 we'll have a shortfall of 1500 megawatts.

So one might ask, well, what does that mean on a day like today? Late last week I spoke to our manager at the system control centre and asked him to tell me what the results would be of losing Dorsey on a day like last Monday day, a day not entirely dissimilar to what we have today. Giving consideration to major equipment that's out

of service in the United States, which limits import capability, and giving consideration to a number of our plants which are out for maintenance and giving consideration to the water levels, we'd be 1,000 megawatts short roughly on a day like today, if we lost Dorsey. If one looks at the load profiles, that would typically translate to some 200,000 homes that would be on rotating outages.

So as Mr. Tymofichuk stated in his presentation, the problem we have today is a lack of redundancy in the HVDC system and insufficient emergency backup resources. We have a load serving deficiency under catastrophic contingencies, and the deficiency gap grows with time due to load growth, and the resource capacity or energy supply capability is relatively constant.

Thank you, that is the end of my presentation.

THE CHAIRMAN: Thank you, Mr. Neufeld. I think we'll take a short break now and when we resume at 3:10, Mr. Mazur will have the floor.

(Recessed at 2:51 p.m.)

(Reconvened at 3:10 p.m.)

THE CHAIRMAN: We'll return to Manitoba Hydro's presentation, Mr. Mazur.

MR. MAZUR: Thank you. Mr. Chairman, commissioners, participants and members of the public, my name is Ron Mazur. I am the manager of the system planning department in Manitoba Hydro. I report to Mr. Neufeld.

I have had this position as the manager for the past 11 years. I have expertise in power system planning, modeling, digital simulation, applications of HVDC and other thyristor control devices, typically known as FACTS devices, heavily involved in development of application and planning standards of transmission tariffs.

Some of my previous projects included planning of the Wuskwatim transmission, the 230 kV line from Glendale to Rugby, North Dakota. And I was involved in operating the Winnipeg/Twin Cities 500 kV line, increased the capacity from 1,200 megawatts to 1,700 megawatts.

I have a Bachelor of Science in Electrical Engineering from the University of Manitoba. I graduated in 1971. Subsequent to

that, I received a Master of Science in Electrical Engineering from the U of M in 1986, specializing in power system applications.

I have worked at Manitoba Hydro for about 38 years in all, starting way back in December '74. I worked in the design area, designing transmission stations, then moved to operations for about five years before taking work in planning.

Prior to coming to Manitoba, I worked for four years after graduation at Atomic Energy of Canada and the Pinawa-Whiteshell Nuclear Research Establishment. I had been involved in planning Bipole III for many years, participated in the development of the chapter 2, particularly the EIS, and was involved in responding to the numerous interrogatories that we provided to the Commission.

So my job today will be to talk to you a bit more and provide a bit more detail on why we chose DC or what were the drivers in choosing DC for this project as opposed to AC transmission, the description of the transmission line in a little bit more detail in respect to the design, the Keewatinoow converter station and the northern

collector station and what we're proposing to build out there. Similarly, what is going to go on at Riel and what is going on at Riel at the present moment to make sure that we all have an understanding of the differences between the two projects.

A little bit about converter technology, something called LCC versus VSC and I'll get into what those mean in a bit, and finally some conclusions.

So with respect to what we were going to build from the north to address reliability, we have a choice between high voltage DC and high voltage AC and there was several factors that we looked at to make the choice. The best option would be DC.

So why HVDC? Before I get into some of the technical merits, I want to explain to some extent what this diagram you have in front of you actually is. To us at Manitoba Hydro, this is second nature but I'm sure you don't see it all everyday. The lines here represent stations. They are station buses. In this case, this diagram in here is what we call the northern collector system. Its function is to collect the

generation from the existing plants at Kettle, Long Spruce and Limestone and supply it via transmission lines that you see here to the converter stations of the existing Bipole I and II systems. Power is transmitted down toward Winnipeg and the Dorsey converter station and then supplied to the Manitoba AC system for distribution and export out of the system of any surplus energy.

The squiggly lines are transformers, so they transform the power from generation voltage which might be 12, 13 kV up to 138 kV at Radisson in this case and 230 kV at Henday.

So Bipole III is going in so there would be a new station, as you have heard, called Keewatinoow down to a new station, converter station at Riel. It will tie into the existing Manitoba AC system.

So in a nutshell, that's kind of an overview of the project. I'll get a little bit more into those other lines a bit later in the presentation.

So technically, one of the advantages of using DC for Bipole III is to facilitate connection to the northern collector system that I

just described. This system is an isolated system. That is one of the big advantages of the existing HVDC, in that because it's isolated, we can allow the voltage and frequency to move in the event of outages. So if we lose power on one of these DC lines, typically the machines will overspeed and the system will speed up and the voltage will go up. Because it's isolated, it has no impact and so we have some leeway. This allows us to do a lot of things control-wise in terms of controlling power that flows out of Manitoba and our tie lines and it's been a big benefit.

So tying in Bipole III, if it was an AC line, we would now have to put in a lot of special controls to do something with that surplus power, and likely that would be tripping generators. So one of the big advantages of using DC is you can control the power precisely. Even though there's surplus in this system, it won't automatically flow on the line. I think Mr. Tymofichuk talked about power instantaneously coming from the U.S. When we lose DC, that's the nature of an AC line. It's tied and it responds automatically. DC is a controlled change in power order, if you want to move the power. It's also

got lower losses. So for the same distance and amount of power, typically the DC power can be transferred more efficiently.

There is also economic considerations. HVDC converters are more costly. What this graph is showing here is the blue line is the DC cost and the converter cost is on this vertical axis here. In this case, all the converters and the associated transmission is in the order of $2 billion. As you progress along to the right this represents the distance in kilometres of the transmission line. So the transmission line cost is increasing with line length. Similarly the DC line cost is less costly than an AC line, and I'll explain why in a few minutes. But the green line represents the AC cost on this graph. And the AC station costs are typically lower than the converter costs, significantly lower as you can see, comparing those two points. But the line cost is higher so the longer the line, the greater the expense as you go up in distance.

Now the AC line is more expensive because you have basically got three conductors versus two. It's a bigger structure. And in this particular case, as you'll see in the next slide,

in order to carry the same power as a Bipole, you would need a double circuit AC line.

So in summation, HVDC is more economical for AC long distance transmission. There is generically a distance called the break even distance that's often discussed. And in this particular case, anything over about 800 kilometres DC would be advantageous. If you include the cost of losses, which I haven't shown in here to keep this diagram simple, it would actually reduce the breaking distance because as I said earlier, losses are less on the DC system so the cost of the losses would reflect proportionately.

So here's a look at the tower schematically. I'll talk a little bit later about some of the dimensions of the DC towers. But it's the smaller tower as you can see. In order to get the same power transfer, we typically need two AC circuits of 500 kV which is depicted on one of each side of the tower. So it's a much sturdier, more expensive tower. And the AC tower would require more right-of-way, and DC tower less right-of-away.

So now I'm going to describe to you in

a bit more detail what is actually being added in the north at the Keewatinoow converter station. So there will be, in addition to the converter, which is the Bipole III converter here, which for this reliability project would be rated 2,000 megawatts, we need to build several 230 kV lines, in fact five, in order to tie that station at Keewatinoow into the existing collector system. There will be a line, 230 kV line from Limestone to Keewatinoow, some 52 kilometres in length. And when I quote these numbers, these are kind of typical numbers. Ultimate routing and stuff may vary and change the distances somewhat. And the four Henday station to Keewatinoow, 230 kV lines of approximately 27 kilometres in length each. This transmission is required so that in the event of losing Bipole I and II, we can move up to 2,000 megawatts of power into this Bipole III station.

On the receiving end at Riel, of course there will be a complimentary 2,000 megawatt Bipole III converter which on the receiving end, I think as Mr. Neufeld pointed out, often referred to as an inverter. I need to point out in this particular case that the facilities at

Riel associated with these lines in this station bus are being provided under the Riel sectionalization project. Right at the end of my presentation, I'll talk about them in a little bit more detail.

But with Bipole III, the proposal is to tie in two more 230 kV lines into the station at Riel. And we referred to that as sectionalizing, which I'll talk about a bit more in this presentation.

So what I want to try and do now is to describe to you at a fairly high level what is HVDC, what is in a converter station. So we'll provide some explanation and then go into some of the functions of some of the equipment as I go through this.

Initially, the sending in, or Keewatinoow station, I think has been mentioned, will have plus 500 kV and minus 500 kV. What this diagram shows is a typical bipole system. By that, I mean there is a positive pole of 500 kV and then a negative pole on the bottom half of minus 500 kV. So there's a million volts across that system.

In the converter itself, these symbols

represent the converter valves and the converter transformer. And there's typically something we talked about as valves. The generation that's fed into this converter, other equipment that's associated with this converter system are things called AC filters, DC filters, smoothing reactors. And I'll talk about those in a little bit more detail as I go through and try and keep it at a level of describing the function of some of those pieces of equipment.

So the receiving end at Riel is essentially quite similar in terms of the components at Riel and Manitoba system. We also have some machines that Mr. Tymofichuk mentioned called synchronous condensers and we'll get to those as well. And then there's the DC line and the ground electrode and the electrode lines, and we'll describe each of those in some detail.

So in the converter station, there is a picture of what some of the equipment looks like. The converter valves are housed in the building, usually called the valve hall, and I think at Dorsey -- this is at Henday. So there's the one valve hall at Dorsey. Mr. Tymofichuk pointed out there is a Bipole I and II valve hall.

Here is some of the filtering equipment. And here in the background, it's more difficult to see what is there.

But what you need to kind of be aware of again is that this again is the station bus and we'll discuss it in some more detail. But again, the valves and the converter transformers are all terms that you need to keep in mind.

On the HVDC line itself, it is mentioned there is two conducters, two what we call pole conductors, the positive pole and the negative pole. And these conductors have been said consist of typically two subconductors. So here is a picture of the insulated string off of that tower and the two subconductors that make up the pole conductor for, I'm not sure if this is Bipole I or II. They are both similar in look.

The Bipole III conductor will look a little bit different. It will be a triple bundle rather than a double bundle. So each pole will have three subconductors. There is a picture of the spacer, or the one on the back table there is a straight line. This will be, with three conductors, of course a bit different.

What the purpose of these

subconductors is to make that one pole conductor look bigger. There is an equivalent radius that you can't achieve by building one single piece of wire. And we do that for many things, to reduce the electric magnetic field effects and the gradient electric voltage gradients on the conductor surface which cause things like corona which I'm sure everybody has walked underneath a transmission line, especially when it's damp and heard the crackling, the design has a lot to do with the amount of corona you lose on the line, et cetera.

The other feature of the transmission line we haven't talked a lot about today is the shield wire. If I can just go back. On the top of this tower, there is a shield wire that's installed typically to provide lightning protection. On Bipole III, it's going to have a second function, and that will be communication. Again this is maybe not too clear but this is the insulator string and that is the pole conductor plus 500 kV or minus 500 kV. This is the shield wire. And within the shield wire core for the Bipole III line, there will be a fibre optic cable for communications. So this communication will be

used for protection and control and general communication between the sending and receiving ends.

The electrode line, there's one at either end. The line itself has a purpose of connecting the ground electrode located at some remote distance to the electrode site itself. And this is a picture of the electrode site at Dorsey. As I said, it provides a ground reference for the DC system. The electrode is buried. It's usually a circuit of configuration. Site size is approximately a square mile. One of the essential requirements is to keep the soil moist. And so ground water availability is important when you're siting it. It's all low potential, perfectly safe for humans and animals that would be anywhere near it. And typically, it's also separated from other infrastructure like pipelines and rail lines and stuff so we don't get an induced current flowing in those other infrastructure.

I'll show you some slides a bit later on the actual functioning of the ground electrode that would be proposed for Bipole III.

What I'm going to attempt to do here, and there won't be a test on this, but try to

explain a bit in some high level what happens inside a converter that converts AC to DC or DC to AC. On the left side here, in North America, all your power is 60 cycles per second. If we go back to our mathematics, in my time it's high school Mathematics. I think now it's probably grade school. But we have a sign wave that typically is positive for half a cycle and then reverts negative. And this happens 60 times every second.

What you see here is the DC current on the right. This is the voltage that's being fed into the converter. And in a three-phase system, there's three of these voltages offset by 120 degrees. So if you want to think of it, these are the thyristor valves and you can think of them as simple switches. When we turn them on, current flows. So if I turn on this switch, when the voltage is positive in phase, I get some current flowing through thyristor and it ends up on the DC line. And if I turn the second one on, they turn on in a particular sequence and they are turned off when the voltage hits zero. If I turn them on in a particular sequence, I can generate little pieces of current from the AC side current to appear on the DC side. So eventually I generate a

DC current or the DC voltage quite similar. And it looks a bit wavy and that's the purpose of filters that I'll talk about in a subsequent slide.

So in a very high level nutshell, not totally technically correct but that's the function of conversion and what happens.

So we talked a little bit about the AC switchyard components. The function of the AC switchyard, I described the station bus and the circuit breakers that are used to terminate transmission lines from the transmission system, also terminate the lines from generating stations, the harmonic filters, converter transformers. You can think of the station bus typically similar to your household panel. If you take the front cover off, you'll see a couple of bus bars at 120 volts a piece and 240-volts across into those bus bars which is the power supply, the generation in your house. You'll have circuit breakers that feed various appliances, lights, stove, fridge, dryer, in the house. You will also see bare copper wire tied to a ground rod. If you grew up on a farm like I did, as kids we always just like to pull out the ground rods, but that didn't turn out to

be a good idea once I learned what they were for. Or in most cities, you'll see the grounding tied to your water pipes which is a good ground source. And that is provided for safety to keep the potential on the panels from floating up to unknown voltages.

Other converter components are the filters. This is a picture of the Radisson filters and filters consist of reactors or coils. And in this case, you know, they are large in size and capacitors and they are stacked in series to get ratings. What these devices do is we tune them to provide a low resistance pap to ground so that all the harmonic currents will be filtered out of the system into ground. It's not unlike water trying to flow over the path of least resistance, so do the harmonics. If you provide a path at the frequency of the harmonic, it will tend to flow, whereas the 60 hertz will not flow down that path. So that's the function of a filter.

If I didn't mention it, I think harmonics are multiples of 60 hertz, conversion process generates harmonics, fifth and seventh, eleventh and depending on the process, higher

harmonic frequencies. And so we need to get rid of those.

The other function of the filters is that they provide some reactive power. Converters, at least the Bipole I and II converters in particular, they consume reactive power. Well, what is reactive power? Reactive power is imaginary power. As engineers, we used to call that the foam on top of the beer. You really can't drink it but it makes it taste good.

The other way of looking at it is if you're pushing a wagon up a ramp and unless you're pushing it, there's two forces, one vertical and one in the horizontal direction moving the device up the ramp. And the real work that's being done is moving in the forward direction. The vertical direction is work that's really not of much use, if your only objective is to get that device over onto the top of the ramp.

So I'm not sure if that syncs with you. But those are two versions of what reactive power is. And in power systems, we can't talk about electricity without talking about real and imaginary power.

The converter transformers have been

mentioned on several occasions. This is a picture of the Bipole II converter transformer. And it's an interface, as I have showed you in the earlier picture between the AC system and the thyristor valves. So the AC power comes into the transformer and it's connected with the thyristor valves in such a manner that when we turn them on and off, we end up with DC current on the DC side. The transformer is a specialized device, it must be designed to withstand the DC voltage stresses on the DC side of the transformer and the AC harmonic currents which add additional current. It's a device that contains a lot of oil for insulating and cooling and this is one of the -- this is true in the AC or DC systems. And Manitoba Hydro provides oil containment and capture systems for all such devices that contain a lot of oil. So in the event of a spill, the oil is contained and recaptured.

The converter valves themselves, I think you have seen a picture in one of them in Mr. Tymofichuk's presentation. The valve component themselves is made up of numerous thyristors. Each of the thyristors is connected in series, so there's hundreds of them in each

valve. And Mr. Neufeld has a sample of a thyristor over here.

MR. NEUFELD: Mr. Chairman, may I interject?

THE CHAIRMAN: Yes.

MR. NEUFELD: Thank you. So Mr. Mazur has spoken about thyristors and how thyristors are used in valve groups. I have here in my hand a thyristor. I will pass this around once I finish my explanation. What you see here are two terminals. These two terminals will allow this device to allow electricity to pass through. It's no longer functional but it's good for a demonstration to get a sense of the size of this type of device. And it's computer controlled for chopping either the AC, when we shift to DC, or at the southern converter, DC moving to AC. So its purpose in life at the right time is to chop up the wave forms. This device is worth about $2,500 and there are thousands of these in each converter station. These form part of a valve group. I'll pass this around.

MR. MAZUR: So in this particular picture, this thyristor you see here has got a piece of wire and that actually is a light guide.

Some of these thyristors are triggered by light to turn them on. I have talked about those on/off switches. Others are triggered electrically. So most of these converter valves are 12 pulse bridges and they contain a lot of thyristors in series to get the rating. Each valve is typically designed for each project. But one of the things the designers do is they try and maximize the current rating of each thyristor. I believe that thyristor there actually carries about 2,000 amps if I'm not mistaken. I'm not 100 percent sure where that one comes from. I think it comes from Thompson. And I think it was mentioned earlier they are contained in a valve hall.

Just of interest here, as you can see in this particular picture, the height above ground because these valves are at high potential and they need to be isolated from the ground.

So I promised I'd talk a little bit about LCC and VSC. We like using shortcut forms to describe these things. But LCC is line commutated converter. It's the type of technology that's used in Bipole I and II. It's a very known technology, it's been around for a long time. And Manitoba Hydro has a lot of expertise in

application of line commutated converters.

There is a new technology called the voltage source converter and it has a lot of appealing benefits. We haven't talked a lot about the Manitoba system in terms of applying HVDC but Manitoba Hydro's system is often referred to as a weak AC system that can be looked at in a couple of different ways. As has been stated, most of our generation is remote. We have some generation in Southern Manitoba on the Winnipeg River and a little bit of Brandon which, because it's durable, it isn't always running. And Grand Rapids, for example, which is again quite a distance. So what that says is that there's very little inertia in the southern system. Most of it is isolated by the DC system on the Nelson River.

You have the ability to control the active and reactive power and hopefully after my lesson, reactive power will have a little bit of meaning. We can black start it, which means we can actually start it from a black system whereas existing DC, you have to be able to start up a generator and energize some piece of the system and provide a voltage source before you can get the converter going.

The other advantage is it does not require synchronous condensers. And I have a slide on synchronous condensers. But this technology would not require the use of these machines. But like all new technology, it's evolving. It hasn't been widespread, applications are minimal. So it's got new challenges. And one of them is DC line fault clearing. It takes longer to clear a fault on the DC line.

Manitoba has been evaluating this technology and we have a lot of information but we made a decision some months back that we really want to get tender prices rather than design level prices and performance specs before we choose the technology. So that will happen sometimes after we get the licence after we have issued the request for proposal for the converters.

To get back to some of the other components in the converter. We talk about smoothing reactors. Again, smoothing reactors are coils and they are the devices that typically are used to get rid of that DC ripple in the slide that I showed you earlier. And they kind of work to some extent like a shock absorber. You get a ripple and/or sudden changes in input. And on the

output, you get a smoother output. So it gets rid of some of the noise in the DC current. It also limits the line fault currents because in the same way, if you get a sudden power surge from a lighting hit on the line, it will reduce the shape, the slope or the wave front that's coming in which could destroy your equipment. So it has multi functions.

I just might point out that these devices are not small. If you notice the height of the workmen, they are pretty much dwarfed by the size of the equipment, which again is part of the complexity and the time it takes to install, fix, repair.

Similarly, we talked about AC filters. On the DC line, there's DC filters. And again, they are designed with coils or reactors and capacitors. And they are tuned so that they provide a low impedance back to ground for harmonic currents that might be flowing on the line. And harmonic currents are created by the multiples of 60 hertz and created by the conversion process. These currents can cause interference with adjacent telephone communication system. So it's important to be able to remove

them from the DC line.

The infamous synchronous condensers. The synchronous condenser is essentially a generator without the prime mover or the driver. And its purpose is to provide reactive power to the converters, and that the guided Bipole I and II with the line commutated conversion. So there's the machine and then there's the transformer as they are connected. The machines are connected to the system via step-up transformer, not unlike all the generators. Generators are producing power at I think 13 kV and connected to the system at 230 kV. Similarly for the condensers.

They provide inertia to maintain acceptable system frequency. I mentioned that most of our generation in Southern Manitoba is remote so we have very little inertia which means that any time there's a sudden change in power, the frequency in our system which we want to have at 60 hertz can move very quickly. And so inertia is an important aspect to the performance of the system.

The other thing that the condenser provides is it's a voltage control device. And

just like a generator which controls the voltage it also controls the voltage at the AC and DC interface.

Now I'd like to talk a little bit about the DC line design itself. The line is designed, consideration of three types of load. There's reliability loads, in other words, based on weather data. So in the Bipole III line, there are two zones defined, a northern and a southern zone. And the line is designed to withstand certain wind speeds. And they are shown here, just 107 kilometres per hour and 93 kilometres per hour. It's also designed for certain ice thickness. And in southern zones, it's 33 millimeters, which is about an inch and a half, and about an inch in the northern zone. And it's also designed for different combinations of ice and wind. It's also designed for security loads. So what that means is that there's anti-cascading towers or dead-end towers provided at about five kilometre intervals. This is kind of preliminary, maybe five to 10 kilometres in some case, some areas may be a little bit more. But the purpose is that we try and limit the amount of line that would be taken down if a tower is lost in that

particular section of the line.

There's also safety loads for construction and maintenance work. So the tower has to have some inherent strength, you know, to provide safe operation and maintenance.

So typically, in today's world, this type of design is referred to as a reliability level two and that we expect a failure every 150 years based on the weather selected loads. As a comparison, and you can't compare it directly because the Bipole I and II lines and a lot of the lines in our system were designed on different principles, but the equivalent type of return period for failure would be somewhere in the 50 year range. So the Bipole III line is designed to the current type of standards.

The conductor itself is required to carry 2,000 amps normally. I think typically there will be some overload capability. You saw this picture earlier. So the minimum conductor diameter is about 37 millimeters, and this is preliminary. But each conductor, each pole conductor for Bipole III will consist of three of these subconductors. Each one of them is 37 millimeters. It's a three-bundle

configuration. So in order to when you put that much conductor up, the thermal capacity of that pole will be about 4,500 amps. That doesn't mean we're going to run it at 4,500 amps. The point here is that in order to achieve minimum losses, to reduce flashovers, we need to create a reduction in the electric field gradient on these conductors. So you need this bundle and then you also need basically just strength of wire strung between the towers.

So after all that consideration, you have to put up a lot more aluminum, so to speak, than you actually can use, especially for long-distance lines. And this is typical of all high voltage lines.

The line is optimized based on sag and clearance, conductor cost, tower cost and tower design.

So there are essentially going to be two tower types planned for the Bipole III line. In the south zone, there will be self-supporting four-legged towers. This is chosen to reduce some of the impact on farming practices. They are more expensive, but they aren't quite as obtrusive on land use as the guyed towers. The guyed towers

are better suited for soil conditions, permafrost, because it allows -- where you expect all the foundations to move. They are less costly.

There will be two types of towers, tangent towers for straight line sections and angle towers where anytime the line route takes a turn.

So, I mentioned earlier the reliability level is going to be planned for a 150 year return period based on the expected weather conditions. This is the level that is now recommended in standards for all overhead lines about 230 kV.

We will apply a reliability level of 500 year return period in sections of the Bipole III within 50 kilometres of Bipole I and II. Our studies have told us that the risk of losing all three bipoles increases exponentially any time you get within 50 kilometres. So there's about 340 kilometres of line in various areas that would meet that criteria. So that is one of the things we are proposing to do.

I have a couple of slides here showing some typical dimensions and what some of these towers may look like. The self-supporting tower

is in the order of 50 metres, 50 to 55 metres in height from base to tip, about 13.6 or 14 metres wide. Of interest is, the insulated string you may have not been able to judge in some of the previous pictures, is in the order of five and a half metres. And the conductor at the insulator is about 40 metres, 42 metres above ground. Mid-span, because conductors as they heat up sag and could be a sag maximum of about 20 metres. Similarly, the guyed tower is, you know, will be of similar height and width. The base width of the guys will depend a lot on the conditions at the location. For the self-supporting towers, the footprint at the bottom is about 64 metres squared. I think that was mentioned by Mr. Tymofichuk earlier.

So there's two types of self-supporting towers. One type referred to is a tangent type which is in-line suspension tower. And the dimensions are similar to the previous slide. The second type of suspension tower allows for some line angle where there is a slight turn. And then the heavier towers are dead-end towers where the line requires a sufficient change in direction. And again, they are all in the 40, 50

plus height, depending on the location.

The family of guyed towers, similar, there are suspension towers and then the dead-end tower which is virtually a three-structured type of tower. And those will be located in the north portion of the line.

I wouldn't be talking about DC without trying to explain a little bit more about the ground electrode and the function. The ground electrode was mentioned earlier. It defines the system voltage by providing a reference to earth. So this is the pole converter. This is the positive pole, here is the negative pole at Keewatinoow and the point in between them is the ground point.

So in operation, when we are in Bipole operation, you will have 2,000 amps flowing from Keewatinoow to Riel, going through into the negative pole and return current of 2,000 amps going back to Keewatinoow.

It's important that this reference voltage be provided for insulation coordination. It's important for designing the insulation. It's also important for over-voltage protection. And so as I said, this operation that you see on the

screen is referred to as a bipolar operation. There's minimal ground current flowing through from one earth electrode between Keewatinoow and Riel. There will be some current just on balance, just from the ability of the control system and the measuring systems to make it exactly zero.

So what happens when we lose a pole conductor? If one of these conductors has a break. What happens immediately is that we go into monopolar operations. So only one pole is operational, it's monopolar operation. We see a current of 2,000 amps going from Keewatinoow to Riel. Now you have half the power. I think that I did mention it in the previous slide, we had 2,000 megawatts, we've got half the power. And the return path is through the ground electrode from Riel back to Keewatinoow. This type of operation would have to exist until we can restore the failed line or there may be limitations in the ability. If you run the ground electrode and the moisture content is inadequate, that would limit the amount of operation.

The second path or event that can happen is we can lose the converter. So if we lose one of the converters, what immediately

happens is similar to loss of the line itself. We get a current flowing from Keewatinoow to Riel and back through the ground back to Keewatinoow. So that's the circuit path. So there's a temporary current path until a metallic return is established.

Through Bipole III, the plan would be to now have a switch here because the converter is the failed element, the line or the pole conductor is still usable, we would then switch or transfer this current that was previously flowing through the ground electrode back onto the line. And so we would be running in monopolar mode with metallic return. And we can run this in that mode indefinitely until the converter is restored.

So that's kind of part of the function of the ground electrode.

The last thing I want to describe to you is the Riel reliability improvement project and the Bipole III project. The reliability improvement project is a separate project. What it does is establish a 230 to 500 kV station at Riel. And as mentioned earlier, the Dorsey to Forbes 500 kV line, our international power line that goes to Duluth, Forbes is a substation near

Duluth, is cut open and tied into Riel to establish the 500 to 230 kV station. There will be four transmission lines tying that station into the grid around Winnipeg. Riel is located, as you may have heard, on the east side of Winnipeg just near Deacon's Reservoir.

And so the purpose of that project was to secure the existing import capability. If we had lost the 500 line when we lost the Bipole I and II lines in September of '96, we would have had a significant reduction in import capability somewhere in the order of 300 plus megawatts. And so by reterminating this line into Riel, if Dorsey is lost, we still have the capability to bring in that power.

So what is sectionalization? Sectionalization simply means we have a transmission line that runs from Dorsey to Forbes. And it is running its right-of-way. We established a new station called Riel where we cut the line and terminate each end of the line into the Riel station, creating a new station; essentially creating two lines, one from Dorsey to Riel and the second one from Riel to Forbes.

So in conclusion, I tried to provide

an overview of the project and some of the equipment and the complexity of the equipment within a converter station. You know, define some of the details of the station and its complexity and hopefully provide you an insight of why we need long lead times to restore the DC system Bipole I and II in the event of an outage. And I can't emphasize enough that we need Bipole III for reliability. We need redundancy in our system as has been explained.

So that's the end of my presentation. I'd like to thank you for your attention.

THE CHAIRMAN: Thank you, Mr. Mazur. I think we have a couple of questions of clarification which I suppose, given the complexity of your presentation, only a couple of questions isn't too bad.

I have one. You talked about the security loads anti-cascading towers at more or less five K intervals. What will they be? Is that sort of a heavier duty tower?

MR. MAZUR: Yes, they will be essentially dead-end towers which now are heavier duty. Suspension towers essentially hold up the line and they can't withstand a lot of torsional

forces that would topple the line. So the dead-end towers are stronger towers that if the conductor breaks, it would be designed to withstand the stress of a conductor breaking so that there wouldn't be cascading of towers.

THE CHAIRMAN: Thank you.

MR. GIBBONS: Mr. Mazur, I had a question of clarification. On what I calculate to be slide 27 where you show to be the typical HVDC tower, a footprint is approximately 64 square metres. But I don't see any corresponding information about either the guyed tower that's in the same slide or the four towers on slide 28 and the three towers on slide 29. Would you know off the top of your head what those might be or could we get that information?

MR. MAZUR: Okay. So the guyed tower is basically a single point, so as far as footprint there. But the span of the guys themselves can be considerable. I don't have that on the top of my head unless my colleagues know. But I think we can easily get that information for you.

MR. GIBBONS: For all those types that are specified in those three slides, two of them

are the dead-end towers that you mentioned for example.

MR. MAZUR: Yes.

MR. GIBBONS: Just curious as to what kind of footprint they might have, if it's possible? Even if it's perhaps an average. I know that the guyed wires may differ from one tower to another. So if we can have sort of a ballpark of what would be typical?

MR. MAZUR: For the guyed wires?

MR. GIBBONS: And for the others.

MR. MAZUR: The others would typically be about 64.

MR. GIBBONS: On the slide, they look like they might be broader on the bottom than the others but they aren't much different?

MR. MAZUR: They aren't. And we can confirm that as well.

THE CHAIRMAN: I have one more question, Mr. Mazur. Sort of reviewing all this stuff over the last weeks and months, in respect of the ground electrode, it's a bit of a mystery to me how the current knows what path to follow when it's going underground? How does it not just shoot off in all directions? How does it know to

go back up north?

MR. MAZUR: Well you always have to be able to return energy to where it came from. So it eventually is going to make its way back to the source. The question that's a bit of an unknown is the theory about where does it flow? Does it flow in deep earth or does it flow near the surface? But it has to get back otherwise you don't have a circuit. So the ground is acting as a return wire, so it will get back to the source. It's a question of exactly where it flows.

THE CHAIRMAN: Okay. It's still a mystery but I'll accept it as a mystery. Any other questions?

MR. KAPLAN: I have one. Mr. Mazur, so that I can sleep tonight, I have one question. In the last half an hour, you kept on referring to Bipole II. Did you mean Bipole III?

MR. MAZUR: I think I was referring to some components in Bipole II or Bipole I in some of the pictures but with the intent that a lot of that equipment that's used for Bipole III will be similar.

MR. KAPLAN: Okay.

THE CHAIRMAN: Pat?

MS. MacKAY: In your discussion of voltage source converters, you make the statement that these are suitable for weak AC systems like Manitoba Hydro. What do you mean by weak?

MR. MAZUR: Okay. In a lot of power systems, if you have a lot of generation disbursed with your load, you have what's referred to as a strong system because generators provide inertia, they also provide short circuit. So if you have a fault, there is a lot of fault current available. And that's characteristic of a strong system.

In Manitoba, because most of our generation is remote in the north, isolated by DC, we've got very little generation into the south. So we have no generators. And generators are flywheels.

I grew up on a farm and I tried to start a John Deere tractor with a flywheel and a crank rod, and it's huge. But once you get it moving, you can't stop it. And so generators provide that inertia and fault level.

In Southern Manitoba, we have few generators that are near the load, so we have a lower value of inertia, lower fault level and what the industry terms as a weak system.

THE CHAIRMAN: Thank you, gentlemen, for your presentations this afternoon.

I just note for the benefit of participants and other members of the public that we will not be engaging in any questioning or cross-examination of Manitoba Hydro until after they have completed their presentations which we we expect will be about midday Wednesday, with one exception and that is tomorrow because of the availability of a particular scientist or expert, we will be dealing with EMF tomorrow, electromagnetic fields. Hydro will make a presentation. And then that piece will be open for cross-examination and questioning tomorrow morning. Aside from that, the other cross-examination will begin probably Wednesday afternoon.

Ms. Johnson?

MS. JOHNSON: Yes. We need to get the documents that you are discussing on the record. I will just put them all in one fell swoop here. They will be MH001 to 43 which will include the EIS supplemental information, the IR responses, the TAC responses and the additional information from September 17th as well as the three

presentations today.

(EXHIBIT MH001-043: EIS SUPPLEMENTAL INFORMATION, IR RESPONSES, TAC RESPONSES AND ADDITIONAL INFORMATION FROM SEPTEMBER 17 AND THREE OCTOBER 1, 2012 PRESENTATIONS)

THE CHAIRMAN: Thank you. Any other business we need to conduct today?

So that will bring us to the end of today's hearings. You get a little bit of a bonus, get out of school early. Thank you very much and we will reconvene tomorrow morning at 9:00 a.m.

(Proceedings adjourned at 4:17 p.m.)

OFFICIAL EXAMINER'S CERTIFICATE

I, Debra Kot, a duly appointed Official Examiner in the Province of Manitoba, do hereby certify the foregoing pages are a true and correct transcript of my Stenotype notes as taken by me at the time and place hereinbefore stated.

Debra Kot

Official Examiner, Q.B.