MANITOBA CLEAN ENVIRONMENT COMMISSION

MANITOBA-MINNESOTA TRANSMISSION PROJECT

VOLUME 6

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INDEX OF PROCEEDINGS

INDEX OF EXHIBITS

INDEX OF UNDERTAKINGS

TUESDAY, MAY 16, 2017
UPON COMMENCING AT 9:30 A.M.

THE CHAIRMAN: Good morning, everyone. Welcome to the continuation of our hearings into the Manitoba-Minnesota Transmission Project. We will be moving today to a new presentation on methodology from the Manitoba Hydro team. So they will do a presentation and then we will have the questions afterwards.

So with that, I'll turn it over to Hydro, unless are there any housekeeping matters we need to deal with first?

MS. JOHNSON: I'll have to swear them in first. Could you state your names for the record, please?

MR. HOWELL: Yeah, my name is James Howell.

MS. JOHNSON: Ms. Coughlin is already sworn in on a previous panel.

MS. COUGHLIN: I am, yes.

(Methodolgy Panel sworn)

THE CHAIRMAN: All right, thank you. And we'll move into the presentation then.

MS. COUGHLIN: Thank you and good

morning. So yes, my name is Sarah Coughlin and I'm senior environmental specialist in Licensing and Environmental Assessment at Manitoba Hydro. And yes, you heard from me earlier in the engagement panel.

And joining me today is Jim Howell. He's senior principal of Environmental Services with Stantec. Although I notice on the outline on people's tables, he's labelled as James Howell. He tells me that's his official name.

So today we're going to share some information about the methodology and the approach taken for the Manitoba-Minnesota Transmission Project environmental assessment. So details on the methodology can be found in chapter 7 of the Environmental Impact Statement. And we'll be providing an overview today.

We're going to talk about regulatory requirements, the approach to the assessment, some lessons learned, engagement and Aboriginal traditional knowledge, how we assessed effects, and confidence and monitoring.

So the MMTP EIS was prepared to meet Manitoba's Environment Act, as well as the requirements set out in the National Energy Board filing manual, National Energy Board regulations, and the Canadian Environmental Assessment Act 2012.

And just to get to basics, environmental assessment, simply put, is a process intended to understand the effects of a project on people and the environment. So the assessment process is used to help make decisions about the project. And the approach used to better understand how people and the environment are potentially affected and how to convey decisions about the project were guided by a few key understandings.

So we wanted to learn from past projects and assessments. We wanted to be adaptive and responsive as we heard concerns throughout the process, and not just at the beginning. We wanted to understand perspectives from those included in the First Nations and Metis engagement process and the public engagement process. We used a valued component approach to understand effects to the people and environment, which is the standard approach in Canada. However, we wanted to be clear about what we knew and share information in a way that was understandable to all audiences. We're going to talk to you about how we described a clear pathway of effect, thresholds and criteria, how we used iterative scoping when we were assessing and monitoring as well, and how we recognized linkages throughout the assessment. And we wanted to be considerate of the principles and goals of sustainable development. So I hope this presentation will explain how the above was accomplished.

&&& So guiding the assessment at the onset was the understanding that we wanted to learn from past experiences. So valuable guidance was shared in past CEC reports, through past projects, and we wanted to incorporate this into the assessment. And this slide you'll see is common in many of the presentations that you'll hear throughout this hearing, and we have included those learnings in the assessment process as well. So at the beginning of each engagement and valued component chapter, we discussed how we have learned from the past and how those learnings have influenced the assessment.

So we have included learnings regarding assessment methodology within this presentation, including valued component selection and other scoping practices, and cumulative effects assessment.

So as you heard last week, throughout the assessment, opportunities for engagement were provided to landowners, the public, First Nations, the Dakota people, the Metis, and stakeholders, in order to gather and understand local interests and concerns and obtain feedback for use in the route selection environmental assessment process.

We were broad in our engagement and strove to be adaptive and responsive as concerns were shared throughout the process and not just at the beginning. People and communities who did not participate early in the process, but wanted to get involved later, were invited to participate throughout the assessment.

So we wanted this assessment to be readable and understood by a non-technical audience. So the language in the assessment is intended to be straightforward and we tried to limit the amount of jargon through all of our documents. Plain language documents and visuals were used throughout. And here's a few examples. This is a valued component handout that was provided at engagement events, and this is a poster that was provided to communities who are participating. This is one of the learnings from the Keeyask process is that colourful posters were valued by communities, and so we created these and provided them at First Nation community events. We also provided summaries of details of the project itself.

So different platforms were used to share information in a format preferred by audiences, including sharing details on route information through videos, and using field tours to see areas of concern in person, and sharing concerns and goals over feasts. So much of how this was achieved was shared in both engagement presentations that you have heard previously.

We wanted to demonstrate transparency and decision-making and process. So this doesn't necessarily mean that everyone agreed with all decisions, but the methods on how different perspectives were balanced were shared. So detailed meeting notes were provided, route modifications were shared over multiple rounds of engagement, and the specifics on how we evaluated routes were described, and process decisions in the EIS were made clear through pathway diagrams, like what you see here.

So concerns and values shared through both engagement processes, including self-directed studies completed by First Nations and the MMF, were considered and integrated in the assessment. Six communities provided Aboriginal traditional knowledge or self-directed studies prior to filing of the EIS. So these studies contributed to greater understanding of the study area, they contributed to project design, they helped identify project effects, and they helped in the development of relevant mitigation and monitoring plans.

So assessment authors have indicated where traditional knowledge has been brought forward within each chapter, and much of what we've heard influenced the way in which communities were engaged. So youth and elder involvement was important to some, and field visits and tours were considered important to others. So ongoing and collaborative engagement was preferred.

Feedback contributed to the way or manner in which communities were engaged, and it may not be limited to just the text in the assessment.

So concerns heard prior to filing of the assessment guided what was assessed, and information shared from TK studies completed after the filing of the EIS will be incorporated into the Environmental Protection Plan.

So this slide describes the general process used to assess effects for both project and cumulative effects. So first we sought to understand the existing environment, and understanding the existing environment in which the project will be built helps us to know which components of the environment may be affected by the project. So we sought to understand, not just baseline conditions, but trends that may be occurring in the environment.

So second, the project and cumulative effects were assessed, and Jim's going to describe how we did that in detail in a few moments.

And third, we made conclusions about the effects of the projects and other projects and activities in the project area.

So we were clear about the certainty of those conclusions and if those conclusions would hold true under future climate change scenarios. So we proposed a robust follow-up and monitoring program as well. So today we're going to share with you a discussion on these first three steps of the process, and later on in the hearing you're going to hear in detail more discussion on the follow-up and monitoring program.

So now I'll pass it over to Jim to continue.

MR. HOWELL: Thank you, Sarah. Good morning panel members, ladies and gentlemen.

As Sarah mentioned, my name is Jim Howell. I'm a senior principal with Stantec Consulting in Calgary. And I've been working with Manitoba Hydro on this project for the past three years, working on developing the methodology that we used, and reviewing sections, and also helping with the IR responses.

So what we had to do to begin with, when we were doing the Environmental Assessment, we didn't run willy-nilly and start analyzing everything in the environment. What we had to do first was to do scoping exercises, where we looked at what is the scope of the project, what is the scope of the assessment going to be?

Scoping included understanding the existing environment, listening to concerns and finding out how the perception of people's effects of the project on the environment is going to be, and how the project is interacting with people. We selected our valued environmental components, we identified boundaries within which to carry out the assessment, and established thresholds on determining the impact of, the significance of the effects.

And this process was iterative. And so when we got more information over the course of our Environmental Assessment determination, we got more information from the routing studies that went on, we got more information from the engagement processes that went on, we got more information from engineering design as it progressed, and more information from the various field studies that were carried out. We fine tuned how our assessment was progressing.

So scoping, we have to understand the existing environment, and we have to keep in mind that the existing environment, the way things are today, is a product of cumulative effects from the past and the present activities and projects going on in the area.

So understanding the existing environment, we accomplished that through a number of steps. There was a desktop review when we looked at existing literature to find out the status of environmental components, their distribution, existing plans and strategies that might be in place to manage different environmental components. We considered past effects. So we did look at what's happened to these environmental components over the course of time. What have been the trends and the health of the valued component? What would have been the drivers for a change in the environmental component?

We carried out key person interviews. We distributed questionnaires at the public engagement meetings. We spoke to academics, we spoke to Provincial biologists, and we spoke to the public. And we did get additional information from these engagement outcomes that we had. Because sometimes people come up at an open house or a meeting and they provide us with more specific information around, for the area that they live in, that you don't necessarily find in reports or even when we do our field studies. So we got additional information from that source.

And then, of course, we carried out the field surveys that had been discussed when we talked about routing last week. So we had our wildlife surveys looking at mammals, looking at birds, looking at vegetation surveys. We had heritage resource surveys. So we got more complete information on what was happening in the project area.

So scoping, we used, as Sarah mentioned, a valued component approach. And this is the standard approach in Canada. It's been the approach for the last 25 plus years in environmental assessment, following the publication of the Beanlands and Dunker report back in the '80s. And this approach recognizes that it's not wise, nor is it possible to study everything in the environment, and it doesn't really help us understand what the effects of the project are going to be. So we focus on the important aspects of the environment and those things that are going to be affected by the project.

So valued components were selected. Understanding that this project spans a highly developed prairie environment and a less developed transition zone between the prairie and boreal forest, assessors considered the different aspects of the existing environment in these areas and the components may already be stressed.

Valued components were selected based on the following criteria: They were a broad ecological or human environment component that might be affected by the project; they are a part of the heritage of First Nations and Metis, or a part of their current use for lands and traditional purposes; they are of scientific, historical or archeological importance; and they have been identified as important by stakeholders or in other environmental assessments that have been done in the area.

We address the environmental and socio-economic elements as listed in the National Energy Board Electricity Filing manual from May 2015, and outlined by Provincial guidance and regulatory documents. VCs, or valued components, suggested from the public engagement process and the First Nation and Metis engagement were incorporated into the valued components that we chose. Some of the elements were identified as valued components. And there's the list of the valued components there. We had fish and fish habitat, wildlife and wildlife habitat, vegetation and wetlands, traditional land and resource use, heritage resources, infrastructure and services, employment and economy, agriculture, land and resource use, visual quality, human health risk, and community health and well-being.

Others were identified as pathway components. And the list here shows the pathway components. It doesn't show up that good on the slide I'm afraid, but these were things such as physical and meteorological environment, soils and soil productivity, water quality and quantity, air emissions, greenhouse gas emissions, climate change, the acoustic environment, and EMF and corona discharge. And the pathway components are used when changes to them are ultimately felt by the valued components. So the valued components are the receptors of changes in the pathway components. So if you take a look at taking air emissions, for instance, the receptor of the air emissions would be something like human health risk. So it's the humans that are affected by that. Air by itself doesn't care if it's dirty, it's the receptors that we focus on.

Learning from the Bipole III EIS, we reduced the number of VCs that we looked at from 67 down to the 12 that we have here. So we're able to focus on the important issues that might be affected by the project.

We also identified boundaries. So we had to focus on what were the physical boundaries that we're going to assess these changes in? So the project development area, or the PDA, is used to describe how the area physically disturbed by the project, and includes the right-of-way and the area taken up by the three station modifications, the marshaling yards, the access roads, and the PDA was the same for all of the valued components.

The LAA, or the local assessment area, is the area in which project effects on a valued component are likely to occur. The regional assessment area, or the RAA, is a larger area and is intended to provide context for determining the significance of project effects, and the effects of past, present and future projects on those valued components. So the RAA was the area in which we assess cumulative effects.

Assessment areas vary between valued components to appropriately reflect the extent of the project effects on that component. For instance, the local assessment area for fish and fish habitat is different from the local assessment area for infrastructure and services.

The assessment areas that we defined were large enough to capture the effects of the project, but not so large as to mask the effects of the project by making them so large that any effect to the project would be such a small percentage of that area.

Temporal boundaries as well were chosen, and these looked at project phases such as construction and operation, but we also tailored them to specific valued components where this was applicable. For example, we looked at fish and wildlife life cycles, and we also looked at past temporal boundaries, like what happened over the last 100 to 150 years.

When we talk about the current or present conditions, we refer to what has happened in the last 25 years, or one generation. Now, for traditional lands and resource use, our understanding of current may not be the same as other worldviews. The boundary for past traditional land and resource use information is limited only by the living memory of the people, the traditional knowledge holders who contributed information to our assessment.

Future use, as far as traditional land and resource use goes, refers to the ability of the First Nations and Metis to continue the use of lands and resources for traditional purposes beyond the life of the project.

Thresholds and significance. So prior to assessing the project effects, thresholds for determining significance were established for each valued component. This is often challenging as there are limited thresholds for many of the components assessed. This is common certainly for assessments in Manitoba and for many areas across Canada. So thresholds were developed for all but one of the valued components. And that was the traditional land and resource use, we didn't have thresholds for them.

Without Manitoba specific thresholds, we have used thresholds established in other jurisdictions such as in Alberta or Saskatchewan, and fully recognizing that there might be limits to their applicability here in Manitoba.

For example, Manitoba does not publish limits for the minimum amount of grassland needed to support populations of wildlife. We looked in the literature and saw that there's a guidance document in Ontario called How Much Habitat Is Enough? And so we looked at that and we saw, is that going to be applicable here? The discipline specialists looked at any thresholds from other areas to determine whether they think they're going to be representative of what the situation is here in Manitoba, and we use them.

So following the scoping of figuring out what we were going to look at -- and when we did that, as well, during scoping we had several meetings with the various disciplines where we had what we call story board sessions, where they presented how they were going to go about assessing effects, what their plan is, and how there might be interaction between one discipline and another one. So that people have sort of this idea in mind when they go about to do their work.

So again, when we started assessing project and cumulative effects, it was an iterative process. We revised things, we upgraded things as we got more information, as information came in from different disciplines, and we expanded or altered what we were doing in the field. There might be something that one discipline found in the field and we had to go out and have an extra look at that area.

So assessing the effects, going through steps, we described the existing environment. And as I mentioned earlier, the existing environment, remember, is the product of cumulative effects from the past and present activities in that area, and this is, yeah, to describe how the component has changed over the past 100 to 200 years.

Project components were, and activities were described, and how these components interact with the biophysical and human environment components were identified.

We looked at pathways of effect, or how the effect may occur as a result of project interactions with the environment. So this is sort of the first cut in saying here's what the project effects might be. We identified, when we were looking at pathways of effect, what measurable parameters there were, what were we going to measure about these effects so that we could actually determine if there had been a change, if there had been an environmental effect.

We looked at mitigation to address these effects. And then after mitigation was applied, what are the residual effects? And these were described, and linkages to other valued components were included or described during these studies too.

So the procedure was followed for each valued component. Okay. So we had a consistent approach throughout the assessment of all the valued components. So I'll explain a little bit about these steps after describing, what we did after we described the existing environment specific to each valued component.

So to begin the assessment of the project on the valued components, we first identified the project components and activities that may interact with the valued components. So here we have a list of project components and activities that would interact with our valued components. So we have various components and activities during the construction phase, the right-of-way clearing, access route to the sites, tower construction and stringing, station preparation, station equipment installation, and we also included operation activities as well. So we've got our vegetation management, inspection patrols, station operations, the actual presence of the transmission line, and what happens when it's being operated.

So we took those project activities and we saw what are the pathways of effect from them to affect our valued components?

So we take an example of one of those. Let's look at walking through how pathways of effects affect vegetation and wetlands. And you see that they affect it in a number of ways. Various pathways or project components have pathways that affect fragmentation of intact areas of native vegetation, disturbance to native vegetation, disturbance to wetland function from clearing and surface disturbance, and introduction of invasive species.

Now, with respect to fragmentation effect, large intact patches of vegetation and wetlands are important to the landscape elements as they support wildlife populations and maintain ecosystem functions. Also, there is a public concern about forest fragmentation.

So let's take a look at just the effects on vegetation and wetlands by fragmentation during right-of-way clearing. So we look at those, and the measurement of fragmentation from right-of-way clearing, we need to use a measurable parameter. So what we measured was the number of large intact patches of native vegetation classes. We next considered what mitigation measures could we use to ameliorate the effect.

So we'll just step aside for a minute and talk about mitigation. Mitigation measures, if you remember, are what we use to eliminate, reduce, or control adverse effects so that they're not significant. And mitigative measures could include physical measures put in place intended to reduce effects, such as installing a silt fence, or installing bird diverters as this example here shows. We could reduce the size of the project activity. In the case here, we're reducing the area cleared in close proximity to waterways or limiting new access, or we could undertake activities in a less sensitive location or time period, such as planning construction clearing activities during frozen ground conditions, when effects on underlying vegetation are reduced, and many bird species are mitigated by having flown south for the winter, or scheduling work during non-critical life stages. So you wouldn't do work in streams if it's when the fish are spawning in a certain area, or carrying out some construction in areas when the birds are nesting. So we have to address those.

The flexible nature of a transmission line routing allowed the project team to route the line to reduce effects to people and the environment. And of course, we addressed this, talked about this at length last week.

Adjusting location of transmission line route was a fundamental tool to reduce effects of MMTP on the environment wherever possible.

Some mitigation avoids effects completely, so routing to avoid a sensitive area. Some mitigation reduces the effect but you still have the effect. So we might during frozen ground conditions, carrying out construction at those periods, we reduce rutting and erosion but we might not totally eliminate it. So the effects remaining after mitigation are considered residual effects. And these are the ones that we assess in the Environmental Assessment.

So to go back to our example of the right-of-way clearing causing fragmentation, we use routing as a mitigative measure.

During routing alteration we reduced the effect of fragmentation but not eliminate it, did not eliminate it, so we had a residual effect. And sometimes the residual effects on one valued component also affect another valued component. In our example here we reduced the effects on fragmentation on vegetation and wetlands, but we still resulted in an effect on traditional land resource use because of the fragmentation that occurred.

So how do we characterize the residual effects? We used the list of variables or characterizations that have been common in Canada for characterizing residual effects for some time now. This came out from CEAA guidance, the CEAA agency guidance several years ago. And we looked at direction, magnitude, geographical extent, frequency, duration, reversibility, and ecological or socio-economic context. And most of these are fairly self-explanatory. Maybe a bit more information on ecological or socio-economic context. We looked at the general context or the general characteristics of the area in which the project is located. If we look at the ecological context, is it a pristine area where no development has happened at all, or is it an area where there has been disturbance already?

On the socio-economic side, we looked at, to put it in context, is it an area where the socio-economic effect is going to be low resilience or a high resilience? So, for example, if you are adding workforce to an area and you're going to put increased pressure on the health services there, is there room in the health services with hospital beds, et cetera, right now, that it can absorb these extra people coming in, or are they actually at their limit right now? So we use that to describe the context for the characterization of the environment effect on the VC.

The criteria are described quantitatively wherever possible, and clear descriptions of what is considered high, medium and low are provided for each valued component. And that's the one characteristic that changes the most throughout from valued component to valued component.

The term negligible, as used in the environmental assessment, means that an effect cannot be discerned and characterized by any means and, therefore, no assessment of that effect exists.

Assessing cumulative effects. Cumulative effects are those resulting from the residual effects of past, present and reasonably foreseeable future projects and activities, combined with the contribution of the project's residual effects.

How cumulative effects are assessed is one of the areas where methodologically Manitoba Hydro has learned from past assessments. As I indicated earlier, we actually started addressing cumulative effects when we were talking about the existing environment. So we talked about what have been the cumulative effects since, over the last couple hundred years. These effects are largely the result of settlement in Southern Manitoba. The extent and nature of these past changes were considered for each valued component. Trends and characteristics or conditions of the existing conditions and valued component condition over time were discussed, to recognize that the existing environment isn't necessarily the pristine baseline to which effects are compared. If the thresholds were closely reached or past effects had substantially affected valued component conditions, these effects were described in our assessment. For example, when discussing baseline conditions of moose, low population numbers in the study area were described and the drivers from past changes were discussed. The nature of these past drivers of change that would be affected by the project were also discussed.

The way cumulative effects are described in environmental assessments aren't necessarily the way everyone may think of cumulative effects. The environmental effects of concern to some participants in the engagement process are not necessarily just the project's contribution and the effects of future projects on the existing environment, they are the cumulative effects, some people feel they are the cumulative effects of everything that's happened up until now.

For example, changes in Southern Manitoba over the past 150 years have been quite dramatic.

Here is an image created by Irene Hanuta during her Ph.D. thesis, where she created a map from Land Survey of Canada information in the 1870s. The area south of Winnipeg was just prairie, which is the light coloured area, or forest, the green coloured area in the figure there. Then if we look at the same area again in 1995, you see that most of the area has been converted to cropland, so it's agriculture for the most part there.

Much of the prairie region of Southern Manitoba has changed from a grassland environment to an agriculture environment since settlement over the last century and a half. The cumulative effects of some environmental components in the region would likely be characterized from a predevelopment standpoint as having experienced significant change, for example, those tied to natural environment and aesthetics. We have qualitatively acknowledged overall cumulative effects throughout the Environmental Impact

Statement, and supplemented by quantification of cumulative effects on current conditions, and an analysis of the project's contribution to these cumulative effects.

This discussion is also well-described in a lot of the traditional knowledge reports, where they talk about the change that has occurred over the past century, century and a half.

When we describe the residual effects of the project, we are adding them to the past cumulative effects that define the existing environment. Spatial and temporal boundaries of other current projects are considered. Those that overlap with MMTPs are described and assessed. Also, the effect of future projects are considered. Again, those that are reasonably foreseeable and overlap spatially and temporally with MMTP are assessed.

This was done by bringing forward those project's residual effects that have the potential to interact with residual and environmental effects of other projects, and conducting an analysis very similar to what we did for the project effects. The residual cumulative effects were described. The thresholds used to determine if project effects exceeded a level of concern were also used for cumulative effects. Then an analysis of the project's contribution to the cumulative effects were described. As we discussed, we included qualitative descriptions of the environment prior to settlement for valued components, if that information was available.

I will turn things back to Sarah to continue.

MS. COUGHLIN: Thanks, Jim.

So when contemplating past, present and reasonably foreseeable future projects, we looked at general activities that take place on the landscape, and specific projects. And we wanted to be inclusive in our approach, and included certain perspective and speculative, some speculative projects in our cumulative effects assessment. So some of the general activities considered are listed here, agriculture, residential development, roads, the airports and the floodway, which is fairly specific, recreational activities, domestic and commercial resource use activities, pipelines and transmission lines.

Here is a list of some of the more

specific projects that were considered. I was going to point these out, but I feel like I might be lasering Mr. Nepinak's eyes if I do this.

So I'll start at 12:00 o'clock. We considered the Northwest Winnipeg Natural Gas Project, the Oakbank Corridor, the Richer South Station to Spruce Station Transmission speculative project, which is part of the Energy East Pipeline Project, the Piney Pine Creek Border Airport Expansion, gas upgrade projects, the St. Vital Transmission Complex, the South End Water Treatment Control Centre Upgrade, the St. Norbert Bypass, Bipole III, the Dorsey to Portage Transmission Line, and the Headingley Bypass.

There is a detailed map of this in the figure of the environmental assessment methods chapter.

So the third step of the process, conclusions and prediction confidence, included discussion on determining significance, how we reconsidered conclusions, prediction confidence, and how climate change was considered in the assessment. So I'll describe these.

So when determining significance, the EIS includes a determination of the significance of residual effects. So, in general, significant effects are those that are likely to be of sufficient magnitude, duration, extent or irreversibility to cause a change in that valued component that will alter its state or integrity beyond an acceptable level.

So the significance of project environmental effects was determined using the criteria to describe residual effects, and standards and thresholds that are specific to each valued component that Jim described earlier, and the measurable parameters used to assess the environmental effect.

So there are, as Jim described, few legal or regulatory levels or thresholds set in Manitoba, or really elsewhere in Canada. So professional judgment was also used to determine significance.

So thresholds were not set for traditional land and resource use, as a defined limit or level did not align well with the more holistic approach preferred by those involved in the First Nations and Metis engagement process.

So the judgment shared through other worldviews, including those shared through

Aboriginal traditional knowledge reports, also helped inform significance conclusions, where most shared conclusions that indicated a significant change of the landscape condition over time, as Jim described.

So some traditional knowledge reports or self-directed studies were received after the filing of the Environmental Impact Statement. So information and potentially environmentally sensitive sites will be included in the Environmental Protection Plan. So discipline leads reviewed each of these reports that came in after and reconsidered their original conclusions with this new information that was provided, and their conclusions as a result of this review did not change. So we received a part 2 of the Sagkeeng First Nation report, we received the Dakota Plains Wahpeton First Nations report, we received a draft Dakota Tipi report, and the MMF study report.

So the confidence of predictions was also described in each chapter of the assessment. So the age of data and date availability, the sensitivity of the environment, how well we understood the activities effect in the environment, were all used to describe the certainty of the conclusions made throughout the assessment.

The sensitivity of the conclusion to future climate change was also described. So Manitoba Hydro undertook a historic and future climate change study for the project, which identifies the range of possible changes to climatic parameters. So some of the parameters contemplated were temperature, wind speed and precipitation. So these three future climate change scenarios were considered for 2020, 2050 and 2080, with a 1.5, and a 2.9 or a 4.1 degree increase respectively in temperature. And conditions were described under these scenarios generally, and assessment practitioners were asked to determine if their significance conclusions would change based on these new conclusions or conditions.

So for example, in the vegetation and wetlands chapter, total growing season precipitation is projected to increase by somewhere between 1.5 and 2.8 per cent. However precipitation amounts are predicted to be lower in July, based on the scenarios considered. So potential water deficit for vegetation and wetlands are discussed within the chapter, and of course there's great uncertainty around these predictions, so that uncertainty is also described.

So effects of the environment of the project were also assessed. So potential environmental changes and hazards may include wind and severe precipitation, and ice storms and flooding, and fires, and even earthquakes. So the influence that these environmental changes and hazards may have on the project were predicted and described, as well as the measures taken to avoid potential adverse effects.

So the uncertainty associated with these conclusions and other sources of uncertainty were described in each assessment chapter of the EIS. So with greater uncertainty and less predictability of reports, monitoring approaches proposed to manage that uncertainty.

So this program, like I say, will be described in more detail in a following presentation, but will include discussion on the Construction Environmental Protection Plan, which will describe how we will implement mitigation measures. It will describe the monitoring initiatives, including the environmental monitoring plan, and how we will be adaptive in our follow-up and monitoring program.

So, Manitoba Hydro maintains its own sustainable development policy and complementary principles, based on the principles and guidelines of the sustainable development adopted by the Manitoba Roundtable on the Environment and the Economy. So basically what these principles do is understand that, through our decisions and actions, we endeavour to meet the needs of the present without compromising the ability of future generations to meet their needs.

So an analysis of how the MMTP and the assessment of the project meet both the Provincial guidelines and policies created under their framework for the Sustainable Development Act and the Federal Sustainable Development Act could all be found in chapter 23 of the assessment.

In general, the Sustainable Development requires the integration of social, environmental and economic considerations in their decision-making. And these principles have been incorporated into the project planning, design, construction, and operation of MMTP, as well as in preparation of the EIS.

So with broad engagement, and scientific rigger, and the integration of indigenous knowledge, and the efficient use of resources, and the nature of a transmission line conveying clean hydroelectric electricity, results in low greenhouse gas emissions and the displacement of even further greenhouse gas in other jurisdictions. And finally, the robust routing process that considered environmental, social, and economic considerations in decision-making, make this project meet the principles and goals of sustainable development.

So in the presentations that will follow, the EMF presentation, so the socio-economic and the biophysical presentations, they're all going to describe the following topics. They'll provide an overview, they'll describe what they heard, what they assessed. And Jim and I described in detail today how we assessed. So the presentations won't cover the how in detail. They will continue to describe key findings, they will describe mitigation monitoring and follow-up, and they will present their conclusions. And that concludes our presentation. Thank you.

THE CHAIRMAN: Thank you very much for that presentation. So now we'll turn to the questioning.

Just a little further clarification to my comments yesterday about timing and questioning, keeping in mind we're looking at the overall schedule of the project, trying to be fair to everyone, and yet keep us moving at the same time. I would urge you all -- some of you have, but I would urge all of you to speak to the secretary about time frames for questioning on each presentation. If you can do one or two in advance, that would be good too. It helps our planning a little bit, so that would be great.

Secondly, we have a fallback in the guidelines of 15 minutes, if there's no discussion with the secretary. Obviously for some of you that would be inadequate on particular topics, it may be adequate for others, so if you want to leave it that way you can, of course. Otherwise I'd urge you to speak with the secretary. We'll be reasonable, obviously, in the allocation of time, and it will be more for some groups on some subjects, offset by other groups on other subjects.

I would also remind Hydro in answering the questions, we covered that yesterday as well, that if the answer can't be produced fairly rapidly, if you could take it under advisement and bring it back, even if it's later in the same set of questioning, that would be fine, and probably preferable. So other questions can be asked in the meantime.

All right. With all that as background, we will turn today to I believe it was Manitoba Wildlands, who I believe is not here today, so I will turn to the Southeast Stakeholders Coalition to start us off. Thank you. Sorry, I should have said Mr. Toyne.

MR. TOYNE: Thank you very much, Mr. Chair. Since Mr. Matthewson is not on this panel, I don't have all that many questions, I apologize.

MS. COUGHLIN: No, that's great.

MR. TOYNE: And given that I've asked a significant number of questions of some of the other panels, I suspect from here on in I'll be relatively brief.

So I've got a couple of questions about how this methodology of assessment works in practice. And I appreciate that some of what I'm going to ask can be developed a little bit more with another panel.

So are one or both of the panelists aware of something called the Fournier farm? Is that a phrase that's familiar to one or both of you?

MS. COUGHLIN: Like a particular property?

MR. TOYNE: Yes.

MS. COUGHLIN: Yeah.

MR. TOYNE: Okay. Just so it's clear for those who may not have read through all of the hundreds of IRs that the Coalition delivered, just a little bit northeast of La Broquerie there's a property owned by the Fournier family, and there was a bit of a -- yeah, sort of in between PDA and La Broquerie, there was a bit of an issue that's recently been resolved with respect to whether or not the Fournier farm was accurately described as a centennial farm. So I don't know, sir, if that helps refresh your memory at all?

MR. HOWELL: Yeah, I recall that.

Thank you.

MR. TOYNE: Okay. So let me give you a bit of background on my couple of questions, and then this will all be over fairly quickly.

So Manitoba Hydro initially denied that the Fournier farm was a centennial farm, but then as a result of some of the queries made by the Coalition, Manitoba Hydro eventually admitted that it was a centennial farm. But Manitoba Hydro continues to deny that the centennial farm falls within the LAA, that's the Local Assessment Area. And Manitoba Hydro continues to deny that the Fournier farm falls within the LLA because the actual farm buildings are just outside of the LLA, notwithstanding that the actual real estate of the farm falls, at least in part within the LLA. So that's the background to my question.

So it strikes me that, in theory, the way to properly identify and assess the different effects and impacts that have to be taken into account, they have to be properly labelled, and that they have to actually be properly taken into account. And this is an example of Hydro trying to avoid taking into account an impact on a landowner by mislabeling and then by denying the impact to avoid having to take that impact into account in this very fancy methodology that you've described.

So does that mislabeling of impacts and then denying that they exist, is that a formal part of this methodology, or is that just one example of Manitoba Hydro not following the methodology that you have described this morning?

MS. COUGHLIN: Do you want to share the IR number on that?

MR. TOYNE: The initial IR, so the first time we asked Hydro to confirm that it's a centennial farm was 217. So we then had to ask a second follow-up to get Hydro to confirm the obvious, and that IR is 360.

MS. COUGHLIN: We have a lovely fellow that's coming to talk about heritage resources during the socio-economic presentation, and I'm not trying to dodge the question, but he knows this situation in detail. And I think it might be a better use of everybody's time, rather than to watch us fumble through, to talk to him directly. So can we redirect that question to the socio-ec panel.

MR. TOYNE: I do have specific

questions about why it was Manitoba Hydro denied the obvious for so long, and I will ask those at the appropriate time. But at the more theoretical level that you've described, I'm just trying to figure out, is mislabeling effects one of the ways that Hydro can avoid taking them into account in this assessment process? Like is that part of Hydro's formal approach to environmental assessments, or is this just a one-off, hopefully, or some other --

MS. COUGHLIN: No, that is not part of our formal approach.

MR. TOYNE: All right. So denying sort of obvious impacts so that they don't have to be taken into account in this assessment methodology, is that a formal part of Hydro's approach to environmental assessment, or is that sort of specific to this one particular property?

MR. HOWELL: I think in that case it was a case of misidentification of whether or not it was a Centennial farm. Again, our colleague Mr. McLeod will address the confusion that arose there. And certainly when we define Local Assessment Areas, it's the area in which effects of the project will be felt. So we don't adjust

Local Assessment Areas or Regional Assessment Areas to try to avoid assessing or concluding what the project effect might be.

MR. TOYNE: Right. I wasn't suggesting that Hydro was, you know, either growing or shrinking the boundaries of the LLA to avoid it. What I'm suggesting is that Hydro simply mislabeled something and then refused to admit the obvious about the impact on it, to avoid it being taken into account in the assessment process. So it's a different type of criticism, but I take your point.

Unless the panel has anything else to say about that, I don't have any further questions on this issue.

MS. COUGHLIN: No, I think you have mischaracterized our intent, and I think this question is better addressed to the heritage resource expert.

MR. TOYNE: All right. Mr. Chair, I don't have any further questions for this panel.

THE CHAIRMAN: Thank you very much, Mr. Toyne. That's more than timely actually. Thank you.

Next we'll turn to Dakota Plains

Wahpeton Oyate, Mr. Mills.

MR. MILLS: Good morning, Mr. Chairman. I apologize for being tardy today, I was reading CVs.

We have two questions. You make reference to your inclusion of the ATK studies that you did receive, and we're wondering to what extent you reviewed and understood them? Are you familiar with the -- within the Golder ATK for Dakota Plains there's a, figure 1 was a map that indicated the Dakota traditional territory. This was a document, we understand, originally produced in 1857. Did you review that and understand the ramifications of that map?

MS. COUGHLIN: Yes, I have the map in front of me and we reviewed it when it came in.

MR. MILLS: Okay. Excuse me, I'm just slow scrolling through that report. We just had one other quick question.

The summary 6.0, you reviewed and appreciated the statement that Dakota Plains members had been practising TLU activities in the project area since Dakota people first occupied the land, probably prior to 1200 A.D.?

MS. COUGHLIN: Sorry, which line are

you referring to? I've got the section opened up here.

MR. MILLS: I'm in the summary, I believe it's page 17.

MS. COUGHLIN: Yeah, I'm there. I'm just wondering which exact line. I don't see those words specifically.

MR. MILLS: 6.0 summary, it confirms and concludes the Dakota Plains Wahpeton Nation members have been practising TLU activities in the project area since the Dakota people first occupied this region prior to 1200 A.D.

MS. COUGHLIN: In a general sense that wording is generally included, that's not the exact text but...

MR. MILLS: But you came upon it and you included it?

MS. COUGHLIN: Yes.

MR. MILLS: Thank you. Those are all my questions.

THE CHAIRMAN: Thank you very much, Mr. Mills, for another very timely presentation or questioning. Thank you.

Next we'll turn to the Consumers Association of Canada, Ms. Pastora Sala.

MS. PASTORA SALA: Good morning, Mr. Chair, members of the panel, I believe I have approximately half an hour of questions, give or take 10 minutes. Would that be okay?

THE CHAIRMAN: That's what I have noted, yes.

MS. PASTORA SALA: Thank you. Good morning, Mr. Howell and Ms. Coughlin.

MS. COUGHLIN: Good morning.

MS. PASTORA SALA: I will take turns asking each of you questions. I will try to address you when I'm asking you a question. But if I'm asking the wrong person, please feel free to correct me.

And so, Ms. Coughlin, you are an environmental specialist in the major projects assessment and licensing at Manitoba Hydro; correct?

MS. COUGHLIN: I am in the licensing and environmental assessment group and transmission.

MS. PASTORA SALA: And transmission, sorry. And you're a member of the International Association for Impact Assessment?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And would it be fair to assume that through your work and your affiliation with the IAIA, you are familiar with the general themes and the literature on cumulative effects in Canada?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And Mr. Howell, you are the senior principal at Stantec; correct?

MR. HOWELL: I am a senior principal at Stantec.

MS. PASTORA SALA: Pardon me, a senior principal at Stantec. And it would be fair to say that you are also, based on your position at Stantec, generally familiar with the themes in the literature on cumulative effects?

MR. HOWELL: I am, yes.

MS. PASTORA SALA: So Ms. Coughlin, I'm going to start with a few questions for you. Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future actions. Would you agree with that?

MS. COUGHLIN: I agree.

MS. PASTORA SALA: Similarly, Manitoba Hydro has defined cumulative effects at page 7-20 of the MMTP EIS, as those resulting from the residual effects of past, present and reasonable foreseeable future projects and activities, combined with the contribution of the project's residual effects; correct?

MS. COUGHLIN: Yes, that sounds like our definition.

MS. PASTORA SALA: And you would agree that cumulative effects are also often referred to as death by a thousand cuts, or tyranny of small decisions?

MS. COUGHLIN: That's right, yes.

MS. PASTORA SALA: And often cumulative effects are unintentional, but can result in conditions that are neither optimal, nor desirable?

MS. COUGHLIN: I agree.

MS. PASTORA SALA: Given Manitoba Hydro has committed to learning from past projects, I assume you are familiar with the work of Drs. Brown, Noble, and Jill Blakley, or formerly Jill Gunn.

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And Manitoba Hydro is aware that Drs. Noble and Blakley are leading experts on cumulative effects in Canada and also internationally well known?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And you would be aware that Drs. Noble and Blakley were retained by CAC Manitoba and provided evidence to the Clean Environment Commission on cumulative effects in both Bipole III and Keeyask hearings?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: In the EIS for the MMTP, Manitoba Hydro indicates on several occasions that it has learned from past projects and builds in improvements where possible; correct?

MS. COUGHLIN: That's correct.

MS. PASTORA SALA: And as mentioned during Mr. Howell's presentation, one of the areas Manitoba Hydro has stated it has learned from past projects has been cumulative effects?

MS. COUGHLIN: That's correct.

MS. PASTORA SALA: And another has been the development of the Environmental Protection Plan?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: Mr. Howell, during

your presentation you mentioned speaking with academics. Did you speak with any academics with an expertise in cumulative effects in preparation for your work?

MR. HOWELL: I spoke to some academic related people that I work with, that are cumulative effects specialists, such as Mr. Hegmann, that has appeared before the other hearings.

MS. PASTORA SALA: So Mr. George Hegmann was consulted with respect to the cumulative effects relating to the MMTP project?

MR. HOWELL: Oh, yes.

MS. PASTORA SALA: Thank you.

Ms. Coughlin, did Manitoba Hydro specifically retain any cumulative effects experts for the MMTP?

MS. COUGHLIN: Yes, Jim Howell, right here.

MS. PASTORA SALA: Mr. Howell, have you had any publications on cumulative effects?

MR. HOWELL: No, I have not.

MS. COUGHLIN: Also, George Hegmann is at Stantec, who has had publications.

MS. PASTORA SALA: Thank you.

And Mr. Howell and Ms. Coughlin, you would have reviewed the recommendations of the CEC relating to cumulative effects in past hearings, such as Bipole III Transmission Line and the Keeyask Generation Project?

MR. HOWELL: Yes, we have.

MS. COUGHLIN: Yes, we have.

MS. PASTORA SALA: Thank you. Sorry, I need you to confirm for the monitor.

We will come back to these recommendations, but first I'd like to have a brief discussion with Ms. Coughlin on some basic principles relating to cumulative effects and monitoring and follow up.

So Ms. Coughlin, would it be accurate to say that the MMTP EIS does not identify a definition for uncertainty?

MS. COUGHLIN: We may not have. Is it not in the glossary? In the interest of speeding up this process, I would go right now and check in the glossary. Is it not in there? Are you pulling from the glossary?

MS. PASTORA SALA: Yes.

MS. COUGHLIN: Okay. So I guess it might not be defined.

MS. PASTORA SALA: For the purposes of the following question, I will use a plain language definition of uncertainty, which has been provided to Manitoba Hydro and the CEC in previous hearings by Drs. Patricia Fitzpatrick and Alan Diduck, and that definition is by former United States Secretary of Defense, Donald Rumsfeld, who stated:

"There are known knowns, there are things we know that we know. There are known unknowns. That is to say, there are things we know now that we don't know. But there are also unknown unknowns. There are things we know we don't know."

I just want to say for the record, I have heard Dr. Patricia Fitzpatrick say that a number of times and I didn't realize how difficult it was to say.

Would you agree with that definition, Ms. Coughlin?

MS. COUGHLIN: Yes, I've heard that definition.

MS. PASTORA SALA: Would you agree that uncertainty is inherent to resource management?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: Would you agree that uncertainty in resource management stems from several sources, such as a variability in the natural environment?

MS. COUGHLIN: Yes. Uncertainty stems, or uncertainty originates in many fields of study, it's not just inherent to natural resource management.

MS. PASTORA SALA: Yeah, sorry, I'm just focusing on resource management for now.

And so you'd agree that uncertainty can stem from variability in the natural environment. And what about human impacts on the environment?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: A lack of knowledge about how ecosystems are managed?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: Multiple social and political goals which impact resource management at any given time?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: Imperfect sampling

and modeling techniques, among others?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And you would also agree that despite certain levels of uncertainty, many development projects must proceed?

MS. COUGHLIN: Yes, using what we call is the precautionary approach, which is an approach that we've adopted.

MS. PASTORA SALA: Yes, and you have almost anticipated my next question.
Ms. Coughlin. I was going to ask you whether Manitoba Hydro would be aware that there are some methods and systems in resource management for dealing with uncertainty?

MS. COUGHLIN: Yes, I am aware.

MS. PASTORA SALA: And some of those ways, in addition to what you've already mentioned, is to explicitly identify the areas of uncertainty?

MS. COUGHLIN: Yes, we have identified many areas of uncertainty through chapters and the Environmental Assessment.

MS. PASTORA SALA: And another is to explicitly identify a plan to address those uncertainties?

MS. COUGHLIN: Yes, we have identified robust follow-up and monitoring program.

MS. PASTORA SALA: And another is to monitor potential impacts of the development of those certain uncertain elements?

MS. COUGHLIN: That's what I have just said.

MS. PASTORA SALA: Ms. Coughlin, would it be correct to say that uncertainty was not explicitly identified in the EIS as one of the factors used for the selection of valued components?

MS. COUGHLIN: No, I disagree with that. Where there's no information, that is something that we contemplated. In fact, that's something that was contemplated quite substantially by the Manitoba Metis Federation. So they had a discussion on whether or not information was available for the Metis specific interests that they considered.

MS. PASTORA SALA: Can you point specifically in the EIS where uncertainty is explicitly identified as one of the factors used for the selection of the valued components? It was not excluded -- pardon me, it was not included in one of the elements in table 7-1, which identifies the rationale for including VCs.

MS. COUGHLIN: It may not have been listed as one of the rationales for included VCs.

MS. PASTORA SALA: So it was not explicitly identified in the EIS?

MS. COUGHLIN: That could be true.

MS. PASTORA SALA: Ms. Coughlin, would you agree that follow-up and monitoring is important too if we're dealing with uncertainties in environmental management?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And would you agree that employing adaptive management in follow-up and monitoring is important for managing uncertainties in environmental management?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: I'm now moving to a discussion on cumulative effects.

Would it be accurate to say that the construction of the MMTP will be affecting a variety of lands in Manitoba, including areas where there are existing corridors, areas being used for agriculture, rural residential and Crown lands?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: But overall the project is located in an area that has experienced substantial and ongoing landscape changes?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And it has been considerably disturbed by past and present physical activities?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And as stated earlier by Mr. Howell, it is located in a highly developed prairie environment?

MS. COUGHLIN: That's correct.

MS. PASTORA SALA: Earlier in the discussion I indicated that we would be coming back to the CEC recommendations from past projects. So Ms. Coughlin, would it be fair to assume that you're aware of CEC, the CEC reports on Bipole III and the non-licensing recommendation 11.1, which states -- would you like me to give you a moment to get it?

MS. COUGHLIN: Do you want to read it while Brett's grabbing it?

MS. PASTORA SALA: "Manitoba Hydro
implement a cumulative effects

assessment approach that goes beyond
the minimal standards of the 1999 CEAA
guidelines and is more in line with
current best practices."

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And that at minimum -- you know what, I don't need to go there. It does go further but I won't read the rest.

And in terms of the best practices for cumulative effects assessment methodology, Manitoba Hydro would be aware that it typically unfolds in four stages: First being scoping, the second being retrospective analysis, the third being prospective analysis, and the fourth being management of significant adverse cumulative effects?

MS. COUGHLIN: I believe that's how Gunn and Noble describe it, yes.

MS. PASTORA SALA: And in addition to Drs. Blakley and Noble, similar standards are established in the literature and good practice CEAA guidance, which is relied upon by Manitoba Hydro?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And in the absence of any of these components of the criteria, a CEAA, a Cumulative Effects Assessment is incomplete?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And so I will be going through some of these essential components of Cumulative Effects Assessment, and I will be asking you whether or not you agree with the description I am providing.

MS. COUGHLIN: Okay.

MS. PASTORA SALA: Is it consistent with your understanding that the cumulative effects scoping elements determines that it will be included and what will be excluded from the assessment?

MS. COUGHLIN: So just to contextualize the assessment, it included contributions from a variety of indigenous communities and organizations. And so information included in those reports was not necessarily dictated by the scoping practice that you are referring to. So information and content in those documents is a valuable component of the Environmental Assessment and has been included within VEC chapters, and wasn't necessarily part of that initial scoping process.

MS. PASTORA SALA: So Ms. Coughlin, I'm just asking you to agree with basic principles of cumulative effects. And I have just said that scoping determines what's included and excluded in the assessment?

MS. COUGHLIN: That's right. And I'm saying that in the scoping portion of our assessment, it didn't necessarily exclude what communities wanted to include in their traditional knowledge studies. So it wasn't entirely exclusive, as you're describing it.

MS. PASTORA SALA: I'm going to put it another way. The scoping exercise can identify also which other projects and actions, past, present and future, will be included when evaluating a project's contribution to cumulative effects. Could you agree with that?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: In terms of scoping for MMTP, would it be accurate to say that the effects of other projects or disturbances was not consistently and explicitly considered as a rationale for the inclusion of VCs in the EIS for

MMTP?

MS. COUGHLIN: I would disagree with that.

MS. PASTORA SALA: Why?

MS. COUGHLIN: So you're saying, did we not include VCs based on what future projects there might be? Could you rephrase your question I guess?

MS. PASTORA SALA: So the effects of other projects or disturbances was not consistently and explicitly considered as rationale for including a VC in the EIS?

MR. HOWELL: We included as VCs any aspects of the project that might overlap, either spatially or temporally, with other future projects.

MS. COUGHLIN: So a good example of that is when we talk about fragmentation and intactness in vegetation and wetlands, where we go quite beyond the project area to describe characteristics of that condition.

MS. PASTORA SALA: Thank you. And Ms. Coughlin, would you agree that, in terms of the retrospective analysis, it focuses on determining baseline conditions, how conditions have changed over time, whether that change is significant to this sustainability of the environmental components of concern, and whether and how that change is attributed or connected to past and present development activities?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: And under a prospective analysis, the discussion is centered on identifying scenarios which serve to assess potential impacts or responses to disturbances in the future, including disturbances directly attributed to the proposed project and other present and future projects and actions within the project's regional environment.

MS. COUGHLIN: I think Lorne Grieg, another expert in the field of cumulative effects, describes scenarios slightly differently than what you've described. So I think what you're pulling from is the Gunn description. Is that correct?

MS. PASTORA SALA: That's correct, and I'm asking whether you would agree?

MS. COUGHLIN: Yeah, I would pull out scenarios, because sometimes they can be quite complex, so I might not include them in a prospective analysis. But I think in the way we're commonly understanding scenarios, like the scenarios that we've describe in our climate change section, that that could be grouped the way you have phrased it.

MS. PASTORA SALA: And in the MMTP EIS, Manitoba Hydro indicates that it has described in existing conditions in each of the VCs; correct?

MS. COUGHLIN: Yes.

MS. PASTORA SALA: Would it be fair to say that Manitoba Hydro did not include an analysis of future conditions without the proposed projects, and in combination with effects of other future project and activities?

MS. COUGHLIN: We talk about the project's contribution to cumulative effects, to future effects, so that in essence is talking about with and without the project and the future conditions. It's a different way of phrasing it.

MS. PASTORA SALA: Can you repeat that?

MS. COUGHLIN: So we talk about the project's contribution of cumulative effects to the future, and that could be another way of phrasing what you're asking. Maybe Jim can characterize this.

MR. HOWELL: No.

MS. PASTORA SALA: So your assessment includes future conditions without the proposed projects?

MS. COUGHLIN: Not specifically without.

MS. PASTORA SALA: Okay. That's what I was asking.

MS. COUGHLIN: Right. But when we talk about the project's contribution to future effects, that's a way of describing what you're asking, just using different terminology.

MS. PASTORA SALA: Okay. Sorry, I think I was just focusing on the without, but I think I understand what you're saying. Thank you.

Would you be aware that the management stage is designed to identify appropriate mitigation and monitoring actions for those components subject to cumulative effects?

MS. COUGHLIN: What do you mean by management phase?

MS. PASTORA SALA: So the management analysis would require Manitoba Hydro, for example, to identify significance of the MMTP's cumulative effects. It is the fourth step in the best practice approach of cumulative effects.

MS. COUGHLIN: Okay. Are you talking about like in the follow-up and monitoring program?

MS. PASTORA SALA: Right.

MS. COUGHLIN: Okay, yes.

MS. PASTORA SALA: And so this is done through each of the VCs in the MMTP EIS?

MS. COUGHLIN: This is done according to what is outlined in the follow-up and monitoring sections of the environmental assessment as well as in the environmental protection program.

MS. PASTORA SALA: Yeah, okay, thank you.

And just to finish off, I want to move away now from cumulative effects and speak a little bit about relationships. So these questions are going to be for Ms. Coughlin.

So mindful of the comments of Manitoba Hydro's legal counsel in the opening statement relating to its commitment to learning, and to the Truth and Reconciliation Commission, specifically call to action 45, which calls for the respect of indigenous legal orders, as well as Manitoba Hydro's legal counsel's comments about Anishinaabe law, which is all about relationships, I would like to direct your attention to page 161 of the Keeyask report, please. And I'm going to give you a moment to get that.

MS. COUGHLIN: Do you want to read it while Brett's getting it up?

MS. PASTORA SALA: So page 161 is entitled Ke nocominanak, Our Grandmothers. And it says in the third paragraph:

"It has been maintained that the Cree worldview is equal to western science, however, the Cree are still not given credit for maintaining the environment for 5,000 years."

And then the next paragraph says:

"The indigenous people did have a governance structure that was unlike the western model, and if the Europeans recognized it, it was dismissed, much the same way indigenous worldviews is dismissed today."

Later on that same page, the

recommendation is that:

"The Minister should support these long-standing and successful methods of the Cree indigenous worldview by incorporating Ke nocominanak, or A Grandmothers Circle, with a mission to overseeing safeguarding the environment."

Recognizing the CEC recommendation was directed to the Minister, has Manitoba Hydro considered creating a Ke nocominanak Grandmothers Circle?

MS. COUGHLIN: I'm familiar, I don't think we need to wait for Brett to bring it up, I'm familiar with that passage. The Aski worldview was something that was discussed quite a bit in the Keeyask. And of course in this project, we have multiple worldviews. So we have the Anishinaabe, the Dakota people, we have a variety of different participants in the process. And one of the things that we've talked about with Dakota, with Chief Pasche, Dakota Tipi First Nation, is he's requested to have a pipe ceremony prior to construction. And so that's something that we have talked to one of the construction guys about, and he'd like to have that undertaken before we begin.

So we haven't had someone ask specifically about having a grandmothers circle, but I think that's sort of akin to what you're asking.

MS. PASTORA SALA: I just for the record would want to point out that I would disagree that it would be akin to what I am asking, but I'm going to specifically ask if Manitoba Hydro has followed up with the Minister to see if they will be implementing a Ke nocominanak or circle of grandmothers?

MS. COUGHLIN: I have not followed up with the Minister, and I don't know if anybody else at Hydro has followed up with the Minister to find out if we should be having --

MS. PASTORA SALA: Would it be possible to get an undertaking to know whether or not Manitoba Hydro has followed up with the Minister to see if they will be implementing a circle of grandmothers?

MS. MAYOR: Manitoba is not prepared to provide an undertaking of their communications with the Minister.

MS. COUGHLIN: And you recognize we have broader than just Cree worldviews involved in this process.

MS. PASTORA SALA: I recognize that. I'm just referring to the recommendation from Keeyask, given that Manitoba Hydro has indicated that it has learned from past processes.

THE CHAIRMAN: I wonder if I could ask a background question first? Was this a CEC recommendation or not?

MS. PASTORA SALA: Yes. I believe Mr. Nepinak could also tell you a little bit more about it.

THE CHAIRMAN: All right. So CEC recommendation, and you're asking whether that recommendation was followed up by Manitoba Hydro; is that accurate?

MS. PASTORA SALA: That's accurate.

THE CHAIRMAN: So, sorry, one more question of clarification. Was that a non-licensing recommendation? I assume so, because I don't think that would be part of a licence?

MS. PASTORA SALA: Yes.

THE CHAIRMAN: It was. Manitoba

Hydro?

MS. MAYOR: The specific question was whether Manitoba Hydro had followed up with the Minister, which is something that Manitoba Hydro is not prepared to share in terms of communications with the Minister. If there was a question whether Manitoba Hydro has taken any steps on the Keeyask project, that again, I mean, it's so broad, we have 6,000 employees. So what work has been done, not an easy undertaking. I think Ms. Coughlin has answered it with respect to the MMTP project and what we're doing on that particular project, which is the most relevant to this particular panel.

THE CHAIRMAN: Is your question related to the grandmothers circle? Is that somehow tied to this project, or is it simply a follow-up to recommendations on a previous project?

MS. PASTORA SALA: During Manitoba Hydro's legal counsel's opening statement, and I'm going to read from the transcript, they indicated that:

"Since 2004, all of us have watched the work of the Truth and

Reconciliation Commission of Canada and have received its report. Call to action 45 of that report, although directed specifically to the Government of Canada, has some useful guidance for our work here. It recommends that indigenous laws and legal traditions be recognized and integrated in processes that involve land claims and other constructive agreements."

Then legal counsel goes on to describe the importance of indigenous legal traditions. It describes Anishinaabe law as being all about relationships, and describes that with relationships comes responsibilities. With responsibilities comes actions required. And what I'm asking is whether or not Manitoba Hydro has followed up on one of the previous recommendations in CEC report from Keeyask. So I would say that it is directly related to this project.

THE CHAIRMAN: All right. Would Hydro then be prepared to discuss that recommendation in relationship to this project, not overall, because I don't think we're here to do a checklist on what was followed up or not on a different project, but would it be possible to discuss -- and I'm assuming the recommendation was specific to the grandmothers circle; is that accurate? Sorry, were you going to answer that?

MS. PASTORA SALA: I'm sorry, your question was whether or not --

THE CHAIRMAN: The question was whether the recommendation was specific to the grandmothers circle?

MS. PASTORA SALA: Would you like me to read the recommendation again?

THE CHAIRMAN: No, just answer that part of it, does it reference a grandmothers circle?

MS. PASTORA SALA: Yes.

THE CHAIRMAN: It does specifically.

Would Hydro be willing to come back with a response on whether that particular recommendation, related to the grandmothers circle, was considered as part of the MMTP process, recognizing that you have mentioned at least one other traditional activity that has been included, and perhaps there are others, but on that specific one? Thanks.

MS. COUGHLIN: We have not included that particular grandmothers circle in this project, but I think we could probably speak to the first part of that recommendation. The essence and the substance of what you're getting at is we have tried to adopt a process of being respective to other worldviews and being considerate of practices that are inclusive. So we can speak to those conversations that we had and the processes that we have been respectful of for this project, no one has specifically asked us for a grandmothers circle, from the people that we have been working with, to the best of my knowledge. But we can speak to what we have heard.

MS. PASTORA SALA: Mr. Chair, I'm unclear about whether or not Manitoba Hydro will be following up with the Minister or indicating whether or not they have followed up with the Minister on the recommendation. Before I respond to Ms. Coughlin's comment, I would like to clarify for the record.

THE CHAIRMAN: I think what we heard from Hydro was that the discussions or recommendations or communication with the

Minister, they are not prepared to share here. So whether that discussion has taken place or not, I'm assuming what's behind it is, are they applying that recommendation to this project? And I think they have answered that question saying that specific recommendation, no, but they have done other traditional activities.

MS. PASTORA SALA: Okay. Thank you.

Ms. Coughlin, could you point me to an expressed written policy or practice requiring Manitoba Hydro to take into account indigenous worldviews or legal orders?

MS. COUGHLIN: Cultural Heritage and Resource Protection Plan.

MS. PASTORA SALA: It specifically identifies Manitoba Hydro as a whole to take into account indigenous worldviews and legal orders?

MS. COUGHLIN: Perhaps not in those exact words, but it is considerate of practices and measures that we can take to be respective of those practices.

MS. PASTORA SALA: Could you point me to a specific reference within that?

MS. COUGHLIN: I don't have it here but we could, we could undertake to do that.

MS. PASTORA SALA: Thank you. Those are my questions.

(UNDERTAKING # MH-5: Advise Specific reference which identifies Manitoba Hydro as a whole to take into account indigenous worldviews and legal orders)

THE CHAIRMAN: Thank you very much. Also right on schedule, so thank you. Except for the five minutes I took up.

All right. We're scheduled for a break, we're just a little bit past it. So we will come back here at 11:25. Thank you.

(PROCEEDINGS RECESSED AT 11:09 A.M.
AND RECONVENED AT 11:25 A.M.)

THE CHAIRMAN: Okay. Welcome back everyone. So we're going to return to questioning on the methodology section, and I believe we're now with the Southern Chiefs' Organization, Mr. Beddome.

MR. BEDDOME: James Beddome for the record, for the Southern Chiefs Organization. Thank you very much, Mr. Chair, the rest of the panel, and the Hydro Panel that's up there today, thank you very much, Ms. Coughlin and Mr. Howell, for being here today.

I'm going to try to be as quick as I can because I'm mindful of our timeline. So first question I think would be for Mr. Howell. Could you explain to me how First Nations were involved in the scoping process?

MR. HOWELL: In the actual scoping process, when we developed the valued components, the items that were included as valued components included items that First Nations had brought up, or did bring up afterwards.

MS. COUGHLIN: I can add to Mr. Howell's response. As part of the engagement team, we went and spoke to people and asked people what they cared about, and what they valued, and what they were concerned about. And we asked them to consider some of the valued components before they were valued components, through meetings. And those understandings were shared with us and that contributed to scoping of the assessment.

MR. BEDDOME: And when you say you met with people, who did you meet with specifically?

MS. COUGHLIN: Participants in the First Nation and Metis engagement process, as well as the public through public events.

MR. BEDDOME: Now, you comment on how

you have a -- sorry, I want to use the right word in your slide here -- broad and adaptive engagement. That's from slide 7. You would agree with that, right, that you made that comment?

MS. COUGHLIN: Yes.

MR. BEDDOME: It seems like in some cases, though, and I understand there would be adaptive engagement, after the fact some First Nations would have reached out to you and expressed an interest and you subsequently would have included them in the project, particularly a good example being maybe Black River. Would that not be fair to say?

MS. COUGHLIN: Yes.

MR. BEDDOME: But if they weren't on the identified list of First Nations and they didn't subsequently reach out to you, then they weren't included in that scoping process.

MS. COUGHLIN: Some communities reached out to other First Nations. So for example, Swan Lake let us know that Shoal Lake 39 and 40 were interested in the process, and so we shortly thereafter included them in the engagement process.

MR. BEDDOME: Thank you. So this

should be really easy, but if you need a reference, you can turn to slide 16 in your presentation. That's where you outline the valued components, as well as the pathway components.

And I don't even know if you need to flip to it, but I just want to establish that two of the valued components that you identified were traditional land and resource use and heritage resources?

MR. HOWELL: That's correct.

MR. BEDDOME: Now, is heritage resources inclusive of First Nation heritage resources, or is it separate or in addition to?

MS. COUGHLIN: Well, I think the reason we are wavering is we think that heritage resources are best described by First Nations in their own community reports. So although there is reference made, I believe subject to check, in the heritage resource chapter, I believe the best way of conveying that information is through self-directed studies from the communities themselves.

MR. BEDDOME: Okay. Now, it's the next slide actually, at 17, you discuss a bit about spatial and temporal boundaries.

Specifically in reference to traditional land and resource use, I guess, wanting you to comment on what those spatial and temporal boundaries were, and I'd just like to note, and I can certainly reference the Stantec socioeconomic report, perhaps it might come up in a later panel, but that -- well, maybe I'll back up. You'd be aware that many First Nations people didn't live on their home reserve. That would be correct?

MS. COUGHLIN: Yes.

MR. BEDDOME: So my question specifically on that is how you took into account traditional land and resource use in terms of boundaries, when you would know that, you know, you might have someone from one First Nation who is living in Steinbach, but they might be from Waywayseecappo let's say, right? So how did you take that into account when taking a look at spatial and temporal boundaries?

MS. COUGHLIN: We assumed use of the area. So I guess you could say we did this in a few ways. When we spoke with communities, we asked them sort of the preferred method of engagement. So if that included speaking to community members in areas outside of the home community, we did that. So that gave us a broader audience to engage with. And in the traditional land resource use assessments, you'll hear about, in the near future Bruce Amundson will talk about how we assumed use of the RAA and LAA.

MR. BEDDOME: So I take it I can save some of my questions for that panel then.

MS. COUGHLIN: You can, but we can try here as well.

MR. BEDDOME: Well, you know, I just want to be mindful of the time. So I guess I'm asking whether you think it's better directed to that panel or yourself then, perhaps that's a better way of phrasing what I was getting at?

MS. COUGHLIN: Sure. Okay.

MR. BEDDOME: So am I better to direct it to that panel or yourself?

MS. COUGHLIN: Can I understand the nature of your questions? Maybe that will help. If they are about the assessment process specifically, maybe Jim and I can take a stab.

MR. BEDDOME: Okay. I think most of them will be for the panel directly. Thank you for that. I want to move on and I do appreciate that.

Now, I really appreciated the image that you had at slide 29. My version only has the afterwards impact. So if you just go to slide 29? So if you go back, you gave a citation, Irene Hanuta, I just want to make sure I get that citation correct, and make sure I spelled the name correct. I think it's actually in your reference materials, in your outline, but if I can just confirm that citation?

MR. HOWELL: Yeah, it's H-A-N-U-T-A.

MR. BEDDOME: H-A-N-U-T-A. Thank you, I actually did spell it wrong, thank you for correcting that for me.

Now, as I understood it, Mr. Howell, you used this in reference of cumulative impacts and you talked about how there have indeed been significant changes to Southern Manitoba over the past 150 years. That would be a correct statement; right?

MR. HOWELL: That's correct.

MR. BEDDOME: But in terms of the cumulative effects, you were trying to be project specific; correct?

MR. HOWELL: That's correct.

MR. BEDDOME: So would I be correct in

assuming that basically, in essence what you are saying is these 150 years of changes, they're not Manitoba Hydro's problem?

MR. HOWELL: No. We put the cumulative effects assessment for a project such as this into the context of what are the cumulative effects that have identified the existing environment, and then adding the project and foreseeable future projects on.

If we want to look at something that is not a project centric cumulative effects assessment, we then look at something, something that should be addressed in a regional environmental assessment or a strategic impact assessment. But for the purposes of a project, it's project centric.

MR. BEDDOME: It's project centric, so then to a certain extent it is Manitoba Hydro's concern then?

MS. COUGHLIN: One of the things we did is we made sure to include both an understanding of the project's contribution to cumulative effects, as well as a discussion in some chapters on what people typically think of the term cumulative effects. So, an example of that is in the vegetation and wetlands chapter, where they describe some of this change that you're seeing in Dr. Hanuka's map in front of you. And it's one of the reasons we went to Dr. Gordon Goldsborough and asked him, is there good imagery that can show what we're hearing is described, through community reports and through what we heard, to illustrate this change that's happened in Southern Manitoba over the last 150 years or so?

MR. BEDDOME: And just to be clear, the cumulative effects then is project specific, it's not Hydro specific, so it's not looking at all Hydro projects in the region, it's specifically focused on the Manitoba-Minnesota Transmission Project; correct?

MR. HOWELL: No.

MS. COUGHLIN: No, that's not what we're saying.

MR. HOWELL: What we're looking at is we looked at the other projects that are existing or foreseeable, and that forms the basis for the cumulative effects assessment.

So we're not excluding Manitoba Hydro projects. As in the figure that Ms. Coughlin showed, we've got Manitoba Hydro projects included in that, in the cumulative effects assessment.

MR. BEDDOME: And I'm going to return to that, I guess -- no, I'll move on. I don't think we need to belabour the point. It's effectively as -- it's a comment you made, Mr. Howell. It's effectively as I sort of heard it, you recognize these 150 year impacts. But as I was to get it, they are beyond Hydro's scope, but maybe I'm not hearing you correctly.

MR. HOWELL: No, what we have done, we have included where we have qualitative information on effects over the last 100 to 150 years. So we did put it into that context. But then we're looking at comparing cumulative effects to the existing conditions and foreseeable future conditions.

MR. BEDDOME: Oh, okay. So I think that helps me. So it's, basically, your baseline would have been, you know, 2015, 2016 Manitoba, rather than going back 100 or 150 years. That would be a correct way of putting it?

MR. HOWELL: For the --

MS. COUGHLIN: No, that's not -- sorry, that's not correct.

So one of the examples that I can show, because we're talking about landscape change in general, one of the valued components that most directly reflects this is vegetation and wetlands. And in that chapter we discuss more recent or more present day changes over the last 40 years. But then there is also reference to the dramatic changes that you see here in front of you. So you see this 150 year change. That's also discussed. So, yeah, that characterizes both time frames.

MR. BEDDOME: Fair enough. Thank you very much for that.

Now, I just want to refer you to 7.3.2.4.2 of the EIS, which you can find at 7-17 of the EIS. 7.3.2.4.2, sorry, a lot of points there. It's in the middle of the page at 7-17 of the EIS.

MS. COUGHLIN: Okay, yes.

MR. BEDDOME: And in the middle of the first paragraph, and I'll just read what it says:

"For example, current and present use of lands for traditional land and resource use has been defined for this assessment as within the last 25 years or one generation."

Do you see that?

MS. COUGHLIN: I do.

MR. BEDDOME: And I would submit to you that from a First Nation perspective, they don't just look at one generation but they tend to look at seven generations. And I would ask you why your analysis didn't take a broader timeline into account?

MS. COUGHLIN: Because that knowledge is passed down through oral traditions. The knowledge taken from one person is actually an accumulation of knowledge passed down from past generations. So that one person tells a story that's reflective of generations in the past.

The NEB electricity filing manual actually specifies this 25-year time frame specifically, and that rationale underpins that timeline.

MR. BEDDOME: I see. So the 25 years came from the NEB guidance?

MS. COUGHLIN: As well as the understanding that I described before that.

MR. BEDDOME: And thank you for that. I do appreciate that, how information is passed on through oral tradition and from generation to generation. It just seemed to me, on one hand we're talking about the 150 years of changes, and then we're only looking at 25 years of use. So it just seemed that part of that, would you not agree part of that oral tradition that's passed down is how these changes have happened over 150 years.

MS. COUGHLIN: I would agree that the oral tradition that is passed down through generations can extend way beyond 150 years.

MR. BEDDOME: And still at page 7-17, I just note that the effects of decommissioning are not going to be assessed at all, and that will be dealt with via whatever regulatory framework at the time. I would suggest to you that a better environmental assessment and cumulative effects assessment would have taken decommissioning into account. How do you respond to that?

MS. COUGHLIN: Projects like this transmission line have a very long life span anticipated for it. And as we know, and as we have experienced over this last year, there has been fairly rapid change in the environmental assessment landscape. There's discussion documents abound right now on changes in the process. And we feel like a thorough and respective discussion on decommissioning of the project will be best done under the regulatory regime of the time, which will be way into the future.

MR. BEDDOME: I guess my comment, though, would be that there might be some value in assessing what needs to be done in terms of decommissioning. Would you not agree?

MR. HOWELL: Yeah. For long-term projects such as the transmission lines, as Ms. Coughlin mentioned, we wait to see what the law is at that time, what the common practices are. If we go back, you know, 50, 60, 70 years ago and what practices were followed then, it's entirely different from what would be done now. If the project were to be decommissioned today, an existing line, it would be a lot different than how one was decommissioned 30, 40 years ago.

MR. BEDDOME: And I can appreciate that. But my point, I guess just to be clear, isn't that things won't change in the future and we shouldn't consider that, and I have a follow-up question, but it's more about how there could be a value in assessing that at the outset here. But I take your point.

The follow-up question I guess I would have, and perhaps you can answer, maybe you can't, would Manitoba Hydro be willing to consider a licensing condition which mandated some sort of public process when decommissioning was to take place, be it 100 years from now, be it 200 years from now?

MS. COUGHLIN: I think that would be so speculative. It might be a better use of resources to use the knowledge at the time and the best practices developed between now and then to decommission the project with the resources we'll have available, and the understanding and increased knowledge we'll have at that time. I think that's a fairly commonly held practice.

MR. BEDDOME: I agree, but my point is allowing a process for some sort of public engagement or some sort of public review, similar to what we have today.

MS. COUGHLIN: We are open to engagement throughout, so I think we have made that point earlier in the hearing.

MR. BEDDOME: Okay. Well, this kind of comes to a general point, and I imagine I'll return to it with other panels, but it seems --

and you commented on this I think on the conclusions after the effect, which you have a slide there with a number of First Nations. But it seems that often the Aboriginal traditional knowledge, it's incorporated into the Environmental Protection Plan, but it's not necessarily as incorporated into the scoping, into the routing, or even into the EIS if the reports aren't submitted in time. Do you see that concern? Do you see how in many cases the recommendations are effectively pushed into the Environmental Protection Plan?

MS. COUGHLIN: I disagree with that premise. We had an IR on this actually, well, similar to what you're asking. So we selected one value component chapter and just identified all of the locations where traditional knowledge was included or referenced in that chapter. And I believe that IR was something like four pages long, just to list all the references where traditional knowledge was incorporated. And that's just the references of where it was incorporated.

So, no, I don't agree with the premise of your question.

MR. BEDDOME: Fair enough. And you indicated you're trying to learn from past projects, and so you'd be familiar with the Bipole III recommendations from the Clean Environment Commission from June 2013; correct?
MS. COUGHLIN: Yes.
MR. BEDDOME: And I don't need to belabour it because we have been here before, Ms. Coughlin, but just you would then be aware that one of the recommendations that clearly came through was an earlier engagement with indigenous people and indigenous knowledge within the environmental assessment process; correct?
MS. COUGHLIN: Yes, and we have an undertaking on that.
MR. BEDDOME: And my last line of questioning, if you could turn yourself to slide 32? Now, you mention the Richer South station to Spruce Station transmission; correct?
MS. COUGHLIN: Yes, that's correct.
MR. BEDDOME: And that would be part of the Energy East Pipeline Project you indicated; correct?
MS. COUGHLIN: Yes. At the time when we were preparing the assessment it was, but this

is one of the projects that was under the category of speculative. So we don't know a lot of details about this. But to be inclusive in our prospective analysis, we wanted to include projects that weren't just defined or in a regulatory review.

MR. BEDDOME: Fair enough. And I'm not sure if you're able to answer this question, but I'm just curious, so we have the speculative project, the purple line crossing across the blue line there, that would be a new transmission line. Would that connect with at all, with the Manitoba-Minnesota Transmission Project? Like I see they run over each other. I'm wondering if there is any potential interconnection between the two?

MS. COUGHLIN: I don't know. Like this was a project that we were quite speculative, we don't have a lot of details. It would essentially run in that area, maybe. So we wanted to include that as a potential change that might happen in the future, but I don't know details about the project because they simply don't exist yet.

MR. BEDDOME: Fair enough. I guess

the reason I'm asking is, you comment about sustainable development and the fact that Manitoba Hydro wants to use its clean green energy to displace other fuel sources. And I'm just, you know, just trying to get a sense as to whether the Manitoba-Minnesota Transmission Project may in fact be complementary to an interconnection with the Energy East Pipeline Project. I can just see that having some consideration for cumulative impacts. Are you able to answer that question or not?

MS. COUGHLIN: No, I'm not.

MR. BEDDOME: I suppose it's too speculative for Manitoba Hydro to be able to answer that?

MS. COUGHLIN: Yes.

MR. BEDDOME: That's all the questions I have. Thank you very much for your time, Ms. Coughlin and Mr. Howell.

MS. COUGHLIN: Thank you.

THE CHAIRMAN: Thank you, Mr. Beddome. And once again, a very timely set of questions. Thank you.

All right. We'll now turn to Peguis First Nation and Mr. Valdron.

MR. VALDRON: Thank you very much, Mr. Chairman. Once again for the monitor, Den Valdron representing Peguis First Nation.

All right. Now, I apologize for the use of the laptop, it's just in low light my eyes aren't terribly good, so I had to jot down my questions and stuff on the screen. So it doesn't mean that I've got like a whole giant list. Okay. It's just an aid.

All right. Now, to start off, thank you very much for coming here, I hope that my questions will be simple and straightforward and easy for you to understand. I think that works for everyone.

I understand that in terms of what you're doing, you're touching on stuff that shows up in other places. So if you feel that one of these questions is perhaps properly, more properly answered in some later panel, that's okay with me. You just say so, and then I'll go to town on those guys.

MS. COUGHLIN: Understood.

MR. VALDRON: And I will be medieval. So let's just jump in on this. All right.

Now, I enjoyed your presentation very

much in terms of methodology. You talked about experience and consultations on Bipole and Keeyask which informed your process. And I guess one of the questions I have is, how informed was it? Were Bipole and Keeyask used to actually make decisions, such as whether or not to engage at different points, or whether some subject areas would or would not be covered? How thoroughly has Bipole shaped what was the choices that you made going in?

MS. COUGHLIN: The learnings from Bipole and Keeyask and other projects were both small and large. We understood different ways that certain communities have preferences for how to work within Manitoba Hydro. We understood sort of changes in practice that we might want to adopt. We understood the ways of presenting materials, and a vast range of learnings that we have described in the first part of each chapter of, each valued component chapter and each engagement chapter of the environmental assessment.

MR. VALDRON: Okay. So, for instance, in Bipole you identified 67 valued components, and for this process, this was reduced to 12. How do you do that? I mean, were some valued components dismissed as irrelevant and weren't even brought into this process, or did you consolidate a bunch? If you deleted some, how did you make the decision as to which ones to delete? What was the process for discarding valued components?

MS. COUGHLIN: One of the recommendations from the Bipole III report was to use more of an ecosystem approach. I don't have the condition in front of me. I'm sure Brett will find it right away here. But it asked how we could be more inclusive or bigger picture, in essence, if I was to boil it down.

So one of the things we did is we sought to have valued components that were just that, were more inclusive. So you'll see a valued component that describes wildlife and wildlife habitat. And under that you'll see descriptions of focal species and focal species assemblages, and we describe the connections between those focal species and habitat connections. So it allows us to describe both species specific details and connections to habitat, and make those broader ecosystem connections that non-licensing recommendation advised us to do.

MR. VALDRON: Okay. So if I'm understanding that answer, then what you're saying is that the 67 valued components from say Bipole were incorporated into the 12 valued added components. If I went searching those 12, I can trace every one of them back to the 67?

MS. COUGHLIN: No, that's not what we're saying.

MR. VALDRON: No? Then I got it wrong. Clarify it for me.

MS. COUGHLIN: So they asked us to use -- Brett is just getting the recommendation -- so they asked us to use a more ecological approach, rather than the very specific valued component approach that was taken. So what we did is we used broader valued components, where a discussion on how specific species that are relative to the Manitoba-Minnesota Transmission Project area could interact with our habitat and could interact more broadly within that particular -- I'm talking about biophysical value components primarily because this is where it most applies. So some of the differences is that in the Bipole III Environmental Assessment, they included species that wouldn't necessarily occur in the MMTP project region. So that could be why they wouldn't exactly be reflected in the MMTP Environmental Assessment. So they wouldn't be a one for one, like what you described.

MR. VALDRON: Okay. So not a one for one, but some incorporation. Or were you simply taking a different approach to determining valued components than in Bipole? I'm sorry if I seem dense, I'm just trying to -- not my area.

MS. COUGHLIN: No, that's a good question. It's a different approach. But what I want to convey is that we didn't lose the specific species understanding. If you turn to the wildlife chapter, there's a table that talks about specific wildlife species that were discussed within the chapter, as well as species assemblages. So although we have those broader higher level ecosystem principles that are discussed, like in vegetation and wetlands they talk about intactness and fragmentation and habitat loss, we also include discussion on specific species that inhabit the area of this project, not Bipole III.

MR. VALDRON: Okay. I notice your friend has passed you something.

MS. COUGHLIN: Yeah. So this is the exact wording of the recommendation. So Manitoba Hydro undertake -- and that's not the right one.

MR. VALDRON: Okay. Well, he tried, we give him points for that.

All right. Now, you have identified 12 valued components and provided a list. I guess my next question is, does that list reflect the sorting of priorities? Are some valued components prioritized over others? If so, how are these priorities established? And if there is prioritization of one over the other, where does traditional interest, the interest of First Nations in terms of hunting, gathering, fishing, trapping, fall in terms of those priorities?

MS. COUGHLIN: We haven't made a prioritization.

MR. VALDRON: So the list that was up on the screen, that doesn't reflect any internal prioritization in that list, it was just some random assembly?

MS. COUGHLIN: It might have been alphabetical? No, it was biophysical and then socio-ec, that was the organization.

MR. VALDRON: Okay. Biophysical and

socio-economic, but that didn't represent any kind of prioritization of one over the other?

MS. COUGHLIN: It did not.

MR. VALDRON: See, simple question, simple answer.

All right. Now, on to cumulative effects. All right. Now just to clarify, I'm wondering how cumulative effects impact on decision-making with respect to residual effects? Is it integrated? And I'll give you an example, because I'm trying to follow along here. For instance, let's suppose there's a marshland, the project is going to be going through the marshland possibly. You examine cumulative effects, you find that over the last 100 years, the marshland has been badly affected, it's lost 90 per cent of its area, the wildlife population is decimated, what's left is highly stressed. So now you come to residual effects and planning. So I guess the question is, how does that cumulative effect get integrated? I mean, recognizing that cumulative effect, do you avoid the marshland altogether, or do you assume that, hey, we can't do anymore damage than is already done, full steam ahead? Do vulnerabilities identified in cumulative effects require greater concern or care?

MS. COUGHLIN: Yeah, there's a few questions wrapped up in that one question you've asked so --

MR. VALDRON: It all comes back to the big question, so go for it.

MS. COUGHLIN: Okay. So one of the things we do in our routing process is we have a discussion and an understanding of different considerations. So that particular scenario that you have described is a marshland or a wetland, that would have been discussed during our routing process and the vegetation and wetlands person would have described concerns that he had in areas throughout the project area. And he may have identified marshlands that were of high value and marshlands that were of medium value, and marshlands that might have been at lower value. And so presumably marshlands that were of higher value, which is not the one that you are describing, would have been put in an area that they considered an area that we would like to not route. And so that consideration would have been contemplated, with many other considerations, through the routing process to arrive at our final preferred route.

And then once we have arrived at that final preferred route, the discipline lead for vegetation and wetlands, say that the route went through that degraded marshland that you described, they would have described effects of the transmission line to that degraded wetland. And the process over time of how the wetland was degraded would be a cumulation of events that have happened in the past. And those events in this imagined wetland condition might have been from a variety of reasons. And understanding trends that might have lead to that condition would be discussed and described in the cumulative effects section of the -- or the existing conditions actually section of the assessment. Does that answer your question?

MR. VALDRON: Yes, thank you. That's actually a very good answer. It's nice to use a specific example to sort of follow through as to how the process works.

Okay. So with respect to cumulative effects, you put up a couple of maps showing the changes over a great deal of time. And I think that it's obvious from those maps that one major cumulative effect has been massive loss of lands available for use and used for traditional activities by First Nations, hunting, fishing, trapping, gathering. TLRU I think is the acronym. I'm still wrestling with acronyms.

You would agree that there's been a major loss of land use by First Nations; correct?

MS. COUGHLIN: Yeah, there's been a major change in the landscape of Southern Manitoba over the last 150 years.

MR. VALDRON: Okay. So given that we're dealing with First Nations which have suffered a major loss of land use, given the potential of this project to impact and cause continuing land use, how was the assessment of impacts there? Is this a situation where you're going, whoa, well, we might have some impact on land use, but very clearly there's been massive impacts in the past, so it's important to minimize any impact now?

MS. COUGHLIN: So, Manitoba Hydro has recognized the value of using existing transmission corridors for this project. So the transmission line would be located in the South Loop transmission corridor, as well as the Riel to

Vivian transmission corridor. So understanding that use may occur throughout the project region, we have tried to take advantage of areas where we could route the project in those corridors to help minimize effect.

MR. VALDRON: So with respect to parts that couldn't be routed through those corridors, is there a stronger stake in avoiding use of Crown land or avoiding impacting First Nations' activities?

MS. COUGHLIN: No. We understand that traditional use activities can continue to take place once the transmission line is in place and that, I believe the number is 30 per cent of the route goes through Crown land, subject to check. But those activities can continue to take place along the line itself. And during construction or maintenance activities, those events are for short -- they're short in duration and infrequent. And beyond those times, access will not be restricted to the line.

MR. VALDRON: Now, cumulative effects also, as I understood, incorporated future projects or future activities, not just from Hydro, from third parties. I was very impressed by that, by the way. It probably would have taken me a while to think of that myself. But it seems clear, looking at some of these descriptions, that many of these future projects and future impacts and effects would impact on traditional land use activities.

Now, did your methodology take into account the risk or impact of these future losses on traditional land use activities in assessing a need to preserve and respect existing TLRU in this project?

MS. COUGHLIN: Yes, we have a chapter on that, that one of our discipline leads will describe in detail in the biophysical panel, as well as many traditional uses are described in the self-directed studies that are part of the assessment.

MR. VALDRON: All right. There are three time periods for monitoring, preconstruction, construction, operation; correct?

MS. COUGHLIN: Correct.

MR. VALDRON: Okay. You hesitated and looked thoughtful there, so I got scared for a second. Anyway, okay.

So field studies, collection of data

about valued components are part of the monitoring; correct?

MS. COUGHLIN: Yes, correct.

MR. VALDRON: Okay. Good. And how will the six First Nation MMF land use studies be used in development of the monitoring plan for construction and monitoring plan for operation?

MS. COUGHLIN: We've hosted a few community monitoring meetings, trying to understand what might be desired of the communities and organizations involved. And we haven't yet figured out what groups might want to monitor. So we will endeavour to work with communities to better understand that and develop a monitoring plan based on those understandings. So we're early days on that.

MR. VALDRON: Okay. You haven't figured out what groups would want to be involved in monitoring?

MS. COUGHLIN: We have invited those involved with the First Nations and Metis engagement process.

MR. VALDRON: Okay. You've said that following the EIS, that ATK would be included in the Environmental Protection Plan. So will there be follow-up on a continuing basis and will that affect the EIS? If the EIS changes, then how does that get reflected in the follow-up mitigation monitoring?

MS. COUGHLIN: Yeah, we anticipate engagement throughout project construction and operation. And so we open the door to concerns or issues that are brought to us throughout this process.

MR. VALDRON: Okay. How does engagement actually result in changes or impacts following the project once you are in operations? How would that be incorporated? I mean, see, I guess the thing I'm wondering about is, you know, it's all very nice to have engagement, but if everything is established and nothing changes, then engagement doesn't really mean much. So how can engagement result in actually incorporating changes?

MS. COUGHLIN: Okay. So maybe a specific example might help. So let's say once the project is in operation and it comes to our attention that there is a particular area that is preferred for gathering activities, we would identify that area as an environmentally sensitive site and apply a buffer around that area. And the treatment of that area would be treated differently than other parts of the project.

MR. VALDRON: Thank you. I find, by the way, that examples are very helpful in terms of conceptualizing. Not all of us are highly trained technicians or specialists in the field. Some of us are trained elsewhere. So examples really make things concrete and allow us to follow through.

Anyway, so here is one, why did Manitoba Hydro not map or use all of the data from Peguis in your assessment of impact on traditional activities? Looking at chapter 11, you made three maps from data from Peguis, map 11.4, map 11.5, map 11.6, but they don't cover all the areas that Peguis gave data for. Looking at those maps, data for areas of importance, recreation, travel routes and occupancy were excluded, or not included.

MS. COUGHLIN: We could probably describe that best in the traditional land and resource use chapter, he talks about travel ways and the importance of travel ways. Some of the information conveyed in the assessment is done through maps and some is done through discussion.

So the information may have been included as a discussion point within the chapter itself.

MR. VALDRON: But not within the maps themselves. Okay.

Why does the EIS chapter 11 maps refer to Peguis First Nations report as an ATK study and not a land use and occupancy study? Peguis did conduct the land use and occupancy interview project, it wasn't an Aboriginal traditional knowledge study. In fact, if you look at the definitions later on, they are two different things.

MS. COUGHLIN: Sometimes the term Aboriginal traditional knowledge is used as an umbrella term to capture the studies done as self-directed studies. So he may have been using it in that context.

MR. VALDRON: So are land use and occupancy studies normally a subset of Aboriginal traditional knowledge?

MS. COUGHLIN: I'm not outlining what's normally done, I'm just saying I think that's what was understood to be conveyed in that particular part of the assessment is the term was used as an umbrella term.

MR. VALDRON: Okay. Is it normally an umbrella term?

MS. COUGHLIN: I think CEAA does, subject to check. They use it as a way to describe -- if we have the CEAA definition of Aboriginal traditional knowledge, I think it is inclusive to the types of studies that Peguis submitted.

MR. VALDRON: Okay. I'll make it really easy. Was it just sloppy or does this represent the thinking?

MS. COUGHLIN: This represents the thinking.

MR. VALDRON: Okay. How was the land use and occupancy GIS data provided under funding agreement used by Manitoba Hydro in the development of the EIS? Peguis First Nation undertook a land use and occupancy interview project with funding from Hydro. Peguis filed drafts, reports, materials. So how was it incorporated or used to develop for the EIS? If you can just describe that briefly, if you can?

MS. COUGHLIN: Do you want me to describe how Peguis information informed the MMTP EIS?

MR. VALDRON: Yes.

MS. COUGHLIN: That would take a long time, a very long time.

MR. VALDRON: Okay. Should I be asking that in some other --

MS. COUGHLIN: No, I just think this is the appropriate venue, but you're going to hear how self-directed studies contributed to the understanding of VEC chapters over the next few days. But one IR in particular describes how information provided from a community to one chapter, the fish and fish habitat chapter, was informed from traditional knowledge studies. And in that chapter it describes a lot of Peguis information. So there's substantial input to the fish and fish habitat chapter, as I understand these are from Peguis First Nation.

And I could go through chapter by chapter, but I think you'll hear about that in the next little while.

MR. VALDRON: All right. Can you cite me the IR?

MS. COUGHLIN: No. Brett's going to look for it right now and we'll get that to you shortly.

MR. VALDRON: I'll tell you what, it's not going to be a big deal. Can I get an undertaking to get the IR?

MS. COUGHLIN: You'll get it in the next little bit here.

MR. VALDRON: All right.

Now, this one's come up before. A couple of days ago we asked about whether Hydro was agreeable to maintain a log and provide a report to Peguis on its use of project data. And at that point the answer was kind of vague. I think the answer was, well, we don't see that was a problem. I just wanted to come back to it and ask, can we have this as commitment now?

MS. COUGHLIN: I think I should probably refer to the agreement. So I think what I'll do is refresh my eyes and have a look at the contribution agreement, and we'll get back to you with a response on that.

MR. VALDRON: Okay. Can I get that as an undertaking?

MS. COUGHLIN: Yes.

MR. VALDRON: Beautiful.

(UNDERTAKING # MH-6: Review contribution agreement and advise if Hydro will maintain log and provide report to Peguis on use of project data)

MR. VALDRON: Now, looking at the maps, they only show Peguis data. So I guess I was wondering, was there map data from other communities or was Peguis the only First Nation to provide GIS files or mapping data?

MS. COUGHLIN: I'm not sure which map you're looking at?

MR. VALDRON: Maps 11, got it on a note here, 11.4, 11.5, 11.6.

MS. COUGHLIN: Yeah, there's literally hundreds of maps in the MMTP EIS.

MR. VALDRON: I certainly know that. But is map data from other communities on other maps, or was Peguis the only one that had GIS files?

MS. COUGHLIN: Peguis was not the only community that had GIS files. The MMF had GIS files as well.

MR. VALDRON: Okay. And are there maps showing their data?

MS. COUGHLIN: Not in the EIS, because

they provided information beyond the EIS submission date.

MR. VALDRON: Okay. Would that data be available? And if so, where would it be available?

MS. COUGHLIN: You could ask the MMF.

MR. VALDRON: We might do that.

All right. Now considering the cumulative effects assessment for value components relating to traditional land resource use, and the characterization of effects on known and assumed traditional land resource use sites, the quotation is:

"The cumulative effects on TRLU are assessed as not significant."

If the preferred route was moved east of Watson Wildlife Management Area, would this change, this assessment, would TRLU effects be assessed as not significant? I swear to God, when it gets to these acronyms I can't help but trip over my tongue. So I apologize for that.

MS. COUGHLIN: Yeah, we haven't fully assessed that potential iteration of the route, so we'd have to reassess, yeah.

MR. VALDRON: Okay. So definitely

there would have to be some reassessment, but that's all you can say at this point. All right.

If a First Nation provided Manitoba Hydro with additional information or studies related to traditional land use and resource use, would this data be used to develop an Environmental Protection Plan, monitoring plan, would that data be incorporated into the mitigation measures?

MS. COUGHLIN: Yeah, I think we have stated that already.

MR. VALDRON: Okay. And which Manitoba Hydro panel will discuss in detail the future proposed monitoring plans?

MS. COUGHLIN: There's a panel that's going to describe follow-up monitoring. I think it's called -- I'll just go to it right now -- Environmental Protection Program and Conclusion.

MR. VALDRON: So right at the end?

MS. COUGHLIN: Yeah.

MR. VALDRON: All right. And so the assessment right now of significance of impact is based on the preferred route only; correct?

MS. COUGHLIN: Correct.

MR. VALDRON: Okay. And what's the

RAA width, just for the record?

MS. COUGHLIN: It's dependent on the valued component.

MR. VALDRON: Okay.

MS. COUGHLIN: So for vegetation and wetlands, or for wildlife and wildlife habitat, it's 15 kilometres.

MR. VALDRON: Okay. So I'm looking, it seems to be pretty much 15 kilometres broadly all through on that map there?

MS. COUGHLIN: Yeah. It's like 15 kilometres on each side.

MR. VALDRON: It's 15 kilometres on each side. That was going to be my next question.

All right. And if the preferred route had been to the east of Watson, would the significance of impact on traditional land use and resources have stayed low, or would it have been higher?

MS. COUGHLIN: We have heard substantial concerns from communities engaged in the First Nation and Metis engagement process about concerns of going further east.

MR. VALDRON: Okay. So that was very similar actually to a question I previously asked you, but you are aware that there are substantial concerns from First Nations then?

MS. COUGHLIN: Yes, we are.

MR. VALDRON: Okay. And it would be something that would have to be investigated very carefully if the preferred route moved?

MS. COUGHLIN: Yes.

MR. VALDRON: All right. Thank you very much. I appreciate your answering all of these questions and I appreciate your patience and the panel's patience.

MS. COUGHLIN: Thank you.

THE CHAIRMAN: Thank you very much.

MR. VALDRON: No problem.

THE CHAIRMAN: All right. That brings us to the last set of questions for this panel, and that would come from the Manitoba Metis Federation. Ms. Strachan.

MS. STRACHAN: Good afternoon.

So I just have a few fairly high level questions about the application of the methodology, and this primarily relates to how it was applied to valued components other than traditional land and resource use, because I understand the process there was slightly different because there were no thresholds and that kind of thing. And I welcome either of the panelists to respond to my questions, as you deem appropriate.

So I note on slide 11 of your presentation, under the heading Aboriginal traditional knowledge studies, there's a bullet point list. And on that list it says that these studies help to identify project effects. And so was ATK also used to help identify residual effects?

MS. COUGHLIN: Yes.

MS. STRACHAN: And so did ATK or Aboriginal worldviews inform the characterization of these residual effects?

MS. COUGHLIN: Yes.

MS. STRACHAN: So just to clarify with an example, it wasn't altogether clear to me when reading the EIS how it was taken into account. So, for instance, if you were characterizing the magnitude of a residual effect on habitat fragmentation, so ATK was considered by Hydro's team in determining, for instance, whether the magnitude was low, medium or high; is that what you're saying?

MS. COUGHLIN: We're just chatting. So I think some of what you're asking is described best in the traditional land use chapter, but -- could you ask your question again, sorry?

MS. STRACHAN: Sure. So, when I asked about the characterization of the residual effects, I meant that list of criteria, like magnitude, duration, frequency, that criteria that was applied to residual effects, and I'm wondering if in chapters other than traditional knowledge and land use, was ATK and Aboriginal worldviews taken into account when trying to assess those criteria? So, for instance, for magnitude, whether it was considered low, medium or high, were you considering ATK?

MS. COUGHLIN: Yeah. So I guess I'll pull again from the vegetation of wetlands chapter. So in that section, we have a discussion on traditional plants and their effect. We also have a discussion on intactness. And intactness, or I think Mr. Mills refers to Mother Earth or the wholeness of things, so that wholeness and intactness is something that is contemplated in chapters other than the traditional land use chapter.

MS. STRACHAN: Okay. So where ATK was considered in assessing these criteria, we can expect that would be explicitly stated then in the EIS, in that relevant section?

MS. COUGHLIN: Yes.

MS. STRACHAN: So I understand from the EIS and the presentation that a significant residual environmental effect on a VC occurs if the VC is altered beyond an acceptable threshold. That's accurate?

MS. COUGHLIN: Yes. Yes.

MS. STRACHAN: And I understand that where possible you used established thresholds, but in many cases Manitoba hasn't established a threshold for some of the VCs?

MS. COUGHLIN: That's correct.

MS. STRACHAN: So where there were no thresholds established by regulation in Manitoba, then your team tried to set thresholds through consulting other jurisdictions or sources. That's right?

MS. COUGHLIN: That's correct.

MS. STRACHAN: And so I note on slide 34 of your presentation, there are four bullet points, again under the heading determining significance. And one of those bullet points said other worldviews. And I would assume that other worldviews would include Aboriginal worldviews. Is that correct?

MS. COUGHLIN: Yes.

MS. STRACHAN: So were Aboriginal world views considered when Manitoba Hydro's team was researching and setting the significance thresholds for VCs?

MS. COUGHLIN: It was considered when we were discussing the cumulative effects of understanding from traditional knowledge studies. So many traditional knowledge studies talked about how effects are already significant. And so those understandings are conveyed within the traditional knowledge studies. And some of those understandings are also discussed again in the assessment chapters within each valued component, or within some valued component chapters.

MS. STRACHAN: Just to clarify, I understand that before Manitoba Hydro conducted the EIS, they would have set these various significant thresholds. Is that correct?

MS. COUGHLIN: That's correct.

MS. STRACHAN: Okay. So when these

significance thresholds were being determined, was any literature reviewed, or any Aboriginal worldviews considered when setting those significant thresholds?

MS. COUGHLIN: They were. And we have included discussion on both our understanding of how thresholds were surpassed from other perspectives years ago. And that's described in the conclusion, as well as in the veg. and wetlands chapter.

MS. STRACHAN: Okay. So if an Aboriginal worldview, or Aboriginal worldviews were considered, we could expect that that would be explicitly stated in the relevant section of the EIS where the significant thresholds were discussed?

MS. COUGHLIN: Maybe not necessarily exactly in that section. So the definition of how we understood significance from other worldviews may not have been as explicitly defined in the significance section for each VC chapter in the assessment.

MS. STRACHAN: So if there was, for instance, in the chapter where you're assessing visual quality, I can't precisely remember the three points that had to be met for significance to be exceeded, but in that paragraph or the paragraphs that describe that, there is no description of how an Aboriginal worldview would have informed those criteria?

MS. COUGHLIN: Yeah, it may not -- sorry to interrupt, but you're right, that's what I mean. It may not be exactly there.

MS. STRACHAN: Okay. And if it isn't there, how do we know if it was considered or not? Can we assume that it wasn't part of setting those significant thresholds?

MS. COUGHLIN: Well, other views were included within the Environmental Assessment through inclusion of the traditional knowledge studies that have become part of the assessment. They weren't necessarily, though, included in the discussion of the significance threshold.

MS. STRACHAN: Okay. Thank you. And those are all of my questions. Thanks.

THE CHAIRMAN: Thank you. Thanks again for timely set of questions and responses.

Well, I believe that finishes all the intervenors' questioning on this chapter. So thank you, panel. And we will take a lunch break and be back here at 1:30 for the next presentation from Manitoba Hydro.

Are there any detail issues or matters? No, okay. One moment, please.

Okay, just to clarify here, we do have one or two questions related to the understanding of Mother Earth, and we're going to include that in some additional questions that we are going to have for Manitoba Hydro. We'll be circulating those to you in advance, and then reading them into the record and getting responses. So we'll just include that in there so that we don't delay too much. Unless, would Hydro prefer to answer it right now? We'll get the question on record right now. You would? Okay.

So, Mr. Nepinak will go ahead now.

MR. NEPINAK: Thank you very much for this.

Ms. Coughlin, a couple of times you mentioned in answering the earlier question on, you mentioned Aski. Do you understand the word and what it means?

MS. COUGHLIN: I mentioned that in reference to when the CAC was referencing the Keeyask document. And I think aski was later referenced in that section.

MR. NEPINAK: Yeah.

MS. COUGHLIN: So I worked partially on Keeyask and I was part of conversations where they described what that means.

MR. NEPINAK: Aski is basically Mother Earth.

MS. COUGHLIN: Yeah.

MR. NEPINAK: And Mother Earth is a term used by all people, all Aboriginal people describing Mother Earth, obviously. And then again you used it in answering this young lady here. And I'm sorry, I'm trying to form my question.

So Mother Earth is about water, because there's so much water on the earth, you know. And our women are keepers of the water. And so when I wrote Ke nocominanak, it was they are the keepers of the water. The grandmothers were our, for all intents and purposes our government, our senate maybe you could say. And we went to them for clarification for everything. And that's not just Cree, but it's all Aboriginal people, to my understanding, the way I understand it. And I just wanted to clarify that, so that we all know when we talk about these things what we're talking about, and not have any misguided knowledge about that, you know.

So I want to thank you. And I'm not criticizing, believe me, I just want to make sure that we all know what we're talking about, so we can move forward in a good way. But thank you.

MS. COUGHLIN: Thank you.

THE CHAIRMAN: All right. Thank you both for that, and we will break for lunch and be back here at 1:30. Thank you.

(Recessed at 12:32 p.m. to 1:30 p.m.)

THE CHAIRMAN: All right. We will be starting in about one minute. Thanks. Okay. We will get going here.

So, our next panel presentation has to do with electromagnetic, and we will turn that over to Hydro.

Is there anyone to be sworn in, Cathy?

MS. JOHNSON: Yes. William Bailey.

(Dr. William Bailey sworn)

THE CHAIRMAN: Okay, Mr. Bailey, go ahead.

MR. BAILEY: Members of the Commission and audience, I will first give a brief introduction to my background and experience and then discuss the work that we did on this project.

I have more than 30 years of experience in the field of bioelectric magnetics, particularly the aspects that involve evaluating the interactions of electromagnetic fields at various frequencies with the environment, including persons and animals.

I trained at Dartmouth College, the University of Chicago, and the City University of New York, and completed two additional years of postdoctoral training under a National Institute of Health postdoctoral fellowship in neurochemistry. Following that, I was an assistant professor at the Rockefeller University in the field of neurochemistry, and following a number of years there, I headed the department of neuropharmacology and environmental toxicology at the New York State Institute for Basic Research.

Because of my background and experience, I have often been asked to advise provincial, state, national, and international agencies on the status of research on electric and magnetic fields.

The scope of our work, our remit was

to calculate the levels of electric and magnetic fields, audible noise and radio noise associated with the existing transmission lines along the proposed project route, and also what the changes would be after the proposed line was constructed.

And we compared these calculated values to standard references and guidelines to assess potential impacts. That report is contained in Section 2.8 of the environmental impact statement.

In addition, we were asked to provide an overview of the current scientific research on electric and magnetic fields in health, in relationship to specific health effects. And we also discussed how these levels relate to guidelines and limits and governmental policies, and also describe research that has been conducted on the biological environment, including livestock, wildlife, and other species. And that is included in Section 2.7 of the Environmental Impact Statement.

To continue, I would like to summarize our work in the slides you see before you. In particular, I'm providing highlights on topics covered in the EIS, you see here; and in addition, I thought it was worthwhile to include some comments on international developments in the EMF health research.

And then finally, at the end, I describe how our work is informed by this research in our assessment of the proposed transmission line.

First, I think it is important to clarify what we mean by the term EMFs. If you go on the Internet, you can find EMF to refer to a great many things, including I think at some point a rock band. So I think it is important that we clarify what I mean by EMF when we use the term.

Electromagnetic fields are one of the four forces of nature, accompanied by gravity and the nuclear strong and weak forces that are involved in binding atoms together.

In terms of electromagnetic fields, it's difficult to talk about them in any single unified way because they are distinguished by their frequencies, and so the way in which the fields extend in space and the way they interact with the environment, including organisms, varies dramatically based upon the frequency.

So in this slide I've displayed the

electromagnetic frequency spectrum at the top bar on the right hand side. You will see ten to the zero, and then ten to superscript 2, and that represents -- superscript 2 at ten represents 100 hertz, or 100 times per second that field is varying. And then every time you increase that exponent by 2, the frequency is increasing by 100.

And at the far right, you see an arrow coming from DC, pointing to the line, and that represents a static or direct current magnetic field, or electric field which is not varying in time, so it has a frequency of zero hertz.

Just above that we see a reference to 60-hertz electric and magnetic fields associated with our power system. These fall into the extremely low-frequency range. And at these low frequencies, the electric and magnetic fields can be treated as completely separate entities. So if we measure the electric field at a particular point in space at a frequency of 60 hertz, it tells us nothing about the magnitude of the electric field at that frequency.

Now, that changes quite dramatically if you go to higher frequencies. You will see across the top the higher frequencies in the millions and billions of hertz associated with AM radio and cellular telephones. Here, at a certain distance from the source, if you measure the magnetic field, you can calculate what the accompanying electric field is, or vice versa.

So these are our radiating fields that start out at a point from the source and go out in straight lines. So the light in this room, and coming from the screen, are examples of electromagnetic fields that propagate away from the light bulb in a straight line. That does not describe the fields at lower frequencies around DC sources, or 60-hertz sources.

The lower bar has an insert showing that in a certain frequency range of visible light, we have developed -- and as have other species -- sensory mechanisms, photo receptors that are capable of detecting a narrow range of frequencies which we see as light.

And then if you go further up, starting in the high ultraviolet frequencies, going to the end of the scale on the left, you see frequencies that are associated with X-rays and gamma rays. And these frequencies have such high energies that they are actually capable of breaking down chemical bonds. All the frequencies below the ultraviolet range do not have that capability.

So with the low-frequency 60-hertz fields that are associated with the existing and proposed lines, we have electric fields which are associated with electric charges.

So if I hold up this pencil here, there are electric charges on this pen. But because they are evenly balanced in terms of the number of positive and negative charges, if I bring up an electric field meter, I will probably measure nothing around this pen, or a very, very low field.

If, however, I take this pen and I rub it across certain materials or if I walk through this room in the wintertime on certain rugs, I can separate charges and produce very strong electric fields. So walking across the carpet in the wintertime might encounter electric fields of twenty or thirty thousand kilovolts per metre, because I have separated charges by means of the friction between my shoes and the carpet.

We measure these fields, I forgot to mention, in units of kilovolts per metre for large fields. And characteristically, these fields, their strength diminishes in intensity as we move away from them.

Another characteristic of electric fields is that common objects are able to shield or block these fields. So if I take an electric field meter and I start -- and I'm in a uniform field, and I start moving towards a tree or a shrub in that field, as I get closer and closer, the field will get weaker and weaker, and perhaps not even be measurable as we get close to that.

So this has implications for transmission line right-of-way, where the presence of shrubbery at the edge of the right-of-way and beyond would block the electric fields. And a building, simple walls of a building are easily able to block almost all of an electric field from outside sources.

But if we go to magnetic fields, these result not from the charges, per se, but when these charges are in motion, they are flowing through a conductor, or if these charges are moving in, let's say, at the molecular level in a permanent magnet, a magnetic field is produced. And we measure these in units of gauss, for very large fields, or in milligauss, for small fields.

These fields, too, diminish in intensity with distance from the source, but unlike the electric fields, they are not shielded or blocked by common objects such as trees, walls, and shrubs. So if I have a magnetic field meter and I put a block of wood around it, I put concrete around it, this magnetic field meter will read exactly the same whether that material is present or not. It would take some kind of specialized metallic covering, such as a plate of steel, or something like this, in order to deflect and attenuate the magnetic field.

So what are the sources of magnetic fields that we encounter? Well, here is a ubiquitous source of magnetic fields, and that's a static magnetic field of the earth, which is caused by circulating iron in the earth, and ferromagnetic materials. And I saw in a scientific press release of a study today, they described the presence of these currents in the earth as being kind of like a lava lamp, and that there were changes in the -- weak changes in the magnetic field during the day, or during the year, due to these changes in the circulating currents in the earth. And it is this static field which is what causes a compass needle to point north. And at the equator, the field is a value of about 300 milligauss, and as you go further north or further south, the strength of this magnetic field increases to about 700 milligauss.

Now, a man-made source that has become of increasing use in our society for diagnostic purposes in the health care industry are magnetic resonance image machines. And here is a picture of a typical machine.

And there are three types of electromagnetic fields found in this machine. One is a static magnetic field in the range of 15 to 40 million milligauss; much more intense than the earth's geomagnetic field. There is a gradient magnetic field; the operation of switching of the magnets produces an oscillating magnetic field that we have converted analytically to what is the equivalent at 60 hertz, and that's 479,000 milligauss.

And then finally there's an oscillating radio frequency field in the MRI device.

Now, most pertinent to this project

are the extremely low-frequency fields at 60 hertz, and this slide just sort of summarizes how electricity is generated, transformed to higher voltages to be carried on transmission lines across larger areas, and then the voltage is stepped down again to lower voltages and carried through neighborhoods on sub-transmission or distribution lines, and finally, at a pole transformer on the street, converted to the voltages we use in our home.

And that's how we get the electric power into all of our homes, schools, and businesses. And in our homes, this is what provides power to these appliances.

I've often asked about -- well, what are the levels of magnetic field that we encounter from various sources? And here I've put up a slide by David Savitz, a well known investigator in the field.

And if you look at the bottom of the slide, here, you can see the -- going in this direction is the strength of the magnetic field increasing up to -- on this graph, a peak of about 10,000 milligauss. And you can see for each one of these types of exposure here, there is a bar.

And this solid bar describes what are common range of levels that would be encountered, and levels that are below that and above that are much less common.

So starting here, within homes, we see away for appliances fields that are generally less than maybe 10 or 20 milligauss.

Next to appliances, the fields can increase considerably, going into hundreds -- perhaps, in some appliances, over 1,000 milligauss.

And then we have electric blankets.

Then, if you go to distribution of sub-transmission lines, you see that within the right-of-way, where you are closer to the conductor, the field levels are higher than they are at the edge of the right-of-way.

Similarly for high-voltage transmission lines, within the right-of-way the fields are higher, in the hundreds of milligauss here, and at the edge of the right-of-way they are lower.

And then finally, in offices and specialized site exposure environments, you have this range of levels.

I think it is important to notice that the amount of overlap in exposures between what we have here for transmission lines, at the edge of the right-of-way, and distribution lines here, and with exposures that we have from appliances and other sources.

To make it even clearer, how the fields change with distance and what kinds of field levels we encounter from appliances, here I've plotted from Gauger's research, this is going a distance away from the source, and this is the measured magnetic field right next to the appliance.

And these are typical kinds of things that might be found in our homes. And you can see immediately that the fields are highest when you are closest to the device, here going from perhaps 200 milligauss to a few thousand milligauss.

But the other thing that's immediately apparent, as you move away from these appliances, that the fields diminish very quickly to much lower levels.

Now, the questions began to be asked in the 1960s about whether workers in substations and high-voltage switch yards might be experiencing health effects from exposure to the higher fields that were there. And then in the 1970s, studies were done in which it was suggested that one explanation for the observation was that magnetic fields from local distribution lines, or transmission lines, or appliances in the home, might be somehow having an influence on our health.

And so I've laid out here how scientists go about answering a question like this, whether it is electric or magnetic fields or whether it is something in our water supply, and it starts with investigation, doing research studies to find out what are the responses that we observe in people, in organisms, to find exposures. And then, having done that research, we spend a lot of time looking to see how all of these studies fit together to give us a clearer picture.

It is kind of like fitting a puzzle together. Each study gives you another piece of a puzzle, but it is how you put those all together into that puzzle that allows us to draw firm conclusions.

Like any body of evidence, there is

always variation, conflicting data. And so the way that health and scientific agencies evaluate all of these studies is the "weight of the evidence" approach. That is, you assemble the body of all of the research, and you go through it to systematically evaluate the strengths and weaknesses of the studies.

Some of the studies may not have been designed very well, and so they don't give you much information. Some studies may have too few subjects to be able to detect an effect, if it in fact existed; and other studies may suffer from other methodological problems.

So, based upon that weight of the evidence, then we can characterize what are the potential facts of any exposure.

And I point out that it is not often appreciated that science does have limitations. We can not guarantee safety, and we cannot prove that health effects do not exist. I can't prove that Winston Churchill isn't alive in South America. But as scientists, we can do experiments and test hypotheses and ultimately, based upon repeated testing, we can determine whether a exposure at some level is definitely hazardous, mildly hazardous, moderately, or somewhere down at this end of the spectrum, either poses little or no hazard at all.

And I said before, the evaluation of the evidence is done of various sources of information. And the three types that we use in health risk assessment are looking at epidemiology studies of human populations. These are basically statistical analyses of exposures that people have as groups, and how that relates to their health.

So an example may be is that there is the observation that in some Mediterranean countries, the population has a lower risk of cardiovascular disease than other countries in the world, including North America. And so the idea was, well, what accounts for this? One hypothesis is that it is the Mediterranean diet that is responsible. But the question is -- and that's a statistical association between having a certain type of diet and the incidence of heart disease.

But the question arises, what actually is the component of the Mediterranean diet, if it does have an effect on heart disease, which is involved. Is it drinking of red wine? Is it eating large amounts of vegetables? Is it having more physical exercise than people in, perhaps, other countries? It is not clear.

And so epidemiology studies are looking at these broad trends, but it is very hard to parse out what are the factors that are causing these associations, and it's very difficult to draw conclusions about causation between these studies.

You know, if I want to increase my son's college board scores, I don't just -- you know, have him go into the next town because those kids in that town have higher board scores, is not going to cause my son's scores to go up, necessarily. So we have to be careful about how we evaluate these associations in epidemiology studies.

In contrast, experimental laboratory studies have some advantages. So if we do a study of animals in the laboratory, we can eliminate any kind of variation in the responses we observe due to genetic variation, because we can make sure that all of the animals have exactly the same genetic makeup. So if we do observe a difference in the experiment, we know that it is not due to genetics. And we can control the temperature, the humidity, the air quality, all of these things. So we remove all of these extraneous variables, and we can just focus on the one factor that we are interested in. In this case, it might be electric or magnetic fields.

And basically, these are the kinds of studies that are used to draw conclusions about cause and effect, and these are the studies that the safety of all of our drugs and medicines are based upon.

So when you give your child an antibiotic, that antibiotic and the safety of that antibiotic has been thoroughly tested by experiments on animals, and then later clinical studies, to confirm that there is not something unusual that is peculiar to animals and not to humans.

And then, finally, if we have a biological response or effect that is of interest to us, either for some beneficial effect or some investigation of adverse effect, then we can go into studies of cells and tissues and try and determine the mechanism that is responsible for that response.

So when you start evaluating the

studies, there is the take-home message, and that is that one epidemiology study is not enough to draw a conclusion. I would say that also applies to laboratory studies as well. All epidemiology studies are not created equal; they all have strengths and limitations. And a statistical association, by itself, does not provide evidence that there is a causal relationship between an exposure and a response in a population.

The way that health agencies assess this evidence is by assembling blue-ribbon scientific panels. These panels may range from as few as eight or nine people to maybe over 30 people that represent expertise in various scientific disciplines. It could be medicine, toxicology, exposure assessment, engineering with regard to exposure issues. And they follow a defined methodology, the "weight of the evidence" methodology I described, and their conclusions are hammered out in a consensus statement that is given out to the public.

Here I've listed some of the reviews of EMF and health research by national and international agencies, going from 1998 to 2007.

And here I've picked out of that group

the report in 2005 from the Federal/Provincial Territorial Radiation Protection Committee that was established to help agencies here in Canada. And they performed a review of epidemiology and laboratory research studies on 60-hertz EMF, and here are their conclusions; that is, adverse effects from exposure to power frequency EMFs at levels normally encountered in homes, schools, and offices, have not been established.

Since there is no conclusive evidence that exposure to EMFs at levels normally found in Canadian living and working environments is harmful, FPTRPC is of the opinion that moderate measures and participation in the process of acquiring new knowledge are sufficient. They are talking from a precautionary perspective.

The next review appeared in 2007, by the World Health Organization, which is a very thorough and comprehensive review of all of the research at that time.

And here is their conclusion. Consistent epidemiologic evidence suggests that chronic low-intensity ELF (extremely low-frequency) magnetic field exposure is associated with an increased risk of childhood leukemia. However, the evidence of causal relationship is limited, and therefore exposure limits based upon epidemiological evidence are not recommended, but some precautionary measures are warranted.

And then they go on the next slide to describe the precautionary mechanisms that they evaluated. And I pointed out here that in the centre paragraph:

"Changes to engineering practice to reduce ELF exposure from equipment or devices should be considered, provided they yield other additional benefits, such as greater safety, or involve little or no cost."

And the thinking there -- and they describe some of this in their report -- is that if you don't know that you have a health hazard, then you wouldn't want to spend more money preventing exposure to that than you do for things that you know are health hazards to the population.

Skipping back a few slides here, because they got out of order in setting up.

After the WHO report in 2007, three

major agencies have issued their reviews.

The International Commission on Non-ionizing Radiation Protection -- this is an affiliate of the World Health Organization -- in 2010 issued their assessment.

The Swedish Radiation Safety Authority has continually, at frequent intervals, issued updates on their evaluation of the science.

And most recently, a scientific committee of the European Commission in 2015 has issued a comprehensive review.

Now I'm skipping back to a few slides ahead, to -- now this is the slide which shows the Scientific Committee on Emerging and Newly Identified Health Risks, and their evaluation of electromagnetic fields across a range of frequencies, including the extremely low frequencies at 60 hertz, static fields, combination of these fields with each other, and exposure to these fields with other environmental stressors. And then they talk about the research recommendations, which are summarized here on this slide.

And with regarding epidemiology studies, they say that studies are consistent with earlier findings of an increased risk of childhood leukemia, with estimated daily average exposures above point 0.3 to 0.4 microtesla. And I will just tell you that that's the terminology that's used in Europe, and often by scientists. A microtesla can be converted to a milligauss by multiplying by 10, so that's exactly the same as exposure above 3 or 4 milligauss.

They go on further to say that no mechanisms have been identified that would account for this statistical association, and there is no support from experimental studies, and that the shortcomings of the epidemiology work prevent a causal interpretation.

They also talk about existing studies do not provide convincing evidence for causal relationship between ELF magnetic field exposure and self-reported symptoms by things like headache, or tiredness, or malaise.

And they also comment that the epidemiology studies do not provide convincing evidence for an increased risk of neurodegenerative disease, or show an effect on reproductive functions.

So I've tried to condense hundreds and

hundreds of pages of these scientific reviews into a few general points. They all agree that there is little evidence that electric and magnetic fields are associated with adverse health effects. They believe that there is some epidemiological evidence for a statistical association of magnetic fields at high average levels with childhood leukemia. And we are talking about here not momentary exposures; we are talking about over periods of time of months to years. And I can come back and explain that a little more later if need be.

And they agree that the laboratory data does not support a link between EMF and any adverse health effect, including leukemia, or they have not concluded that EMF is known to cause any disease.

So here is where I'm going to digress for a little bit and just give you some updates about some recent international developments that shed light on this body of research. And first of all I'm going to talk about the epidemiology of childhood leukemia, because this is the area of research which has gathered the most interest and concern, and which there has been the most consistent associations reported.

And it was these consistent associations that caused the working group that I was part of, assembled by the International Agency for Research on Cancer, to state that there was limited evidence for a relationship between long-term average exposure to magnetic fields and childhood leukemia.

So in 2013 -- this is after the WHO review and so on -- there is a flurry of power line studies that came out. This one is called the GEOCAP study. And there is others here which are not showing well on the screen, but we will go through them separately.

So, the first one that you saw was what is called a GEOCAP study, or the French power line study, in which these investigators did a typical epidemiology study for this literature.

And basically the goal of these studies is to compare the exposures that people have in two groups. One group is assembled -- in this case, it was children with acute leukemia -- compare the exposures of that group to a comparable group of children without leukemia. And the idea is, if there is a very large difference in the exposure of these two groups, then maybe that exposure has something to do with the disease.

And so in this study, the way they tried to estimate or compare the exposure of these two groups was by calculating the distance between the residence where this child lived and the nearest overhead high-voltage transmission line. And they looked at voltages of lines all the way from 63 kV to 400 kV. Overall, they did not find an association between distance to the transmission line and childhood leukemia.

One of the limitations of this and the other studies that I'm going to be talking about afterwards is that distance from a transmission line is not a very exact way of estimating exposure to magnetic fields. Obviously, if you are 100 feet from a transmission line that is carrying a lot of current, the magnetic field is going to be higher than if you are 100 feet away from a transmission line that is carrying almost no current. So based upon these studies, if you are 100 feet away, they would be treated the same.

So that's a limitation of these type of studies, but they are still informative.

Another study was done in Denmark, in which Pederson and his colleagues compared the exposure of cases of leukemia with controls that were randomly selected from the population. And this was the residence at time of birth. And they looked at transmission lines with voltages between 132 and 400 kilovolts. In this population, they did not see a relationship between childhood leukemia and living near a high-voltage transmission line.

I think the next study is one of the most interesting of the studies because I think it really helps us understand not only something about this epidemiology literature but also the way that science progresses.

So I'm going to back up a second here and talk about a study that was published in 2005 by Dr. Draper and his colleagues at Oxford University in the United Kingdom.

What they had reported was, looking at a large portion of the country, they compared the distances of the birth addresses of children who had leukemia and they compared it to other children. And what they reported was that there was an association that the odds of a child living, having an exposure by living closer to a transmission line was greater for a child of leukemia than it was for a control. And this study got a lot of interest for a couple of reasons. First of all, it was done by an extremely highly regarded group of epidemiologists at Oxford University and also because they had this finding that this association extended out as far as, you know, hundreds of metres away from the line, at a distance where if you took a magnetic field meter, I don't care what kind of currents were flowing the line, you would not be able to measure a magnetic field. So they had some doubts that a magnetic field was responsible for this association. But that was just one possible explanation.

So they went back and over the years they went back and calculated the magnetic fields to the residences and overall they found that there was a trend towards higher fields at people's houses living closer to the lines but the association was not statistically significant. And then here in this study in 2014 they gather 13 more years of additional research, they included lower voltage lines down to 132 kV and they included all of Scotland. So now they have 53,000 odd cases of cancer to look at and 66,000 controls. And they are comparing the distances of the children with and without cancer to transmission line distance. So here are the results that they show in this 2014 analysis.

So, across the bottom you see the here are the years where they covered the studies and here are the odds ratios, sorry that's missing here. And what they report is in the 2005 study they were reporting on data gathered in this period of time and you can see that they have an association here of above 4, so this represents that children with leukemia had higher odds of living within 199 metres of an overhead transmission line than did the control children.

But when they went and continued to gather data and analyze this population over time, what did they see, is that this association that was present in the 1960s, and for a period of time thereafterwards, diminished. And so in the most recent analysis, there is no association between living near a transmission line and whether or not a child has leukemia.

And you can see if you look at

distances greater than 200 metres, where you wouldn't expect any magnetic field exposure, there has been essentially no change over this period of time.

Now, the question, interesting question, is: What accounts for this? But clearly, the idea that in our society, as we build more and more power lines and as we use more and more electrical devices, that this association, if it is related to magnetic fields, would disappear, just is not credible.

And so both in their 2014 study and in a 2015 study of underground lines and a 2016 study, they continue to refine the argument that the pattern of these results do not fit the idea that magnetic fields were responsible for the association in the initial period that they observed, and rather that they were factors about the way that the population sorted out in those earlier periods, which accounts for the observation.

The next study is more recent, from 2016, in which investigators in California attempted to replicate the original Draper study. It took a long time for them -- 11 years -- to assembling the study to replicate the 2005 publication.

And here they have a large number of cases of leukemia, central nervous system cancers, and they randomly selected the controls from the population individually, matched them for age and sex to the cases, and looked at the address at birth and the distances of the overhead transmission lines over a wide range of voltages, and did not report an association between distance to the transmission lines and whether or not the child had leukemia.

So that is a perspective of how science has advanced over this period of time. And in these recent studies that have been done in the UK and France and Denmark, and this more limited study in California, that these associations have not been confirming some of the associations that have been suggested based upon earlier studies.

And I didn't really focus on discussing the laboratory experimental studies, except I point out here that I think it is important for the public to understand that there has been important research done in the laboratory. And this is what the World Health Organization has -- and other agencies have pointed to as the lack of evidence supporting the idea from some epidemiology studies that magnetic fields were a cause of cancer.

So here are studies in which animals -- in this case rats and mice -- have been exposed over their entire lifetime to high magnetic field levels at 50 hertz, which is the power frequency in Europe, or 60 hertz here in North America.

And again, I'm sorry, these values are in units of millitesla. 5 millitesla is 50,000 milligauss. So in the Yasui study in 1997, they exposed the animals to 50,000 milligauss over their entire lifetime. They sacrificed the animals and went through all of their tissues with a microscope, examining them, looking for elements of cancer or other toxic effects.

Dr. Mandeville, in Quebec, did her study at fields going up to 20,000 milligauss, and two studies from the National Toxicology Program in the U.S. exposed rats and mice to fields up to 10,000 milligauss. And overall, these studies did not see an increase in any type of cancer.

Now, more recently, studies have been done of Alzheimer's disease, and the early studies were done of workers in occupational environments. The difficulty with Alzheimer's disease is there is no firm diagnostic test while a person is alive, so that has been a difficulty in advancing research in this area.

But in 2008, this study was published talking about Alzheimer's disease in Switzerland. And the design of this study was much like the previous studies that I talked about for childhood leukemia; they looked at the address of persons that had died -- on the death certificate, it identified where they lived at the time of death -- and they were trying to interpolate from the death certificate whether they had Alzheimer's or not. And then they compared that to how long they had lived or how close they had lived to overhead transmission lines.

And you can see here, on this part of the slide, overall, there wasn't much of a relationship between distance from the nearest 220 to 380 kV line, and their exposure, the distance from that. But if you looked at it 5 years and 10 years and 15 years for people living in the same location, it looked like that persons that were -- proportionally more persons with Alzheimer's disease living within 50 metres of these overhead lines. And so this only became really statistically significant for these longer-term periods.

The difficulty here, we are dealing with mortality, and it is hard to distinguish deaths from Alzheimer's disease from other types of neurological disease. And so it wasn't until 2013 that this study in Denmark attempted to replicate this earlier study with a more advanced study design.

And they use the very good Danish registry to identify new cases. So these are people that had been specifically identified as having Alzheimer's disease. And they very carefully identified the addresses of these cases. They then looked at the distance to the lines, and also did comparisons of the estimated exposure. In this study, using this more advanced model, they reported no association.

And here is a slide from their study. Let me just sort of unpack this a little bit here, because it is a lot of numbers.

So this is here showing distances to the power lines, in metres. And this is the number of cases, the number of controls that were compared, and this is the odds ratio, or hazard ratio, here.

And if you start out 200 to 600 metres away from the line, this is the reference group. So we are comparing how these numbers here compare to a reference group at this distance.

And you can see that as you look at distances where these people lived, as you get closer and closer to the transmission line, these values are all about 1. So what they are reporting here is that there is no association that is different from what is present far away from the lines as you get closer to the lines.

And I point out here, what this column here reports, 95 per cent confidence intervals. So just purely from a statistical point of view, you will expect some variation, like when you look at the results of polling for political preferences and so on. And so this gives the range, if you did repeated samples over and over again, in the long run, the range of values could be between in this range here. And none of these lower values is above 1.

So this tells you that none of these associations that are reported here can be statistically distinguished from this association here.

And then if you look at cumulative time within 50 metres of a power line, specifically, just taking this line here, and looking at number of years, going further away, you can see 1, 1.8; it jumps up a little to 1.79, and then after 10 years, it drops back down to .71.

And none of these lower confidence levels here are above 1. And that tells us that there is not a reliable difference in these numbers here. Again, representing that there is not an association between Alzheimer's disease in the study and living for long periods of time near a transmission line.

So, altogether, what we've reviewed so far is there is no conclusion from health or scientific agencies that EMF is a cause of a disease. There is no consistent association between magnetic fields and any disease, with the exception for the childhood leukemia studies which had been reviewed in earlier years.

And as I pointed out, these newer studies that were done in California and in other countries, in France and Denmark and so on, the association is weaker or non-existent, and both short and long-term animal studies as a whole do not show adverse effects, and laboratory studies of cells and tissues do not confirm a mechanism that would explain a causal relationship between weak magnetic fields and any disease.

In this slide here, I apologize, the text that's quoted should be below the World Health Organization bullet. And I will read that, because if you go to the World Health Organization website, this is their current interpretation of the evidence. It says:

"Based upon recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low-level electromagnetic fields."

We also reviewed in our report research on livestock, wildlife, and plants. There is a wide range of types of studies that have been done to look at this. These are studies on farm, and observation of cattle living near transmission lines; experimental studies of cattle, sheep, and swine where animals had been penned directly underneath the conductors and compared to a control group living hundreds of metres away.

It involved looking at the migration patterns of elk and deer to see if noise or electromagnetic fields might deter their behaviour. Field studies of corn and soybeans, and experimental studies of more than 70 different plant species have been studied in the laboratory to see if high levels of fields would affect their productivity or health.

And overall, there is no effect of 400 kV, 500 kV, and 765 kV lines, or similar levels of exposure in these studies.

I'm often asked questions about -- "Well, you know, we hear about electromagnetic interference from various kinds of sources; what about power lines?"

And particularly more and more people these days, as we live to longer periods of time, we find more uses for them: implanted pacemakers are an example of a medical device that -- some of you at my age who may remember that when microwave ovens first came out, you'd go into a cafeteria and there would be a sign next to the microwave oven that would say "Not to be used by persons with pacemakers."

Well, you go around today, there are no longer any signs around microwave ovens, for two reasons. First of all, the microwave ovens are designed better today, so they don't leak radio frequency fields. And second of all, pacemakers have been considerably improved, and so they are shielded by metallic cases; they have built in filters to remove interference, and they have adjustable sensitivity settings, so that you can set the threshold for reaction of the pacemaker to above the kinds of background noise that a person might occur in their everyday environment.

And we have searched databases in Canada, in the United Kingdom and the U.S., looking for reports of interference of pacemakers by transmission lines. We have not found these reports, although there are all kinds of reports in these databases about electronic surveillance systems at book stores, and other consumer outlets, causing interference with pacemakers.

There is the fellow who carried his stereo speakers from one room to another and inadvertently turned off the pacemaker, because the magnet of the speaker was strong enough to toggle off the pacemaker. The physicians use a magnet to turn a pacemaker on and off, and to adjust the sensitivity; and the magnetic field from the speaker was so strong that it turned off his pacemaker.

So there are lots of other devices that have been reported as producing interference with pacemakers, but not high-voltage power lines.

Now, how does this inform our assessment of this proposed transmission line project? Again, what we looked at in this project were two components: the transmission line itself, which is routed on an existing right-of-way, except for two sections, which in our reports we have labeled E1 and E2, E1 corresponding to the self-supporting towers and E2 to the guy-wired towers.

And then, in order to accommodate this transmission line, there is going to be additional equipment installed at the Dorsey, Riel, and Glenboro South stations.

And here is the route. And this map, with our annotations on it showing the different sections we analyzed, going from A to E, gives you the key about how to relate the values in our tables to geographical locations along the route.

Now, what we evaluated for the EIS was we calculated the electric field, and we also looked at what kind of currents would be induced on a very large object that was parked underneath the transmission line. We calculated the magnetic field. We calculated levels of audible noise due to the corona of the conductors, and also the radio noise associated with corona on the conductors.

I won't go through the whole report; we'd be here a long time. But I singled out this section here, on Route G. And just to go back a second, Route G, as you can see here, is in this portion of the route.

And here the existing transmission line is also a 500-kV line, the D602F. And in the proposed postconstruction configuration, the new line will be constructed adjacent to it.

Here is the graph from our report showing the calculated fields from these existing lines, which are shown by -- this is the existing line here, shown in kind of gold colouring; and here is the calculated magnetic field -- or the electric field, I'm sorry -- coming from this line here.

And as you can see, the peak is here, and it comes down, with distance going off in this direction, and the same thing is true there. And the peak calculated here is about 10 kV per metre. And this is based upon the preliminary design of the calculations.

And as I will tell you in a moment, there has been further refinement in what is the height of these lines here that is going to make some adjustment to those values.

And then here, you can see here the calculated values associated with the new line here.

So you can see that the addition of the new line here increases the field on this portion of the right-of-way but has almost no influence here, at the edge of this right-of-way, and going in this direction, that the field at this edge of the right-of-way is dominated by this existing transmission line.

Here is a similar profile calculated for the magnetic field at average loading. And again you can see, here are the magnetic fields, both under existing and proposed conditions, are very similar above the existing line and going in this direction, away from that, and that the addition of the new line serves to increase the magnetic field here. And that magnetic field diminishes, and so it has a minimal effect at this edge of the right-of-way.

I would point out that for reference, the limit -- I'm going to be talking about standards in a minute -- the standard, the limits for exposure, human exposure of the general public for electric fields, is calculated to be around 27 to 34 kV per metre, depending upon which organization's guidelines you look at.

For magnetic fields, it is between nine and twelve thousand milligauss. So you can see the electric -- here the magnetic fields are in the range -- the peak values are about 200, compared to this 9,000 and 12 000. So the values are -- both under the existing and proposed conditions -- are far lower than the guidelines.

Here are the values for audible noise, in this section.

This line shows audible noise due to the existing transmission line, and here is how that noise level will increase after the proposed line is installed. And you can see that there is -- much of the effect is related to the existing line at this edge of the right-of-way.

And I also point out that these values are, in fair weather, well below what you might describe a quiet rural background as, so that at these levels, it is not clear, even in quiet backgrounds, whether these would be audible. Certainly difficult off the right-of-way.

Like everything else in life, at low levels, we don't have much concerns about exposures. I get a kiss from my children on the cheek, and it is fine; somebody hits me with a hammer in the face, I'm hurting. And the fundamental concept of toxicology is that the dose makes the poison, and that as you keep increasing the exposures of almost anything that we encounter in life, at some level you will get some kind of untoward effect.

So EMF, like anything else scientists have investigated, what are the highest levels that -- of exposure that can produce adverse effects? And then we establish exposure guidelines to prevent those effects from occurring, either in workers or the general population.

There are two organizations that have published standards, the International Commission for Non-ionizing Radiation Protection -- and this is the guideline that has been adopted by all the members of the European Community, some 27 countries. And the IEEE, International Committee for Electromagnetic Safety, has a similar guideline.

Here I've compared the guidelines of these two organizations. The first is for controlled environments; that is perhaps workers at Manitoba Hydro.

And here are the levels of recommended limits on exposure for magnetic field and electric field, and these are what are called reference levels. So if you have an electric field exposure below this value here, 8.3 kV per metre, you are guaranteed, for any configuration, any kind of way in which you might be in that environment, of being below the basic restriction, which is a internal electric field produced by these external exposures.

And you can see, for the general public, these values are much lower; it goes from 10,000 to 2,000; 27,100 for this guideline for ICES to the 9,000, and the same thing is true for the electric fields. Higher exposures are allowed for workers than they are for the general public.

And for magnetic fields, all of the exposures are below this value; and for electric fields, the dew line exposures are below these values. And these are the reference values, so you are allowed to exceed these reference values if you've done further calculations to determine that the underlying basic restriction -- that is, the biological limit -- has not been exceeded.

Now, when we were beginning to work with Manitoba Hydro in evaluating this project, when we did our initial calculations of the electric fields for the existing lines, the fact that the field levels had come up to about 10 kV per metre suggested to us it would be worthwhile for us to investigate whether that level of exposure for this line would cause currents to be induced on large vehicles parked underneath the line that might give the potential to produce something greater than a nuisance shock.

And so we evaluated this possibility by assessing the amount of currents that would be induced on the largest agricultural vehicle that we could imagine might be underneath the line, where agricultural operations were coming into account. And in both Canada and the U.S., the limit on that induced current, if you walked up and grabbed a handle of a vehicle parked underneath a line, the largest current that would be allowed to flow through you to ground would be 5 milliamps.

So our calculation showed that for all of the sections except F and G, these induced-current values were quite low, and well underneath that. But in sections F and G, the induced current did not change as a result of the project, but it was at -- we calculated at 5.6 milliamps above that limit.

Now, subsequently, Manitoba Hydro has been working further on the design of their facilities and have communicated to us that the preliminary conductor heights that we used for our calculations of the electric and magnetic fields and other quantities in those sections of the right-of-way where the induced currents on vehicles was high, that those -- in the case of existing lines, that the minimum conductor height is now 14 metres, rather than the 10 metres we used in our calculations.

And for the new line, that is increased a little bit, from 14.4 to 15.5 metres. And those elevations of the conductors would bring both the -- well, it would bring the existing lines in compliance with the CSA and the U.S. standards on induced currents.

And so that was an issue that we identified, and that then has been looked further into by Manitoba Hydro.

And the magnitude of this induced voltage or current depends upon the size of the vehicle; obviously, if you have a huge combine which is extending up in the air closer to the conductors, the induction will be larger.

And our calculations were extremely conservative. If you were to have an issue where people were getting stronger -- something stronger than a nuisance shock, there are various ways that that can be investigated and mitigated.

So in conclusion, the EIS reports that the proposed project would increase EMF audible noise and radio noise on the transmission line right-of-way, but will result in only a small change in these parameters at the edge of the right-of-way and beyond.

I point out that for the magnetic field, where the new line parallels an existing line, the largest increase at the edge of the right-of-way is only 3 milligauss. Where it is on a new section of right-of-way, not paralleling another transmission line, the magnetic field would increase to just 21 milligauss.

And even for those few days of the year where the largest currents may be expected, the magnetic field at the edge of the right-of-way, in those sections where the new line is just by itself, would only increase to 24 milligauss.

And the electric field, similarly, at the edge of the right-of-way, increased quite little. For existing lines, it increases -- where you parallel existing lines, it increases by only half a kilovolt per metre; and where the new line is by itself, the field level, without any background, increases to only .8 kV per metre.

With regard to the scientific literature on electric and magnetic fields, the current consensus among numerous national and international agencies that have reviewed this extensive body of research is there are no known adverse health consequences of exposure to ELF EMF at the levels generally found in residential and occupational environments, including proximity to electric transmission and distribution facilities. Results from scientific research do not provide evidence to alter this conclusion.

Thank you very much for your attention, and I will welcome any questions or comments.

THE CHAIRMAN: Thank you very much for that presentation.

All right. For this afternoon's questioning -- and we will begin the questioning, and then find a logical break in the proceedings for a stretch.

So I believe there may have been some discussion between the Southeast Stakeholders

Coalition and Dakota Plains regarding who will start first. Is that true? And the decision -- okay. Dakota Plains.

Mr. Mills.

MR. MILLS: Do we have an additional microphone today, Mr. Chairman? It is a reading light. Wow. Thank you very much.

Mr. Bailey, good afternoon.

MR. BAILEY: Good afternoon.

MR. MILLS: Thank you for your very complete presentation.

Before we get started, I just have one quick question; perhaps you can help me. And we were wondering this at lunchtime: Does continuous exposure to multiple PowerPoint screens, combined with high-intensity WiFi and multiple LED light sources, pose any risk to my pacemaker, tinnitus, or Alzheimer's?

MR. BAILEY: I think you'd have to parse it out by looking at each one of those sources independently, and I think that's a whole different topic.

MR. MILLS: Thank you.

Sir, we met before; we had this parallel conversation on Bipole. And we had similar concerns for our First Nation client then, and although the concerns remain, the information seems to grow and get better, and we acknowledge and appreciate that.

I reread our transcript of Bipole, and I reread your Bipole report, and we certainly reviewed this. Sir, we reviewed your CV, and I have to tell you, we were considering asking the CEC for additional funding in order to cover the time that we spent doing that, but we sensed we wouldn't have much success. Eight academic appointments, five teaching appointments, four prior experiences, 124 published documents, total of 156 CV references. You certainly know what you are talking about.

In reviewing your work, sir, and we seemed to dig into it, somewhere I came upon a quote of yours that -- where you said that you were more concerned about -- I think you were referencing your children, and you'd mentioned them in this presentation; you were more concerned about Lyme disease than about EMF. Do you remember that quote?

MR. BAILEY: That is something that I am concerned about. I don't remember specifically when or where I made that comment, but that's something that my evaluation of the scientific evidence has informed my concern, or lack of concern.

MR. MILLS: I couldn't find it today, but I know that the reference somewhere was that you expressed that you were more concerned about the effect of Lyme disease on your family than on EMF, and I wondered what that concern might be.

And just for your information, there were -- there are currently 4 million people in the United States with an increase of 300,000 per year affected by Lyme disease.

Could you call up your Slide 23, please.

MR. BAILEY: Which -- what's the --

MR. MILLS: I think it is the right-hand screen.

MR. BAILEY: Oh, I see.

MR. MILLS: I hope it's 23.

MR. BAILEY: That one?

MR. MILLS: Yes. Thank you.

MR. BAILEY: Okay.

MR. MILLS: In your work in this project, sir, did Hydro ask you to provide any input as to what they could do to possibly reduce EMF and/or corona noise radiated from this transmission line?

MR. BAILEY: They asked us to -- you know, they gave us the information about the design of the line and the project, and asked us to review this. And one of the things that -- the first questions we asked was whether or not the planned phasing of the new line had been considered, so that the -- as to how it fit with adjacent lines. The reason is that electric and magnetic fields, unlike other things that we have in life, not only have a magnitude, but they have a direction.

MR. MILLS: Sir, I apologize; I --

MR. BAILEY: So that's what we asked them about, and they told us that the design did incorporate what is called "optimal phasing" to minimize the magnetic fields to the new line. And that was an important factor.

MR. MILLS: I'm sorry, the question is, did Hydro ask you to provide any input as to any techniques they could employ to reduce EMF and/or corona noise on this transmission line?

MR. BAILEY: As I said, they had

already selected the optimal phasing, which is a technique for minimizing magnetic fields. Again --

MR. MILLS: So the answer would fairly be no, then?

MR. BAILEY: We did not advise them further, because they had already selected.

MR. MILLS: Thank you.

Sir, are some of us more sensitive to EMF than others? Would children be more sensitive than you or I?

MR. BAILEY: Let me unpack that. My response is no. And let me explain why.

We know that exposure to electric and magnetic fields, as well known for well over 100 years, are capable of inducing voltages and currents in the body, and that is what has been determined as a confirmed potential adverse effect at high levels.

If you do the computations for the levels of fields that are induced in the body of larger people, that there are larger currents and voltages induced, and they are smaller for smaller people, and much smaller for children. So the exposure that children have to internal electric fields from an external source will be, in general terms, smaller than they would be for a large adult.

And apart from that, I don't have evidence that children have some kind of inherent greater response to magnetic fields or electric fields than adults.

MR. MILLS: Thank you.

Sir, does EMF increase as the load down the line increases?

MR. BAILEY: Only the magnetic field will increase directly with the load or the flow of current on the line. The electric field would not -- only increase a minor extent, and that would just be accounted for by perhaps a greater conductor sag, if the line was carrying higher currents, but not primarily due to the operation of the line.

MR. MILLS: Thank you.

What loads on this line did you assume when you prepared your calculations?

MR. BAILEY: Okay, one moment.

MR. MILLS: I understand this is a 500-kVA line. Did you assume maximum load, did you assume an average load, did you assume the sold load? What information do you base your conclusions on, in terms of the load down the line?

MR. BAILEY: One moment.

If you turn to Section 2.8 of the EIS, and appendix C, it says:

"Summary of right-of-way configurations, line loading, and new structure diagrams."

Table C2 has the line loadings of both existing and proposed conditions that were used for modeling the magnetic fields. And those were 881 megawatts for the new line under average loading, and 1,000 megawatts at peak loading.

MR. MILLS: So what percentage of potential maximum line loading are your calculations based on?

MR. BAILEY: Our calculations are based upon the average, the expected average, and also the peak, and does not take into account the per cent of the time that the line is on -- I mean, the per cent of the time that it is under peak or average conditions.

But in our experience, the time that a transmission line is at its peak loading is; for a limited period of time, measured in hours, or perhaps a few days. And if you want an estimate of the magnetic field on any particular day, using the magnetic field calculated average loading is the best predictor.

MR. MILLS: Sir, how accurately can EMS be measured? These figures that we refer to, is there a -- when you talk about a milligauss, is there a tolerance in those numbers, or does measurement equipment of EMFs provide a fairly accurate report?

MR. BAILEY: Depends upon, in part, the quality of the meter you use, but you can quite accurately measure magnetic fields at virtually any resolution you want to. Most commonly, the resolution of the meters is about a tenth of a milligauss.

MR. MILLS: I see. Is that expensive equipment?

MR. BAILEY: It need not be expensive equipment to get a measurement of a tenth of a milligauss; but to be sure that that is actually the field of the frequency you are interested in might require a more expensive instrument.

MR. MILLS: How difficult would it be

for Manitoba Hydro to survey the proposed route and establish the existing EMF levels along it?

MR. BAILEY: One could go out and take those measurements along the existing route, but I will point out that measurements, by and large, are what we call spot measurements; so if you go out at 4:00 o'clock on a Friday afternoon and take a measurement at 100 feet from the existing line, you could come back a week later, a month later, and get perhaps a higher or a lower value.

MR. MILLS: Okay. Thank you.

You are a scientist; is there a protocol or an approach to pre-measuring the EMF levels along this line that would provide you with a standard or a baseline that you could refer against?

MR. BAILEY: There are protocols for taking measurements along transmission lines that have been published by the IEEE, and are referenced in our report, but there is no particular application towards pre- -- what you call preconstruction measurements. In some projects, we have done preconstruction measurements and found that those preconstruction measurements match pretty well with what we'd calculated for those existing lines.

So it can be done, but we haven't seen a case where it provided additional or particularly useful information, more than what we had obtained by modeling.

MR. MILLS: Sir, our sense is that there is a great amount of concern, but the concern, as you've pointed out, is difficult to confirm. And we are wondering -- and we look around to other constituencies, and appropriately enough, in the case of the EMF on this line, we look no further than the U.S. permit on the line that this connects to. And Article 8 of that permit -- and just let me take you through this; bear with me.

"Minnesota Power shall investigate any complaints from residents with regards to EMF interference identifiably caused by the operation of the facilities covered. Minnesota Power shall then take appropriate action as necessary to mitigate such situations, and complaints from individuals residing within a radius of the centerline of the transmission line must be resolved. Minnesota Power shall maintain written records of all complaints."

Would it be -- it certainly seems to work for that constituency. Can you see anything that would prevent or -- yeah, prevent -- Manitoba Hydro, as we do with air and water and all kinds of other environmental variables, do you see any problem with, as a condition of the licence for this work, and in the face of all of the concern -- and I respect, arguably, in many cases unsubstantiated -- but in the face of all of the concern, would it be -- would you have any difficulty with supporting a licence condition that called for Manitoba Hydro to do a pre and post construction EMF reporting, as you have done on existing lines, you've shared with us, and for similar conditions within the operating licence to be embedded, including a requirement that Hydro mitigate any proven EMF effect of this line?

And before you answer that, in the case of the American permit, they established a radius; but all of the information you've provided us with is that the further away you get, the least risk there is. So I'm not sure that even a radius would need to be considered, in light of the fact that distance appears to eliminate EMF.

So a simple question: What the United States permit does in requiring the utility to prior measure EMF and then report to any cause or concern, would you see a problem with that? Would it be possible, scientifically, today?

MR. BAILEY: A moment, sir -- did you read part of the permit that called for the pre-construction measurements, or did you talk about other activities? I may have misheard you.

MR. MILLS: I may have missed that. I'm referring to Article 8 of the Great Northern permit, which requires Minnesota Power to investigate any EMF complaints and to take appropriate action as necessary to mitigate any proven complaints.

I am anticipating that in order to substantiate an EMF complaint, we would need a prior construction or baseline to measure against. And I'm asking your scientific advice and help in -- how would we describe that process? How would we put that together?

MR. BAILEY: Okay. Thank you for clarifying your question.

Certainly what you read out, as a requirement from the permit on the U.S. side of the line, seems to me pretty much standard utility practice. If people have complaints about a facility, in my experience, the utility is to investigate that complaint and deal with it. If that complaint was about EMF, it would be -- the way that you would go about investigating that, specifically, would be to go to the location where that complaint originated, whether it is the landowner or some portion of the right-of-way, and take measurements there to determine if there was anything unexpected.

And a pre-measurement may or may not be at all helpful, because that pre-measurement may not have been taken at a location which was close to where the complaint arose, and so therefore would not be helpful; or that there might be site-specific conditions that might make the area where a concern or complaint originated to be different from what a standard pre-construction survey might mean.

So, certainly a pre-construction survey can be done, but it wouldn't be something that would be particularly informative in terms of addressing a complaint of a particular landowner.

MR. MILLS: I don't understand. If we did a pre-construction survey, and an affected landowner was shown that these are the EMF levels today, and three years later the line is built, and the affected landowner has concerns as to the EMF experiences they suspect they are having, would it not be very reasonable to compare pre and post and be able to say to the farm owner, "You are right", or "You are wrong"?

EMF, it appears to me to be -- you've described that it's very measurable. You model it, you anticipate it, you measure it. You've told me the equipment is reasonably inexpensive. You've told me that you are able to measure it to very, very small increments. Why could we not just simply provide, as we do with water quality, pre and post, we do with air quality, pre and post, why don't we include that as a condition of this licence that Manitoba Hydro's EMF line pre and post is catalogued, independent third-party measurements? And if the land users or owner, if the hunter, the trapper, the fisherman, is concerned as to their EMF, and there is a reasonable basis for their concern, the permit could require Manitoba Hydro to, in due course, measure and be able to say, "I'm sorry, but it was 10.6, and it is 11.2, and your concerns are unfounded."

Couldn't we establish that in the permit, so that all of the -- shall I say "boogeyman" business around EMF -- could be quite simply measured and proved or disproved? And if it is proven that there is an EMF effect, a condition as Minnesota Power is required, complaints from individuals residing within one-half mile of the centre line of the transmission line must be resolved.

It seems to me it is a -- let's put your money where your mouth is, to be coarse.

MR. BAILEY: I think what you describe is extremely complicated, and not likely to be useful in resolving particular customer complaints.

So this is a very long transmission line. One could not reasonably measure the magnetic field just by itself. Electric fields are complicated by vegetation and surrounding objects, and so those levels vary all over the place; but even magnetic fields, it may not even be possible at some locations to get to that location, reasonably, to take a measurement.

I know my colleagues recently came back from a trip, and they had to -- and they were trying to do a profile near a transmission line, and they had to go around numerous bogs, starting on one side and then walking around to the other side and continuing the measurements, because they didn't have waders deep enough to get through the bog.

So if a particular person on the land has a complaint, they should register it with Manitoba Hydro; and if it involves EMF, they would, through ongoing -- you know, engagement, they would address that complaint. If that required taking measurements of electric and/or magnetic fields at that particular location, it could certainly be done in a very expedited fashion.

And that the -- I would just caution that measurements at a particular point in time can vary, and so that if the value was -- it could be 3 milligauss higher or 3 milligauss lower -- I'm speaking hypothetically here -- than what was calculated that distance in the report, I don't think that would particularly be helpful to the person.

I think what you would have to do is do a very site-specific and detailed measurement protocol, and hope that that would be useful in resolving the complaint or questions from the person.

THE CHAIRMAN: This is Serge Scrafield, the Chair.

We are at little past 3:15 now. Are you anticipating having a number of additional questions?

MR. MILLS: A couple of minutes.

THE CHAIRMAN: Really? A couple of minutes.

MR. MILLS: Yeah.

THE CHAIRMAN: Are you sure? Okay. Thank you.

MR. MILLS: I guess, Mr. Bailey, we can agree to disagree. But I observe that the World Health Organization tells us that most nations, most developed nations, have national standards of electromagnetic fields. In order to have standards, there must be measurements.

I just don't understand why we can

establish national standards of measurement, but you are telling me it would be difficult or impossible for Manitoba Hydro to apply pre and post construction standards of measurement to a relatively short transmission line, using readily available, reasonably priced equipment, and at a time when Hydro is going to be all over this land anyway, I don't understand your reticence or your pushback on the concept of pre and post, and quite simply providing Manitoba Hydro with the information to tell the land user, landowner, farmer, that your fears are unfounded, or providing the information to the landowner, land user, farmer, that your fears are proven.

And I would suggest that with the sniff of witchcraft that many of us sense to all of this, something that we don't understand, a protocol that would measure it and allow concerns to be spoken to.

And I guess in closing, sir, I don't understand, with your high level of assurance that there are relatively little risk to this, why you wouldn't be all in on establishing a permitted requirement that would prove what is in fact your position.

MR. BAILEY: Sir, I think there is just a bit of confusion here. I think what I've heard is, is it possible to take measurements pre and post of the transmission line to verify that the calculations that have been made that the line, if it is running at a certain load, will produce a certain milligauss value?

That certainly can be done. And you would not measure every foot of the right-of-way for the whole length; you would do some representative profiles going across the line. And that certainly could be done.

But what I'm saying, sir, is that that is a separate activity, and has a separate potential value than resolving individual -- you know, concerns or complaints at a particular location. And taking those measurements at a particular location would just verify what the values are for purposes to inform the landowner or the person. But if that person said, "I believe that I'm getting headaches as a result of the transmission line", there would be no way that that could be resolved by taking measurements pre-construction or post construction.

And so you could clarify what the

exposures are at a particular period of time. And so, for instance, I will give you an example: Transmission lines are designed to not be in corona much of the time. It can be that there can be a broken piece of hardware, or something like this; something may happen during the course of the line where all of a sudden you are getting sparking that could lead to extreme radio frequency interference, and that could be causing interference to a person's radio reception, for instance. Hydro could go out and confirm whether that was occurring, and if it was occurring, they could fix that broken piece of hardware and solve the problem. But other types of concerns that you may be pointing to, it wouldn't easily resolve.

And I also would take issue with the labeling of people's concerns about electric and magnetic fields as witchcraft. I have met many people who have, based upon things that they had seen, had led them to believe that there might be concerns about electric and magnetic fields, and I don't think that people who have those genuine concerns should be regarded as believing in or practising witchcraft.

MR. MILLS: My point is quite simple

and quite straightforward. Something that can be measured economically in great detail, which you in fact have, surely can be measured pre and post, and surely that information would be valuable in responding to concerns raised by those who believe they are affected.

And I say with respect, sir, that the Presidential permit in fact anticipates that, and speaks to it. And I'm hoping that through this process, a similar oversight will be embedded in this licence, because I think the things that we can't see, but that may affect us, cause us concerns that we need to be able to address scientifically. And we have an opportunity within a condition of this permit to cause scientific measurement of a potential gray area, and I would have hoped that you would assist us with your advice as to how we could do that.

But I will leave it at that, Mr. Chairman. Thank you.

THE CHAIRMAN: Thank you.

We are going to take a break here. I'm going to shorten it to about 12 minutes by my watch. We will start at 3:35.

(Recessed at 3:19 p.m. to 3:35 p.m.)

THE CHAIRMAN: All right. Welcome back, everyone.

Just one preamble that I would like to mention here, and that has to do with the questioning and the responses. I wounder if we could -- and I know most people are trying to do this, but if I could remind everyone to get to the question as quickly as possible, without too much background. And the same on the answers: If we could get to the answer as quick as possible, it certainly benefits the panel, and I hope the rest of the people in the room, to get as many questions as possible asked, and as many of them answered as possible, although I did say earlier if it is complex, you can come back with the answer later; that's fine.

So with that in mind, Mr. Toyne, go ahead.

MR. TOYNE: All right. Thank you, Mr. Chair. Just so it is clear on the record, Kevin Toyne for the Coalition again.

So, some of the questions that I was going to ask have already been asked, so I apologize; I'm going to jump around a little bit. It may seem a little bit disorganized. That's only partially intentional. And then, depending on how we are doing for time, we may get to some questions about the recent update to the CV that we received from you.

So to start, if you could go to your Slides 52 and 53. Those are the ones with the graphs along route section G. So it should be the next two slides.

All right. So it wasn't clear to me from your presentation -- and if I simply just don't understand, I apologize. So can you either explain for the first or the second time why it is that the new, slightly taller tower seems to have higher both electric fields within the first 50 metres from the centre of right-of-way, and then the next slide over, why there is also slightly higher magnetic fields in that first initial distance from the right-of-way.

MR. BAILEY: I'm not quite clear as to your question. Are you talking about -- if you go to the distance along the right-of-way, if you could give me a distance where you are talking about, then I can focus better.

MR. TOYNE: Sure. And again, this is just from a lay perspective. The first -- so from zero to 50, it is higher for the proposed line than the current line. But after 50, it is basically the same. And the same applies for the next slide, for the calculated magnetic field.

And I'm just wondering what the explanation is for the difference.

MR. BAILEY: Okay.

MR. TOYNE: And if you have already given this answer, I apologize; I did not understand it.

MR. BAILEY: No, this is a complicated slide.

So if you just consider the existing line by itself, and you start out at minus 150 metres, and you follow that orange line all the way through, it gradually rises to a peak, and then it drops down again, and then it goes to another peak, and then it drops down again and goes to plus 150.

Now, what happens, that is what the -- in this slide, what the electric field would be just from the existing line.

MR. TOYNE: Right.

MR. BAILEY: Now, what happens when you add the new line, the blue dash line indicates the increase in the field above what was -- what is calculated for the existing line, starting -- you know, a little bit before the centre of the right-of-way, at zero, and continuing on, and then once you get beyond -- a little bit past 50 metres, the field after construction is virtually the same as it is before construction.

So the presence of the new line, what this is showing after plus 50-some metres, is that the new line has virtually no effect on the electric field that is already produced by the existing line.

And the same thing occurs in the following slide, for magnetic fields, again coming up just at -- you know, minus 20 metres or something. You can see an influence of the proposed new line, and then again, after about 50 metres, the presence of the new line does not really change the magnetic field profile, going all the way underneath the existing line and out on the other side of the right-of-way.

MR. TOYNE: All right. So the addition of the second line has a impact from zero to 50 metres from the centre of the right-of-way, but not much of an impact after that.

MR. BAILEY: Correct.

MR. TOYNE: Okay. Then again -- maybe this is just because I'm a layperson; I don't have the background -- why is there an impact within the first 50 metres but not after that?

MR. BAILEY: Well, the closer you are -- as I explained, the closer you are to the conductors, the higher the field. So if you are close to a new source, the field will be higher than it was before that source appeared. But once you get a certain distance away, the influence of the new line is less important.

And the profile is dominated, in this case, on the right side of the figure; it is dominated by the fields produced by the existing line.

MR. TOYNE: All right.

Switching topics, you had talked about some research that was done into childhood leukemia; there has been some research that's been done into Alzheimer's. As I understand it, there is also people who are concerned about the impact of electric and magnetic fields on fibromyalgia, chronic fatigue. Are you aware of any research that's been done as to whether or not there is an impact on people that suffer from those conditions from electric and magnetic fields?

MR. BAILEY: I don't know of research that has focused on those particular conditions.

MR. TOYNE: Based on the research that you are familiar with, is there anything about electric or magnetic fields that could have an impact on people that suffer from those conditions?

MR. BAILEY: I don't have any particular insight into whether they might or might not. There is basically no research on that topic.

MR. TOYNE: All right.

Do you know why there's been no research done on that topic? It is just a lack of interest by utilities? Is there a lack of government funding that's available? Is it something that's just such a new concern that no one has thought to start to study it?

MR. BAILEY: I mean, research on fibromyalgia has been going on for a long time, and I think it is only recently that people have speculated that that particular condition might be related to electric and magnetic fields. But I will point out that there is a very large body of research in which people who are just sort of human volunteers, or people who have participated in studies because they believe that they have general somatic complaints that might be related to electromagnetic fields, and they have participated in research studies, and those studies have not indicated that when you bring people with these complaints into the laboratory and look to see if they can -- are better able to detect the presence of fields, or if in fact when they are exposed to magnetic fields, say, in the laboratory, and they are not told what they are exposed to, that their symptoms actually increased in relationship to the exposure or non-exposure.

So the World Health Organization has looked extensively into this, and their conclusion is that while there are people who have complaints about their health, they can't be traced to electric and magnetic fields for these general somatic type of complaints.

MR. TOYNE: All right.

You took us through a number of different studies and reports, and as I understand it, the actual literature that's out there is considerably broader than what you've specifically referred to. Do you know -- what is the best way to phrase this -- do you know what percentage of the research that's been done into electric and magnetic fields is industry-funded, as opposed to government-funded?

MR. BAILEY: I don't know what percentage that might be, except that generally, epidemiology studies are very, very expensive to undertake, and so by far, most of the epidemiology studies have been undertaken by governments. And sometimes they have reached out to electric utilities to give funding to that government study, or to have -- provide them with data that they need in order to conduct the study.

But epidemiology studies, in particular, are not very often conducted by or on behalf of utilities directly. In some laboratory studies there has been individual studies of cells and tissues that have been funded by utility research organizations, but I don't know of any studies -- certainly currently, in the last decades -- that have been done by utility personnel on electric or magnetic fields and health.

MR. TOYNE: All right. So for the studies that you've personally been involved in, what percentage were industry-funded and what percentage were government-funded?

MR. BAILEY: In terms of direct research, I'd say -- you know, probably guesstimate 80 per cent funded by utility-related organizations, research organizations, and 20 per cent government.

MR. TOYNE: If we could return for a couple of minutes to the licensing-condition line of questioning that took place before the break. You made a couple of references that I wanted to drill down a little bit more.

At one point -- and I think I got this down correctly -- you made reference to a site-specific detailed measurement protocol. I don't know if that's a term of art or a term of science, but in the context of some sort of a potential licensing condition that might be imposed on Hydro as a result of this current process, can you provide a little bit more detail about what you meant about that site-specific detailed measurement protocol?

MR. BAILEY: Sure. If you are going

to go out and take measurements of electric or magnetic fields, you want to be able to compare them across a variety of conditions. So it is not helpful if one person goes out and takes measurements, and all their measurements are taken by placing the meter on the ground, and somebody else goes out and take measurements and has the meter on a pole that's five feet high, and somebody else takes them at waist height.

So the IEEE and the IEC protocols call for the measurements to be taken at a standard height of 1 metre above ground, and that they be done with a calibrated meter that is not susceptible to interference, that you record the time, the temperature of the measurements, et cetera, et cetera, et cetera, like this, so that whenever measurements are taken, you have the documentation to understand what they -- what circumstances they were taken under and how appropriate it may be to compare those two measurements at some other site.

MR. TOYNE: Now, earlier you had already said that -- the hypothetical I think you gave was taking a single measurement on a Friday afternoon at 4:00 o'clock may not be particularly useful, because if you take another measurement a week, a month, or a number of months later, the measurement may change.

To be able to get data that be would useful, how many different measurements would need to be taken in compliance with those two protocols that you just talked about? Are we talking ten samples, 100 samples?

MR. BAILEY: Again, it depends on what the purpose of the measurement protocol is. The typical way that measurements are taken pre or post construction would be to pick a location where it would be possible to obtain good-quality measurements. And generally that is a location where the ground is flat, that there is not a body of water there to interfere with access.

Where it is -- it is very difficult to take accurate electric field measurements where there are any tall trees or shrubs around. So if you were interested in electric fields, you would pick a site where that -- otherwise you would measure almost no electric field, because it would be blocked by the vegetation.

And you would then start on one side of the right-of-way and -- perpendicular to the line, you would take measurements along that transect, generally with a recording magnetic field meter attached to a wheel, and you would collect those measurements. And then you would have the utility provide you with what was the load at the time that you took those measurements, so you would know what that loading was. And then you could compare what you measured with what you had calculated for that particular site for a certain loading.

The difficulty is -- and you can show that in cases where we've done this, that there is a very good agreement between what was measured and what was calculated. The difficulty is, if you go even to another site on the same portion of the route, it could be that there are differences in the height of the conductors above the ground, due to change in terrain and so on. And so the conductors may be closer or further away from the ground at that location than where you took your first measurements, so you would have to do that whole thing again, because the differences between those two measurement sites may be just due to the differences in the height of the line at that location.

MR. TOYNE: And you've talked about some of your colleagues that have been involved in these types of measurement protocols; what utilities were they doing that work for? Do you know?

MR. BAILEY: It is a variety of utilities that have done this. For instance, in the state of Connecticut, it is -- on some projects, the Siting Council has requested post-construction monitoring -- not every project; some projects they have, and other projects they haven't.

MR. TOYNE: And in your view, is doing some of that measuring prior to construction important, so that when you do the post-construction monitoring, you've got something to compare it to?

MR. BAILEY: Those -- generally, pre-construction monitoring is not done. The orders that I have seen almost entirely relate to post-construction monitoring.

MR. TOYNE: And do you have any sense as to the cost involved in doing that sort of monitoring, post-construction monitoring?

MR. BAILEY: What?

MR. TOYNE: Do you have any sense as to the cost of doing that type of post-construction monitoring?

MR. BAILEY: It depends upon basically how many different sections of the line there are. If you have a 100-mile line, and the load is constant, there are no intervening substations, there is no adjacent lines, you just have a bare transmission line, you could take one measurement alone that right-of-way, and it would describe the entire 100-mile line.

The difficulty is that for many projects, you will have multiple lines that are entering and leaving the right-of-way, and so you would have to do measurements and comparisons for each one of those sections. And so that's where it gets complicated. And it is a considerable undertaking. We are talking about, depending upon the number of sections, you know, tens of thousands of dollars.

MR. TOYNE: And the personnel that would be involved in taking the measurements for this type of monitoring, do they require special training, or special -- other than the actual measurement tools, any special equipment?

MR. BAILEY: They need high-quality measurement equipment. And in all the cases, these are done by trained licensed electrical engineers.

MR. TOYNE: And do you have any sense as to how long it takes to get these initial measurements in the post-construction monitoring?

MR. BAILEY: Do you mean how long after the line is constructed would these measurements be taken?

MR. TOYNE: No, sorry. When the question came out, it sounded awkward.

To take the measurements that need to be taken to assess what the EMF readings would be in a particular site along the line, how long does that actually take to do? The hypothetical you used was a line that was 100 miles long; is this a two-day project? Is this a two-week project, two-month project, two-year project? Like, how long does this type of monitoring take? At least at the outset.

MR. BAILEY: At each particular site, it might take -- depending on the complexity of -- particularly whether you are taking both electric and magnetic field measurements, with setup time and everything, it may be half a day per site. And so this would -- depending upon the number of sites that were selected for measurement, it could go on for some days.

MR. TOYNE: You had also talked about issues of -- and I apologize again for the technical awkwardness.

If the line goes into corona, there might be radio and TV interference. Leaving aside the fact that I'm not entirely sure exactly what you are talking about, are there steps that can be taken, if there are complaints raised about that, to address those concerns, if they aren't, say, the result of broken equipment?

So, for example, if a landowner starts to experience issues with cell phone reception, WiFi, radio, TV, and there is no issues with the actual equipment that Hydro has nearby in the right-of-way, are there steps that can be taken to address those concerns, say, to minimize any interference that might be going on?

Does that make sense?

MR. BAILEY: It would depend very much upon what the nature of the complaint, or what was experienced by a person, as to how it would be addressed. In my experience, utilities are more than willing to work with landowners to try and identify the sources of problems, and to determine if that problem is deriving from some utility infrastructure or something else.

MR. TOYNE: All right. So it looks like I'm starting to run out of time, so I will jump to the last couple of minutes of my questioning.

So, sir, we recently received an updated CV from you, along with a letter from a fellow named Roberto Levi at the Weill Cornell Medical College. And I'm wondering if you could just explain to us how it is that you came to be claiming that you were a visiting scientist at Cornell for the past number of years, when in fact you weren't?

MR. BAILEY: I was appointed as a visiting scientist at the department of pharmacology at the medical school in 1986, and have been available for consultation to Dr. Levi and several of his colleagues over the years.

And recently, when the question was raised about whether I had an appointment or not, because these type of appointments are not always published on the university website, I contacted Dr. Levi to obtain the certification of my appointment. And what we were told was that I had been sent a letter in 2012 to my old address, saying that my name had been taken off the appointment rolls. And this was news to both Dr. Levi and myself, because I never received a letter, and he had not received a letter.

And so when I discovered this, I amended my CV and provided this information. But I had no idea that this appointment had not been continued. And it didn't interfere with -- you know, my availability for consultation to Dr. Levi and the department.

MR. TOYNE: Do you know why you were removed from the visiting scientist roster?

MR. BAILEY: I have no idea. There was no explanation given.

MR. TOYNE: And it is -- there is a reference to your old address in New York. When had you left that particular address?

MR. BAILEY: In 2009.

MR. TOYNE: All right. And was there any sort of a renewal process that you had to go through to maintain your registration as a visiting scientist at Cornell?

MR. BAILEY: Not that I was aware of.

MR. TOYNE: So you were appointed in 1986, and there was no paperwork that was required to maintain that appointment thereafter?

MR. BAILEY: I was not asked for anything after that.

MR. TOYNE: That wasn't quite the question that I'd asked. So your removal as a visiting scientist from the roster, did that have any impact on your ability to carry out whatever you were doing when you were actually at Cornell?

MR. BAILEY: Actually I had -- until very recently, I had no idea that I wasn't on the roster.

MR. TOYNE: So from 2012 until this letter, how often would you actually be at Cornell, doing visiting-scientist-type activities?

MR. BAILEY: The nature of the consultation that I did to Dr. Levi wasn't -- didn't require my personal appearance at the laboratory. It was the nature of when questions arose, people would call me and ask for advice. Or if I found things that were potentially important and useful to their research, I would contact them and discuss that with them.

So it was a very informal kind of consultation. It didn't require that I actually go to the laboratory at all after I left New York.

MR. TOYNE: All right. What sort of activities were you involved in from 2012 until recently in your capacity as a visiting scientist at Cornell?

MR. BAILEY: It was similar to what I just described.

MR. TOYNE: All right. So in 2012, did you actually do anything that could be considered as being within the role of a visiting scientist at Cornell?

MR. BAILEY: I don't have -- going back to that time, I don't have a specific recollection year by year as to what I was called upon to answer to, or information that I provided to them.

As I said, this is kind of an ad hoc arrangement for their -- for them to have me available to address issues as they came up.

MR. TOYNE: So more of an ad hoc consultant?

MR. BAILEY: Correct.

MR. TOYNE: Okay. That certainly doesn't sound quite as important as "visiting scientist", does it?

MR. BAILEY: Well, I think it accurately describes what I was doing when I was -- I mean, there could be a visiting scientist where you are in the laboratory, and I have been a visiting scientist at other laboratories where I've actually been in the laboratory, working alongside of people in the laboratory. In this case, my role was more ad hoc consultation.

MR. TOYNE: Is there a difference between visiting scientist and visiting fellow? Because the CV that we were originally provided with also refers to you being a visiting fellow.

MR. BAILEY: I think -- my recollection is -- I noticed that difference when I looked at my CV again, but I think it may be that the terminology that the university used has changed over the years, and that what was visiting scientist has also been called visiting fellow.

But that's -- that's all I know about that. The terminology of their positions is not something that has really been a focus of my interest.

MR. TOYNE: But you can appreciate why others might be concerned about what the terminology means, and the accuracy of your résumé?

MR. BAILEY: It is fair for people to ask questions.

MR. TOYNE: Have you taken any steps to get back on that ad hoc consultant roster?

MR. BAILEY: It is not -- I mean, Dr. Levi is investigating to find out why that letter was sent in 2012. But it is -- in some ways, it is kind of a moot point, because he is in the process of retiring, and his laboratory will be closing in a few months. So I don't know whether that kind of consultation will be important going forward, after his lab closes.

MR. TOYNE: All right. Now, if I suggested to you that this wasn't an error, and that you were intentionally trying to deceive this Commission, how would you respond?

MR. BAILEY: That's false.

MR. TOYNE: All right.

No further questions, Mr. Chair.

THE CHAIRMAN: Thank you.

I take it that the Consumers' -- well,

just going back to my list here, the Consumers' Association of Canada then would be next.

Ms. Pastora Sala.

MS. PASTORA SALA: Thank you, Mr. Chair. CAC Manitoba would like to thank Dr. Bailey for his presentations.

We have no questions for this presenter, Mr. Chair.

THE CHAIRMAN: Thank you for that extremely concise question period.

MR. BEDDOME: Mr. Chair, we are in the same position, if you want. James Beddome, for the monitor.

The Southern Chiefs' Organization also has no questions for this witness at this time.

THE CHAIRMAN: Thank you.

That brings us to Peguis First Nation.

Mr. Valdron.

MR. VALDRON: Yes. Valdron for Peguis, for the record.

We have no questions on this. Isn't that a shock?

THE CHAIRMAN: Was that intentional, the shock part, or -- thank you. All right. Ms. Strachan from Manitoba Metis Federation.

MS. STRACHAN: I also have no questions for this panelist. Thank you.

THE CHAIRMAN: Thank you.

I think that then -- Manitoba Wildlands is not present, I take it, so that brings us to the end of -- the time is 4:10. So we do have some possibility of starting the next presentation.

Is Manitoba Hydro in a position to do that? Or would you like us to start earlier, although that -- let me just ask the secretary. That would be quite a bit earlier.

Would that work?

MS. MAYOR: So Manitoba Hydro's socio-economic panel is available.

THE CHAIRMAN: All right. Given that Hydro has the people available, we will start now.

MS. MAYOR: We might need a few moments to get them all here.

THE CHAIRMAN: All right. Stretch your legs for five minutes; no more than five, though. We will start at 4:15.

Is that acceptable, Hydro?

MS. MAYOR: Yes. Thank you.

(Brief Recess)

THE CHAIRMAN: Are we just about ready, or do you need a few more minutes?

MS. BRATLAND: Give us two minutes to set up.

THE CHAIRMAN: Okay. Two more minutes.

MS. BRATLAND: Good afternoon, and thank you for your patience while we get sorted out up here. We are a bit of a larger panel, trying to find space for everyone.

Ms. Johnson, you wanted to do the swearing in before we begin our presentations?

MS. JOHNSON: Yes, please.

Could you all state your names for the record.

MR. AMUNDSON: My name is Leslie Butch Amundson.

MR. McLEOD: My name is Kenneth David McLeod.

MR. WHETTER: My name is David Whetter.

MR. BOHLKEN: My name is Frank Bohlken.

MR. LEECE: My name is Bryan Leece.

MS. JOHNSON: Ms. Bratland had been

previously sworn in.

(Socioeconomic Panel Sworn)

THE CHAIRMAN: All right. So that's it. Everyone is sworn in and so we will start with the presentation on the socio-economic side of things.

We will go until five o'clock and then take a dinner break, unless just before that or just after that -- and I will leave that up to your judgment -- there is a more logical break.

MS. BRATLAND: There will be a logical break after the presentation on land and resource use. I will give a short introductory presentation, and then Mr. Bohlken will do a presentation, and that will be a good time to break before completing the rest of the presentations.

MS. BRATLAND: Good afternoon again, everyone, Commission, participants, and members of the public. My name is Maggie Bratland. I'm a senior environmental specialist in licensing and environmental assessment at Manitoba Hydro.

Today we will be providing an overview of the socio-economic components of the environmental impact statement and assessment. I will first introduce the panel members to you, and their role in these presentations and the EIS, and then I will be giving you a brief introductory presentation in terms of what we will be covering with this panel today.

To my -- I'm going to ask them to raise their hand.

Mr. Frank Bohlken is a senior socio-economic practitioner with Stantec. He led the Stantec team in developing the EIS chapters as they relate to the socio-economic assessment.

Dr. Bryan Leece. Dr. Leece has a PhD in biochemistry from the University of Guelph and has 30 years' experience in human health risk assessment. Dr. Leece is a senior toxicologist at Stantec, and is the discipline lead for the human health risk assessment component for the MMTP EIS.

Mr. David Whetter. Mr. Whetter conducted the agricultural effects assessment for the EIS. He is a professional agrologist and has 16 years' experience studying and assessing the interactions between agriculture and the environment.

Mr. McLeod is a Stantec associate and senior archeologist, with over 40 years of heritage resource experience. He was heritage discipline lead for MMTP, and drafted chapter 12 of the EIS as well as the heritage resources technical data report.

Mr. Amundson is also a professional archeologist, with 37 years' experience. He has also contributed to chapter 12 of the EIS.

In terms of an outline for the presentations that will be provided by the panel this afternoon and this evening, I'm already providing the introduction. We will then have Mr. Bohlken present on land and resource use. Mr. Whetter will present on the agriculture assessment. Then Mr. Bohlken will again present on visual quality. Dr. Leece will present on human health. Mr. Bohlken will present on community health. And Mr. McLeod and Mr. Amundson will present on heritage.

These presentations will represent a number of the valued components that were studied as part of the socio-economic assessment on this project.

I will first pause and highlight some of the socio-economic context for the region, before we get into the specific presentations.

This map is taken from the EIS. It comes from the wildlife -- wildlife TDR, and is Map 1-3, for those of you that are interested. It presents the land cover in the project area.

And as we've already heard today, in the methods presentation, the landscape of southeastern Manitoba has changed considerably over the years. The blue line, which is tricky to make out on this, represents the final preferred route. The final preferred route and the assessment of this route is what we will be discussing today.

The project makes use of 92 kilometres of existing corridor around the City of Winnipeg to approximately Anola -- I'm terrible with this pointer -- and it occurs in an area that saw historic settlement after Lake Agassiz receded and indigenous peoples moved into the area, following raised and sandy ridges that have become modern-day trails.

Since that time, agricultural and residential development, which is highlighted by this more beige colour here, has progressed, and now agriculture is a predominant land use in the western portion of the study area, with mining, forestry and ongoing use of the area for cultural, traditional, and contemporary purposes by First Nations and Metis people.

Through each of the presentations that follow on each of the valued components, we will be highlighting a number of key points, and they will be highlighted at the top of the slides here, to help you follow along.

Each presenter today will highlight engagement feedback that has informed the assessment. Feedback received through the public and First Nations and Metis engagement processes informed the selection and scope of valued components, as our earlier presenters noted, which the EIS is focused on.

We also had feedback on regional and site-specific concerns that was used by the assessment team in their evaluation, and this will be highlighted.

Each specie chapter highlights lessons learned. A few broad lessons learned include the importance of considering individuals as well as broader issues. While the assessment makes conclusions on the overall project effect, Manitoba Hydro carefully considered individuals and the effects of the project on individual landowners and land users, and continues ongoing discussions to develop mitigation and protection measures.

We heard about planned and ongoing land uses and the importance of considering these in route evaluation and assessment, and we also supplemented the literature and data with Manitoba-based research through both the Prairie Research Associates report on property value and farming around towers, as well as through the self-directed traditional knowledge studies.

As noted earlier today, on the methods presentation, there are a number of assessment areas that we will be referring to today. For each valued component assessment, area was defined that is VC-specific. In each presentation, the presenters will highlight to you how these areas vary and how they were determined.

But for everyone, the PDA refers to the project development area. The project development area is the footprint of the towers on the FPR, and the stations for the project. The LAA is the local assessment area, which is usually a wider band on either side, and then the RAA is the regional assessment area, which has relevance for cumulative effects assessment.

The presenters will also highlight routing considerations that affect their assessment. Routing has been covered in detail, but I will just highlight a few of the key areas that we've talked about already.

The socio-economic environment was considered throughout transmission line routing. This included the use of existing corridors, that helps us to avoid the introduction of new right-of-way in agricultural and residential areas near the City of Winnipeg; included the consideration, in areas of least preference, and consideration of built components in evaluation criteria, both the alternate route evaluation model and preference determination steps.

As a result of the FPR selected, there was avoidance of some features of importance in terms of the socio-economic environment. These will be discussed by each presenter.

Presenters will highlight specific methods relative to their assessment. I wanted to cover the general broad methods that are relevant to all.

Desktop review and literature searches were conducted. Field studies were conducted. Simulations, modeling, and analysis, supplemented by key person interviews as well as the consideration of engagement feedback.

You heard yesterday, I believe, a little more about specific mitigation measures relevant to the project. Each presenter will highlight mitigation measures that were key to their assessment in the valued components that they considered.

A number of those mitigation measures are worth noting at a high level. In particular, design considerations are important, including routing, tower type and placement, which continue to be a way to limit potential effects on the project.

Existing access will be used as much as possible, and an access management plan will be followed.

You will hear further today about the cultural and heritage resource protection plan for the project, and how that applies.

We've also highlighted our biosecurity program for the project, that will be discussed further today, in the context of potential effects on agricultural operations. And we also heard about the landowner compensation program.

Next up, we are going to have the presentations on the specific valued components that we will cover today. In the interest of time, we will not be covering every valued component covered in the environmental impact statement in our presentations. We will not be covering infrastructure and services, and employment and economy. But I do want to point out that we are absolutely available for questions or for further clarifications on those topics.

And finally a bit of a roadmap. Each of our VC presentations will follow this roadmap. You first saw it in the methodology presentation. They will begin with an overview, highlight what they heard, what was assessed, key findings, discuss mitigation monitoring and followup, and present conclusions.

So without further ado, we will get into our first valued component presentation.

Give us a moment while we switch out the slides.

MR. BOHLKEN: Thank you, Maggie.

Good afternoon, Commission, ladies and gentlemen. My name is Frank Bohlken, and I work with Stantec, where I'm a socio-economic practitioner.

On this project, I was involved in scoping and study design. I oversaw the research and writing on socio-economic components, as well as provided technical review and guidance on the various valued components that I will be talking about today.

So we are going to start with looking at the spatial scope of the assessment for land and resource use. The local assessment area was an area of a one-kilometre buffer along the transmission line right-of-way.

While the regional assessment area consisted of the eleven communities -- eleven rural communities, rather -- that the transmission line would cross, as well as the Rural Municipality of South Cypress, where the Glenboro Station is located.

So why are land and resource uses considered? Well, why was it selected as a valued component? Well, because of the potential for the project to affect a variety of land and resource uses, including private property, rural communities, parks, and protected areas, as well as commercial and non-commercial land uses.

The EIS addresses potential effects on private property, protected areas, recreation, and non-commission land uses. Private property is a subcomponent, because use and enjoyment and development potential could be affected by product activities, including disturbances, land take-up, and change in esthetics.

Designated lands and protected areas and recreation are important for conservation objectives, natural heritage values, as well as for use and enjoyment by residents and tourists.

Commercial land uses are important for their economic contribution, and in the case of forestry, hunting, and trapping, are sustainable resources.

Mr. Whetter will be discussing agriculture at a later presentation.

Groundwater is used for potable water, as well as for agricultural purposes.

From previous transmission line projects, Manitoba Hydro understands the importance of conducting a multi-stage route selection process, coupled with public, First Nations and Metis engagement. The route selection process considered qualitative and quantitative factors, including a number of land and resource use metrics, and the final route selected offered a balance of land use considerations. Effects addressed in the land and resource use sections from previous environmental assessments helped inform selection of potential effects addressed within the MMTP EIS.

Previous projects also informed the selection of mitigation measures applied to avoid or reduce effects on lands and resource use. For example, access management was identified as an issue of concern for Bipole III and Keeyask.

As presented earlier at this hearing, Manitoba Hydro conducted comprehensive engagement with First Nations, Metis, and general public. Key concerns with respect to land and resource use identified during engagement included use of unoccupied Crown land; proximity of transmission lines to homes and communities; effects on land development potential; proximity to recreation use areas; potential disruption of forestry, mining, trapping, and hunting; effects related to increased access, as well as potential risks to groundwater quality.

Concerns were addressed either through the route selection process, which tried to limit overall land use effects, as well as through the incorporation of the issues as effects addressed in this section.

Land use was considered in a number of ways during the route selection process. Areas of least preference, such as protected areas, First Nations reserves, Treaty land entitlements, and buildings, were considered during routing.

Land use route metrics were factored into the built environment routing criteria, and used to compare route choices. Based on the feedback from engagement, new route segments were identified that avoided or limited potential effects on one or more land use values. Some examples will be shown.

The final preferred route provides a tradeoff between potential effects on undeveloped and developed lands.

So we are going to provide some examples in the second -- here we go. Okay.

So in this first example, Segment 341

was developed to avoid boxed in homes, and would reduce effects on a core in the Rural Municipality of Tache.

The next one, Figure 2, a new segment was developed and accepted that equalized distance between the Ridgeland Cemetery and Lone Sand Lake, in the Rural Municipality of Stuartburn, so it's balancing socio-economic and biophysical concerns.

Next, Segment 353 was created to avoid a 43-lot subdivision under development west of Richer. This was -- okay, the next one, please.

Segment 450 considered a balance of issues, including residences, visual quality, and other infrastructure, including the rail and aqueduct.

Next, after Round 3 of public engagement, Segment 479 was created, and later modified to provide greater distance from the Quintro Road residences in La Broquerie.

And finally, Segments 409, 470 to 471, and 468, was selected to avoid livestock options and private recreation, also in the Rural Municipality of La Broquerie.

These are just some examples of how routing was used, specific examples of how the route selection process addressed some land use effects.

Potential effects on land and resource issues that were addressed in the EIS were private property, including development potential, designated parks and protected areas, recreation areas, hunting and trapping, mining and aggregates, forestry, and groundwater.

Primary and secondary data sources were used to describe land and resource use existing conditions. Primary research included key person interviews with recreation organizations, a windshield survey to identify private buildings, helicopter survey with respect to forested areas.

Geospatial data from Manitoba Sustainable Development was plotted, using GIS software, to determine the spatial distribution, nature, and intensity of overlapping land uses. By using GIS overlay mapping, interactions of the project on other land uses were quantified. Generally, this included the number of interactions and/or areas of spatial overlap. A forest damage appraisal and evaluation was undertaken to quantify the value of commercial forests that would be affected by the project.

So we are just going to move into some of our key issues.

The new right-of-way would cross 254 land parcels in respect to 126 landowners. There would be one dwelling in the PDA and eleven residences within 100 metres of the right-of-way. There would be some temporary noise and dust disturbances to nearby residents during construction, but limited audible noise during operations.

The project would reduce development potential -- could potentially reduce development potential due to the fragmentation of lots. A transmission line could also reduce interest in wanting to buy a lot or build residences nearby, thus lowering the development potential of nearby lands.

Outside of urban centres or settlement areas, most of land in the RAA is designated as general agriculture, agriculture limited, or rural areas under individual development plans. There is limited opportunity under these plans for intensive non-agricultural development in lands designated as general agriculture and other agricultural designations. However, there are small pockets of land within the RAA with rural designations for which residential, commercial, and industrial development is possible.

Several existing and potential residential developments were avoided during route development; for example, near Richer, and Rural Municipality of Tache.

The final preferred route would affect 19 lots or parcels with low development potential and 8 lots or parcels with high development potential.

The right-of-way will not affect existing protected areas, ecological reserves, or wildlife management areas.

While the PDA crosses the Duff Roblin Provincial Heritage Park, Manitoba Hydro has an arrangement with the Province for access to this location that predates the creation of that park. No other parks are transected by the project. The proposed route would also not cross any campgrounds, resort areas, or cottages. However, there would be three golf courses that are located near the line.

Change of access could result in new

recreation opportunities, but this can also be reviewed as an adverse effect, considering that for some, increase in access could result in competition, for example, for certain resources.

Much of Southern Manitoba is contained within open trapping areas and game hunting areas. Disturbances to these areas will be temporary during project construction, and hunting and trapping can continue, for the most part, during operations. Right-of-way construction will disturb approximately 0.4 per cent of game hunting areas and open trapping areas in the RAA.

As I just mentioned, however, change of access could lead to some concerns over resource competition, but those would be managed by an access management plan.

The PDA overlaps 15 private corridor withdrawal permits, totalling 62 hectares, plus 8 municipal aggregate resource areas. This is approximately 0.3 per cent of the area of mining -- area dispositions, rather -- in the RAA.

As I mentioned earlier, a high-potential aggregate resource deposit in the Rural Municipality of Tache was avoided through route adjustment.

Except at tower locations, and subject to clearance or setback restrictions, mining resource use activities will be able to occur adjacent to or near the PDA throughout the project operations.

With respect to forestry, clearing and disturbances will be limited to defined rights-of-ways and associated access routes. Compensation will be paid to the Manitoba Sustainable Development for removal of high-value timber resources under the forest damage appraisal evaluation. Compensation will also be available for re-establishing the shelter belts outside of right-of-way, where possible.

Less than 0.1 per cent of commercial forest and annual allowable cut in the RAA would be affected by the project, and similar small-magnitude effects on private and municipal forested areas.

Groundwater resources and wells are located throughout Southern Manitoba. However, effects related to -- potential effects on the project could be related to, for example, geotechnical drilling or foundation work for towers, for example, but these would be avoided by mitigation measures such as sealing of drilling wells and monitoring of water levels.

The following key mitigation measures will be applied to avoid or limit effects on lands and resource uses. As mentioned, avoidance of effects through routing, limitations of clearing, using existing roads and access trails to limit new clearing, application of an access management plan, the management of project construction activities and equipment in order to avoid damage and disturbance to adjacent properties, structures, and operations.

Mud, dust, and vehicle emissions managed for public health. Noise and vibration disturbances limited to daylight hours. As I mentioned earlier, re-establishment of shelter belts outside of the right-of-way where possible, and groundwater management.

Manitoba Hydro continues to engage with First Nations, Metis, and public, including sharing information on the project, and topics of interest.

So in terms of effects, the project will not affect Provincially protected lands. It will not affect the function of the Duff Roblin

Heritage Provincial Park through which it transects. As I mentioned earlier, Manitoba Hydro has arranged with the Province to allow access at this location, which predates the park's establishment.

There will be limited potential effects on hunting, trapping, forestry, and mining, due to the limited area of spatial overlap with these resources relative to their availability.

So, in summary, with the application and mitigation measures, the project will not disrupt, restrict, or degrade any of the land uses to a point where they cannot continue at or near baseline levels, and therefore project effects on land and resource uses will be not significant.

So, last slide is on cumulative effects. So as presented in earlier presentations, a large proportion of the regional assessment area has already been disturbed by historic agricultural activity and other developments. The project will add to the cumulative effects of past, present, and reasonably foreseeable projects, including other transmission lines, roadway construction, gas pipelines, and residential and agricultural developments.

Cumulative nuisance effects could occur if multiple projects are built in the same area at the same time. Otherwise, most cumulative effects relate to spatial reduction in the land base for other activities. The project overlaps with only a small fraction of lands within the RAA available for other uses, and will not appreciably affect the land base available for land and resource use. Cumulative effects on land and resource use are considered to be not significant.

Thank you.

MS. BRATLAND: Mr. Chair, that takes us to ten minutes to five. Our next presentation is considerably longer, probably close to an hour. So ...

THE CHAIRMAN: All right. So you are saying this is the logical time. Yes.

If I could ask the secretary, do we have any documents to file now, or will that be later, or --

MS. JOHNSON: We can wait until the end, because we will be adding on as we go on tonight.

THE CHAIRMAN: Okay.

As I mentioned yesterday, this evening we will hear the public first, assuming a 7:00 o'clock start, so we will hear any members of the public who wish to speak, first. Following that, we will continue with the Manitoba Hydro presentation on the socio-economic context.

And my guess is we won't get through that, I think, from what I'm hearing about the number of parts, depending on when we start. So the questioning is likely to be in the morning. But we will judge that when we get there.

Anything on the organizational side of things to add? No? Okay.

So we will see you all back here at 7:00 o'clock. Thank you.

(Recessed at 4:50 p.m. to 7:00 p.m.)

THE CHAIRMAN: All right. Welcome back, everybody.

A couple of things I want to mention before we start. First of all, we have Don Labossiere who has joined our team and is helping us at the back door. And Cheyenne will be back tomorrow.

Secondly, we don't at the moment have

anyone from the public who wants to make a presentation, so we will continue with the Hydro panel; but if we get a member of the public who does want to make a presentation, we will interrupt.

Okay, so I will turn it back to Hydro.

MR. WHETTER: Thank you. And good evening, everyone. Hopefully everyone is refreshed after the dinner break.

I will be, as Ms. Bratland mentioned, I will be speaking for about 50 minutes on agriculture.

My name is David Whetter. As Ms. Bratland mentioned, I'm a professional agrologist and discipline lead for agriculture on MMTP. I will be speaking to you tonight about the agricultural VC under the human environment.

Through the presentation, there will be content on both screens; in many cases the content will be the same, so that's by design. In some cases there will be different information on the right-hand screen, and I will advise in these instances, just using supporting graphics and images and that type of thing.

So, just to start off, why

agriculture? Agriculture is the predominant land use in the project area, and represents over half of the land use in the area the project traverses. It is an important driver for the economy, from provincial to local scales, and it is of ultimate importance to individual producers' livelihoods.

The area of the project is -- in terms of agriculture, it is a highly diverse agricultural landscape, from intensive annual cropping production in what we consider the prime agricultural lands in the Red River Valley, around the City of Winnipeg, to mixed farming areas, as the line heads south through an agricultural-to-forested transitional area. The agricultural landscape also includes areas of intensive livestock production, particularly within the new right-of-way.

To understand this variability, we characterized agricultural options and activities from regional to local and down to individual scales. But it is not possible to understand the intricacies of all individual operations, considering the varying equipment types and sizes, and that type of thing.

It is also important to note that in

terms of these individual operations, we did rely on the public engagement program, which led into our understanding of the agriculture landscape at that individual operation level.

We understand there will be a residual effect on agriculture, even following the implementation of mitigation on the project. There will be a very small loss of land from production for the life of the project, but more importantly, I think, the presence of the tower structures and conductor lines will interfere with many agriculture operations and activities on the landscape.

In acknowledgment of these residual effects, and to offset them, compensation will be provided. But as assessors, for us, we really consider compensation kind of like a last line of defence, and we sought to lessen the potential effects of the project through other mitigation considerations.

Lessons learned were drawn from Manitoba Hydro's experiences with recent transmission line projects. We've heard a lot about Bipole III, but also St. Vital transmission projects, as well as other linear projects, such as pipelines, that the assessment team has gained experience in.

One of the sentiments coming out the Bipole III was that engagement with agricultural landowners could be improved. For example, there was comment that it didn't occur early enough in the project, in the planning phase. And this is an area I believe that was a major improvement, when we look at MMTP, where engagement occurred from planning to routing, and right through the assessment phases. And I will delve into that further on the next slide.

Biosecurity was raised in Bipole III as another issue that could be improved on in subsequent assessments. But the wide range of agricultural production in the MMTP project area, biosecurity is a concern for both cropping and livestock operations. The MMTP has handled landowner concerns regarding biosecurity better than in the Bipole III project, primarily through recognizing the importance of early and ongoing and continuous landowner engagement on this topic.

The other main agriculture-related issues that were raised in Bipole III were tower placement, diagonal crossings, and effects on buildings. Given the similarity between MMTP and Bipole III, Manitoba Hydro prioritized these issues with the aim of improving the way these issues were handled.

The team sought to proactively mitigate these issues during the siting of alternative routes, and throughout the route selection process. Routing and avoidance included the decisions, for example, to attempt to place towers at half-mile lines, as recommended by the Commission here in Bipole III in 2013, or along half-mile lines or established roadways as per subsequent engagement with agricultural landowners and stakeholders.

Another example is avoiding and reducing diagonal crossings, or angled-towered crossings, in cultivated lands.

As was previously presented by Mr. Joyal and Ms. Coughlin, there were numerous opportunities for engagement throughout the course of the project. If you look on the right-hand screen, I've provided a list of the types of engagement conducted throughout the project, with some specifics on agriculture.

Engagement occurred leading up to and

throughout the assessment process. It included such engagements as with the public, with industry and stakeholder groups -- for example, Manitoba Aerial Applicators Association, Manitoba Agriculture, and other producer representative groups. Also included individual producers, First Nation, and Metis.

As part of the assessment process for potential effects to agriculture, we conducted key person interviews with producer representative groups. We used these to better define and understand potential effects of the project on the traversed agricultural landscape.

So, what did we hear: So if you look back on the left-hand screen, you will see a list of key issues we heard about..

We heard about the loss and degradation of land due to construction activities, as well as the presence of the project on the landscape.

We heard a lot about the interference, conflict, and nuisance related to the project presence, and all types of -- equipment types and different activities.

We heard from the Aerial Applicators

Association around concerns they have, including potential proximity of the line to airstrips, and conflict with their pesticide application activities.

We also heard various concerns around livestock health. Biosecurity, as mentioned, was a prominent theme, and it is becoming a more important issue for both crop and livestock producers.

So we asked, and we listened, and we heard, but how did we incorporate that engagement information into our assessment? I think, right from the get-go, really supported the identification and importance of the routing criteria that was applied, as discussed earlier by Ms. Bratland. It really helped to find themes and specific issues of importance on the agricultural landscape from that stakeholder perspective, those that are going to be affected.

It supported our team in terms of scoping the assessment, helped us select our effects to be considered, as well as the parameters to be measured. Ultimately, it helped focus our assessment on the key issues of importance, again, to the stakeholders, that will ultimately be affected.

I will now discuss agricultural-related issues that were considered through the routing phase. I will then move on to discuss compensation, and then -- before getting into the nuts and bolts of the assessment and key mitigation in terms of further limiting effects.

Engagement helped identify key issues, as just mentioned, for consideration through the routing phase. Routing represents a portion of the planning phase which provides a key opportunity to avoid or otherwise limit effects to the agricultural landscape --

I will draw your attention to the right-hand screen for a list of criteria that was considered in the alternative corridor model and the alternative route evaluation model. I'm not going to go through each of these in detail, but I did want to give you just that sense for the various -- numerous and various types of criteria that were included in those portions of the route evaluation.

As a reminder, the industry stakeholders defined the criteria in the alternate corridor model. Building off that, and based on some of those key issues we heard about, we identified agricultural-specific criteria to be used as part of that built environment perspective, under the alternative route evaluation model.

So back to the left-hand screen. As presented by Mr. Matthewson and Ms. Bratland, diagonal crossings and paralleling existing linear features were considered siting principles in identifying the alternate routes. And diagonal crossings are an example of a criteria that was carried forward and used throughout the evaluation of these alternate routes.

Additionally, we considered the presence of all types of agricultural operations, including applying a three-mile buffer around hog operations, to consider the interaction between the project and liquid application of manure by draglines for those operations. And this was a specific issue raised through public engagement by that representative group.

We also looked at the capability of land to support agriculture, as well as the current type of cropping and associated productivity on the land base.

Other specific activities related to cropping that potentially interact with the project included aerial application activities and known irrigation infrastructure. The overall effects to agriculture were limited, because these issues were considered during this phase of the project.

When it comes to agricultural land use, it is really a tale of two study areas, and that's a theme that I will come back to a few times through the remainder of my slides.

On the left-hand screen, this provides kind of a conceptual look at how the predominant crop type changes from the origin of the transmission line at the Dorsey Station in the northwest to the border crossing near Piney in the southeast.

The existing corridor portion of the project is predominantly under annual crop production. On the other hand, in the new right-of-way, we get into an area that really is best represented as a transitional area, and best characterized as mixed farming, with a range of production from annual cropland to perennial cropland or hay land, and improved pasture, as well as unimproved range and grassland.

On the right-hand screen, you will see a map there. This is the crop type distribution throughout the project area, presented in a spatial map manner. So I put a red arrow where the existing corridor turns to the new right-of-way and heads south.

And if you look at everything to the left of that, that red arrow, in the existing corridor -- and it is in kind of a peachy colour on the screen there -- that's the area that's really predominantly annual cropland. And all the agricultural land use to the right of the arrow, and to the south, in the new right-of-way, is -- you can see -- the colours aren't coming through too great here, but you can see more variability in the land-cover classes, or the crop types, in this case.

So agricultural land use is more variable. And there is also a substantive portion of non-agricultural land use in the lighter colour.

So why is this important? Well, where the route was fixed through the existing corridor, the cropping land use is relatively intensive.

After all, annual cropping requires relatively more field operations and inputs. However, through the existing corridor, the transmission line is paralleling other existing transmission lines and other linear features, for the most part, which is a generally preferable situation over creating a new right-of-way.

Where routing influenced the location of the route in the new right-of-way, land use is less intensive from a crop-production perspective.

As previously mentioned, diagonal crossings were -- I think I mentioned it -- diagonal crossings were generally not preferred by agriculture landowners and producers, and definitely not preferred by aerial applicators. These crossings tend to create additional interference, relative to a straight-line crossing, including potentially cutting fields into separate management units, or just generally increasing the nuisance factor. After all, most farming happens along straight lines.

For the existing corridor, most of the nine kilometres of diagonal crossings are in annual croplands. However, these crossings -- again, they are in an existing corridor; they parallel existing linear disturbances, and are in many cases in close proximity to the City of Winnipeg, another residential development. Therefore, in these areas, there will be little or no additional interaction with the aerial application practices.

While there are 26 kilometres of diagonal crossing in the new right-of-way, these are primarily on range and grassland, where there is lower intensity of activities, and generally where aerial application is not occurring.

It is important to note as well that in the new right-of-way, a portion of the diagonal crossings in the more intensive annual cropland areas were actually preferred by landowners. For example, a four-kilometre diagonal crossing was preferred routing in the area of the Pineland Hutterite Colony, close to the border crossing, and another diagonal crossing just southeast of La Broquerie was also a landowner preference.

So we've just discussed routing and avoidance mitigation, and now I will briefly discuss compensation, or sometimes considered offsetting mitigation, before, again, getting into the other parts of the assessment and other types of mitigations considered.

Again, we know that there will be residual effects to agriculture following the implementation of mitigation. As it is understood this is the case, compensation is made available to those agricultural landowners and producers affected by the project.

As a reminder, and presented on the right-hand screen, the MMTP compensation program includes four key aspects. I won't review these in detail, as they were presented previously by the property panel. However, I'll just summarize.

Getting back onto the left-hand screen, the compensation program really addresses direct effects to land use through construction or operation activities, damages to land or infrastructure that may be caused by the project, as well as indirect impacts to operations. For example, if a portion of a field becomes inaccessible due to the presence of the project, that is something that be would be considered for compensation.

It is important to note that the program, as well, considers effects on individuals, and compensation is really developed in discussion with individual landowners.

So, moving into our effects assessment. Building from our understanding of the project and the baseline agricultural environment, and concerns raised through an extensive engagement process and learning from past projects, we scoped the assessment and developed two broad-based effects to evaluate what the project would mean in terms of agricultural activities and operations in the project area.

These two effects were, number one, the loss and degradation of agricultural land; and number two, conflict with agricultural activities.

Under each broad effect, multiple issues were identified and evaluated to determine the nature, degree, extent, and magnitude of the effects of the project on agriculture.

Potential effects were assessed within three defined spatial boundaries, which have been previously discussed, specific to agriculture in the PDA, or the project footprint, that really included the entire right-of-way, as well as the expansion of the Glenboro Station footprint.

And just as a note, the expansion of the Dorsey footprint did not occur in agricultural land, so it is not included as part of the agricultural PDA.

For a local assessment area, we selected a one-kilometre buffer, so one kilometre on each side of the line, and we really identified that to capture what is the basic agricultural field management unit, certainly in this area of the province, being the quarter-section, with dimensions of 800 metres by 800 metres.

Direct effects of the project on agriculture: Activities were assessed within this LAA.

Our regional assessment area, similar to other socio-economic valued components, consisted of the boundaries of the RMs traversed by the project. Again, we used this assessment area to assess the overall significance in the broader agricultural context, including cumulative effects.

The right hand slide just shows those boundaries of the LAA and RAA, although it is pretty much the same figure presented earlier by Ms. Bratland in terms of the overview.

Effects were also assessed based on two temporal boundaries, being the construction phase, which we considered up to two growing seasons, in the agricultural sense, as well as the operations phase, or the lifetime of the project.

I will now move on to briefly discuss some of our methods. I'm not going to discuss all of the methods employed for the assessment of agriculture; rather, I will just summarize some of the key methods or specific ones to our VC.

As mentioned previously, we conducted key person interviews with industry stakeholder groups to identify specific issues of concern and to help focus the assessment. We conducted crop productivity estimates using an Agriculture and Agri-Food Canada geospatial crop inventory layer, coupled with crop yield and value data provided by Manitoba Agricultural Services Corporation, and that's provided on a RM basis.

We developed soil compaction ratings, and used existing erosion risk ratings to determine the susceptibility of the soils to degradation from project activities.

We classified livestock operations to understand the types of livestock and the proximity of these operations to the transmission line.

We also conducted extensive literature reviews. One that I do want to mention is the evaluation of farming around Hydro towers in Southern Manitoba, which was conducted by the Prairie Agricultural Machinery Institute in 2015. And one of the key pieces of information we used from that evaluation was the estimates of land areas affected around towers, as well as the increased production cost as a result of the presence of those structures.

I just noticed a virus scan; I will hit the X here. My apologies.

So I will now talk briefly around what we call the loss of land from agriculture. So -- sorry about that.

I have two slides here on the issue of land loss from agriculture. So this is one -- again, one of the two major -- this is one of the two major components of that loss and degradation effect under our assessment.

I will first talk about temporary land loss, which is addressed on the left-hand screen.

Temporary loss is anticipated to occur during the construction phase, after which period most of the affected land will be returned to previous agricultural land use.

For the assessment, temporary land loss was assumed to affect the entire project development area, so that includes the entire right-of-way, as well as the Glenboro Station expansion footprint.

I think this is conservative in terms of both the area assessed as well as the duration. Construction activities don't tend to disturb the entire right-of-way, and don't typically disturb agricultural areas for more than one growing season.

The graphic on the left side of the left-hand screen provides a visual representation of that PDA, or the right-of-way, and that's the area shown in the light green shading. And that's shown in relation to a quarter-section boundary. Within that quarter-section field, the right-of-way represents just less than 10 per cent of the field area.

The photos on the right side of the left-hand screen -- hopefully that's not getting too confusing.

The top photo shows -- is intended to show the construction activities are generally intensive in close proximity to the tower structures. And the bottom photo, there, is intended to show -- again, it is typically not the entire right-of-way that's disturbed by construction activities.

And I don't know if it is coming through totally well for everyone, but you can see kind of an area of predominant traffic along the right-of-way, and this is taken from the Bipole III project.

So if we look over on the right-hand screen, I will talk about what we call permanent land loss. That's loss that will occur over the lifetime of the project, and it really occurs under and immediately around tower structure, and again, that expanded Glenboro Station footprint.

The total footprint loss from agriculture production will be small, relative to the total area of our local assessment area, or even the PDA. Manitoba Hydro realizes that the effects of this loss could be of relative importance to individual landowners and producers, again, at that individual operation level.

In our assessment, we considered a three-metre buffer around tower structures as completely removed from production for the operational life of the project. We determined this buffer through literature review, and I mentioned that PAMI 2015 study. When we compared our buffer against the results of the PAMI study that was released kind of later in our assessment period, we found that our buffer estimate was pretty reasonable and conservative, relative to what PAMI determined.

And on review, as well, the Manitoba Hydro compensation formula considers a larger area impacted, so can also be considered in this regard.

The diagram on the left, from here, it is pulled from the Manitoba Hydro compensation program, and it really just -- it is a visual to demonstrate the area around towers that are -- in the case of the little dotted area here, that's what Hydro considers to be 100 per cent loss, crop loss, and then that larger area is considered 40 per cent crop loss. But when you look at even the area of 100 per cent crop loss, again, that's a much larger area than we considered with our three-metre buffer.

The photos on the right-hand side of

the right-hand screen provide a visual representation of the areas of crop loss, you know, in actuality, so there is examples both of a single-tower situation as well as when towers are situated beside each other in a shared-corridor situation.

I think in many cases producers seem to do better in that three-metre buffer in their approach to the towers, but obviously they can't always do that.

I will now talk about the second component of that first effect, and that's the soil degradation pathway. Soil degradation could occur as a result of either compaction or erosion. However, erosion is not a substantive concern, as soils are generally not disturbed by the project activities, as well as the low slopes in the study area really limit that potential for water erosion.

The extent and frequency of project interactions with agriculture that will result in degradation will be substantively less during project operations compared with the construction phase, due to much fewer occurrences of equipment traffic in the right-of-way and the timing of those activities, which is typically -- typically don't occur in the spring, summer, and fall in agricultural lands, when soils tend to be more prone to compaction.

Through our assessment, soil compaction was determined to be the primary soil degradation mechanism of concern. And construction timing -- for example, working on frozen soils, or when compaction-prone soils are not wet -- will help limit soil compaction and avoid situations such as what's really pictured as a worst-case scenario of heavily rutted soils pictured on the left-hand slide.

On the right-hand screen, it is a visual map of the soil compaction risk throughout the project area, throughout the RAA. The compaction risk is predominantly high, and that's in the red colour, if we look to the left of the black arrow in this case, and that's getting into the existing corridor, so that area is predominantly a high risk to soil compaction.

And looking to the right and down, so it is just south of that black arrow, we get into, again, more of a variable soil condition, with a range of compaction risk from low, in yellow, to moderate, in orange, and there are some areas as well that are at high risk. However, a lot of the high-risk areas in the new right-of-way are actually in non-agricultural areas, in organic soils. However, compaction risk is an important issue for the project area, particularly, again, in that existing corridor.

To provide a better understanding of how we evaluated effects to agricultural land loss and degradation, we considered multiple factors.

For areas of land loss, we made use of two main factors; that's agricultural capability and crop productivity.

Agricultural capability, quickly, is really a measure of the inherent capability of the soil landscape to support cropping. It's determined by static properties, such as soil texture, drainage, slope, climate, moisture limitations. Agricultural capability classes for the project area will be discussed in the next slide.

As well, we looked at crop productivity. Again, that provides more of a current snapshot in terms of what is actually happening across the landscape in terms of the crops grown, and getting into the estimated value of this production. As discussed on the previous slide, compaction risk was used as the primary assessment tool to support evaluation of the potential for soil degradation.

So when it comes to agricultural capability, again, it is really that tale of two study areas.

On the left-hand screen, I have a chart that displays the relative areas under some different agricultural capability groupings. In the existing corridor, which is shown on the left-hand side here, the land is predominantly classed 1 to 3, which we call prime land. It is displayed in the blue bar on the left side of the chart. So Class 1 to 3 land is characterized as having no to moderate limitations for agricultural crop production.

In contrast, when we look at the new right-of-way, a relatively small portion, or 20 per cent of that right-of-way, is considered Class 1 to 3, again, represented by the blue bar. Just less than half, or 40 per cent, of the component is grouped into Class 4 to 5, represented by the red bar, which has -- getting into moderate to severe limitations for crop production. These soils are typically considered more marginal, and generally support less intensive cropping, such as hay land.

The remaining area of the new right-of-way consists of 14 per cent Class 6 to 7 soils, in the green bar. They are soils with little to no capability for annual cropping.

And then we have -- the remainder is 25 per cent, is organic soils, which are generally under natural land uses.

The right-hand side, again, shows a spatial distribution, this case of agricultural capability classes, and that same kind of relationship emerges, you know, to the -- in existing corridor to the left of the red arrow, you are seeing mainly those light browns or tans and green, in those Class 1 to 3 soils; and then getting into that new right-of-way, it is much more variable, with lower classes present as well.

So, these two slides present the average annual crop production values within the existing corridor and the new right-of-way. A similar relationship is apparent, as discussed, for crop types and agriculture capability.

On the left-hand screen, you can see the average yearly total crop production value in the new right-of-way and the existing corridor, and you can see that the value for the new right-of-way is less than half of that to the existing corridor, even considering the total length of each component is pretty close to being the same.

On the right-hand screen, within areas of agricultural land use, the production value per unit area is much lower in the new right-of-way. And this is presented in dollar per hectare.

So again, where we actively contributed to selection of the route in the new right-of-way, the result was a limitation of effect with respect to the value of crop production affected.

I think this is meaningful when considering the removal of land from production, as well as, again, that interaction between activities in the presence of the project. I will get into a little further here in the coming slides, when I talk about the conflict effects.

So the discussion here is on mitigation, that really follows the consideration of routing, including avoidance, so I won't be talking about those again.

A major design mitigation decision was the use of steel lattice versus guyed towers. And that's in improved agricultural lands, so that from an agricultural perspective, the benefit of these towers includes a longer span length, which reduces the number of towers that landowners need to avoid when operating agricultural equipment. The average separation is 470 metres, so it will be two or less towers per quarter-section.

These towers also have a smaller footprint than a guyed tower, and were chosen for agricultural lands in part to reduce the extent of that permanent land loss.

Continued landowner engagement will be an important tool to address concerns for individuals -- for example, through activities like tower spotting -- to limit effects within a field management unit.

Rehabilitation work will be carried out by Manitoba Hydro if damage occurs, such as through soil degradation through compaction, or damage to things like tile drainage systems.

Management of equipment traffic on the

right-of-way will include scheduling to reduce or limit compaction, and routing, such as avoidance of wet conditions and winter construction where feasible.

On the right-hand screen, there is a photo there that just shows you some mitigation in action on the Bipole III project. It just shows what we call "rig mats" placed on the soil surface in areas of heavy traffic and soils that are at high risk to compaction.

So I'll now summarize key findings for effects to land loss and degradation.

So new right-of-way areas, as we've discussed, will -- sorry, have lower agricultural capability ratings, have lower crop production values, and lower compaction risk ratings.

Routing has avoided agricultural buildings. There are six buildings within the existing corridor PDA, and it is limited to some grain bins and a shed that -- some of it, I think, had been already removed.

Temporary land loss is expected to last not more than two growing seasons, and would affect a small proportion of the local assessment area. Based on conservative estimates, up to

1,974 hectares of land could be affected. Again, that's the entire area of right-of-way under agricultural cropping. This comprises 1,637 hectares of agricultural land within the existing corridor, 331 hectares of agricultural cropping land within the new right-of-way, and 6 hectares of land for the Glenboro South Station expansion.

The temporary land loss will be limited up to one year in the south loop transmission corridor, but could affect up to two years in the remainder of the route. However, it is unlikely that this will result in a loss, actually, over two growing seasons, in any given area.

In terms of permanent land loss, it was estimated -- again, using our three-metre buffer -- that an area of less than 12 hectares would be lost to tower footprints over the lifetime of the project. So this is -- it's a very small portion of the PDA or right-of-way. It is equivalent to about 20 per cent of a quarter-section of land.

Compaction risk is an important consideration, with approximately two-thirds of the route considered at high risk.

So we've talked about the first effect, being land loss and degradation; now we will move into the second of two broad-based effects, conflict with agricultural activities. We will first review interference with equipment operations.

So this part of the assessment considered both ground-based equipment, which represents the majority of the operations on the landscape, as well as aerial application of pesticides.

Conflict, interference, and nuisance, again are ways to describe how the presence of the project -- namely the towers and conductors -- interact with agricultural activities in areas traversed by the project.

Interactions may include interference with field operations -- so again, the ground and aerial operations -- can result in overlapping equipment travel and input application, and it can also result in increased time management effort and cost to producers.

As you can see in the pictures on the right-hand screen, the ground-based equipment comes in many types, shapes, and sizes. This variability is one factor that complicates the understanding of these interactions at that scale of individual operations; hence the need for ongoing engagement with individual producers.

The graphic on the right-hand screen is pulled from the PAMI 2015 report mentioned previously, and it is intended just to provide a glimpse into the type of evaluation they conducted.

In this instance, the graphic visualizes how farmers in some cases work around the towers with an encircling pass, to ensure as much land as possible remains productive. However, this does result in overlap of input application -- which is supposed to be represented by that hatched area -- as well as increased time and again, cost, working around these structures.

Interference with dragline operation for liquid manure application or injection was raised as an issue in Bipole III, and it was raised again during the MMTP engagement program, as well as during the IRs.

According to PAMI, the 2015 study, who evaluated the effects to this activity specifically, while there will be interference with the practice, it can continue in the presence of a high-voltage line.

The worst-case scenario, according to PAMI, is illustrated on the right-hand screen, and occurs with a diagonal crossing. The bottom line is potentially a small area under the centre line that can not receive application, and additional starting and -- a starting or origin point for the dragline. Now, the latter situation would require some additional pipeline setup and associated management effort.

So, again, after the consideration of routing and avoidance mitigation, when we talk about mitigation for conflict with equipment operation, again, design mitigation is an important aspect. So again, these self-supporting towers on approved agricultural lands reduces the footprint, as well as the interference relative to a situation with guyed towers, as you can imagine, based on the figure on the right-hand screen.

Additionally, again, the average span is longer with self-supporting towers; again, that span is, on average, 470 metres on the project. Again, that limits the number of towers to two or less per quarter-section. That's -- again, that's an important factor limiting that conflict relative to a shorter span.

Continued landowner engagement will further limit effects on individual operations. This includes, as mentioned previously, the potential for tower spotting opportunities, some of which has already been -- has occurred in some instances, sorry, as well as planned communication with producers, leading up to and during construction, to limit those impacts related to interruptions to specific field operations.

So here are some key findings on the conflict with equipment operation. The new right-of-way was found to be outside of the primary area of aerial application, and no known aerial applicator airstrips were found in close proximity to the right-of-way.

A small amount of diagonal crossing in the new right-of-way occurs in annual cropland, but again, much of the 4.6 kilometres were sited based on landowner preference.

Project effects will be limited to the PDA or the right-of-way for most types of equipment conflicts, so things like ground operations for seeding, harvesting, and pesticide application.

In other words, these effects aren't felt outside of the right-of-way. In some cases, however, they may extend into the LAA, or that one-kilometre buffer, capturing that quarter-section field management unit; for example, aerial application of pesticides, dragline operations and biosecurity.

As a note, as well, there is 20 hog and dairy operations within that local assessment area, and these are those operations that will potentially apply liquid manure on nearby fields using draglines. Additional engagement with those landowners may help to further mitigate potential interactions and effects with these activities.

So, as mentioned previously, biosecurity was raised through the public engagement program and the IRs, and is an issue that, again, is becoming of increasing importance for producers. As production systems become more intensive in new path centre areas they weren't present in before.

Of interest to crop producers are soil-borne pathogens and other pests found in the soil, such as bugs and weed seeds. The primary mechanism of transfer is soil getting stuck on equipment tires and boots, and being transferred from an infected field to an adjacent non-infected field.

The primary soil-borne pathogen of concern in the project area is clubroot, which is a pathogen that affects canola crops.

On the right-hand screen, I've provided a figure indicating that the confirmed presence of clubroot -- clubroot has been confirmed in most of the RMs traversed by the project. And just to provide some context, the project origin is about here; loops around the City of Winnipeg and heads south, down to Piney, so -- any of those RMs that have oranges or yellows are RMs that have soil spores over a certain threshold level.

Other concerns were raised during public engagement, including verticilium wilt, which affects canola. While it has been confirmed in Manitoba in 2014, I understand that confirmation is just in research pots, and the presence and distribution is unknown, at best, in the project area.

Another issue raised was soybean cyst

nematode, and that is an issue that hasn't been confirmed in Manitoba, and there has been multiple surveys over the last few years that haven't come up with any confirmation of that. I should note it has been confirmed in Minnesota, the adjacent state to the south.

So just in terms of mitigations for biosecurity, Manitoba Hydro staff and contractors will follow -- implement and follow the Manitoba Hydro corporate policy on biosecurity and the associated standard operating procedures throughout the project. This was previously discussed by Mr. Alec Stuart during the property panel.

I think it's important to note here that it is a risk-based approach that Hydro uses, and that risk assessment determines the level of consequence, based on considerations such as frequency of activity and field conditions. It is used to -- as well, to determine the procedures to be followed given a situation.

A key aspect to the program is of course cleaning equipment before and after accessing a field. Again, that risk level determines the cleaning method; and if cleaning should happen by a mechanical means, such as a brush, or using something like a pressure washer, where more intensive cleaning is required.

Limiting equipment to the project development area and existing access points are also key activities to reduce the potential for spread of pests. In cases where a more stringent landowner or operation SOPs are in place, Manitoba Hydro is committed to work with those landowners to implement them as appropriate.

Additionally, Manitoba Hydro is working with industry to develop and conduct a pre-construction sampling program for biosecurity concerns. This will occur in agricultural fields traversed by the project, and I think that will really help inform and improve the biosecurity program on the project.

I think the biosecurity program is an example where Manitoba Hydro strives for continued improvement, and I think the engagement with producers and stakeholders, such as Manitoba Agriculture, has improved this program relative to Bipole III. And it is evident they are continuing to work with industry in an ongoing manner to improve the policy and the standard operating procedures.

So, next issue for review is livestock health. And we heard concerns related to project interactions with livestock, including biosecurity, as well as stray voltage. For biosecurity, the concerns included construction and maintenance workforce coming into contact with animals in livestock operations.

As well, there were concerns around increased access for wildlife to livestock production areas. It was a concern -- again, it is a result of clearing right-of-way under areas that are currently under bush or forest, and that subsequent interaction between wildlife and livestock potentially resulting in disease transmission.

A specific concern in this regard was raised by Manitoba Beef Producers, and it was related to the increased potential for bovine tuberculosis for milk in proximity of the U.S. border.

As well, during KPIs, or key performance interviews -- or, sorry, key person interviews; I'm getting my acronyms mixed up here -- Dairy Farmers of Manitoba expressed concern regarding stray voltage effects due to the proximity of the project to two particular dairy farms in the vicinity of La Broquerie.

To support our assessment, we conducted literature reviews and engaged with other discipline specialists, including our wildlife team and the EMF team member, Bill Bailey, who you just heard from.

With respect to livestock in the area, the project traverses -- sorry, just in terms of the livestock that the -- livestock operations that the project traverses, there is relatively few operations within the existing corridor; again, that's an intensive -- predominately an intensive annual crop area.

And there is areas of relatively intense occurrence of livestock operations around Ste. Genevieve and La Broquerie, in the new right-of-way.

In terms of mitigation, similar to our discussion on cropland biosecurity, Manitoba Hydro staff will follow and implement a stringent biosecurity policy and SOP throughout the project. Again, more stringent landowner and operation SOPs, where they exist, will be implemented by

Hydro where appropriate.

Limiting equipment usage to the right-of-way, using existing access points, and avoiding access through intensive livestock operations and biosecurity zones will act to limit the potential for disease transmission.

An example of engagement resulting in reducing the potential for effects to operations is through Manitoba Hydro's commitment to installing exclusion fencing in the calving area, where there was a concern related to the presence of towers at that sensitive site.

Ongoing engagement with producers will include a focus on reducing the overlap between livestock-related field activities and construction activities. For example, working with producers to avoid spreading manure, and pasturing of livestock in the transmission line right-of-way during construction, is a known and effective method to prevent the spread of disease.

I will now summarize key findings for livestock health.

The biosecurity program continues to be improved, and will control contact with livestock and limit compromised biosecurity situations. The route avoids the core elk area in Manitoba, and there was no sign of elk during surveys conducted by our wildlife team within the LAA. So the spread of TB that was a concern raised by the Beef Cattle Association does not appear to be a concern.

Research indicates no adverse effects on the health of livestock, including dairy cows -- sorry, dairy cows, other cattle, sheep, and pigs, due to magnetic or electric fields or audible noise.

Livestock operations were included as criteria in both the corridor and routing models, to limit that potential interaction between the project and operations such as dairies. The closest dairy operation is approximately 170 metres from the centre of the transmission line, or approximately 140 metres from the edge of the right-of-way. Manitoba Hydro will work with dairy producers to address concerns related to stray voltage, should they arise.

The next two slides will deal with the issue of cumulative effects. Since the 1800s, the regional assessment area has undergone substantive development for agriculture. The development really began with river lot developments south of the City of Winnipeg in the 1830s and the development of other agricultural-based settlements from the mid 1850s on.

Today, the area contains a broad range of agricultural land uses that contribute appreciably to the local and provincial economy. The development of the agricultural landscape has occurred in conjunction with other developments, such as the communities that serve agricultural areas, as well as the highways, roads, and roads to access these communities and the agricultural areas.

Other infrastructure required to support agriculture and other sectors have resulted in land loss in conflict with agricultural activities, including residential development, transmission lines, pipelines, and railways.

Currently, approximately 52 per cent of the regional assessment area is under agricultural lands use, including annual cropping, hay land, and pasture, while 2.5 per cent is considered otherwise developed.

Future planned projects include, in

the case of transmission lines, the Bipole III, St. Vital, Dorsey, Portage, and Richer to Spruce Station. We also included the Energy East Pipeline project, additional residential development, as well as improvements to highway infrastructure, including specifically the Headingley and St. Norbert bypasses.

So when the future planned projects are considered, the additional loss of land to agriculture is anticipated to be less than 500 hectares. To put this in context, it is approximately the equivalent of two sections of land. This represents a very small proportion of the agricultural lands in the regional assessment area, less than 1 per cent -- or less than .2 per cent, actually -- of the over 445,000 hectares within that area.

Further, the project, the MMTP project's contribution represents a very small proportion of the anticipated overall land loss, so less than 2 per cent of that 500 hectares estimated.

The combined effect of these projects will be adverse, but it is not anticipated to impair the capacity of agriculture within the regional assessment area. In other words, agriculture is anticipated to continue at or near pre-project disturbance levels.

So I will briefly talk about some specific monitoring followup, and I promise we are getting close to the end here.

As discussed, Manitoba Hydro is working with industry to develop and conduct a pre-construction sampling program, to provide that baseline information on soil-borne pests. A sampling program will be developed in discussion with Manitoba Agriculture.

Monitoring will be used to confirm predicted environmental effects and evaluate the success of mitigation implemented. Post-construction monitoring will include confirming the absence of visual evidence of compaction and routing, and crop performance monitoring will be considered, should lasting effects from compaction be a concern.

Manitoba Hydro will work with producers to rehabilitate damaged soils or infrastructure, such as tile drains, as required.

Additionally, monitoring will be used to identify deficiencies or detect unexpected environmental effects. Followup will be conducted to address any site-specific issues that require additional attention.

And I think this is an example of the adaptive management program.

As well, dedicated landowner liaisons are being identified to develop working partnerships and a personal point of contact for individual producers. They will discuss concerns, and will be there to address any specific issues that may arise through construction and beyond.

So, just to summarize, as we've discussed through the presentation today, routing and design have effectively limited effect to the agricultural environment. For example, cropping and livestock operations were considerations in corridor and route evaluation. The use of self-supporting towers will generally result in two towers or less per quarter-section.

Temporary land loss will affect many agricultural operations traversed by the right-of-way; however, the impact during growing seasons will be at most, two seasons, and generally will be one growing season or less. A very small amount of agricultural land will be removed from production for the operational life of the project.

Ongoing mitigation, engagement with individual landowners, and the environmental protection plan will further limit effects of the project.

The residual effects of losses of land from production, and the additional cost and nuisance caused by the project presence, again, will be offset by compensation.

Therefore, in conclusion, the project residual and cumulative effects are considered to be not significant.

I thank you for your time today -- or tonight, I should say.

THE CHAIRMAN: I wonder if we will break, and there will be another presentation immediately. Could we take about three minutes? A couple of people wanted to get some tea. But I'm going to hold everyone to three, as we want to get as much of this done as we can.

Thank you; that was very interesting.

(Brief Recess)

THE CHAIRMAN: Okay. Sorry to be rushing everyone, but we do want to get as much of these presentations done as we can this evening.

So thank you, and we will turn it over to Manitoba Hydro.

MR. BOHLKEN: Okay. I'm going to get started now. The people in back, maybe grab your drinks and head back to your seats.

THE CHAIRMAN: That was great; you are having a lot more success than I do.

MR. BOHLKEN: Again, it is Frank Bohlken, from Stantec. Tonight I'm going to be -- or evening -- I'm going to be presenting on the work we did on visual quality.

So we will start off with the spatial scoping for visual quality. It is a little different than we use for land use; for the LAA, we use an eight-kilometre buffer either side of the PDA, and that's basically the distance to which individual project components are most likely to be visible.

The RAA would define -- which is 15 kilometres -- would define the limits of visibility of the project in consideration of -- well, the curvature of the earth, for one thing, as well as the size of the structure.

So why is visual quality important?

Well, visual quality of the landscape is important to local residents, First Nations, Metis, recreationalists, and tourists. This is being established both from feedback from the engagement processes as well as general literature on the importance of visual quality. Really, what we are trying to understand is how will the project be changing the aesthetic character of the area.

From Bipole III and other studies, we understood that there can be a number of concerns related to visual quality for transmission line projects; for example, changes in views from residences, areas of recreation use, reduction in landscape integrity and landscape character.

Such concerns help us select and prioritize viewpoints for the analysis, which included residential areas, recreational sites, as well as the Ridgeland Cemetery; we will get to that in a minute.

We also reviewed a number of other environmental assessments that had visual quality assessment sections, to just inform our -- the methods that we used for this EIS.

From engagement, we understand that there are concerns in how changes in visual quality from the project may affect property, private property, tourism, recreation, quality of life.

Now, this section, we are focusing on visual quality effects, but effects on project and tourism and recreation were also addressed in Section 16, land and resource use, which I spoke about prior to the break.

Quality of life relates to a number of aspects, including, for example, enjoyment of one's home, community, an ability to recreate, et cetera. These topics are broadly considered in a number of sections, including the section on land use, as well as the section on community health -- which we will be talking about perhaps later, but likely tomorrow -- related to, for example, how they could be affected by stress and noise.

So, we -- again, there was discussion, there was a presentation on routing earlier at this panel, and we spoke about it a little bit related to land use.

Visual quality considerations are factored into route selection in several ways. The number of high-value viewpoints within

400 metres of the right-of-way was one of the metrics used in the preference determination for the built environment. The final preferred route generally travelled through less-populated areas, and parallels existing transmission lines and roads, and is generally located away from residences, communities, parks, and recreation features, thus reducing or limiting its potential interaction with areas of visual importance.

We assessed how the project may change visual quality from representative viewpoints using three parameters. One is visual sensitivity, which is how sensitive the landscape is to alteration. Landscape character, which is based on the degree of built interventions, of which we will show you some examples in a few minutes. And prominence, which is the degree by which the project will occupy once -- maybe you can -- yeah.

Prominence, which is the degree by which a project will occupy one's field of vision from any particular viewpoint. And the second screen here is showing the -- when we're doing our visual quality analysis, we're looking at it from the point of view of what one's visual field is, which is approximately 60 degrees horizontal and vertical.

Okay. So when we are seeing -- let's say this photograph here, when we were doing our visual assessment, we were considering that central field of view, how that central field of view would be affected.

This table shows the landscape character class definitions used in the assessment. As landscape class moves from rural pastoral to urban industrial, the proportion of built interventions within one's central field of vision increases.

The next slide will illustrate -- illustrates landscape character class, just in terms of -- again, from a rural pastoral setting in the upper left-hand photo down to a photograph of -- well, downtown Winnipeg, which is primarily urban.

So again, the proportion of built interventions increases as one proceeds through these landscape character classes.

We undertook what we believe to be the most comprehensive visual quality assessment prepared for a transmission line project in

Manitoba. We started out with a literature review and viewshed analysis to identify potential viewpoints of concern, of which we identified 89 viewpoints of potential concern.

Seventy-five of these were either duplicated by other viewpoints, or were more than eight kilometres away from the proposed right-of-way.

So what we were looking for were, for example, recreation sites, residences, areas where people would potentially have issues with change in the aesthetic landscape.

Fourteen viewpoints were selected as representative of a variety of visual concerns. These range in distance from the right-of-way from less than 100 metres to 1.6 kilometres, on average being 600 metres.

The second slide -- sorry about that.

The second slide just shows the distributions of the viewpoints that were assessed within the LAA. So again, we looked at everything from in and around Winnipeg right through down into the Piney area.

So we then conducted field studies to photo-document the views towards the project from the 14 viewpoints, and collect data on viewpoint characteristics to inform the visual impact assessment.

We then did computer modeling to render images of the project superimposed on baseline backgrounds, and re-ran the landscape character class analysis. This gave us the change in visual quality attributable to the project.

Finally, we calculated prominence, which is the degree by which the project components would occupy the field of vision from any particular viewpoint.

Because of its flat topography, the project is potentially visible from much of the LAA. However, particularly in southern areas along the route, vegetation will screen visibility of project structures from many viewpoints.

Of the 14 assessed viewpoints, one was rated as low, and 11 were related as having moderate visual sensitivity class, indicating that in general, visual quality will be important to viewers. Most views were rated as rural pastoral, with minimal to distinguishable development in terms of the landscape character class.

The project will result in less than

1 per cent additional visual disturbance to the assessed views overall. Again, this is based on the 14 viewpoints we looked at, and we again -- we were, I would say, fairly conservative in this assessment, because the average distance between the viewpoints we looked at and the right-of-way was 600 metres. In other words, we were really only looking at a fairly close band of viewpoints, near to the right-of-way, relative to the entire LAA.

Overall, transmission line towers will be moderately prominent from the assessed viewpoints, however -- and we will see some examples where they will be highly prominent; again, potentially mitigated, however, through tower spotting.

I'm just going to show you some examples of before and after renderings.

So this is viewpoint number 2, which is located east of Sundown. In the baseline condition, we are seeing, actually, a fair amount of different types of interactions. We have the road, we have fence, and so forth.

So this is, from our calculations, about 23 per cent disturbed. When we add the towers about 300 kilometres away, that disturbance factor goes up.

This next one is the La Verendrye golf course in La Broquerie. So here we are characterizing this as rural pastoral. I mean, of course it was clear it is a golf course, but in terms of -- we are considering that to be -- you know, aesthetically pleasing, so really no disturbance from an esthetics point of view.

When the project goes in, the overall disturbance is 0.4 per cent at 400 metres, but this would have at least a moderately prominent change because of the tower, if indeed it ends up being located at that location.

The next one is the Trans Canada Trail, at Courchene Bridge. So we see in the background there, there's -- I think that's a communications tower. So a fairly small alteration; we would consider this characterized as rural, with minimal development.

At this location, the tower would -- if indeed it ends up at this spot -- would be quite close to the viewpoint, approximately 100 metres away. It would be highly prominent. But again, the overall percentage disturbance is still relatively moderate, at 3.1 per cent.

This shows the Red River Floodway, at Chrypko Road and Two Mile Road, and again, the baseline condition would be characterized as rural pastoral, no builts and interventions visible.

Here, in the project case, the project would be located about 500 metres away, and would change the view to rural pastoral with minimal development.

Our final view is Road 58N. In this one, in the baseline condition, we are seeing D602F transmission line about 300 metres away. Here is an example of where the project would be located adjacent to an existing line, so really not changing the visual characteristics from this viewpoint.

This is a summary of the measures proposed to mitigate effects on visual quality, as previously discussed. Route selection has resulted in avoidance of many visually sensitive locations. Tower spotting has and will be used to reduce the effect of visual quality at sensitive viewpoints. By adhering to approved clearing boundaries, visual changes due to right-of-way clearing will also be limited.

Again, so Manitoba Hydro will continue to engage with First Nations, Metis, and the public, including sharing of information on project and topics of interest. This could include further discussions on, for example, tower spotting opportunities.

So in summary, Manitoba Hydro acknowledges that changes in the views are a legitimate concern, and that the project will be permanently visible in the LAA landscape, and will be of high prominence from some viewpoints. However, while the project may be highly prominent from some viewpoints, it will not change the overall visual character of the LAA. Therefore, residual effects on visual qualities will be not significant.

In regards to cumulative effects, the visual landscape in the RAA has been substantially altered by past developments, as we've heard from my presentation on land use, as well as Mr. Whetter's on agriculture. Planned projects will continue to affect the visual quality in the RAA, particularly those that involve above-ground infrastructure, such as other transmission lines and building structures.

These effects will also include changes to vegetation patterns; for example, right-of-way clearing could also have an effect on visual quality. However, identified foreseeable projects are not expected to change the baseline character class of the RAA, and therefore cumulative effects are not significant.

Thank you.

THE CHAIRMAN: Thank you.

Shall we just move right into the next presentation, then?

MS. BRATLAND: We will just need two minutes to pull up the next slides. And the presentation will be on the human health assessment.

(Brief Recess)

MS. BRATLAND: We are ready with our next presentation, which will be Dr. Bryan Leece, presenting on human health effects.

MR. LEECE: Good evening.

My name is Bryan Leece, and I'm a principal with Stantec, and a senior technical lead for human health risk assessment in Canada. I served as the discipline lead for the human health risk value component, a chapter of the MMTP

EIS submission.

The human health risk assessment presentation will follow the same sort of roadmap that's been used in the other presentations, as we've seen for this project. We will start with an overview of why human health risk assessment was included as a valued component; what the assessment considered in its deliberations; and the regulatory guidance that was used in completing the work.

We will talk about what we heard through the public and Metis and First Nations engagement processes, and how this information helped us frame the human health risk assessment, or HHRA, to address the concerns as they relate to the human health risk.

We will briefly discuss what we assessed in the HHRA, outline the key findings of the assessment. We will also be talking about any recommendations for mitigation and monitoring and followup that arise from the assessment of human health risk.

And finally, we will outline the conclusions of the assessment.

Why was human health risk included as

a valued component in the EIS? We are really looking at human health risk because of the inherent importance of human health and well-being.

To understand how human health relates to health and well-being, it is important to understand that we are all exposed to physical agents, such as chemicals, in the environment on a yearly, daily, and even hourly basis. And the human health risk assessment provides a way to evaluate those exposures to determine if the human health risks associated with these exposures represent a potential concern for human health.

Exposures to physical emissions from the project, such as vehicle emissions, dust, or herbicides, for example, could alter human health risks, if the exposures are large enough, or if they persist for long enough, over periods of months, years. So we must evaluate whether the emissions from the project have the potential to alter human health risk, and ultimately represent the concern for human health.

The human health risk assessment is a process, and it is a recognized process, that's used to help evaluate potential human health risks associated with exposures to physical agents in the environment. Physical agents, such as dust and chemical agents, or herbicides and noise, and in the case of transmission lines like MMTP, EMF.

Human health risk is assessed by comparing an individual's estimated daily exposure to a chemical to the exposure limit for that chemical. And you can think of the exposure limit really as an allowable daily intake. Daily exposures that are below the allowable daily intakes don't represent a concern for human health, and they don't represent a human health risk.

Exposure limits, or allowable daily intakes, are usually set by regulatory agencies such as Health Canada, or the U.S. EPA, and they represent daily intakes that are well below the levels where actual health effects would be expected to occur -- ten times below that up to ten thousand times below that.

So what that really means is that a change in a human health risk value -- and Dr. Bailey talked about this briefly a little earlier today -- is that a change in a human health risk doesn't mean there is going to be a human health effect. And really, what it does mean is that the chance that a human health effect could occur increases as those exposures increase above the allowable daily intakes.

Therefore, the assessment of the residual project effects is based on exposure levels that are well below the levels where actual changes in human health can occur. And what this does is it incorporates a precautionary principle into the assessment of human health.

The human health risk assessment that was completed as part of the EIS submission for MMTP followed standard risk assessment guidance from agencies such as Health Canada, and although the guidance documents that are shown here really reflect the guidance that Health Canada provides for assessing contaminated sites, it is also the guidance that Health Canada recommends be used for assessing human health risk as part of an environmental assessment.

Because herbicide use and EMF are a particular concern for transmission line projects such as MMTP, the HHRA also made use of regulatory guidance specific for the evaluation of these components. The Pest Control Products Act was used to help define the regulatory requirements governing the use of herbicides, and this helped to establish and define the potential short and long-term environmental effects that may be associated with the use of these products. The International Commission on Non-ionizing Radiation Protection guidelines for limiting exposure to time varying electromagnetic fields were also used, and we used this relying on the work that Dr. Bailey was talking about earlier today.

During the public and First Nations and Metis engagement process, we heard a number of concerns related to potential effects that emissions from the project could have on human health. More specifically, we heard that vehicle emissions and dust during construction and maintenance operations could alter air quality, and that these changes could have an effect on the health of people who are in the areas where these activities are occurring.

Changes in ambient noise levels during construction and operation could alter enjoyment of the areas, and could represent a potential concern for people who live near the Dorsey, Glenboro, or Riel Stations.

We also heard that the use of herbicides for vegetation control could alter the quality of country foods, both vegetation and wildlife, which could represent a human health risk for people who consume country foods.

The EMF from the transmission line could also represent a potential risk for people who live near or engage in traditional or recreational activities around the transmission line.

Some of the things that were considered in routing, you've heard about through the routing process; but the ones that are relevant to the human health risk assessment, really, are the decisions or the attempt to keep the line away from places like residences, schools, or other developed areas, for as much as is practical. So with the aim of being that we are ever practical, situating the line away from these features.

Past experiences on other environmental assessment projects played a critical role in the design of the human health risk assessment component of the EIS submission. From other resource-based and linear projects, the

HHRA team learned that dust and vehicle emissions can change local air quality, and that these changes can alter human health risk if the changes are large enough and if they last long enough to have an effect on long-term air quality.

Construction and operation activities can alter ambient noise levels in the vicinity of the project, and these changes can have an effect on human use and enjoyment of the adjacent lands. Noise associated with station operations can raise ambient noise levels in the vicinity of the station, and that may be noticed by residents near the stations.

Herbicide use certainly has the potential to alter soil and country food quality, which in turn could alter human health risk if the changes in exposure are high enough, and again, if these exposures persist for long enough.

The operation of the transmission lines and supporting transmission infrastructure at the stations could alter local EMF levels, and the magnitude of these changes needs to be considered to determine whether they represent a potential concern.

We will spend a little bit of time

talking about the methodology that we used to conduct the human health risk assessment. And the assessment really is associated -- the assessment of potential human health risks associated with emissions from the project relied on a desktop review and analysis of information provided by the air quality technical data report and the noise assessment technical data report, the vegetation management plan, and the information regarding the current scientific position on the existence of the causal relationship between EMF exposure and changes in human health risk and/or changes in human health. So the work that Dr. Bailey's group did.

The air quality assessment provided the information necessary to understand the potential change in the long-term air quality along the right-of-way during construction, operations, and maintenance. And this information helped to inform the assessment of potential changes in human health risk associated with the inhalation exposures to dust and vehicle emissions for people who were in the area when these activities are occurring.

The air quality assessment also

provided information on the magnitude of the predicted changes in air quality, and on how long these changes could be expected to last, which is necessary to understand the potential human health risks.

The noise assessment provided information on predicted changes in ambient noise levels during construction and operations along the right-of-way and around the Dorsey, Glenboro, and Riel Stations. The information from the noise assessment helped to inform the HHRA with respect to the potential effects that changes in ambient noise levels could have on daytime and nighttime noise levels, and how these changes may affect things like sleep patterns.

The vegetation management plan provided information on the herbicides that are used by Manitoba Hydro, and on the application practices and typical application frequencies. This information was essential in understanding how the herbicides that are used by the project could interact with the environment, such as soil, plants, and animals. It is also essential in determining how these interactions may have the potential to alter human exposure to chemicals, and thereby change the human health risks.

For EMF, the information we got from the work that Dr. Bailey provided really was the EMF scientific update, and that provided a comprehensive review of the current state of scientific understanding of the relationship between EMF exposures and changes in human health and human health risk. This information helped in assessing whether the project -- or predicted project-related EMF fields represented a potential human health risk.

The human health risk assessment evaluated the potential changes in human health risk associated with the potential changes in exposures to the physical agents that we've been talking about. We considered changes in human exposure to vehicle emissions and dust, between current conditions and conditions predicted to be present during construction, and in operations and maintenance phases of the project.

Changes in ambient noise levels and the potential for those changes to result in increases in annoyances in the community is the potential for increased noise complaints.

Changes in human exposures to

herbicides through the consumption of country foods, such as wild meat and traditional vegetation and berries, and the potential changes in human health risk that would be associated with these changes in exposures, and changes in human health risk resulting from changes in exposures to EMF from the project.

As we mentioned earlier, the human health risk assessment really relies on information that's provided by other disciplines, particularly the air quality and the noise assessments. As a result, the local assessment area for the human health risk assessment has to overlap with the local assessment areas for the air quality and the noise assessments.

Both the air quality and the noise assessment define their local assessment areas as a one-kilometre buffer on either side of the right-of-way. For the air quality assessment, the LAA represents the anticipated extent to which air contaminants from the project activities may be generated and released during construction and operations.

In the noise assessment, the local assessment area is defined as the anticipated extent to which noise levels associated with the project can be heard by the human ear. The spatial boundaries for the HHRA are the same as those as the air quality and the noise assessments, and the LAA for the HHRA therefore really was defined as a one-kilometre buffer on either side of the right-of-way. This LAA represents the anticipated extent to which emissions from the project, such as vehicle emissions, dust, or noise, could potentially alter human exposures.

Herbicide use is strictly limited to the right-of-way, and herbicides used by the project would not extend beyond the right-of-way. Therefore the one-kilometre buffer that's defined as the LAA for the noise and the air quality assessments adequately captures the potential changes in exposure to herbicides associated with project activities. The one-kilometre buffer also adequately captures potential changes in EMF exposures, as EMF levels are predicted to approach background within close proximity to the edge of the right-of-way.

Temporally, the human health risk assessment looked at the operations and the construction phases.

If we take a look now at changes in air quality, the changes in air quality resulting from vehicle emissions and dust during construction and operations and maintenance could alter local air quality on a short-term basis, less than a 24-hour period.

Changes in air quality would be very localized, and typically limited to the right-of-way, where construction activities would be taking place. They would also be of very short duration, and would occur while construction or operation or maintenance activities are occurring, and would not persist once daily construction activities have ceased.

So the project-related changes in air quality related to vehicle emissions and dust are predicted to be negligible, only occurring for short periods of time at any given location. As a result, the changes in human exposure to vehicle emissions and dust resulting from project-related activities will also be negligible. So if you have a negligible change in exposure to vehicle emissions and dust from the project, the project-related activities and the risks associated with those will also be negligible.

What this means is that project-related vehicle emissions and dust represent a negligible human health concern for members of the Metis, First Nations, or other communities who may be in the area where these project-related construction and/or operations and maintenance activities are occurring.

During construction of the transmission line, the noise assessment determined that the project-related noise would exceed the residential desirable noise guideline of 55 dBA, or decibels. However, the exceedances would be intermittent, and they would be temporary, and it is anticipated that most locations along the transmission line would be subject to the construction noise for the construction of one, or possibly two, towers. These noise predictions do not account for attenuation by natural or man-made features, and therefore what they represent is a worst-case assessment of the potential change in noise levels.

Meaning, really, that actual noise levels would be expected to be lower than the levels predicted and used for the assessment.

The noise assessment considered changes in ambient levels along the transmission line and at the Dorsey and Glenboro and Riel Stations. Along the transmission line, in operations, the noise assessment determined that there would be an inaudible increase in ambient noise levels, from about 22 decibels to 23 decibels. And this increase in ambient noise would not really be perceptible to the human ear.

At the stations, the noise assessment evaluated the change in ambient noise levels of the closest residence to each of the Dorsey, Glenboro, and Riel Stations. The ambient noise levels at all three stations would meet the residential guideline of 55 decibels for daytime noise levels. The ambient noise level at the Riel Station would also be below the 45 -- the desirable guideline of 45 decibels, nighttime noise limits.

Ambient noise levels at the Dorsey and Glenboro Stations would exceed the 45 dBA desirable residential nighttime noise guideline, being 52 dBA at Dorsey and 55 dBA at Glenboro.

Again, these noise level predictions represent the maximum predicted outdoor levels at the closest residences, and they do not account for noise attenuation by natural features, such as trees and shrubs, or man-made features, such as building or facility structures.

They also do not account for potential attenuation of noise between outdoors and indoors. For example, Health Canada guidance on noise assessments assumes a 15-decibel reduction or attenuation in noise levels between outdoors and indoors in buildings with partially-open windows.

So if somebody is sleeping at night and have a window partially open, you have a 15-decibel decrease in noise levels between what is outside and what is inside.

If the windows are closed, Health Canada assumes that there is a 27-decibel decrease in the noise levels. What this means is that the indoor noise levels in the residences nearest to the Dorsey and Glenboro Stations would be at least 15 decibels lower than the 52 and 55 decibels that have been predicted, and that's not accounting for natural attenuation of those noises.

So the noise assessment really determined that along the transmission line, there would be a slight change in ambient noise levels that should not result in changes in noise complaints related to increased noise levels for people living near or engaged in activities on or near the right-of-way.

The assessment also determined that low predicted noise levels at the Dorsey and Glenboro Stations may exceed the nighttime guideline. The levels indoors would be expected to be below the 45 dBA level, and thus would not be expected to result in complaints or sleep disturbance.

If station-related noise results in noise-related complaints, noise monitoring can be undertaken, and passive noise mitigation measures, such as the construction of sound-attenuating barriers, or active noise mitigation, such as noise-cancellation techniques, can be applied to reduce operational noise.

As I mentioned earlier, the use of herbicides for vegetation control along the right-of-way has been raised as a concern. And yes, if used incorrectly, herbicides can build up in the soil and in plants that grow in that soil. This, in turn, could lead up to a building-up of herbicides in animals that consume the plants that have herbicides in them.

The presence of herbicides in country foods could be a health concern for people who eat country foods containing herbicides.

However, as mentioned in other presentations, it is important to know that herbicides will not be used during construction of the transmission line; herbicides will only be used during operations and the maintenance phase, where their use will be limited to controlling the growths of trees and tall-growing shrubs.

While it is true that herbicides are dangerous chemicals that must be used with caution, it is also true that their use is strictly regulated at the Federal and Provincial levels, and the herbicides used by Manitoba Hydro are approved for use by Federal and Provincial agencies, and are considered safe for use in Manitoba and in Canada.

It is also important to understand that the application requirements for herbicides are set at the Federal level by the Pesticide Management Regulatory Agency, or the PMRA, and that the application rates established by the PMRA are set to prevent environmental effects occurring as a result of herbicide usage.

Application requirements set by the PMRA will be followed by Manitoba Hydro. And as you heard in the vegetation management plan presentation, the use of herbicides on the right-of-way will decrease over time, as low-growing vegetation becomes established on the right-of-way, and the need to control taller-growing vegetation decreases.

Manitoba Hydro's use of herbicides in the right-of-way will be lower than what the regulation allows, meaning that the herbicides used by Manitoba Hydro will not result in herbicide accumulation in soil or vegetation.

This, in turn, means that the use of herbicides along the right-of-way will not accumulate in vegetation or wild meat, and will not alter the quality of country foods harvested along the right-of-way.

Because herbicides will not alter country food quality, they will not alter the human health risks associated with consuming country foods, and thus herbicide use represents a negligible change in human health risk.

Some of the key mitigation measures

that will be used associated with the use of herbicides, really, include the application of herbicides, making sure that they conform to regulatory requirements.

The vegetation management plan, as we've talked about before, is designed to reduce the application frequency of herbicides as low-growing vegetation becomes established.

Manitoba Hydro will certainly provide notification of planned herbicide use to Metis, First Nations, and public users of the right-of-way, and herbicides will not be used in known areas of berry or other vegetation harvesting.

As you heard from Dr. Bailey's presentation earlier today, the current state of scientific understanding is that there is no causal link between exposures to low levels of electromagnetic fields and changes in human health. The predicted EMF fields at the edge of the right-of-way are well below the guidelines for electric fields recommended by the International Committee on Electromagnetic Safety and the guidelines for magnetic fields recommended by the International Commission for Non-ionizing

Radiation Protection.

This slide provides a graphical representation of the predicted electric field strength for Section E components of the transmission line. The graph also includes the ICES recommended guideline maximum exposure in the column on the left-hand side, so that's -- except I'm -- there we go. Here.

The guideline is 10, and what we see is that the predicted electric fields on the right-of-way are lower than the guideline, and at the edge of the right-of-way, they are more than ten times lower than the guideline, and lower still 30 metres beyond the edge of the right-of-way.

What we have is the guideline in this column, the maximum on the right-of-way, which is 5.9 here for Section E, at the edge of the right-of-way, that's dropped to .8, and 30 metres beyond the right-of-way, that's dropped to .2.

If we take a look at a similar graph for the electromagnetic -- the magnetic fields, what we find is that the maximum predicted on the right-of-way is considerably lower than the guideline of 2,000; it is 122 milligauss.

And what we find, they are about 95 times lower than that guideline at the edge of the right-of-way, and more than 250 times below that guideline 30 metres beyond the right-of-way, over here, at 7.4. You can't really see the bar there, but it is there. It is just very, very small.

What this means is the data suggests the magnetic fields in the right-of-way will not represent a human health risk for people who spend time on the right-of-way or who are in close proximity to the right-of-way.

In summary, for the EMF, the data really shows that the predicted changes in EMF levels represent a negligible human health risk.

In terms of the key mitigation, this really relates to routing, and the routing really was selected to limit proximity to residences and developed areas where practical.

Moving on to cumulative effects, the human health risk assessment also included a cumulative effects assessment for potential effects for air quality and noise, and for herbicides, and for EMF.

For air quality, there is a potential

for cumulative effects to occur if project-related construction activities overlap with other construction projects. However, given the transient nature of construction activities for linear projects such as MMTP, overlap between construction activities would be expected to be very short-lived, and would represent a negligible change in human health risk.

For noise, there is a potential for noise from future projects to interact with noise from the MMTP, resulting in an increase in ambient noise levels. However, these predictions have not accounted for the noise attenuation in actual noise levels that would likely be lower than predicted. If station-related noise results in noise-related complaints, noise monitoring can be undertaken, and passive noise mitigation measures, such as sound barriers, as we talked about before, or active measures, such as noise cancellation, can be applied to reduce operational noise.

Under the vegetation management plan, herbicide use will be limited, and will conform to regulatory requirements to prevent environmental effects resulting from herbicide usage. Herbicide use will be strictly controlled and will be limited to the right-of-way.

And as we've seen talked about a little bit earlier, herbicide use will not alter country food quality. What this means is the use of herbicides in the right-of-way will not overlap with herbicide usage elsewhere, and thus there are no cumulative effects associated with herbicide usage on other projects, and further assessment of cumulative effects related to herbicide usage was not warranted.

For EMF, we've talked about the point that Dr. Bailey made very well earlier on today, is that there is a potential for cumulative effects with the projects. However, the electric and magnetic fields predicted for this project are well below the recommended guideline limits. In addition, as noted earlier, the scientific evidence indicates that EMF associated with transmission lines do not pose a risk to human health.

The ongoing engagement for the project will aid in the identification of harvesting areas, particularly for berries and vegetation, so that these can be excluded from areas where herbicides are applied as part of the vegetation management plan. It will help set up the proper buffer zone, so that herbicides are not being used in areas where people are harvesting berries.

It will also provide public notification of herbicide use, so that people are aware that herbicides have been used or are planned to be used in the area, and the areas where that will happen will be identified.

With respect to EMF, Manitoba Hydro will continue to monitor the state of the scientific understanding of EMF, and will make new information available to the public as it becomes available.

The human health risk assessment reached the following conclusions regarding the potential changes in human health risk associated with changes in ambient air quality, noise, herbicide usage on country foods, and EMF.

For air quality, the human health risk assessment determined that changes in ambient air quality associated with vehicle emissions and dust during construction and operations represent a negligible human health risk.

For noise, the HHRA noted that ambient noise levels during construction and operation are not predicted to exceed typical ambient noise levels on a continuous basis. Occasional exceedances of daytime noise levels will be short in duration.

Ambient noise levels at the Dorsey and Glenboro Stations would exceed the desirable residential nighttime guideline of 45 dBA; however, these predicted noise levels, as we mentioned earlier, do not include natural attenuation of the sound from vegetation and structures. This means that the actual increases in ambient noise levels could be expected to be lower than the increases predicted in the assessment.

Passive and/or active noise, where reduction strategies can reduce noise levels at the Dorsey and Glenboro Stations if noise complaints become an issue.

Herbicide use will not alter country food quality; therefore, herbicide use for vegetation control on the right-of-way represents a negligible human health risk, as we mentioned earlier.

EMF from the project are well within the limits recommended by regulatory agencies within the right-of-way and beyond the limits of the right-of-way; thus, EMF from the project represents a negligible human health risk.

The final conclusion is that because the human health risks associated with changes in air quality, ambient noise, country foods, and EMF are determined to represent negligible human health risks, the project residual effects on human health are considered to be not significant.

Thank you.

THE CHAIRMAN: Thank you for a very interesting presentation.

I guess I would ask the Hydro representatives, it is now five to nine; probably not much point in starting another one.

MS. BRATLAND: No. We have two more presentations on this panel, and they each are approximately 30 to 35 minutes long.

THE CHAIRMAN: Okay. So we will reconvene at 9:30 tomorrow morning, back here, and we will finish those two presentations and then move on to questioning of this presentation.

Any filing or other issues to deal with?

MS. JOHNSON: Yes, we have a pile of

paper today.

MH038 is the methodology presentation we heard this morning. Thirty-nine is Mr. Bailey's presentation. Forty is the first part of the socio-economic presentation, the introduction. Forty-one is Part 1 of the land use presentation. Forty-two is Part 2. Forty-three, agriculture, Part 1. Forty-four is agriculture Part 2. Forty-five is visual quality, Part 1. Forty-six is Part 2. And number 47 is health, Part 1.

(EXHIBIT MH-38: Methodology presentation)

(EXHIBIT MH-39: Dr. Bailey's presentation)

(EXHIBIT MH-40: Introduction socio-economic presentation)

(EXHIBIT MH-41: Part 1, land use presentation)

(EXHIBIT MH-42: Part 2, land use presentation)

(EXHIBIT MH-43: Part 1, agriculture presentation)

(EXHIBIT MH-44: Part 2, agriculture presentation)

(EXHIBIT Mh-45: Part 1, visual quality presentation)

(EXHIBIT MH-46: Part 2, visual quality presentation)

(EXHIBIT MH-47: Part 1, health presentation)

THE CHAIRMAN: Is that it for the filings?

All right. We will see you all tomorrow morning at 9:30. Thank you.

(Adjourned at 9:00 p.m.)

OFFICIAL EXAMINER'S CERTIFICATE

Cecelia Reid and Debra Kot, duly appointed Official Examiners in the Province of Manitoba, do hereby certify the foregoing pages are a true and correct transcript of our Stenotype notes as taken by us at the time and place hereinbefore stated to the best of our skill and ability.

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Official Examiner, Q.B.

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