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Tuesday, November 26, 2013

Upon commencing at 9:30 a.m.

THE CHAIRMAN: We'll come to order now. We'll reconvene the hearing. Today we have a full day of the Consumers Association of Canada, Manitoba Branch, and Byron Williams.

Mr. Williams, over to you.

MR. WILLIAMS: Thank you, and good morning members of the panel. I am going to have our witnesses introduce themselves and then I'll ask Ms. Johnson to affirm or swear them in.

Dr. Lee?

DR. LEE: I'm Murray Lee with Habitat Health Impact Consulting.

DR. BROWN: Gordon Brown with G&P Resource Services Inc.

MR. BRESEE: Karl Bresee, Intrinsik Environmental Sciences.

Murray Lee: Sworn

Gordon Brown: Sworn

Karl Bresee: Sworn

MR. WILLIAMS: I'm just going to suggest for Dr. Brown and Mr. Bresee, you can move that other mic over, and when you are speaking you

will want to have the mic a little closer to you.

Just for the panel, you should have, for the purposes of this morning, two powerpoint presentations: One by Dr. Lee, which we will be starting with, and then a second one in blue for which Ms. Johnson will probably chastise me, I apologize, by Dr. Brown and Mr. Bresee.

THE CHAIRMAN: Will they be on the screen or not?

MR. WILLIAMS: Yes, they will be on the screen.

THE CHAIRMAN: Thank you.

MR. WILLIAMS: And I can also indicate that you should have -- obviously the curriculum vitae of all three witnesses have been filed -- but you should have before you two. One is Dr. Lee's statement of qualifications and then the second one will have both Dr. Brown and Mr. Bresee.

And if I might just start with you, Dr. Lee, am I correct in suggesting that you are a practising physician who specializes in rural and remote medicine and have worked extensively with Aboriginal populations in Canada's north, as well as indigenous populations elsewhere in North

America?

DR. LEE: Yes.

MR. WILLIAMS: And you are a senior partner in Habitat Health Impact Consulting Corporation?

DR. LEE: I am.

MR. WILLIAMS: And you are also, in your spare time, a clinical assistant professor at the University of Calgary?

DR. LEE: Yep.

MR. WILLIAMS: And you are the chair of the Population Health course at the University of Calgary?

DR. LEE: Yes.

MR. WILLIAMS: Okay. And in terms of your specializations as it relates to your evidence, sir, would I be correct in suggesting that one area of specialization flows from your -- as a medical doctor?

DR. LEE: It does, yes.

MR. WILLIAMS: And certainly you also have expertise in health impact assessment?

DR. LEE: Yes.

MR. WILLIAMS: Okay. If we could just flip you to the second page of your statement,

brief statement of qualifications. Would I be correct in suggesting that you have done a number of health impact assessments, primarily for industrial customers or government?

DR. LEE: Both for industrial customers and government, as well as community, yes.

MR. WILLIAMS: And community as well.

Could I get you, under project experience, just to discuss very briefly the very first bullet in terms of your work in terms of mining activities near Keno City?

DR. LEE: Okay. That was a health impact assessment that was requested by the medical officer of health in the Yukon, looking at resumption of mining in a small historic mining community, a place that had thought that mining was gone, was trying to reclaim a lot of contaminated sites. And in the process of reclamation of sites, the company involved in that discovered that they had commercially viable prospects and started actively mining again. So the medical officer of health asked for a broad review of health impacts of mining in the area.

MR. WILLIAMS: Okay, thank you.

And just under your publications, I see that with Ms. Orenstein, you have done some work in terms of determinants of health and industrial development in the RM of Wood Buffalo, and I wonder if you could briefly discuss that as well, Dr. Lee?

DR. LEE: Again, that was a request by, in that case, the Cumulative Environmental Management Association, particularly the air resources board of that, to look more broadly at health, with the feeling that the broader perspective on determinants of health was being lost in the regulatory process and the review process, so they wanted a report to look at all the aspects of industrial development in Wood Buffalo and how health might be impacted with that.

MR. WILLIAMS: Thank you.

Mr. Bresee, turning to you.

And his statement of qualifications is at the back of the one starting with Dr. Brown.

In terms of the expertise relevant to this hearing, Mr. Bresee, would I be correct in suggesting that a key area of expertise you bring is in exposure assessment modeling?

MR. BRESEE: Correct.

MR. WILLIAMS: And you also have a number of years of experience, many years in terms of health, human health risk assessment?

MR. BRESEE: Correct.

MR. WILLIAMS: Just focusing on your work with Intrinsik over the last 13 years, would I be correct in suggesting that it has involved performing risk analysis for humans and ecological projects, and developing human and wildlife health exposure assessment models?

MR. BRESEE: Correct.

MR. WILLIAMS: And in terms of your presentations, I'm correct in suggesting that you presented to the tenth international conference on mercury as a global pollutant, focusing on mercury related human health risks associated with the consumption of fish in the Oil Sands region?

MR. BRESEE: Yes.

MR. WILLIAMS: Just flipping to the back page of that brief statement of qualifications. I would be correct in suggesting that you have been involved with over 50 environmental impact assessments, sir?

MR. BRESEE: Yes, I have.

MR. WILLIAMS: And a number of them are set out here. One that's not is your 2008 work in Fort McMurray in terms of arsenic. And I wonder if you could very briefly describe that project?

MR. BRESEE: Alberta Health and Wellness had requested that we look at the potential health risks associated with consumption of game meat and arsenic.

MR. WILLIAMS: Okay. And in terms of your work, would I be correct in suggesting it's been primarily with industry and/or government?

MR. BRESEE: Yes.

MR. WILLIAMS: Dr. Brown, I'm leaving the most senior person to the last. You'll acknowledge that you are more senior than Dr. Lee and Mr. Bresee?

DR. BROWN: Yes, sir, I do.

MR. WILLIAMS: I may have just violated the Human Rights Code there.

But from 1998 to 2012, sir, you were the senior scientist and principal for Intrinsik Environmental Sciences Incorporated?

DR. BROWN: That's correct.

MR. WILLIAMS: And in terms of your

area of specialization, they would include human health and ecological risk assessment?

DR. BROWN: Yes.

MR. WILLIAMS: The communication of chemical risks to the public and to stakeholders?

DR. BROWN: Yes.

MR. WILLIAMS: And stakeholder consultation and communication?

DR. BROWN: Yes.

MR. WILLIAMS: I couldn't lift your curriculum vitae, Dr. Brown, but when I scanned it, would I be correct in suggesting that you have been involved in more than 80 environmental impact assessments?

DR. BROWN: Yes, definitely more than 80. I don't know the exact number, but it's accumulating.

MR. WILLIAMS: And sir, just in terms of your experience in communicating risks to the public and stakeholders, I wonder if you can briefly describe a bit of that experience?

DR. BROWN: Yes, certainly.

Human health risk assessment paradigm involves four basic scientific steps, but equally important in the scientific methods that are used

in human health risk assessment is input from local stakeholders using a public consultation process. It's very important that in the problem formulation of the human health risk assessment that the risk assessor does have a complete understanding of the local study area, as well as the concerns of the community and, of course, their lifestyles and habits in terms of things like consumption of country foods, et cetera.

So, for virtually all of the risk assessments that I have been involved with, there has been extensive public consultation throughout. In many cases at our insistence, we are able to communicate the methodology to the stakeholders so that when we present the results, which are scientific and somewhat difficult to, you know, to lay people, that the stakeholders that are potentially affected and do have concerns, they fully understand and, for the most part, appreciate what we've done and what we're presenting.

MR. WILLIAMS: Okay. Thank you.

For the panel's benefit, we're going to present the powerpoints and the direct evidence sequentially. Dr. Lee will lead off, and then

Dr. Brown and Mr. Bresee will do their presentation, and then we will make them jointly available for cross-examination.

DR. BROWN: Mr. Williams, excuse me.

MR. WILLIAMS: Did I interrupt you, Dr. Brown?

DR. BROWN: Well, yes. I'll be honest, you did.

I wanted to mention that a lot of the stakeholder consultation that I have been involved with has involved First Nation communities, in particular I'll just highlight three of those projects. The first goes back to the late 1970s, was for the Stony First Nation which is west of Calgary, Morley. In that particular case, oil and gas development in Alberta, of course, sour gas was found on the Stoney First Nation Reserve. And our firm, it was Western Research at the time, later came to Intrinsik and Cantox, our firm was involved in, again, talking to the local stakeholders, including the First Nation. And we had more than two or three round tables with the elders of that First Nation. So we had a very good understanding of their concerns, addressed those in our environmental impact assessment.

More recently, and over the last 15 years or so, I have been very involved with the hazardous waste treatment centre at Swan Hills, Alberta. And in that project, which does treat hazardous waste through releases of hazardous chemicals, of low doses, in particular things like dioxans, interferons and PCBs, but also heavy metals. And I have been responsible for assessing the human health risks of the consumption of wildlife, deer, moose, and also consumption of fish, you know, local Chrystina Lake.

There has been considerable concern early on in this process by the Lesser Slave Lake First Nation in regard to their foods being poisoned, their perception that their foods are being poisoned. And over the last 15 years or so, at least once a year, sometimes two or three times a year, we have met with elders of that First Nation. Again, listened to their concerns, tried to address those concerns on the spot where we could, or reported on those concerns later.

At this point in time, I will say that they are very comfortable with the results and they no longer have this fear about eating, you know, important country foods.

Even a more recent project, I was working for the Town of Strathmore who was releasing wastewater into the Bow River, east of Calgary but upstream of the Siksika First Nation. So because the Siksika First Nation is downstream of the wastewater discharge, there was considerable concern by the First Nation in regards to the human health considerations. And we were involved through the Town of Strathmore over the period of a year and a half, meeting over and over and over again to not only understand what their concerns were, but to make sure that we addressed those concerns in the risk assessment. And when we presented our results to them, they were satisfied. The Government of Alberta Environment saw they were satisfied and the approval was given for the discharge.

I just wanted to emphasize that I have had pretty good success and are very comfortable in working with First Nations. Sorry to take so long to say that.

MR. WILLIAMS: Thank you, Dr. Brown, and I apologize for interrupting you.

Dr. Lee, please proceed. I may interrupt you one or two times during your

presentation as well.

DR. LEE: As long as Gord doesn't, that's okay.

So, we at Habitat specialize in health impact assessment, and we were asked to review the Keeyask EIS for potential impacts on community health issues and to review how they were addressed. Our perspective at Habitat is through health impact assessment.

Now, for people who are familiar with environmental impact assessment, health impact assessment isn't much of a leap. It's a similar sort of process. But instead of looking at the environment, or the social environment in particular, we look at how changes impact the health of the communities that are affected.

It's a very common sense approach. It's sometimes not something that people have heard much about, simply because it's not part of the regulatory framework in many areas. In North America, it exists to a large degree in Quebec. Alaska is starting to pursue it more and more in resource development projects. We're working with the governments of Saskatchewan and Nunavut to try to bring it into the environmental review process.

But other than that, it's often not part of an environmental review process, generally speaking.

It does have widespread acceptance and it's been endorsed and used quite widely around the world. International lending agencies, including International Finance Corporation and the European Bank for Reconstruction and Development have both provided guidance and require it for projects that they are lending money to.

Multinational corporations, particularly in resource extraction are starting to use more and more health impact assessment, and are providing -- having internal standards often that far exceed what is required from an outside regulatory perspective, including in Canada. Shell and Chevron in particular are two companies that we have worked with that have strong internal requirements for health impact assessment.

And health agencies have also produced guidance, training, endorsement, and are trying to disseminate the use of health impact assessment. Health Canada lead the way quite some time ago. They are a little bit quieter on it now. The Centres for Disease Control in the United States

has done a lot of training and a lot of promotion, and the World Health Organization as well is promoting the use of health impact assessment.

It should be clear that when we're talking about health impact assessment, we're talking about health quite broadly defined. Often in a regulatory environment, health is very specifically defined, particularly around toxicology. Health impact assessment looks at the determinants of health in social and physical environments and looks at all possible health outcomes that might occur in a community.

So at Habitat, we have been involved both in the development of the field over the last six to seven years, and we have been involved in a lot of health impact assessments. Some of our work in North America on this map, the red dots being health impact assessments or associated work that we have done ourselves. The purple dots being health impact assessments where we have been brought in as technical advisors to give guidance to folks that are doing it.

We have done other work as well outside of North America, in Brazil and in Africa as well. Most of the places that we work are

rural and remote. Most of it is in resource extraction, energy, and in other developments. And we often have -- our work typically involves communities that have a large Aboriginal proportion of the population.

So when it comes to reviewing the Keeyask EIS, it should be clear that there wasn't a health impact assessment per se, which isn't unusual. What we did isn't a health impact assessment, instead what we did is a process that I would sort of refer to as a scope and search type process.

The first thing we did was to estimate the type of impacts and the range of impacts that we would anticipate you might see in a project like Keeyask. To do that, we used best practice guidelines, we used professional standards, our own work experience, literature, and some of the stakeholder commentary to get a sense of what range of health impacts, with health broadly defined, we would expect to see in Keeyask.

And then we reviewed the EIS documents to assess the degree to which those health impacts had been addressed. And we ended up focusing primarily on the socio-economic environment,

resource use and heritage resources supporting volume, because that's where most of the information was. There are other volumes and other documents that we reviewed as well. That's where most of the health and data that was relevant to our review was to be found.

So when it comes to the scope of health impacts that I would expect you might see in a project like Keeyask, these are the eight broad areas that I would expect health outcomes to be seen. Economic change, infectious disease, diet and nutrition, injury and safety, stress, mental well-being, emergency medical response, health care provision and Aboriginal people's health. And I want to go over each of those eight areas just to give an overview of the kinds of things that I would anticipate in any resource development project, but particularly in Keeyask, one might see health impacts from.

And I'll start with economic change, because this is often where some of the biggest health impacts derive from. This is often where a lot of the concern in local communities is. It is also where a lot of the emphasis to go forward with projects comes from. Because employment and

income do have a very strong benefit to individual health. But with that economic change, with that employment income, there is also a commensurate increase in drug and alcohol use and prostitution and crime. So you have the two balancing conflicts, and in health those play out quite strongly. The trend towards the harmful aspects to health tends to be stronger in areas where there's rapid change. We have done a lot of work in communities that have a boom/bust type cycle where the negative impacts of economic change on health are often fairly significant.

Infectious disease transmission is another area that we typically see. In Canada, with resource development, infectious disease transmission usually is just a matter of people and place. So you have a large workforce that has come in from outside, are concentrated into small areas, often into camps or into crowded housing, and infectious disease transmission can occur in those settings. So in either crowded housing or in camps, you can have prospect for respiratory diseases and influenza, gastrointestinal disease or food borne illnesses in camps, which can then get out of the camp if there is contact between

the camp and the local communities. Also sexually transmitted infections are almost invariable, any place that you have a large mobile workforce moving into an area, it's pretty well inevitable that you'll see an increase in sexually transmitted infections in the local community.

Diet and nutrition is a major area, especially with the work that we have done, which is most of our work in places that have a large degree of subsistence diet. I think it really comes down to three things, availability, accessibility and acceptability. So availability, I would think would be around the cost of food, which can change with development, and the presence of food. So if local, particularly subsistence resources are no longer available, that can be an issue.

Accessibility, physical access to sources of traditional food for sure. Also time, if there's competing conflicts for time when wage economy enters into an area where there's a lot of traditional economy, can reduce the ability to hunt or to fish. But at the same time, money can improve accessibility, if you have money for fuel or money for ammunition.

And then finally and often most importantly is acceptability. And this is something that I know Gord and Karl are going to talk about. With the presumption or the fear of contamination, regardless of actual levels of contamination, sometimes acceptability of traditional food sources can be impacted and a transition away from traditional food sources can occur.

All of these things have impacts on health. There are obvious nutritional outcomes. There are the issues around contamination. Those are fairly rare from a health perspective. As a physician, as an epidemiologist, I'm more concerned with metabolic outcomes, diabetes, obesity, heart disease. And also food security, in remote communities and particularly Aboriginal communities food insecurity is already a fairly significant issue that has significant health impacts, and changes in the availability or acceptability of food can have significant health impacts there.

MR. WILLIAMS: Dr. Lee, can I just stop you there? Wouldn't one expect at a time of some economic growth that food insecurity issues

would diminish?

DR. LEE: No. Food insecurity is not universal across the community. So there are individuals in any one community, or rather households that are more food insecure. And economic change in a community doesn't necessarily impact everybody equally. So you can actually have, particularly in a boom/bust type cycle, you can actually have worsening food security, due to things like competing cost for housing and housing affordability. Sometimes the prices in local stores can go up. So for people who receive the money, sometimes food security can improve. Although if costs go up, they might not improve as much as you might expect. And especially in areas where there is a significant proportion of the diet that is country food, then the economic change is countered in some cases by other impacts on traditional food sources.

MR. WILLIAMS: Thank you.

DR. LEE: Injury and public safety is another area. Most resource development projects, Keeyask included, involve both the construction of new roads, plus a lot of construction traffic, and the travel of workers to and from the site. Very

simply, when it comes to road safety, more vehicles, more traffic equals more injury. So it is a known impact. There is also the potential for alterations in access to traditional food sources, to land, hunting and fishing that can impact public safety in the traditional economy.

Stress and mental well-being are major issues in any such project, Keeyask included. They are not uniform across the community. Some people are more susceptible to stress. There are aspects on the individual level and aspects of the project level that can make stress and mental well-being more of a problem.

From a health perspective, it is an important thing to consider. Stress itself is considered to be a health impact, plus there is also the mental health consequences, and there are physical health consequences of persistent and ongoing stress.

MR. WILLIAMS: Dr. Lee, just in the context of your clinical experience or your health impact experience, have you had occasion to interact with individuals whose traditional way of life has been impacted by resource developments or industrial development, in that they have lost

some elements of their traditional way of life?

DR. LEE: Oh yeah, yes, for sure.

MR. WILLIAMS: Any commentary on the individual impacts in terms of that experience?

DR. LEE: It's, you know, it's a hard one to speak of as a clinician versus as an epidemiologist. I know on a population level that when a community has lost control, or has a lack of control over outcomes or over life, and has chronic stress, that there are major health concerns, particularly for children that grow up in the area of stress. So as an epidemiologist, I can speak to what you can see on a population level.

As a clinician, it's more difficult, because you can see an individual that is highly stressed, that has lost access to traditional food sources, or to their family's usual hunting grounds.

And it's hard -- I can get into the stories and I can hear the stories. It's hard for me to pick out individual health outcomes for that. I can understand in the field where it might go, but on an individual level it is always hard to pick out causation, if you know what I mean.

MR. WILLIAMS: Okay, thank you.

DR. LEE: Emergency medical response is another area that we always look at and that is usually already an expressed concern in communities. Large projects with a lot of people, particularly in an occupational setting that can lead to injury or to mass casualty or to trauma, can strain local resources, depending on how emergency response planning has been done. If there is a tie into the local services for emergency response planning, it does not take much to swamp local services. Small communities can have very limited ability to respond to trauma and to injury, and an industrial workplace next to it can quickly swamp services, depending on how it's been planned.

Healthcare service provision is another area that can be impacted. Either due to just the volume of people requesting or accessing services, but as much, if not more, from just a change in the burden of disease. So particularly in areas where you expect to see increases such as alcohol and drugs and sexually transmitted infections, there can be limited ability to deal with that already in a remote community, with

sexually transmitted infection clinics, or nurses, or mental health providers, or alcohol and drug counselling. So if you increase the burden of disease in those areas, you can actually again swamp the available response.

It's worth noting that in most rural areas that I have worked for my clinical life, these aren't places that you need, you know, five or six doctors or dozens of nurses, you need only a few service providers because you are dealing with a small remote population. So recruitment and retention of healthcare workers is invariably a problem and it will always be a problem in remote communities. And if you strain an already vulnerable system, it doesn't take much to actually have retention become even more of an issue. So healthcare service provision is something that we always consider to be a potential problem.

And then finally Aboriginal people's health. There is where we work, like Keeyask areas, where Aboriginal communities are very proximal to resource developments or projects like this, and where land that is traditionally used is directly affected. And it's no secret that

Aboriginal peoples in Canada already have a lot of inequity when it comes to health outcomes, and a lot of risk historically and currently from issues within the system. So we always look at health with a lens toward Aboriginal health and towards health inequity.

So in terms of the review of the Keeyask EIS, I want to start off by saying that we were fairly impressed with what we saw. We had to dig around to find places where health was addressed. But on the whole for an environmental impact review, it was quite good. Much better than what we have seen in the past, better than what we saw last year in Bipole. And there are a lot of things in particular that are done to the standard of health impact assessment, had it been a stand-alone health impact assessment. In particular, there are these six things that I want to talk about that were done well in our mind.

First off, there was a broad definition of health, including framing things in a Cree concept of well-being and looking at determinants of health perspective from an Aboriginal perspective as well. That's one of the keys of health impact assessment and that was

there.

There was a significant amount of information on both health outcomes, such as injury, diabetes, traffic, mental health, physician visits, what have you, as well as health determinants, prime traditional resource use, racism. So there was a fair amount of good health data for determinants and outcomes.

There was prediction of potential health impacts that can be associated, particularly in the area of alcohol and drugs, violence, STIs, contamination, mental health. There was some prediction of potential impacts on emergency services and healthcare services. There was an inclusion of the community perspectives on health and well-being. As I mentioned, it was framed in a determinants of health perspective amongst Aboriginal populations, involved cultural indicators, key community concerns, as well as Aboriginal perspectives of health and well-being. Again, this is core to the philosophy and the practice standards in health impact assessment and we are glad to see it in there.

And then finally, and significantly, there were mitigation measures proposed that are

protective of health specifically. There were mitigations around public safety, attempts to address worker interaction with communities, which is where some of those health impacts are seen, mitigations around loss of cultural landscape, and attempts to address the impacts on emergency medical services and healthcare provision.

So there were a lot of really good features in the EIS that we saw. There were still gaps, and I want to go over some of those gaps. And I'll frame, when I review some of the gaps, I want to go back to those eight health areas that I scoped out initially. There weren't gaps in all of them, but the ones that there were, I will address.

So first going back to impacts associated with economic change. There was discussion of alcohol and drug misuse, but there was no baseline data, which given the fact that's one of the major concerns and one of the major areas where we would expect to see an impact, it would be nice to see some baseline data. I think the report suggested that baseline data was not shown due to the sensitivity of the data, or possibly the accessibility of the data. But those

are both things that can be addressed. We often will use proxy measures. You can actually get health data for emergency visits or accidents involving drugs or alcohol with the RCMP, and get DUI's. You can aggregate from smaller communities over regions to get around some of the sensitivities of individual communities, not report individual community level, but still get a sense of the burden of drug and alcohol use that's up there already.

There was discussion of health benefits associated with higher income but they weren't specified. Given that there are health consequences to the income and employment and the economic change, it's nice to know what health benefits we're specifically talking about in order to be able to balance that against the known risks, but they weren't particularly spelled out.

Inequity was something that wasn't particularly or specifically addressed. And as I mentioned before, the distribution of benefit across a community is important to know who is actually getting the gain and who is getting the risk from a health perspective. That's one issue.

The other issue is inequity itself is

a health risk. Communities that have more levels or higher levels of inequity, actually have poorer health outcomes. Inequity and distribution of wealth was not actually something that came up that we could see with regards to health.

With regards to infectious disease transmission, again there was fairly good coverage of sexually transmitted infections, but no baseline rates. I suspect this was due to the same reason as alcohol, the concern that it might be a sensitive issue. Sexually transmitted infection rates are easily available, they are all notifiable diseases, and some of them are fairly prevalent. So the data is there, and it is an area where we expect to see an impact for sure, so I would have liked to have seen what the baseline rates were.

The sensitivity is not as much a concern, particularly if you can use a disease like chlamydia, which is incredibly common, highly prevalent, and not a lot of stigma attached to it. You don't need to get into things like HIV or syphilis. If the rates of chlamydia have changed, you know the risks of all STIs have changed.

Infectious disease associated with

water quality, crowded living conditions, or work camp settings, so the GI gastrointestinal illnesses, diarrhea illnesses, respiratory disease, those things weren't actually included at all.

The mitigation measures to control those diseases, so camp related diseases, weren't addressed. Similarly, there were no mitigation measures that we could find to address the spread of STIs, which is one of the major known impacts of any resource development project and of camp life. There is no discussion of how to actually prevent the spread of that through the community.

With regard to diet and nutrition, there was not any data on food insecurity, which we know historically and we know from current surveys that more rural communities and Aboriginal communities tend to have higher rates of food insecurity than the rest of Canada. The rates of food insecurity across Canada are actually surprisingly high. It would have been nice to know what they are there because this project is likely to impact it.

And the specific health risks and negative impacts that are associated with changes

in the food ability were not addressed.

Again, as a physician working in areas reliant on subsistence diets, and Nunavut has probably got the highest rate of subsistence diets, everything I do is about trying to protect the traditional diet. The health outcomes that I'm most concerned about as a clinician, traditional diet is protective of all of that, so, again, heart disease, diabetes, food insecurity. It would be nice to actually see diet and nutrition in this EIS taken to actual health outcomes.

Injury and public safety. This might be a bit of a picky point, but it's important. Accident rate data was provided as a baseline, but baseline data on injury per se as a health outcome wasn't provided. Accident rates are good. That's where most of the impacts would be expected to be. Injury is fairly important because that's actually, in Aboriginal communities across Canada, that's where the highest burden of disease currently is. It would be nice perhaps to see baseline data on injury.

Finally, this is my last slide, I'm going to end with gaps regarding Aboriginal

peoples health. And like in other areas, there was discussion of cultural landscapes and the changes of physical environment. But, again, taking those changes of acculturation to actual health outcomes was not specifically discussed. When you look at current health conditions in Aboriginal communities, acculturation is a huge part of that, and how this project will fit into that and affect health specifically is an important feature to me.

Similarly, the health benefits of traditional culture and spirituality were noted but not specifically discussed. This actually is a health issue, and for me I would like to have seen a more tighter link between them.

And then finally inequity, once again I come back to inequity. Inequity and its health impacts were not specifically addressed, because from a health perspective it really all comes down to inequity, both equity within Manitoba and within the communities that are specifically or directly affected. Whether it's health status or health determinants, there's large baseline levels of inequity, and knowing how the project is going to affect health inequity is important. If the

goal isn't just to mitigate specific risks but to actually improve health and to reduce inequity, I would have liked to have seen that to be more front and centre in the report.

MR. WILLIAMS: Dr. Lee, thank you very much. You can sit back for a couple of moments and let Mr. Bresee and Dr. Brown do a bit of heavy lifting.

If we could have their powerpoint pulled up?

DR. BROWN: Our presentation will take somewhere between 45 minutes and an hour, just to warn everybody I guess. And I think the plan is that questions would be asked after our presentation?

MR. WILLIAMS: Yeah.

DR. BROWN: To both groups, okay.

So, again, I'm Gord Brown with G&P Resource Services. I was involved last year at this time with the Bipole hearing. And at that hearing, one of my main issues was the fact that a human health risk assessment had not been conducted for Bipole.

MR. WILLIAMS: Dr. Brown, I'm going to ask you just to move a little closer to the mic,

pull the mic in. And certainly if the panel members have trouble hearing at all, they'll let us know. I apologize for interrupting.

DR. BROWN: So it was very nice to see in this application, Keeyask EIS, that a human health risk assessment had been included. And I was asked by our client, the Public Interest Law Centre and the Canadian Consumers Association to review that human health risk assessment, especially with mercury in fish.

And as Dr. Lee alluded to, I was quite impressed with the document. Scientifically it's very good. We do have issues only with some of the assumptions that were made in that human health risk assessment, but the overall methodology is correct and state of the art and up to date, so that was impressive.

Throughout this presentation I'll be making some references to the main reports. You might want to have that handy if you want to take a look at my references to certain page numbers, that type of thing.

In terms of the presentation this morning, first of all, I'll be summarizing the issue, definition of the problem. I should say

that the presentation here is a summary which is about 35 slides, of an executive summary which is about 30 pages, of a main report which is about 150 pages. So, you know, it's quite synthesized and there's a lot more information behind the scenes, so to speak.

So I'll be talking about some comments on the human health risk assessment, I have already said a few points but I have got a few more. I'll be talking about current government guidelines. There's government guidelines both from Health Canada and from Manitoba Health in regards to consumption of fish containing mercury.

I think you'll find it very interesting. What we did was we compared mercury from the Keeyask study area under current conditions, present conditions, and under future predicted conditions, post impoundment conditions, to mercury that you will find or has been measured in fish in other Canadian lakes. And you will see through this data that the Keeyask study area is lower or, at the most, similar to mercury levels in fish in other Canadian lakes.

In terms of mercury in fish, we also did a literature review of mercury that is -- did

I say the first one right? Sorry, I might be getting ahead of myself.

The first comparison we did was mercury in fish in other Canadian lakes to Keeyask. The second comparison we did was mercury in fish in supermarkets, okay, to Keeyask study area fish. I think I was talking too fast and I might have got those mixed up, I'm sorry. It will become clear as I continue with the presentation.

I will then be summarizing current international regulatory agency exposure limits. So these are health-based regulatory agencies, Health Canada, US EPA, and other international agencies. We did a comprehensive literature review. There is a tremendous amount of scientific literature on mercury in fish and human health effects. This is the epidemiology type of data, so what has been observed in populations, as Murray was referring to, of populations that consume large amounts of fish.

We then conducted some modeling. The human health risk assessment used a method that involved comparison of exposures, predicted exposures from consumption of fish to Health Canada basic exposure limits. That's where it

stopped. We went beyond that and we did some additional monitoring or modeling to predict the concentrations of mercury that will be in hair of communities, of individuals in the Keeyask study area. And that's because hair and blood are very good bio-monitors of mercury exposure in humans. So this is an additional line of evidence that we presented based on what we believe is very good baseline information from a First Nation study in Manitoba that Mr. Bresee will be referring to.

Next, we did another, we did some more additional literature review on the benefits, the health benefits, this is very important, of course, the benefits of fish consumption, and summarized some of that information there. It's not good if people stop eating the fish because of concerns they are contaminated. And what really is required is a balance between the risks and the benefits, so that's really what this presentation is focusing on, that message.

We have some suggested risk management options. I'll be quickly identifying some of those in this presentation, and then finally conclusions and recommendations.

Okay. So the issue, methylmercury in

fish was identified as a human health concern by the Keeyask Partnership, and Federal and Manitoba regulators, based on past experience with environmental impacts of hydroelectric development.

According to the final human health risk assessment in the Keeyask EIS, under current conditions, it was concluded that:

"Potential unacceptable risk could affect persons of any age if unrestricted consumption of the larger fish occurred on a frequent basis."

Risk estimates as high as 4.7 fold to 15.1 fold above the Health Canada tolerable daily intake were predicted. And in the risk assessment, the Keeyask risk assessment, it is stated that acceptable health risks are those where these risk estimates are less than or equal to one. Okay. So we're five to 14 times acceptable levels according to the Keeyask risk assessment for current conditions.

We have trouble with those numbers and we will be presenting some of our own risk estimates later in this presentation.

Following, post impoundment, following

the impacts, there is again,

"Potential for unacceptable health risks for persons who decide to frequently consume fish from Gull and Stephens Lakes."

Predicted risk estimates are up to 14.2 fold above the Health Canada tolerable daily intake for average size fish and would be greater for larger fish.

So I'm going to be referring to risk estimates later on in the presentation, so I'd like you to try to remember that these are five times to 15 times higher than an acceptable level, according to the Keeyask human health risk assessment.

So risk assessment is really a complex issue when it comes to mercury in fish and consumption of fish by humans. Because, again, the potential health benefits of methylmercury for fish consumption must be weighed against the considerable health benefits with fish in the diet.

Health risks are also very much dependent on consumption rates and the types of fish species typically harvested.

And KCN members and Cree Nation members have indicated they had already stopped or decreased the eating of fish and traditional foods due to concerns about mercury. There has been a reduction in domestic fishing and consumption of country foods as people are afraid to eat fish, resulting in an increase in store bought foods.

And this is not something that I am saying, this comes directly from the Keeyask EIS. I believe it was in the aquatic section of the EIS.

Next slide. In the final risk assessment, here is a quick summary of some of the highlights, and I'll be referring to a couple more in the executive summary.

They state, it is stated by the author, Mr. Wilson, of the risk assessment that, you know, he points out throughout that as a result of the use of conservative assumptions, actual risks may be substantially lower than those that were predicted in the risk assessment.

And some of the evidence for that is the second and third bullet:

"Numerous fish in Gull and Stephens Lakes currently have low, less than

0.2, and very low, less than 0.1 micrograms per gram of total mercury concentration."

Micrograms per gram are very small units. Micrograms per gram are equivalent to parts per million. So I was trying to think of an analogy to try to get this into perspective, these are very low concentrations. What is the population of Winnipeg? Let's say it's a million people. Okay, one part per million or one microgram per gram, would be one person out of the whole population of Winnipeg. That's how low these concentrations are. We're talking about even less than that, we're less than .2 parts per million, or less than .2 people, and very low, less than .01 parts per million. So these are very low current levels.

Now, the pike and the walleye, which are the predator type fish, have average concentrations, greater than .2 but less than .5 micrograms per gram. So under current conditions for the predator fish, the concentrations of mercury are less than the Health Canada limit for commercial consumption, which is .5 micrograms per gram or parts per million.

It was also stated in the risk assessment, Keeyask, that for wild fish for subsistence purposes there is no official recommendation from Health Canada or the World Health Organization for mercury because of the tremendous nutritional benefits of fish consumption.

We will elaborate a little bit on what I have said so far as we go through the presentation. In particular, we have done some calculations and have come up with some exposure ratios or estimated risks that we feel are more realistic of the situation in the Keeyask study area.

Manitoba Health and Health Canada have committed to working with KCN, this is stated and this is going to happen, and Manitoba Hydro, on consumption advisories in a separate process.

It was stated in the HHRA that it was beyond the scope of the risk assessment to attempt to predict blood and hair levels in the Keeyask First Nation. And we have attempted to do that. That's an additional line of evidence that we feel is quite important and Mr. Bresee will be addressing that.

Other pertinent statements -- other pertinent statements from the human health risk assessment are found on page 2 and 3 of the main report. This is just a brief summary of some of them. If you look at page 2 and 3, I've got 15 or 20 points that came from the human health risk assessment. You have already seen it. But I think it's important that it's been understood that the conservative assumptions are what resulted in these high risk estimates.

Okay. In particular, the high risk estimates were based on the consumption of a high fish consumption rate. And what this slide shows for the various types of fish that are consumed in the Keeyask study area, those being whitefish, northern pike, walleye and sturgeon, what was assumed in terms of serving sizes for, first of all, young adults, and then for young children and then for adults. For young children, it was assumed that a hundred grams or about three and a half ounces of fish would be consumed three times a week. And for adults, it was assumed that 400 grams of fish would be consumed three times a week. 400 grams is about 14-ounces. When we do our risk assessments, we compare the exposure from

fish consumption to a tolerable daily intake. So what we did is converted the 400 grams and the 100 grams three times a week into daily intakes for children. At the bottom of the slide, you will see the consumption rate is 43 grams per day assumed, and for adults 171 grams per day assumed.

For your information, and as shown on the next slide coming up, 171 grams is about a can of tuna, okay, approximately.

And we used, in the human health risk assessment in the Keeyask, it was assumed in the exposure estimates that either the one species of fish only was consumed. So only whitefish was consumed, or it was assumed only pike was consumed, or it was assumed only walleye was consumed, or it was assumed only sturgeon.

We've got some survey data from Manitoba that shows that these four fish are quite popular, and we've done apportionment of typical range or mixture of the types of fish that would be eaten, we believe, by the local First Nation.

So next slide. This next slide is titled "Comparison with Fish Consumption Guidelines." Now, Health Canada and Manitoba Health both got guidelines here. Health Canada

guidelines are really meant to, and they are based on populations that consume high amounts of fish. And this isn't just First Nation people, but it's Canadians in general that eat a lot of fish from supermarkets. The recognition by Health Canada is that many of the predatory fish, marine, sea fish, are relatively high in mercury. And so that it's very important for, particularly for sensitive individuals such as women of child-bearing age or children, where they are potentially eating a lot of these fish species that are high in mercury, that they don't stop eating it, but that they come up with kind of an optimal level. So Health Canada is recommending the following numbers, which are pretty low, to help maximize the nutritional benefits of eating fish while minimizing the risk of exposure to mercury.

So for the general population, 150 grams or 5.3-ounces per week. That's about a can of tuna per week or so. Women of child-bearing age, 150 grams or 5.3-ounces per month, a can of tuna per month. Children five to 11, 125 grams per month, and children one to four years old, 75 grams per month.

So these recommended fish consumption

rates by Health Canada for consumers of fish that contain mercury are, you know, they are quite conservative. But, again, you don't need a lot of fish in order to get the nutritional benefits from fish that are optimal. And you'll see a little bit more about that later.

So more about fish consumption guidelines. Health Canada guidelines, I have already talked about this, 0.5 PPM total mercury, and existing and predicted future -- existing and predicted post impoundment future fish mercury concentrations at Stephens Lake are all below .5. For Gull Lake, existing mercury concentrations for all fish are less than .5, but predicted future post impoundment Gull Lake and Keeyask reservoir mercury concentrations are less than .5 for whitefish and lake sturgeon, but may exceed one part per million or microgram per gram in the predator fish, the northern pike and walleye.

Am I going too fast or is this an okay pace? Thank you.

Manitoba has got some very impressive recreational fishing guidelines. This is our document that I believe was published in 2013. It's called "Mercury in Fish and Guidelines for

the Consumption of Recreational Angle Fish in Manitoba."

This is an extremely well done document, in my opinion. Manitoba Health is obviously very clear on the science as it relates to mercury in fish. You know, it's a long document, it's fairly complicated. I'll just highlight, you know, some of the -- I'll mention some of the highlights. Then we've done some risk estimates that correspond to the guidelines to show what its risk levels are if you adhere to the Manitoba guidelines.

And so the Manitoba guidelines recognize that there are different concentrations of mercury in fish. They refer to four categories: Category one, concentration. Mercury concentration would be less than or equal to 0.2 micrograms per gram of mercury in fish. And for each of these, this is a matrix, for each of these categories, the Manitoba guidelines state in a matrix how many meals per month could be safely consumed, based on some assumptions they had made about the size of a serving, 227 grams a day for example for adults, based on an assumed body weight of consumers, and based on the Health

Canada tolerable daily intake for sensitive individuals, that is women of fish -- sorry, I'm saying fish way too much -- women of child-bearing age and children. Okay. I thought I was talking too fast.

Okay. So if we go back to our slides now, these different categories, first of all category one for whitefish, whitefish fall into the category one for the Manitoba guideline. Their concentrations are less than 0.2 micrograms per gram. According to the Manitoba guidelines, that would allow a consumer to safely eat 19 meals per month, 227 grams, general population, and eight meals per month for women and children.

Now, these risk estimates that you see were not based on the categories but they were based on the actual measured fish concentrations in the Keeyask study area. So if you see under the title, it says:

"Assuming present mercury concentrations in slide 12 and 13."

If I can just go to slide 12 for a minute? At the bottom of the slide, you will see mercury in Keeyask study area, Gull Lake. Gull Lake was the most impacted lake, so I used Gull Lake for the

assumed mercury concentrations for these calculations. For present conditions, which is the slide that we are going to go back to, whitefish average concentration is 0.07, northern pike is 0.22, walleye 0.23, and lake sturgeon 0.2. So category one -- we'll go back to that slide now -- whitefish fall into this category. And according to the Manitoba matrix, 19 meals per month for the general population is okay, it's safe. And we confirmed that by calculating the risk estimate. This risk estimate can be compared directly to the risk estimates that were in the Keeyask HHRA. They calculated, as you recall, five to 14 for current conditions. We're saying if you follow the Manitoba guidelines, the risk is about a third of the tolerable daily intake. So very, very safe at 19 meals per month.

For the sensitive women and children, our exposure -- or sorry, our risk estimate is 0.35, if they consume eight 114-gram meals per month.

For the category two, walleye, northern pike and sturgeon guidelines say eight meals per month is okay for the general population. We calculated a risk of 0.43 to .49.

And three meals per month for women and children, here the risk is 0.38 to 0.44. So clearly very safe guidelines for Manitoba.

MR. WILLIAMS: Dr. Brown, just before you leave this page, that 0.38 to 0.44, what would I be comparing it to, to allow you to make the conclusion that this is safe?

DR. BROWN: Sorry, I didn't hear the last half of the sentence?

MR. WILLIAMS: When you are concluding that this would be safe, what would be unsafe? What are you comparing that 0.38 to?

DR. BROWN: The acceptable risk of one is where the estimated exposure is equal to the Health Canada exposure limit. So if you are above one, that indicates that your estimated exposure exceeds the tolerable daily intake for sensitive populations.

MR. WILLIAMS: Thank you.

DR. BROWN: Okay. So this is, the next one is for predicted future, so post impoundment situation. Again, according to the Manitoba guidelines, whitefish are still less than .2, so 19 meals per month for the general population is okay.

Now, here the risk estimate has gone up. It's 0.97, and that's because the whitefish concentrations have gone up somewhat. They are still less than one.

Similarly, for children and women of child-bearing age, eight meals per month, the risk is 0.96, so less than one, so safe.

For lake sturgeon, which fall under the category two, 0.2 to .5, eight meals per month is okay, the risk is .4. And three meals per month for women and children, the risk is .57.

Now we get to the walleye and northern pike, the predicted future concentrations post impoundment are relatively high. The risk assessment assumed one part per million or microgram per gram. But in the aquatic section of the EIS, it's stated that these concentrations of mercury could be as high as one to 1.4. So we assumed those concentrations.

And if we go to the next slide -- just so you know where the numbers came from, the bottom, second graph at the bottom says post impoundment. We use these concentrations, whitefish .19, northern pike 1 to 1.3, walleye 1 to 1.4, and lake sturgeon .3, we used those in our

calculations to come up with our risk estimates. So based on the three meals per month for the general population, we calculate a risk of 1.05 to 1.13 for the walleye and northern pike, slightly above the tolerable daily intake if, you know, you eat three meals purchases month, 227 grams for the rest of your life.

When we see numbers that are close to the, you know, close to the value of one, we're not too concerned and that's because of the safety I will say that's built into the exposure limit.

And I'll have more to say about that here shortly.

For walleye and northern pike at these concentrations, the Manitoba guidelines recommend that there's no consumption by sensitive women or children. So the risk is zero when there's no consumption of course.

As I tried to say earlier, we compared mercury in the Keeyask study area to mercury in other Canadian lakes, and I think the easiest way for people to follow what's in this graph, I mean, there's a bunch of numbers there, but the top is -- the top graph is mercury in other Canadian lakes and the bottom graph is mercury in the

Keeyask study area. So if we look at the first column, whitefish, for example, Manitoba 0.06, Alberta has got a range but we didn't have an average, 0.02 to 0.14, and Canada average 0.17, and northern Canada, 0.11. We can see in the Keeyask study area the whitefish are actually lower or, you know, in the same range as what is found in Manitoba and the rest of Canada. Even post impoundment the concentrations are slightly higher than on average in Canada, but not by a lot. You know, certainly within the same order of magnitude.

For northern pike, you take a look at that column, 0.2 in Manitoba, Alberta there's a range, Canada .56, about three times what's in Manitoba, and northern Canada .38, about double in Manitoba. Keeyask study area, 0.22, lower or certainly in the range of what's measured in other Canadian lakes. Post impoundment the number is going to go up, these are the predicted future post impoundment, and those are relatively high concentrations compared to background.

For walleye, 0.16 in Manitoba, .13 to .79 in Alberta, .41 in Canada, .47 northern Canada, .23 Keeyask study area, so low, low in

Manitoba. And post impoundment these numbers are predicted to go up fairly high, 1 to 1.4.

For sturgeon we've got the same concentration in Keeyask as in all of Manitoba, First Nation reserves, lower than Canada, slightly higher than northern Canada, and post impoundment is .3, which is about the same as in the rest of Canada. So I think what this shows is that the concentration of fish in the Keeyask study area is lower to, or certainly similar to what you find in background in other Canadian lakes.

This is additional evidence that it is, in our opinion, safe to eat the fish, if the Manitoba guidelines are followed in the Keeyask study area.

MR. WILLIAMS: That's under current conditions?

DR. BROWN: Under current conditions, that's correct. Well, actually, yes, under post impoundment conditions, I did in the previous slide, that's slide number 11, those are the post impoundment Manitoba guidelines. And I will qualify what I just said about being safe to eat by having to refer to this slide. Women and children should not be eating any fish when the

concentrations are 1 to 1.3 parts per million. Other than that, if you follow the guidelines, safe consumption rates are dictated in the Manitoba guidelines.

Women and children, zero consumption is in the Manitoba guideline as well.

Okay. Mercury in supermarkets, this is the same idea. And what we have here is we have the four types of fish that are found in the Keeyask study area, whitefish, northern pike, walleye and lake sturgeon in Canada and the United States, and Ontario, compared to those in the Keeyask study area.

If we look at the first column, whitefish, we can see that the present conditions, whitefish are lower than supermarket values, in some cases quite a bit lower: .29 in Ontario, .11 in the U.S. and .1 in Canada, .07 in Keeyask study area. Northern pike, we're certainly within the range of what's measured in northern pike from Safeway. Walleye, found in Keeyask was lower than what's found in grocery stores, mercury concentrations for walleye in grocery stores. And for lake sturgeon, Keeyask is slightly higher than what's found in fish in grocery stores, .1.

The concentrations will increase to .19 for whitefish, so that's still within the range of what's seen in grocery stores; 1 to 1.3 is about 4 to 5 fold above what's found in grocery stores. And for lake sturgeon, we're about .3 compared to .2 right now, but .1 is what's found in grocery stores.

So here the existing concentration of fish in the Keeyask study area is very similar or lower than what is found in local commercial outlets, grocery stores, your Safeways, your supermarkets, that type of thing.

Next slide. The same idea here except we have some of the seafood, the salmon, the lake trout, the halibut, the canned tuna, that type of thing, and we compare that to the Keeyask study area. I'll let you take a look at that slide. You'll see there that, again, the concentrations, existing concentrations of the Keeyask study area fish are in many cases lower than what is found in seafood. Salmon is very low in Canada .03. But some of the tuna, for example, the albacore tuna has very high mercury concentrations, relatively high mercury concentration, 0.33. And I think that's really all I'll say about that.

There is a problem at the footnote on the bottom. It says similar to fish in other Canadian lakes, it should say similar to fish in supermarkets.

I'm just about done my first part. Just a couple of more slides, then I'm requesting to turn it over to Mr. Bresee.

The next slide is current regulatory agency exposure limits. And this summarizes the current health-based government exposure limits for methylmercury for human beings. So there's three types of exposure limits that I'll be referring to, and I've got four international agencies that have exposure limits.

The first exposure limit, the first row there is the tolerable daily intake. This is a dose, or this is an exposure that represents a limit for intake of mercury into the body from consumption of fish. So Health Canada has a limit of 0.47 micrograms per kilogram of body weight per day for the general population, and for sensitive subgroups, 0.2, less than half of the general population. This is for the women of child-bearing age and children.

The WHO numbers are essentially the

same as the Health Canada numbers. The US EPA number is lower, it is 0.1, this includes sensitive sub groups, lower than, the 0.1 is lower than the .2 in Canada. This is simply due to some different, more conservative assumptions made by the US EPA, but based on the same epidemiological database that was used by World Health Organization and Health Canada. And finally, the ATSDR, which is the Agency for Toxic Substances and Disease Registry in the United States, their numbers are very similar, kind of right in between Canada's numbers. So that's the allowable intake, tolerable daily intake.

The next is blood in micrograms per litre. And blood is a very good bio-monitor of exposure to mercury. These data for blood and hair are actually based on the same studies of the exposure limits that were derived for the dose, tolerable daily intakes. So blood, 20 and 8 in Canada, a little bit lower in the United States, similar in the World Health and similar in ATSDR.

At the bottom, sorry, the second from the bottom row is hair. Hair is a very good bio-indicator of mercury exposure. Canada, 6 for general population, 2 for sensitive individuals,

so women of child-bearing age. Again, the US EPA is a little bit more conservative, but all of -- the point of the last row there, the uncertainty factor applied, all of these exposure limits or all of these, you know, in one case the dose and the bio-monitoring data, they are all very safe limits. And that is because there has been what we call here uncertainty factors applied to the limits or to the actual concentrations where effects were observed. Actually, the way it should be said is that there's been safety factors applied to where no effects were observed. So, for example, for Health Canada, for the tolerable daily undertake is 0.47, this was based on a no observed effect level of 4.7. That means there is nothing observed at a dose of 4.7, but a safety factor was applied to get you down to the 0.47. So there's a ten fold safety factor in there. So these are very safe limits. And I think that's all I'll say about the limits. In the human health risk assessment that was conducted by Keeyask, the tolerable daily intakes from Health Canada were used, for general population and for the sensitive sub group of 0.2.

Okay. Comprehensive literature

review, 150 pages of report down to about 30 pages of executive summary, down to four bullets here. There's a lot more in the main report, but here's some of the highlights.

Health Canada proposed a toxicologic reference of 10 milligrams per kilogram mercury in maternal hair, so in women of child-bearing age, as the approximate threshold for neuropsychological effects, again, in sensitive subgroups. A five fold uncertainty factor to account for inter-individual variability was used to derive a hair benchmark of 2 milligrams per kilogram, and a tolerable daily intake of the 0.2-microgram per kilogram per day for women of reproductive age and children. The Manitoba government uses this TDI, the 0.2, to determine their fish consumption guidelines. Actually, the Manitoba guideline uses 0.47 for general population and 0.2 for sensitive.

There is clearly from the literature, the most recent literature, inconclusive evidence for adverse neuro-developmental effects below 10 to 12 milligrams per kilogram in hair. And Mr. Bresee will be showing you the results of our model predictions for concentrations in hair, so

you can try to keep some of these numbers in mind, but he'll refresh your memory in his graphs.

The overall preponderance of evidence indicates that hair and mercury levels at Health Canada's safe level of exposure for sensitive sub groups, that's the women and the children, 2 milligrams per kilogram or less are definitely not associated with adverse effects.

Now I will take a breather and turn it over to Mr. Bresee.

MR. BRESEE: Okay.

Modeling mercury in humans. We used two models in our assessment. One model was used to predict mercury exposures on a daily basis. And then we used the biologically based model that converted these exposures into adult female hair concentrations. We wanted to predict the hair concentrations so we can compare these values to measured values in Manitoba and other areas, and we can also compare these hair concentrations to values observed in the literature and other toxicity studies.

And finally, we used this information as part of the weight of evidence regarding potential health risk.

MR. WILLIAMS: Mr. Bresee, before you leave this page, if I were to distinguish your approach from that undertaken in the human health risk assessment, the additional component you undertook relates to number 2, the model looking at converted exposures to maternal hair concentrations; is that right?

MR. BRESEE: Yes.

MR. WILLIAMS: Okay.

MR. BRESEE: So, unfortunately, we have to use math because we're quantifying numbers or risks. But this is the equation that was used in the human health risk assessment, and it basically consists of the concentration of mercury in the fish, measured in milligrams per kilogram. Don't worry, it's set to stun.

So here the milligrams per kilogram in fish, or PPM, this is multiplied by the ingestion rate, which is in kilograms per day, and we divide by an individual's body weight. Combining these three variables, we get the exposure, which is here represented as milligrams per kilogram per day. This is a standard equation that's used in risk assessment for predicting exposures, which is then compared to exposure limits to derive risks.

In our assessment we used that same equation, but with a subtle difference, where we used the annual distribution of fish dietary preferences. This information was obtained by a study conducted by Chan et al, and it was printed in 2012, where they looked at households in eco-zone three in Manitoba. This is eco-zone three is sort of the central region where the closest community I believe to the Keeyask area is Cross Lake, was included in part of this eco-zone three. In that zone, the dietary information showed that most people consumed walleye. Based on this table here, on average 51 percent of the time individuals are consuming walleye. The next popular fish is whitefish at 22 percent, or roughly a quarter of the time, and then pike and sturgeon is the least frequently consumed.

So what we did was we used this percent dietary preference information to calculate a weighted fish concentration. And it's a fairly standard mathematical equation that's employed in statistics. It's basically a weighted mean. And this is the equation that was used where it's a component of the sum of the concentration in the individual fish species,

times its percent distribution.

Another subtle change that we did in our risk assessment is our input variables were modelled as distributions to predict exposures on a probabilistic basis. The reason we did that is in the world, or in the environment, nothing is a fixed number, they always have ranges about them, and we try to make use of these distributions so we can understand the range of possible outcomes.

So on the top figure here where it says body weight, this actually refers to the body weight in adult females, for example. And we see by this graph that the central estimate is about 6 kilograms.

What this graph also shows is the low end is about 46 kilograms, and the top end is about 83 kilograms, if my memory serves me correct.

What this is saying is that 95 percent of the time in the population, you would find individuals in between the 46 and the 83 kilograms. It's just to try and represent the distribution of individuals within a population or a community.

Similar to this, we also looked at a

distribution of fish mercury concentrations. This is a graph that shows the concentrations of walleye in Gull Lake. And the lower and upper bounds here are actually the confidence intervals that were submitted as part of the Keeyask evidence from the aquatics assessment.

So, generally average walleye mercury concentrations are .24 PPM. The lower confidence interval was .17, and the upper confidence interval was .13. When we perform our calculations in the simulation, 95 percent of the time we are getting concentrations in between the .17 and the .3. It's just respecting the fact that concentrations are not fixed but they are a range in the environment.

When we use this information, that same equation that was used in the human health risk assessment, instead of getting a point estimate value, we now get what's called a distribution. And this distribution is called on the Y axis here, a cumulative percentile. So if we were to look at this line here, the blue line, we're starting at the minimum value, or the zero percentile is about one, and it goes up to just below two. So I want to describe a little bit

more, the bottom axis here is mercury exposure to adult females, and here it's in micrograms per kilograms per day.

What the distribution shows is the concentration of adult female exposure to existing fish in the offsetting lakes, Split Lake, Gull Lake, and Stephens Lake. And the horizontal orange line shows the Health Canada's tolerable daily intake of .2 micrograms per kilogram per day.

This distribution shows that almost all of the predicted exposures are above Health Canada's limit of .2. And these values are actually fairly similar to what was predicted in the human health risk assessment because they are based on 171 grams per day consumption.

So if we were to look at the top end here, the exposure for Stephens Lake is about 2 micrograms per kilograms. Comparing this to the exposure limit of .2, we would say that the maximum exposure is about 10 times higher than Health Canada's exposure limit. If we look at the low end, or the minimum value, it's around .2 micrograms per kilogram, which would be equivalent to one times the exposure limit.

The centre part, we're looking at -- sorry, I was incorrect. The top end here is not 10, it's five times higher. And so the central estimate here would be about two to three times higher than Health Canada's exposure limit.

MR. WILLIAMS: Could you go back to that previous slide for a moment, please?

Just so I'm clear, in terms of the consumption rates of 171 grams per day, those were the consumption rates assumed in the human health risk assessment conducted?

MR. BRESEE: That's submitted by the Keeyask.

MR. WILLIAMS: By the Partnership?

MR. BRESEE: Yeah.

MR. WILLIAMS: And I want to just turn to that purple line which is existing offsetting lakes?

MR. BRESEE: Okay.

MR. WILLIAMS: And in terms of, if we assume consumption rates of that magnitude for the existing offsetting lakes, what observations would you make about it?

MR. BRESEE: 95 percent of the predicted exposures would be above Health Canada's

tolerable daily intake.

MR. WILLIAMS: Thank you.

MR. BRESEE: I won't go into as much detail on this graph, but I just wanted to show that the distribution of exposure for the toddler is fairly similar to the female adult. This graph is based on the consumption rate of 43 grams per day. And it shows that almost all of the exposures, regardless of whether you are consuming fish from the offsetting lake, Split Lake, Gull Lake, or Stephens Lake, would exceed Health Canada's tolerable daily intake.

So with this information, we tried to explore other ways of interpreting the risks of fish consumption. One of these tools that we used was methods that allow us to convert these exposures into hair concentrations where we could then compare these predicted levels to what is observed in bio-monitoring results and to compare to effect benchmark values. The model that we used is actually the same model that was used by US EPA and Health Canada to derive their exposure limits.

Bio-monitoring results are available from this Chan et al study, it's called the FNFNES

study, the estimated upper hair concentrations of 0.25 PPM among females aged 20 to 50 years of age living on First Nations reserves in Manitoba.

For comparative purposes we looked at the Canadian population. Geometric mean blood levels of total mercury in the Canadian population was measured to be 0.69 micrograms per litre. This can be converted through a conversion factor to an equivalent concentration of .2 PPM in hair.

I'm going to use that benchmark, or sorry, that measured value of 0.25 for comparative purposes.

So going back to this slide, the adult female hair concentration based on the exposures of existing concentrations in fish are presented here. And so these exposures have been converted into hair concentrations. And what I show is the distributions for adult females consuming fish at existing levels from the offsetting lake, from Split Lake, Gull Lake and Stephens Lake. The middle blue line is Health Canada's reference benchmark level of 2 PPM in hair. What I also show on this graph is the 0.25 PPM that's measured in the First Nations communities in adult females.

We can see from this graph that most

of the exposures are above Health Canada's 2 PPM level, and most of the exposures exceed measured levels by approximately -- sorry, let me rephrase that. That existing hair concentration -- sorry, predicted hair concentrations are approximately 10 times higher than measured levels.

MR. WILLIAMS: Just to stay on this page for a moment. Again, this is based upon the consumption levels assumed in the Partnership's human health risk assessment?

MR. BRESEE: Correct, this is based on the 171 grams per day.

MR. WILLIAMS: And just to remind us, in this chart, the Health Canada guidelines are in the blue in the middle?

MR. BRESEE: Correct, the middle line.

MR. WILLIAMS: And the orange line to the left are the results by Chan et al, looking at selected reserves in Manitoba?

MR. BRESEE: Correct, it was for the whole province of Manitoba.

MR. WILLIAMS: Okay. And in terms of the observations, in terms of comparing the results from Chan to the predicted results from the offset lakes or otherwise, any comments on the

difference or the gap between them?

MR. BRESEE: The gaps are actually fairly narrow. You're probably looking at a difference of twofold. In terms of risk assessment, that's not a number that would -- it's not a variation that would be of concern. You're looking more of a magnitude of differences when you start to notice differences that you can perhaps make some changes to your model, or look at refining your risk assessment. Which is what we tried to do after we predicted these results, is what could we change in our model to try and get these exposures -- or sorry, to narrow the gap? And that's what I'm talking about on the next slide.

So what we looked at is we looked at modifying two assumptions, and the goal was to try to reduce the gap observed between the predicted hair concentrations and the measured hair concentrations. We looked at modifying two assumptions in our model. The first one was the fish consumption rates, and the second one was the proportion of methylmercury in fish tissue. And I'll speak to these.

The FNFNES, or the Chan et al study,

provided information that could be used to derive fish consumption rates. The information was based on a traditional food frequency questionnaire for the past year and for all seasons. It was a 24-hour diet recall interview and it was based on interviews conducted in homes.

Following that analysis there was a sub sample selected to conduct a second analysis which looked for information that allowed the consumption rates to be adjusted for intra-individual variation.

This second analysis provides a better indication of long-term consumption rates.

In total, this study interviewed 706 participants from the First Nations communities.

The information in the FNFNES study, present data yields an upper consumption rate of 25 grams per person per day for females aged 20 to 50. As another point of comparison, Health Canada recommends a subsistence adult fish consumption rate of 40 grams per person per day. These rates are substantially lower than the 171 grams per day assumed in the human health risk assessment for whitefish, pike, walleye and sturgeon.

And finally, instead of assuming 100

percent methylmercury in fish, we assumed a portion of 85 percent methylmercury of the total mercury in fish.

When we look at the same model, however, we're using 25 grams per day. We see that the adult female hair concentrations from exposure to existing fish in the offsetting lakes, Split Lake, Gull Lake and Stephens Lake, are closer to the measured hair concentrations of .25 PPM. Most of them are actually above it, but almost all of the exposures are below Health Canada's benchmark value of 2 PPM.

MR. WILLIAMS: And again, the Health Canada one would be the blue line running vertically?

MR. BRESEE: That's right.

MR. WILLIAMS: Thank you.

MR. BRESEE: And I wanted to show the same exact outcome based on the consumption rate of 40 grams per day. This is the Health Canada subsistence adult fish consumption rate. Generally most of the hair concentrations fall between Health Canada's limit of 2 PPM, which is the blue vertical line, and the measured hair concentration of .25 PPM.

So in summary, hair mercury exposure modeling provides evidence that the predicted mercury health risks in the Keeyask HHRA are higher than expected.

Models are helpful in identifying key uncertainties that can be reduced by collecting more information. And the models can be used to identify consumption patterns that are relevant to the development of risk management plans.

And now I'm going to turn the remainder of our presentation to Gord Brown.

DR. BROWN: Okay. We're just about done. There's four more slides but they should go pretty quickly.

Health benefits of fish consumption was a section of our document. A lot of information here, but here are some of the highlights.

Fish, and most of us know a lot of this stuff I'm sure, but in summary, fish are a rich source of protein, essential fatty acids, vitamins and minerals. They are a nutritionally and culturally important food for many Canadians, especially Aboriginal groups or populations that consume wild fish. Fish are unique in their

nutritional benefits due to low levels of saturated fats and high levels of the beneficial omega 3 polyunsaturated fatty acids, or PUFAs, absent in most other foods.

We understand from the literature that when health risks are perceived by First Nation peoples, traditional foods consumed by them are frequently replaced by energy dense and nutrient poor market food alternatives. This is not a statement from the Keeyask HHRA, but it's from the literature. And if you want more information on that, you can refer to page 43 of our report. We have a full reference and description there.

THE CHAIRMAN: Dr. Brown, what does energy dense mean?

DR. BROWN: Potato chips.

THE CHAIRMAN: I figured the type of food was evident, but why the term energy dense?

DR. BROWN: I guess a lot of calories, you know, per unit of food.

THE CHAIRMAN: Okay, thank you.

DR. BROWN: Potato chips is probably a bad example, but it was the most obvious, you know, quick energy dense hit of calories, that type of thing.

So overall, it has been concluded that the benefits of modest fish consumption, one or two servings per week, outweigh the risks among adults, and excepting for a few species, select species of predatory fish among women of child-bearing age. Some of these fish species that are referred to here are, again, the high predator, mainly seafood, tuna, shark, swordfish, that type of thing. Page 5 of our main report has more detail on this.

Suggested risk management options. Health Canada and Manitoba Government advise that choosing fish that are higher in Omega 3 fatty acids and lower in mercury is a means of balancing risks and benefits of fish consumption. Whitefish are a very good source of these PUFAs with estimated concentrations approaching that of Atlantic farmed salmon.

Walleye, northern pike and sturgeon are much poorer sources of these nutrients. Thus a shift in consumption toward more whitefish and less walleye and pike would maximize health benefits associated with fish consumption.

And for whitefish, this recommended intake of 200 to 250 milligrams per day of the

unsaturated omega 3 fatty acids, 200 to 250 milligrams per day is recommended to optimize fetal development in pregnancy and lower cardiovascular risk. And this can be met through even one meal per week of about 150 grams, which is about one can of tuna.

That brings us to conclusions and recommendations.

The first conclusion, we agree that the highly conservative exposure assumptions in the Keeyask risk assessment did substantially overestimate risks to local consumers. In particular, assumed fish concentration rates based on major consumer information, or based on consumer information provided by local communities are the major contributor to predicted health risks.

Health risks predicted in the risk assessment for existing conditions would also apply to the offsetting lakes -- this has been discussed by Karl and Byron -- indicating that risks may be predicted using the Keeyask model regardless of where the community harvests fish. Present average mercury concentrations in study area lakes are below the commercial guideline of

0.5 parts per million, and are similar to or lower than measured in other impacted Canadian lakes, and similar or lower to what's measured in store bought fish.

The last slide. While consumption recommendations were removed from the final HHRA, our review concludes that fish in Gull Lake and Stephens Lake can safely be consumed based on guidance provided by Health Canada and the Manitoba Government.

And I would just like to insert a little bit. This is an abbreviated conclusion, so I'm going to turn to our executive summary. There's just a couple of points I wanted to make from this. So it's page XII, page 12 of the executive summary, the last two paragraphs.

MR. WILLIAMS: One second, Dr. Brown, page 12 of the executive summary? Okay, just give people --

DR. BROWN: Page 12 of the executive summary, I'd like to have this on the record. It's not in the slides.

So the last paragraphs there:

"Overall, it has been concluded that the benefits of modest fish

consumption, one to two servings per week, outweigh the risks among adults in accepting a few select fish species among women of child-bearing age. This illustrates the importance of targeted fish consumption advice to ensure that non consumers...",

that is non targeted consumers, I should say, that is males or older women,

"...do not reduce their fish consumption unnecessarily."

And next paragraph:

"Prior to making recommendations on how post impoundment risks will be managed among community members, the existing risks to the community should be more fully characterized to help ensure that the management of risk...",

it says "does impact," I wanted to correct that. It should say:

"...the management of risk does not impact the nutritional benefits of wild fish consumption. In this regard, collection of data on

distributions of actual fish consumption rates and measured mercury in blood, hair, of consumers of fish from impacted and offset lakes will be needed."

And finally, the last bullet on the last slide here:

"The additional information that we have provided herein by our client and by the Consumers Association of Canada will allow for a more comprehensive weight of evidence approach to the development of future fish consumption advisories for Keeyask."

So future fish consumption options, and of course the very important risk communication plans.

In the Keeyask risk assessment, one line of evidence was presented, and because of the conservative consumption rates, risks were predicted that we believe were unrealistic. So we presented additional lines of evidence that we hope will help put the true risks into perspective of the Keeyask area now and in the future.

Thank you.

MR. WILLIAMS: And thank you to

Dr. Lee, Mr. Bresee and Dr. Brown. I'm sure they are available for cross-examination. Hopefully we'll get a modest break to stretch the legs, but obviously we're at the discretion of the chair.

THE CHAIRMAN: I'll grant you your hope, Mr. Williams. We'll take a break right now for 15 minutes, we'll come back at 11:35, please. The proponent will be up first.

(Proceedings recessed at 11:20 a.m. and reconvened at 11:35 a.m.)

THE CHAIRMAN: Okay. We'll reconvene now with the cross-examination. First up is the proponent, Ms. Mayor.

MS. MAYOR: Thank you, Mr. Chair. You, in particular, will be most pleased to know that --

THE CHAIRMAN: Can't hear you.

MS. MAYOR: You, in particular, will be most pleased to know that we have had some conversations before the hearing started this morning and we have decided that if we have to meet again next fall as we, three of us have, that we will be doing that in Hawaii. I haven't actually got approval from Ms. Pachal for the budget.

THE CHAIRMAN: That might be in relation to Lake Winnipeg Regulation and that doesn't come under Ms. Pachal's jurisdiction, does it. Talk nicely to Dave Cormie I guess.

MS. MAYOR: I think he would be game for that.

THE CHAIRMAN: We certainly would be.

MS. MAYOR: Okay. I'm going to start, Dr. Lee, with you. We'll go in the order of your presentations. Your conclusion on page 16 of your report, and I think you have reiterated that this morning, is that the overall quality of the Keeyask assessment of community health impacts is high.

DR. LEE: Yes.

MS. MAYOR: You also say that a few small gaps remain. So I just wanted to spend a few minutes today speaking about those to see if we can perhaps even close the gap slightly.

You spoke this morning and in your report about focusing your review on the socio-economic environment supporting volume. You also indicated that you looked at some other sections of the response to the EIS guidelines and some information requests are also referenced in

your report. There's no mention of any other reading of the Partnership materials in your report. But could you tell us, were there other materials from the Partnership's filings that you would have reviewed?

DR. LEE: Yeah, we reviewed and I can't quote to you which it is, but we reviewed everything. The reason why we focused on the socio-economic environment and resource use is that's where we found most of the stuff in the end. But that was after a scan of most of the documents we came across.

MS. MAYOR: So were you asked then or did you review the environmental evaluation reports prepared by the Partner First Nations?

DR. LEE: Yes, I did.

MS. MAYOR: And so you would have been aware that each of those reports describe the impacts to each community from the project and the approach taken by each partner First Nation to address them.

DR. LEE: Yes.

MS. MAYOR: And those would have included not only impacts but a description of the benefits of culture and tradition and spirituality

to each of them?

DR. LEE: Yes.

MS. MAYOR: Now each of those reports also put great emphasis on public health issues related to the relationship of the communities with land and water?

DR. LEE: Yes, with the exception that it's not necessary to the degree of health outcomes that we would look for in a health impact assessment.

MS. MAYOR: Well, you would agree that in the Fox Lake Cree Nation report, there is even a specific section dedicated to health.

DR. LEE: Yes.

MS. MAYOR: One of the indicators that you talked about was traffic and safety. And in your report, you discuss concerns in relation to increased traffic, particularly during construction. Would you have had an opportunity to read, as part of your materials, chapter 6 of the response to the EIS which deals with traffic issues? It wasn't one that was referenced in your materials. It's actually a different section of the volume. Would you have had an opportunity to review that?

DR. LEE: I can't recall.

MS. MAYOR: Would you have been provided with the updated Keeyask traffic assessment filed with the Clean Environment Commission this spring which adds to the information in both the EIS and the supporting volumes and provides expected rates of traffic increase as well as information on traffic accidents and mortalities?

DR. LEE: I don't recall seeing anything regarding the expected rate of injuries, no.

MS. MAYOR: So it may be that you weren't provided with that updated assessment?

DR. LEE: It may be.

MS. MAYOR: In terms of communicable diseases, in your report, you make mention of, and this morning as well, you make mention of a lack of reporting on rates of infectious diseases, and your desire to have steps taken to prevent their spread in workplace camps?

DR. LEE: Yes.

MS. MAYOR: Were you provided with the international hydropower association audit document which describes labour and working

conditions and the steps which will be taken to ensure there are sanitary conditions?

DR. LEE: No, I'm aware of general camp operation standards everywhere. And usually what I am looking at is the coordination between the camp life and the local community and trying to mitigate the transmission of disease from camp into the community. So part of that is actually operational standards in a camp, trying to make sure that you prevent things within a camp. And also it's coordination with the local healthcare services.

MS. MAYOR: So starting with that first premise that we start at the camp to make sure it's not spread elsewhere, so starting with the camp itself, would you have been provided with the Burntwood Nelson agreement which is a collective agreement applying to all employees working at the camp?

DR. LEE: I don't recall reviewing that agreement.

MS. MAYOR: So it would give you some degree of comfort if you knew that in that collective agreement, there are a number of provisions which ensure that sanitary conditions

are actually maintained? And there is in fact as well a project safety committee. One of the responsibilities which it has is to discuss any concerns with sanitary conditions.

DR. LEE: Yeah, it's always -- the operating conditions in any camp in North America and Canada in particular are good. And there is always fairly good sanitary requirements. That doesn't actually prevent disease. And when you're looking at the impact into the community, the presence of the camp does increase the risk regardless of how well that camp is actually maintained with regard to respiratory health and gastrointestinal disease.

With regard to sexually transmitted infection, usually the best standards that we see in camp operations still don't address very well the risk of sexually transmitted infections.

MS. MAYOR: So in terms of the camp itself, you have no concerns with the particular camp, the sanitary conditions, and in fact the state-of-the-art facilities that's been described to us. Your concern isn't with this particular camp itself?

DR. LEE: I don't have any reason at

the moment to be concerned with this particular camp. I am concerned with camps in general.

MS. MAYOR: So it does assist in some of your concerns and perhaps address some of your concerns that this particular camp has been described as a state-of-the-art facility with the highest level of sanitation, janitorial services, maintenance and all of those factors?

DR. LEE: Yes.

MS. MAYOR: So in terms of then that next step, which is the connection between the camp and the transmission into the communities, you are aware that, first of all, there's going to be paramedic and ambulance services on site 24 hours per day, seven days a week, and those service providers will be coordinating with the Northern Regional Health Authority as required?

DR. LEE: I'm not entirely clear on your question.

MS. MAYOR: I'm sorry. One of the concerns you have is the transmission from the camp into the community. So the Keeyask project has ensured that there are 24 hour, seven day per week paramedic and ambulance services to be able to react quickly to any sort of outbreak. And to

prevent, hopefully, a spread going into the community. So were you aware of that and would that --

DR. LEE: No, I'm aware of that. Paramedic services and emergency services in camps rarely are well-equipped for infectious disease outbreaks. That's more of a technical public health type of response. And most camp health operations don't actually have good public health training response to outbreaks. In fact, most rural communities don't have that either. It's a medical officer health level and that's something that's usually outside the community.

MS. MAYOR: In this particular project though, they have gone one step further and are actually working with the Northern Regional Health Authority and have an on-site health professional working with those service providers and working with individuals in the camp.

DR. LEE: Yes. But again, I would have to see the training of that individual. Because in most cases, health professionals working in camp are there to deal with the common injuries, the common infections, the common complaints, which is great to reduce the impacts

on local healthcare resources but it doesn't specifically address the risk of infectious disease outbreak which is more of a technical response that they are not usually trained to deal with.

And again, I haven't looked at the specific training that they are providing for these people in this camp but I haven't seen in any camp where that is part of the job description of people who operate in the camp.

MS. MAYOR: In this particular instance, I am told that the individual would be a public health nurse and included in his or her areas of responsibility would be the provision and referral to health promotion and risk management programming, which would include communicable disease education, prevention measures. And that would include all forms of communicable diseases including STIs. So that again would be one step beyond what other camps generally provide?

DR. LEE: If it happens. And I don't mean to be obstructionist with this, but there is enough to do in a camp as a healthcare professional, that those things often are on back burner. So I would have to see how that job

description plays out. And the resources that are tasked to disease prevention and particularly to sexually transmitted infection prevention.

MS. MAYOR: So your advice to the Partnership would be to ensure that that is included in the job description and that the individual who is chosen has that particular experience and expertise?

DR. LEE: Not just the experience but the resources and the authority to pursue that. Particularly when it comes to sexually transmitted infections, often there are no resources or authority to actually deal with it. So the presence of a nurse doesn't itself necessarily do enough.

MS. MAYOR: One of the important factors would be coordination between that particular nurse and the Northern Regional Health Authority?

DR. LEE: Yes.

MS. MAYOR: And there was some information provided in the last few days that in fact the Northern Regional Health Authority has provided a letter to the International Hydropower Association that did the audit confirming that

they are working with the Partnership towards these end goals. So that would give you some further degree of comfort?

DR. LEE: Yes.

MS. MAYOR: Now there is also an ongoing dialogue that's occurring between the Northern Regional Health Authority and the Partnership to help identify new healthcare requirements for the Health Authority's five year strategic plan. You would agree that that's a positive step towards dealing with communicable and other diseases in the community?

DR. LEE: Depending on the nature of that agreement, often it might be -- to reframe that, it might be a good thing in terms of staffing and impact on healthcare resources in the area. I'm not entirely convinced that that would be necessarily a positive thing, depending on how it's done on infectious disease.

MS. MAYOR: In terms of the public health nurse that's actually going to be on site, using a public health nurse on site would also potentially alleviate some of the healthcare pressures in the community itself by adding an additional resource?

DR. LEE: In terms of dealing with the illnesses in the camp and preventing those individuals from accessing healthcare, yes. If there's a change in the burden of disease in the community that results, then no. Because whatever the nurse -- the nurse's job will be at the camp.

So, for instance, if there is an increase in alcohol or drugs or crime or STIs that aren't treated in the camp, then that will burden the outside healthcare system, or if workers are going back and forth between camp and the town.

MS. MAYOR: In terms of the data, you had mentioned this morning some concerns about provision of baseline data. Now you would agree that populations of the First Nation partner communities are relatively small?

DR. LEE: Yes.

MS. MAYOR: So if the communities communicated to the Partnership as a whole that they were concerned about making such data available because it may make individuals identifiable and confidentiality may be at risk?

DR. LEE: Absolutely.

MS. MAYOR: That's a legitimate concern?

DR. LEE: It's a legitimate concern. We usually deal with that by presenting data if it's common conditions, things like injury rates or, again, certain, like chlamydia for instance. There's no problems with anonymity with that, because they are common enough, even in small communities. Or if you have rare outcomes and you arrogate over into larger regional data.

MS. MAYOR: Now you mentioned a number of infectious diseases in your report. You weren't referencing them this morning, but there were a number of diseases that were referenced. And although the data for each community was not reported on individually, would you agree with me that not only did the health impact assessment consider all of those various disease classifications but the health impact assessment team also reviewed public data, they did community visits and key person interviews and then shared all of that data with the respective healthcare professionals in each of those communities to ensure that the data was consistent with their experiences in the community.

DR. LEE: Well, first, there wasn't a health impact assessment team per se, just to be

clear with that. I don't think that there is, that I reviewed or that I suggested there wasn't actually health data. I don't think there actually was data collected on baseline rates on most of those infectious diseases that I mentioned. I could be wrong but I didn't see it.

MS. MAYOR: But there were key person interviews conducted to try and gather as much health information as possible from the actual community members.

DR. LEE: Yes.

MS. MAYOR: That information as well as public data were then shared with the healthcare professionals in each of the communities.

DR. LEE: Right.

MS. MAYOR: To ensure that they were consistent.

DR. LEE: Oh yeah.

MS. MAYOR: One of the other steps that is going to be taken is that the Partnership is going to work with the local Health Authority to ensure that public information campaigns are in place in the communities prior to construction. And this would include information about STIs and

other communicable diseases. You would agree that that would be one positive step in terms of educating the community about potential risks?

DR. LEE: Yes, although education only goes so far. Most people are already fairly familiar with the risks of sexually transmitted infections.

MS. MAYOR: There would also be the on-site health professional providing resources, if necessary, to refer them to actually healthcare professionals that could assist?

DR. LEE: Yeah. But again, my concern is that those resources, as necessary, is't explicitly laid out. I don't know what those resources are. I don't know if there's going to be on-site testing. I don't know whether there's going to be condoms provided in the camp. I don't know the actual specific nature of the STI prevention program.

MS. MAYOR: So my information is that there will in fact be condoms supplied in the camp. So again, that would be addressing one of the concerns.

DR. LEE: That would be great, yeah.

MS. MAYOR: Not always included in all

of the information, but there are many pieces that are being addressed.

DR. LEE: Yeah, that's good.

MS. MAYOR: Were you asked to review the adverse effects agreements signed by each Partner First Nation?

DR. LEE: Sorry, can you repeat that?

MS. MAYOR: Were you asked to or did you have an opportunity to review the adverse effects agreement signed by each Partner First Nation?

DR. LEE: I don't think I reviewed each of them, no.

MS. MAYOR: There is some reference to them in I think your report, so you're at least familiar --

DR. LEE: Yes.

MS. MAYOR: -- with some of the programming. Would you have been aware that those agreements deal with the Keeyask adverse effects which reflect the First Nation partners, the unique priorities, and that includes risks or injuries to the health, safety, well-being, comfort or enjoyment of members from each first nation and the impacts on interests and exercise

of rights in relation to lands, pursuits, activities, opportunities and lifestyles of those members. That's a long-winded one. But in terms of that general philosophy and the objective of those agreements, were you familiar with that?

DR. LEE: Yes.

MS. MAYOR: And you were also aware that within those effects agreements, there are offsetting programs to provide appropriate replacements, substitutions or opportunities to offset some of those effects on practices, customs and traditions?

DR. LEE: Yes.

MS. MAYOR: Were you aware as well that those offsetting programs would be in fact paid for by the Partnership?

DR. LEE: Yes.

MS. MAYOR: So it's not in fact placing an additional burden on potentially lower income community members?

DR. LEE: Yes.

MS. MAYOR: Now in your report about diet and nutrition, you discuss the need to consider inpacts that may arise due to the loss of country foods and potential food and security.

Now, you would agree that the First Nation partners themselves are in an excellent position to recognize those concerns?

DR. LEE: Yes.

MS. MAYOR: And one of the ways to address potential concerns would be to develop offsetting programs to ensure access to healthy country foods.

DR. LEE: That is one of the ways. But as has already been pointed out, that consumption of traditional foods has already begun to decline. So offsetting programs are an important intervention. But as Gord and Karl had mentioned, there is a lot more messaging that needs to happen. There's a lot more that's going on than just offsetting programs alone we'll be able to deal with.

MS. MAYOR: So education, public information about those country foods is also an important component of any offsetting program?

DR. LEE: Right.

MS. MAYOR: So we heard in the last few days the First Nation communities actually discussing how they are going to inform their members, how they are going to hold potentially

open houses, how they are going to involve them in all of the programs. You would agree that that would be an important step being taken by those First Nation partners so ensure that healthy country food is accessed?

DR. LEE: To a point. I was actually talking to Karl about this at the break. There is only so much talking about food that you can do before people start to assume that it's unhealthy. As I was saying to Karl, if I was going to the supermarket and every time I'm there, there is a Health Canada scientist standing in front of the Oreos and there is a sign up as to how many boxes of Oreos a week I should eat, I'd probably stop eating them. But I know that a walleye is healthier than a box of Oreos.

So the more we talk about the risks of fish, even if the risks are low, the more fish is going to be considered to be risky. And from a health perspective, the effects of that message, no matter how often you repeat it, can be more harmful than the mercury itself the people are worried about to begin with.

So I would want to be careful because I have seen a lot of good public health messages

about one particular risk cause complications of hazards and health consequences in other ways.

The offsetting lakes are great. The overall goal should be to preserve and to maintain a strong traditional diet, locally sourced, widely available.

MS. MAYOR: And so distribution centres which have been established by the Partner First Nation communities operated by the First Nation communities would present a positive message and would also provide the food?

DR. LEE: Yes.

MS. MAYOR: Another opportunity that's being provided by the offsetting programs is actually providing access to substitute opportunities for hunting, fishing and trapping. So that individuals can actually go out and catch their own food and again remain confident that there hasn't been additional harm caused. You would agree with that type of programming?

DR. LEE: That's correct, yes.

MS. MAYOR: Under in your report, you reference the need, and I'm paraphrasing, to consider the health and well-being of those affected by alterations to the land, to heritage

resources and to culture and spirituality. Is that a fair summation?

DR. LEE: Yes.

MS. MAYOR: One of the concerns that you expressed was that there should be some examples of positive impacts that could have been given in, in fact, the report. Do you recall that?

DR. LEE: Yes.

MS. MAYOR: Now the CNP Keeyask environmental evaluation report actually provides a number of examples of positive impacts. And there's in fact a table which summarizes the positive Keeyask project impacts across 12 relationships, including spiritual, emotional and social. Were you familiar with that?

DR. LEE: I was, yes.

MS. MAYOR: And so that would be one good example of the potential positive benefits.

DR. LEE: Definitely. My point was more in terms of again making the connection between these parameters and actual health outcomes. That's one of the linkages that we often look for. And again, it's one of the places where health impact assessment sometimes adds to

what's already existing in an economic or a social or a cultural impact assessment. It's just making the link between that and actual health outcomes.

MS. MAYOR: So in terms of linkages, were you aware that there is a direct negotiated contract with the Fox Lake Cree Nation and the York Factory First Nation for a project counselling service provider?

DR. LEE: Yes.

MS. MAYOR: And so as part of that contract, you would have been familiar that there is cultural ceremonies marking project milestones to respect and respond to issues of well-being and the emotional loss associated with such changes?

DR. LEE: Yes.

MS. MAYOR: So that's an important linkage between the two, making that connection?

DR. LEE: Yes.

MS. MAYOR: There is also a crisis centre and wellness counselling program being set up by the Fox Lake Cree Nation under its adverse effects agreement and it includes coordination with various government departments and agencies and engages professional services as required.

DR. LEE: That's good.

MS. MAYOR: Another good linkage between the impact and an outcome?

DR. LEE: Well, I think we are having a little bit of a miscommunication. These are all great things, and I think the report has been fantastic in dealing with that. And my issue, when I mentioned that, wasn't that it wasn't being addressed, it's just that I was tasked to look at the health issues and I was looking to see the connection made between health outcomes and cultural stressors. And when you look at the inequities in the Canadian health outcomes, a lot of what Aboriginal populations are dealing with now, a lot of it has to deal with acculturation over time. So there are good mitigations measured. You are referring to a lot of them, those are fantastic. Those will help try to buffer ongoing acculture of stress.

I was just looking to see a firmer connection between acculture of stress, acculturation and health outcomes, and what we actually see when you start measuring and counting disease and death to see what happens. That's what I was looking for.

MS. MAYOR: Sorry, just one moment.

So taking your comment from that then, based upon all of the measures and programs that you have described are fantastic, so there's language programs, there's cultural traditional programs to ensure that all of those are carried through. And you indicated that we have addressed those.

So is it fair to say that not only has the potential impact on the mental well-being of our Cree Nation Partners been mentioned, it has also been well-considered and planned for, especially by the first nation partners themselves?

DR. LEE: Yes.

MS. MAYOR: I have no further questions for you.

Now I'm going to ask Dr. Brown and Mr. Bresee. So I will defer to who you think best can answer the questions. So if I have directed it to the wrong individual, I apologize.

And perhaps, Mr. Bresee, we'll start with you. I think these are best to you, but Dr. Brown, feel free to interrupt me.

DR. BROWN: Like Byron does? Okay.

MS. MAYOR: You utilized a computer-modeling approach to assess the potential

impacts of mercury in fish. And in doing so, you used, I'm not sure if this is a proper term, but generic consumption data from a number of sources for your modeling?

MR. BRESEE: Correct.

MS. MAYOR: And one of your sources of information was the Manitoba Guideline for Fish Consumption?

MR. BRESEE: That was on one of our slides but it was not presented in our report. The specific reference to the Manitoba Consumption Advisory Guidelines was only presented in our presentation today. It's not specifically calculated in terms of hazard quotients in our report, but it is mentioned in the report.

DR. BROWN: The Manitoba guideline references in the report, and is one I showed this morning and I talked about, the risk estimates derived assuming adherence to those guidelines.

MS. MAYOR: The other sources of data that you used are the guidelines recommend a certain number of meals per month for the general population, women of child-bearing years and children. That would be accurate?

MR. BRESEE: Yeah.

MS. MAYOR: And those are based upon an average meal size, and I think those are set out in your report. And that was for adults 227 grams or 8 ounces and for children 114 grams or 4 ounces.

DR. BROWN: That's in the Manitoba guidelines.

MS. MAYOR: And so yours were in fact smaller or larger than that?

MR. BRESEE: We used essentially three consumption or information from three sources. One was the information that was provided in the human health risk assessment presented by Keeyask which was an adult consumption rate of 171 grams per day and a toddler consumption rate of 43 grams per day. We then also looked at a report presented by the FNFNES study or the Chan et al paper or report where a consumption rate for adult females between 20 to 50 years of age in the First Nations community, the upper percentile was calculated to be 25 grams per day.

In terms of our modeling, we only focused on the female hair concentrations because the toxicity information focuses on the most sensitive endpoint which is for the females

bearing children. And so the models were developed with the parameters for an adult female.

The third information source for consumption rates was provided by Health Canada's 2007 document on fish consumption advice and health risks in Canada.

And primarily, that is to show how important consumption rates are in terms of predicting risks and how sensitive that parameter is.

MS. MAYOR: So consumption rates or ingestion rates, I think was another discussion we had, the ones that you used, so aside from the human health risk assessment done by the Keeyask project, the other two that you used had substantially smaller consumption rates than that used by the Keeyask project team.

MR. BRESEE: Correct.

MS. MAYOR: And you would agree with me that those rates used by the human health risk' assessment team were in fact drawn from interviews with members of the actual communities affected?

MR. BRESEE: I saw in the report, in the Keeyask report, the consumption rates were presented. I was unable to find the information

about the workshop that presented the methods and outcomes of that workshop.

MS. MAYOR: So we were told both in evidence and by various witnesses that the Keeyask First Nation partners repeatedly advised that their consumption rates were at the level described by the human health risk assessment?

MR. BRESEE: Okay.

MS. MAYOR: And you would agree that those were much larger than those used by your models?

MR. BRESEE: Yeah.

MS. MAYOR: So when you indicated --

DR. BROWN: Excuse me. I think there's some uncertainty associated with the actual consumption rates. And we tried to drill down into, you know, those consumption rates. We took a look at what was in the human health risk assessment, as Karl said and as you said. We took a look at the text in the human health risk assessment where the author, Mr. Wilson, said these are quite high compared to, you know, what we see and what we used and what are recommended elsewhere.

So, you know, I guess we were

concerned about those comsumption rates, as we said in our presentation, and we did ask for additional information from a workshop. And we were told that that information is confidential. So, you know, we really can't address, you know, what's behind those risk estimates -- sorry, those consumption rates other than they are very high compared to anything else we looked at.

MS. MAYOR: In your presentation today though, you indicated those were the rates assumed by the Partnership. Just to clarify though, they weren't assumed, those were based upon actual information obtained from individuals in the communities?

DR. BROWN: Apparently or evidently, yes.

MS. MAYOR: And in your view and I think the words you used this morning, Dr. Brown, were that those were unrealistic?

DR. BROWN: Yes. In my opinion, those were unrealistic. They are highly conservative, therefore not realistic.

MS. MAYOR: And your team didn't have the opportunity to, in fact, interview individuals from the communities themselves?

DR. BROWN: Correct.

MS. MAYOR: And when conducting health impacts assessment for a project study area, you would agree that utilizing community specific data is certainly one very appropriate approach?

DR. BROWN: Yes.

MS. MAYOR: And that was an approach used by Dr. Chan in his 2012 report and also in Seychelle and Pharoah Island's study referenced by you.

DR. BROWN: Yes, except the sample sizes in those studies, all those studies were significantly higher than what they would have been in the Keeyask. I don't know how many people were present that were survived. That information was confidential, but very high sample rates in the other studies that you mentioned. So it should be quite statistically valid scientific data.

MS. MAYOR: And because the study areas in those particular studies involved much larger areas?

DR. BROWN: Yes.

MR. BRESEE: I can also point out that consumption rates are not available from the

Pharoah and Seychelle Island studies. The only measures that they used is they had some information on the concentrations of mercury in the fish. They had either blood or hair concentrations from the cohort that they were following, and the analysis of the neurobehavioural outcomes that were measured. So there was no attempt in those studies to characterize consumption rates.

MS. MAYOR: But they were following actual individuals in the study area through a period time to assess actual information as opposed to assumed rates?

MR. BRESEE: Correct, yeah.

MS. MAYOR: Now the main concern in your reports is that the risks have been over-exaggerated; is that fair?

DR. BROWN: Yes.

MS. MAYOR: And that is for both present and post impoundment conditions?

DR. BROWN: Yes.

MS. MAYOR: And that means, in simple lay persons terms like mine, that the Partnership has over-estimated the effects of the project, and in particular, under post-impoundment conditions.

DR. BROWN: Under both present and post-impoundment, yes, for the consumption of fish by humans yes.

MS. MAYOR: And in your view, there were fewer effects than identified by the Partnership under post-impoundment conditions?

DR. BROWN: Lower risks.

MS. MAYOR: And one of the concerns that then follows from your position is that the communities will not eat fish.

DR. BROWN: Yeah. The concern is really that, you know, right now we understand from the Keeyask application that people are not eating fish already. They are already concerned about mercury. And, you know, they have turned to, you know, store bought food in many cases. You know, this is a generalization as you know. Not everybody would. But my concern is that they are already concerned about the, you know, the poisoning of the country foods. Then an application by, you know, well-recognized Manitoba Hydro and Keeyask Partnership that says the risks are five to 15 times higher than what's acceptable would just make things worse. So, you know, I think it's very important that we get this message

across that in our opinion, based on the additional evidence that we present, that things aren't as bad as has been presented by the Keeyask application human health risk assessment.

What it's going to take is a lot of messaging and communication so that people become comfortable over time, a lot of monitoring, a lot of communication, a lot of follow-up.

MS. MAYOR: I'd like to go with you to the messaging, but just one point of clarification. You indicated that the information in the human health risk assessment is that people have already stopped, the Keeyask Partner First Nations have already stopped eating fish. I think the information was that they have stopped eating fish from the system, not stopped eating fish.

DR. BROWN: Fair enough, yes.

MS. MAYOR: Now the Partnership has noted in both the socio-economic supporting volume and in the human health risk assessment that it will be important to have an accurate message about fish post-impoundment. I am assuming you agree with that based on what you have just said?

DR. BROWN: Yes.

MS. MAYOR: And such a message should

be developed taking into account all relevant and credible sources of information?

DR. BROWN: Yes.

MS. MAYOR: So consideration should be given both to actual consumption data that's been gathered but also the more generic data that you have relied upon in other studies?

DR. BROWN: Right. And, you know, in terms of actual data that's been collected, I think it's based on what we have seen, that is minimal data collection so far. I think what is needed going out in the future is a more thorough understanding of the actual consumption rates by the affected communities. Not everybody in the Keeyask Cree Nation is eating 400 grams three times a week I am sure.

MR. BRESEE: And another key measure that we looked at is the measurement of hair concentrations in Manitoba First Nations population. That's a fairly good measure or indicator of what mercury exposures potentially are. And the level is -- an upper confidence limit is .25 PPM which is fairly low in comparison to individuals living in Canada, it's the same.

DR. BROWN: Could I add to that,

please? Somewhere in the Keeyask EIS, I read that there was discussion of whether or not hair samples, mercury sampling for hair should be done in the Keeyask Cree Nation. And it was the Partnership's decision not to do that at this time. Because, I'm trying to recall my memory, but one of the reasons that they felt that they would not do that at this time is because it may induce additional concern or additional fear to the peope that there is a problem already. But the other reasons that they gave us, that there will be ongoing monitoring in the future to make sure that the fish concentrations are, you know, at such-and-such a level and that type of thing.

So you know, hair mercury data is extremely important and there was none. But if it were collected and based on, you know, our evidence and our suspicions, those hair and mercury levels would be quite low. So that would be a very positive thing to share with the community level is that, you know, there doesn't seem to be a problem right now. We suspect that would be the outcome of the hair sampling.

MS. MAYOR: So you talked about hair sampling not being provided and it being a

decision of the Partnership not to proceed in that fashion.

DR. BROWN: Right.

MS. MAYOR: And I can confirm that in fact the First Nation partners were not wanting to do that at this time. However to address both of your issues, were you aware that an option for testing people for mercury levels and, in particular, hair sampling is being offered in the future to be performed by either Dr. Chan that you have referenced or by Health Canada?

DR. BROWN: I'm glad to hear that.

MS. MAYOR: You had also mentioned the need for further data collection. So were you aware that every five years, a survey of country food consumption will be undertaken and that will feed into an updated human health risk assessment every five years after peak mercury levels have been reached?

DR. BROWN: I would say that's not satisfactory. I think a very pertinent, and Dr. Lee referred to this, I think I referred to it in my description of the risk assessment paradigm, it's very important to have strong baseline data. You know, so in terms of consumption rates, you

know, and other variables associated with fish consumption, the strong baseline data is just plain not there yet. So that body of evidence needs to be built up.

And then after that, five years is not soon enough. Lots can happen in five years.

I read that the, you know, the levels of mercury are predicted to increase to a maximum in seven to 10 years. So waiting five years to find out that there's a problem with the fish is way too long. You know, I would think that annual surveying and annual monitoring of not only the fish but of the people that consume the fish and hair sampling probably on an annual basis, it's not expensive, it's not hard to do, it would be much more appropriate than a five year span.

MS. MAYOR: And perhaps you and I had a bit of a disconnect, but the monitoring on the fish is being done annually.

DR. BROWN: Good.

MS. MAYOR: It's simply the survey of country food consumption is being done every five years.

DR. BROWN: Okay. I would say that should be done more frequently, every year, yeah.

MS. MAYOR: Were you aware that resource users have also been asked to bring in samples of fish and other wild foods for testing to assist in the monitoring of this issue?

DR. BROWN: I agree with that.

MS. MAYOR: If we can go back now, we sort of veered off for a minute, if we can go back to the messaging. There seems to be a common theme, and I think between both the Keeyask projects working group on mercury, Dr. Chan in his report and in your presentation today, the common theme seems to be that there needs to be a balance in the messaging between presenting the valid risk of consuming fish with the nutritional benefits. So there needs to be a balanced message going back and forth.

DR. BROWN: Yes, absolutely.

MS. MAYOR: And so it's crucial to communicate not only the risk but also the many nutritional benefits of eating it.

DR. BROWN: Definitely.

MS. MAYOR: You would also agree that some caution has to be exercised when recommending the number of meals per month or per week because a meal size for the general population may differ

from area to area?

DR. BROWN: Yes, that's correct. But you know, I think that in terms of future, risk management options and the fact that Keeyask is working with Health Canada and Manitoba Health on appropriate determination of risks and acceptable consumption rates, as I said earlier, I was very impressed by the Manitoba guidelines. You know, everything is in there I think that needs to be in terms of a determination of the acceptable amount of fish. For example, it says in there that the general population can eat 19 meals per month of whitefish. And that's 227 grams. So that's, you know, 19 big meals of fish, and the risk is still less than one. The risk for that was about .4. So adherence to those guidelines I think is a very important piece of information that has got to be taken into consideration in future advisories and communicated with the type of numbers that I was using today.

MS. MAYOR: Now the Partnership's approach is to have its own monitoring advisory committee review and discuss the results of all of its monitoring to then provide those results to both Health Canada and Manitoba Health, and to

work with both of those governmental agencies, so Health Canada and Manitoba Health, in developing a risk communication message for the communities that are affected by the project that is clear, it's consistent with fish consumption information being communicated by those two levels of government. You would agree that that approach is reasonable and appropriate?

DR. BROWN: Oh yes. I saw that throughout the application, is that that is, you know, an ongoing process that will have been very important. But, you know, what I was disappointed in seeing is that the first draft of the human health risk assessment did have some consumption recommendations done by the author of the risk assessment. And for whatever reason, I think that the consumption recommendations by the risk assessor were more in line with realistic risk, you know, by an expert. And so some of the consumption recommendations in the original human health risk assessment that were removed, you know, show that it is acceptable to eat, you know, fish. I forget the exact amounts and the meal sizes and what the details were. But that information was removed from the first draft, it

didn't show up in the second draft.

The only thing that appeared in the second draft was that we've got these risks of five to 15 and they are probably substantially high. But you know, no additional perspective other than that. So that's why I am emphasizing these Manitoba guidelines are great. Adherence to those guidelines should be very much part of the future of the risk management decisions and the communication.

MR. BRESEE: But also that when working with those agencies, Health Canada and Manitoba Health, you need to be careful about the numbers that you assume for your consumption rates because they can have a dramatic impact on the outcomes of the risks. And that's what we tried to show.

MS. MAYOR: And you may not be aware of this, but in terms of just answering your disappointment, the working group on mercury removed those consumption recommendations at the request of government regulators to allow some further review of information and to better discuss what the appropriate message would be.

DR. BROWN: Yes, I did know that. It

didn't reduce my disappointment though that there was --

MS. MAYOR: In terms of approach, sir, you have indicated that that's an appropriate approach for the Partnership to take. I assume from your comments about Dr. Chan, I think you even reference him as being an interinternational expert in the field of mercury and health in your report, you would agree as well it's the Partnership's approach to have their human health risk assessment reviewed by him?

DR. BROWN: Yes.

MS. MAYOR: Thank you. I have no more questions.

THE CHAIRMAN: Your timing couldn't be more perfect. We'll take a break for lunch. We'll come back at 1:30.

(Proceedings recessed at 12:28 p.m.and reconvened at 1:35 p.m.)

THE CHAIRMAN: Are we ready to go?

MR. WILLIAMS: I apologize, I had misunderstood and I had aimed for 1:40, so that's my fault.

THE CHAIRMAN: You are a day late in that. Okay. We will resume cross-examination of

this panel.

Fox Lake Concerned Citizens, you are up first.

MS. PAWLOWSKA-MAINVILLE: Good afternoon.

Thank you for your presentation. I have -- the first question is about mercury. So Keeyask will be about the fourth dam in the area in about 50 years, and you stated that humans should be tested for mercury, correct?

DR. BROWN: Yes.

MS. PAWLOWSKA-MAINVILLE: Okay. And have you found in a lot of cases that Aboriginal people sometimes do not want to be tested because they are either afraid of the results or the implications? Could you speak a little bit about that?

DR. BROWN: I can't from personal experience. I wonder if Dr. Lee can?

DR. LEE: I have come across that occasionally, yes.

MS. PAWLOWSKA-MAINVILLE: Can you speak a little bit about it, like maybe why or --

DR. LEE: I can't speak to any personal reasons as to why someone would not want

to be tested. From a scientific perspective, testing an individual is always, when I've been in programs that had bio-monitoring, it has been a little bit concerning. Because what we are mostly interested in is sort of global risks across a community, and any one individual has very idiosyncratic things that can cause mercury levels or any other toxic toxin to be high. You can never ascribe a cause to that.

So if someone comes in, if you test for mercury or some other substance and you find it is high, you can't necessarily say it is the fish.

So for the information to be useful for this kind of setting, you need to have a program that tests a lot of people and is designed to get a community average, the kinds of things that Gord was talking about before. Ad hoc individual testing, although informative to individuals, doesn't really get that.

MS. PAWLOWSKA-MAINVILLE: Okay. Thank you.

Then have you found that when there is a program about having Aboriginal people bring in their harvested resources to get it tested, has

that been successful in the past, or in your experience?

DR. BROWN: I have some experience in Alberta with the Swan Hills hazardous waste treatment facility. I have been working on that project over about a 15-year period. It is a hazardous waste facility that has both an incinerator and a landfill. The incinerator is state of the art, and under normal circumstances it burns virtually 100 per cent of the emissions.

There was an unfortunate incident in the late 1980s whereby a weld in the furnace apparently was not the right welding material, so there was a leak, and what happened was some PCBs, dioxins and interferons were emitted to the atmosphere. And this was really a significant concern for everybody, because dioxins are highly toxic, or can be highly toxic. So I was involved in helping to determine the risk associated with the consumption of large game animals, and also of fish, human health consumption of large game animals and fish, what were the risks associated with both.

In terms of the large game animals, in terms of the overall program, the communication

program, there was a lot of concern, not only by the proponent, but the other stakeholders as well, including the local First Nation. And the local First Nation in this case was Lesser Slave Lake, which is about 60 to 80 kilometres away. But we, first of all, did modeling similar to what we have been talking about today to predict the future risks. Empirical data can only be used after you collected and measured the data. So we had to use models to predict what the risk would be, and then to come back and to measure that over time, similar to what is going to be done in this project.

The First Nation community was very, very, very concerned about consumption of large game animals and country foods in general. And for the first few years of this program, while we were still in the measurement mode, we were told that they wouldn't touch the meat within 100 to 200 kilometres of Swan Hills First Nation, would not eat any of the country foods. That's how worried they were about it.

It was after many years, well, several years of collection of data and measurement of that data, that the risks were put into

perspective and communicated.

The data came from local stakeholders. The data came from hunters of big game animals, non-Aboriginal, and after two or three years it came from Aboriginal people.

At this point in time, all of the meat samples and the fish samples -- sorry, just the meat samples are collected by the First Nation community and submitted to the proponent for analysis.

It is different than hair sampling, different than human health sampling of blood and hair. But I think if people understand what the value, what the outcome is of testing, they will eventually agree that it is a good thing.

I'm sorry if I'm talking too much about that.

MS. PAWLOWSKA-MAINVILLE: That's fine.

MR. BRESEE: And I can also state that as part of environmental impact assessments that I work on in the Oil Sands region, there is some food studies that have been conducted where snowshoe hare, grouse and moose meat was harvested by First Nations people and submitted for metals analysis. And I have been using that study and

that information fairly regularly as part of the baseline information for our impact assessments. It also included fish that was harvested by the communities and we used that information.

MS. PAWLOWSKA-MAINVILLE: Thank you.

DR. LEE: I might add something as well. I think there are great opportunities to have a program that's done in conjunction with, and with the cooperation of the local hunters or trappers, or subsistence users organization of some sort.

I've been involved in ongoing monitoring for biological contaminants, is one of the areas that I work, and it doesn't work quite as well because the information is not useful to the hunters. Where Public Health has asked for samples, then take a long delay to get back, and the information gets back, it actually is not useful in any way, and it can tend to undercut confidence in the local food supply. So having local hunters or fishermen contribute samples is great if it is messaged well, if it is tightly run and everyone is on the same page. Otherwise there can possibly be harms around the perception.

DR. BROWN: My key message is exactly

what Dr. Lee just said. It is very important that the people that are being sampled know why, and know what the outcome is, you know, valuable information that is good for their health.

MS. PAWLOWSKA-MAINVILLE: Thank you. You just answered my second question.

Have you heard of cases maybe in Canada where there is methylmercury poisoning or Minimata diseases across the country, is there a community that you perhaps have known of?

DR. BROWN: Minamata was Japan, and that was 40 years ago, no, 60 years ago, that was a very, very, very high risk, high exposure to mercury. So there are no Minamatas in Canada for sure.

MR. BRESEE: I have read one paper for a community in Northern Ontario where there was a chlor-aikali plant in the early '70s.

DR. LEE: There still is individual cases of high mercury, but they are due to individual exposures, particularly things like canned tuna and what have you. There is no, as far as I know, no clinically relevant contamination of a community in recent time in Canada.

MS. PAWLOWSKA-MAINVILLE: Have you heard of Grassy Narrows perhaps and the case of high mercury poisoning there?

DR. BROWN: I'm not familiar with that one. I will say, though, that we do know that Health Canada and probably Fisheries, Canada Fisheries has been involved in more holistic studies of community health impacts associated with fish consumption. And there is references in the Keeyask EIS to some those studies. For example, Saskatchewan Health Canada has been involved, Manitoba Health Canada has been involved, I think 1979 to 1990, in Northern Manitoba, Churchill Diversion issues and that type of thing. So there has been Federal involvement, Federal studies associated with high exposure to mercury, and obviously the results are public information.

DR. LEE: I'm not sure if you really wanted everyone to contribute to every answer kind of approach, but certainly there are communities that have high levels, but there is a difference between high levels and mercury poisoning. So you might have a community that is more exposed than what we expect, or what we accept, but that

doesn't necessarily lead to a Minamata type of experience where you have a mass poisoning.

MS. PAWLOWSKA-MAINVILLE: Thank you.

I would like to switch over to some of the subjects that you have mentioned earlier, and you talked about different health determinants. So if I could perhaps ask you a few health determinants that we could perhaps discuss? Would you say that traditional life or the continuation of hunting and trapping would be a viable health determinant, if that is taken away or if that exists?

DR. LEE: Absolutely.

MS. PAWLOWSKA-MAINVILLE: Thank you.

So would you say that if that lifestyle is removed, or if people are removed from that lifestyle, then the health and well-being of the individuals would deteriorate?

DR. LEE: Yes.

MS. PAWLOWSKA-MAINVILLE: Thank you.

And would you say that a change in the traditional diet, for example, no access to country foods, has an effect on the mental health and well-being of individuals?

DR. LEE: Yes, not just mental health

but also physical health as well.

MS. PAWLOWSKA-MAINVILLE: Have you heard of the expression soul food, that perhaps country food is seen as soul food, and it seems to be a very cultural kind of identifying symbol to Aboriginal people?

DR. LEE: Yes.

MS. PAWLOWSKA-MAINVILLE: So would you say perhaps that lack, or change and disappearance of the country food and access to the country food would diminish the well-being of individuals that don't have access to it?

DR. LEE: I agree, yes.

MS. PAWLOWSKA-MAINVILLE: Thank you.

And the proponents actually discussed the offsetting program, which includes moving hunters from one area to another so that the continuation of hunting and trapping can occur.

Do you think that the link to a certain cultural landscape, and I think, Dr. Lee, you discussed the idea of the cultural landscape earlier, for the hunter to have access to that cultural landscape because it has been passed down generation to generation it actually is an important cultural determinant?

DR. LEE: Yes, I definitely agree. I mean, not having been in the community, when I was reading about the offsetting program and the distance to some of the lakes, that's exactly one of my concerns was that perhaps I was looking specifically at mercury, possibly at caloric requirements for food, but might not be getting into some of the other aspects of what actually food sourcing and hunting do for health.

MS. PAWLOWSKA-MAINVILLE: Thank you.

Would you say that heritage, or that cultural link to heritage and identity is a strong health determinant?

DR. LEE: It is usually, particularly in Aboriginal populations in Canada, that's definitely considered to be a health determinant, yes.

MS. PAWLOWSKA-MAINVILLE: Thank you.

Would all three of you perhaps agree that housing is a social and health determinant?

DR. LEE: Yes.

MS. PAWLOWSKA-MAINVILLE: Dr. Gordon?

DR. BROWN: Okay with me.

MS. PAWLOWSKA-MAINVILLE: Thank you.

Mr. Bresee?

MR. BRESEE: Yes.

MS. PAWLOWSKA-MAINVILLE: Thank you. Would you say that racism is a health determinant?

DR. LEE: I would, yes. And it is not, when you are looking at lists of health determinants or terms of health, Health Canada has a famous one that has 12 on it. Racism is not per se on that list, although you could put it under social environments, what have you. It is definitely on other lists of health determinants that I have seen.

MS. PAWLOWSKA-MAINVILLE: Would you consider systemic racism as well as, for example, exponential racism to be part of those determinants?

DR. LEE: Sorry, I didn't catch the second part?

MS. PAWLOWSKA-MAINVILLE: The systemic or exponential, so that something that somebody --

DR. LEE: Yes, it is.

MS. PAWLOWSKA-MAINVILLE: Thank you.

And would you consider worker interaction, for example, an influx of people who do not understand aboriginal culture to be an aspect of a health determinant?

DR. LEE: I'm not sure I would put that on the list of health determinants, but I can see how the pathways of that kind of interaction can impact health.

MS. PAWLOWSKA-MAINVILLE: Thank you.

Have you in your research come across cases where Aboriginal women, for example, state that they have been taken advantage of or abused by workers at camps or in the city, from projects?

DR. LEE: I have heard reports of that both in my health impact assessment work and in my clinical work.

MS. PAWLOWSKA-MAINVILLE: Thank you.

And I guess my larger next question is sort of a larger question. So if Aboriginal people who are directly impacted by a project suffer from ill health, could you perhaps, each of you state your opinion and discuss why is it that workers who work on these projects do not suffer from such issues?

MR. WILLIAMS: Excuse me? In terms of -- that's clearly within the questions, clearly within the competence of Dr. Lee, so certainly fine with him.

If Dr. Brown or Mr. Bresee feel that

they are able to comment on that and that it is within their competence, I will leave that open to them. But I just want to make sure that if they feel uncomfortable in venturing beyond their expertise, that they don't. But certainly it is a proper question to Dr. Lee, and it may be to the other two. I'm not familiar with it.

DR. LEE: Can I ask you to repeat the question?

MS. PAWLOWSKA-MAINVILLE: I guess we were thinking that if Aboriginal people who are directly affected by a project, they suffer from all of these ill health issues, social determinants I guess like housing, racism. Why is it that workers who work on certain projects do not suffer from the same issues if they are in the same environment?

DR. LEE: Workers suffer from other health impacts, particularly -- I mean, there has been a lot of work done in boom/bust economies and in man camps, looking at gender and gender roles, and the impacts on men, and substance abuse, and various behaviours related to that.

So certainly the people who go to work in that sort of setting aren't immune to health

impacts. But depending on your risks, depending on your population, depending on the things that are affecting you, a single project will impact different people in different ways.

The impact on workers is obviously at least partially mitigated by the fact that they get to leave.

MS. PAWLOWSKA-MAINVILLE: Okay. Thank you.

That was just a question that we had based out of interest really.

And have you come across, in your experiences, that perhaps some Aboriginal people do not understand the level and extent of the long-term effects on their health and well-being due to development?

DR. LEE: I think it is generally true for people in general, Aboriginal or not, that environmental impacts and social environmental impacts on health are not necessarily well understood. I teach at a medical school, it is not actually well understood amongst medical students.

DR. BROWN: I think I can answer that in terms of, not just for First Nation people, but

the Canadian population in general, local stakeholders, while they are normal educated people, they are not aware technically and scientifically of the possible impacts of a resource development project.

So that's why earlier I was making a point of saying, it is very important to have that communication and education starting very early on. So that we can address people's concerns and also educate them about what the project impacts will be and how they will be mitigated and what the risks are.

MS. PAWLOWSKA-MAINVILLE: Thank you.

And I have a question to the three of you, it is an opinion question, based on your experience. So from your expertise, what does a healthy community look like to you? What components would it comprise of, if it was a healthy community?

DR. BROWN: I will address one determinant, and that would be contamination or pollution.

A healthy community would not have significant sources of contamination or pollution that would affect their health on an acute basis

or on a chronic basis.

And the rest is up to Dr. Lee.

DR. LEE: I'm just, I paused and let Gord go ahead. That's an incredibly complicated and difficult question to answer. Health in many ways has to be defined by the people who are experiencing it. So it is hard for me to say what makes one community healthy or not healthy, that's sort of up to the individuals in it.

There has been a lot of work amongst health professionals to try to get at that, what constitutes health. A lot of it has to do -- it is hard to talk about it without making it sound very touchy-feely, and very whatever. But a lot of it has to come into autonomy, the ability to actualize and to achieve your basic needs and then beyond. It is hard for me to explain that right now. And I'm not sure I'm doing a very good job at all. It is not simply just a safe environment and elimination or control of actual health risks, or low levels of disease. It has more to do with the ability to actually live a full and healthy life, if that makes any sense.

MS. PAWLOWSKA-MAINVILLE: It does, thank you.

So how would you envision then a healthy Aboriginal community? Does it comprise of similar components? Is there anything additional?

DR. LEE: In my experience, and again this goes to my clinical experience, I have travelled a lot and worked a lot through Canada. I would say that maintenance of culture, maintenance of traditional food systems, maintenance of an active relationship with the land is actually a huge part of what to me seems to be a healthy community. I get that in a sense from talking to patients. I also get in a sense from what I'm actually seeing in the clinic or in the emergency room or lab tests or what have you. I can't necessarily back that up with any epidemiologic studies, but I can speak to that after 20 years of travelling around and working in various communities.

MS. PAWLOWSKA-MAINVILLE: Thank you.

And my final question is, have you ever heard a First Nation say that the health of the land means the health of the people?

DR. LEE: Yes.

DR. BROWN: Yes.

MS. PAWLOWSKA-MAINVILLE: Do you find

that is a significant aspect of well-being or be mino-pimatisiwin of Aboriginal people?

DR. LEE: Yes.

DR. BROWN: Yes.

THE CHAIRMAN: Thank you, Ms. Pawlowska-Mainville. Ms. Whelan Enns?

MS. WHELAN ENNS: Thank you to all three of you for your presentation and for informing myself for sure in the hearing.

Please feel free to correct me if I have the wrong expert in terms of who I'm addressing a question to. I wanted to ask, and this may apply to both firms, to all of you, whether there are specific assessments in terms of human health assessments that you have conducted in or with First Nations communities who are significantly affected by mercury?

DR. BROWN: We have conducted several studies that have involved mercury as a chemical of concern, but to my recollection there has been no studies that I have been involved with where stakeholders, First Nation communities, have been significantly affected by mercury. In other words, it has been addressed but it wasn't a problem in the studies that we have been involved

with.

MS. WHELAN ENNS: Just checking, okay. Thank you very much.

There was a comment, and I believe it was Dr. Lee, about health impact assessments being infrequent in terms of a requirement in the regulatory process?

DR. LEE: Yes.

MS. WHELAN ENNS: Thank you.

Are you seeing any change in this pattern? Is it sort of a flat line where that's pretty consistent in the work that you are doing in Canada in particular?

DR. LEE: No, it is not a flat line at all, it has been rapidly increasing over the last, probably especially the last five years it has been increasing a lot. More from proponents requesting it than from governments requiring it. It is starting to get into terms of references in a few areas. The State of Alaska has written some good guidance. Like I said, none of us is working on it. So it is growing faster in practice than it is growing in terms of a regulatory requirement, but it is growing in both.

MS. WHELAN ENNS: So if I'm

understanding you correctly, you are talking about, sort of like the first step down the hall, where guidelines and requirements in filing an EIS are beginning to include the human impact assessments? Am I hearing you correctly?

DR. LEE: On the regulatory side yes. That's the first step down that hallway. In terms of the practice of health impact assessment, where it has been requested or required by other bodies, then we are in a whole different ballroom and it is a much more advanced field there.

MS. WHELAN ENNS: In the trend, as you are describing it then, are you also seeing requirements in regulatory decisions and/or written into licences that may then, you know, may in fact be issued for a project, where the human impact assessment is written in at that point?

DR. LEE: Again, in some jurisdictions we are seeing that, and we've been involved in some.

MS. WHELAN ENNS: Thank you.

There was some content in your presentation and some earlier questions regarding having a nurse on site for the residents, if you will, the worker residents. This will apparently

be up to 2,000 people. So I wanted to ask you whether you have recommendations, and we did all hear your comments about nurses' training and best skills and training for this kind of a setting, but I wanted to ask you whether, given that this will be up to 2,000 people, whether you have recommendations in terms of whether one nurse is enough, whether there needs to be health practitioners available 24/7, whether it needs more than one shift a day, that kind of thing?

DR. LEE: If a camp actually has 2,000 people in it, one nurse is clearly not enough. For comparison sake, a community of 2,000 people would typically have a -- I'm not sure what the requirements are in Manitoba, but again where I work, a community of 2,000 people would typically have a nursing station of five nurses with one on-call full time. And in addition to that, a home care nurse and a mental health nurse. So when you get to 2,000, that's a sizable town, and having one public health nurse would not be sufficient. I would be surprised if that's what they were planning.

MS. WHELAN ENNS: Thank you.

Would you recommend, or do you know

instances where protein from country food is available and part of the meals provided to workers in large on-site housing situations?

DR. LEE: I have heard, but I wouldn't be able to confirm, but I have heard of programs that have a country food provision in camp food. If you have a large proportion, if you are trying to recruit local workers from an Aboriginal community, that would be presumably a part of the plan, or ought to be part of the plan.

MS. WHELAN ENNS: Thank you.

Going back to the small town of 2,000, in terms of your description of it, and thank you for the description, how many diabetics would there be in a small town of 2,000, taking the Canadian average in terms of diabetes?

DR. LEE: I would have to look up my numbers and I would have to do some math.

You can't necessarily do that, though, because this small town of 2,000 would be a small town of 2,000 mostly men between the ages of 20 and 40, which would have a very low rate of diabetes compared to the Canadian average or compared to the regional average.

MS. WHELAN ENNS: Fair point.

Given the Partnership's stated goals in terms of Aboriginal workers over both construction and then, of course, also operation, is it fair to say that the number of diabetics then in this workers population of up to 2,000 people, given the Aboriginal workers, would be higher?

DR. LEE: Certainly.

MS. WHELAN ENNS: Thank you.

There was also a fair amount of content and discussion and questions today about STIs. And I listened for, I may have missed the content in terms of this next question, but I would like to know if you have -- whether you considered in your analysis or you have anything to add in terms of potential increases in HIV?

DR. LEE: Again, I didn't do a health impact assessment. I reviewed the document for how they addressed sexually transmitted infections, and I didn't see a discussion of HIV. With HIV what we would be looking at is a risk rather than actual rate, because HIV is fairly low incidence regardless, it is a population where the prevalence is quite low. And it actually is a very difficult disease to catch, but it is one

that you always have your eye on because the consequences are obviously significant. So we would typically use a more common and easier to catch STI like chlamydia as a marker for sexual behaviours. And then know that if those sexual behaviours are going on, then your risk for less common diseases like HIV and syphilis are also increasing.

MS. WHELAN ENNS: Thank you.

I may have missed in our review of the EIS some of the content for this next question, but I wanted to ask whether then comparative data for the construction period for the Wuskwatim Generation Station in Manitoba would be relevant in terms of doing a full human impact assessment and doing the preparation for then the Keeyask Generation Station construction period?

DR. LEE: Sorry, you are asking if the comparison data were available, that it would be useful?

MS. WHELAN ENNS: Yes. This is a generation station that finally went into operation in terms of all turbines at the end of 2012, so it is the preceding generation station project in Manitoba.

DR. LEE: If there was good data, then yes, it could inform a health impact assessment here. The data sometimes is difficult to get. As you already mentioned, the communities are small and sometimes the epidemiology is hard to actually be able to trace or see diseases. Sometimes you don't have a very good baseline, and to follow things up, it is not all that great. But for common diseases, common outcomes, things like motor vehicle accidents, health care service demands, some STIs, you might be able to find some data and see what happened elsewhere. As important would be stakeholder and key informant surveys, to go in and talk to people in the community and talk to the nurses, talk to any physicians that serves the area and see what they experienced, as clearly there would be analogous impacts.

MS. WHELAN ENNS: Then you are saying that it would be, to have that kind of comparative data, it would have been necessary to have collected that data particular on the work force, if we are comparing populations of workers for the generation station that's to be constructed, if licensed, and the one that has been constructed,

they would have had to have been collecting the data during the construction period?

DR. LEE: Yeah. Although I think the impacts that we are usually looking at are not in the workers, it is actually in the local community, so that would be where I would be interested in seeing outcome data, if it were to exist.

MS. WHELAN ENNS: Fair enough, thank you.

Finding questions that have already been asked.

I wanted to ask a question about the FNFNES study and the slide information. It is basic, I believe, but there is 706 First Nation participants in this study, as we understood it.

Are they from, are they then participants in the survey or study from communities who are adjacent to or affected by Hydro infrastructure or other generation stations?

MR. BRESEE: I don't know specifically. The closest community that I found in that study close to the Keeyask area was Cross Lake.

MS. WHELAN ENNS: And that would be a

yes. But, fair enough, thank you.

MR. WILLIAMS: Ms. Whelan Enns, if it would help, we are -- I don't think our witnesses would mind providing to you, just by way undertaking, a list of the communities. And then if that would assist you to do a bit of cross-referencing, that wouldn't be too hard. So I think we would be prepared to do that.

MS. WHELAN ENNS: Thank you very much.

(UNDERTAKING # 11: Provide list of communities in study)

MS. WHELAN ENNS: This is definitely a non-expert's question, but in following your presentations and looking at averages for consumption of fish, and we did our metric and imperial, because I needed to understand the approximate half pound average meal size. The question, though, is whether there are any risks to averaging, and again it is a non-expert's question -- understanding the reason for the surveys and how the data has been used, the question more is whether there are any risks or factors where people, for instance, would eat a great deal, you know, of walleye, being a higher risk in a short period of time, and then not at

all, as in are there any human risks in the variables in terms of how people would consume, taking walleye?

MR. BRESEE: The science may not be there yet, but patterns of consumption can have an influence on the short-term mercury burden in the individual. But it has to also take into consideration the concentrations in the fish too.

DR. BROWN: I guess I would add that the tolerable daily intakes that we referred to from Health Canada, for example, the .2 for the women with fish -- I remember that -- bearing -- women of child bearing age, the .2 micrograms of per kilogram per day, that's a tolerable daily intake. But it doesn't mean that that exceeding that intake on any particular day is going to have impact on that individual. That basically, that .2 microgram per kilogram per day is a chronic average over a life time. If it is not exceeded over a full season or a full year or a life time, that is not considered to be a health risk.

MS. WHELAN ENNS: Fair enough. And thank you, questions finished.

THE CHAIRMAN: Thank you, Ms. Whelan Enns.

Ms. Kearns, do you have any questions?

MS. KEARNS: No, Pimicikamak does not have any questions.

THE CHAIRMAN: Thank you. I think that's it for the participant groups present today. The panel has a few questions.

So, Mr. Shaw, did you have?

MR. SHAW: No.

THE CHAIRMAN: Ms. Bradley?

MS. BRADLEY: Thank you.

I have a quick question, and this would be to Dr. Lee. When you were doing the health impact assessment and reviewing how, what the potential impact would be on the community and, of course, workers, and you were doing your review and taking factors into consideration, were you aware that there is going to be another work camp, small town, as we've heard the phrase, that will be coming along very shortly, so that there will be two work camps that will be running simultaneously, almost at the same time? The second camp I'm referring to will be the up and coming camp for the Conawapa dam. And you know, was that taken into consideration with your review?

DR. LEE: It wasn't taken into consideration with the review because I don't think that it was taken into consideration in terms of how the EIS was written around the health impacts. So, no. But certainly that does -- that falls more into the cumulative impacts type of world and we didn't go into that in great detail in our review.

MS. BRADLEY: Okay. The other reason why I'm asking that question is, I'm also interested in knowing whether or not you took into consideration the work schedule arrangement? And yes, I understand that that is under a contract agreement, but the work schedule is set out, and I'm not going to quote it because I will probably be off somewhere, but the work schedule does call for long days, and I believe one day off, six days on, something like that, one day off, a fairly rigorous work schedule. And then if you have two camps that are running almost simultaneously, one would think there would be an impact from that. So, were you aware of that work arrangement and what the potential impact would be?

DR. LEE: I don't think that I was aware of that work arrangement. I don't think it

actually came up in our review. Certainly there are impacts as to how you schedule work arrangements in a camp situation, and there are different impacts on both the migratory workers who come in for it, and if they are coming in and say for instance working ten days on and leaving, and then ten days off, being flown out of the community, that sometimes can mitigate some of the impacts, but also impacts on workers from local communities, particularly with regards to subsistence leave and that kind of thing. I don't believe in our review we found there was a very thorough discussion of work arrangements or schedules, but that does influence some of the health impacts.

MS. BRADLEY: Thank you.

THE CHAIRMAN: Mr. Nepinak?

MR. NEPINAK: In your statement you mentioned that walleye, the consumption rate is 51 per cent on walleye. And up until this point I hadn't -- it just kind of raised a memory that suckers are a staple of Cree people, in the '70s when I was in Northern Manitoba, and also as recently as eight years ago when I last saw my late elder in Northern Saskatchewan, and I just

realized that I don't see any numbers on suckers here. Was that taken into account?

MR. BRESEE: Are you referring to slide 19 specifically?

MR. NEPINAK: It says modeling mercury exposure, oh, there, yeah, 19.

MR. BRESEE: Okay. If we had sucker concentrations of mercury we could easily add this to the assessment and include it as part of analysis. If I remember correctly, the FNFNES study did show that sucker was part of the food consumption, or the diet. So, yeah, some of the information is there to include it, but not all of it.

MR. NEPINAK: Okay.

And also I don't think it is even in Manitoba Hydro's reports if I -- I just thought of it when I saw it here. But thank you.

MR. BRESEE: Okay.

THE CHAIRMAN: Mr. Yee?

MR. YEE: Thank you, Mr. Chairman.

I have specific questions on mercury, so I will just direct them to the panel here. So I guess it is Dr. Brown or Mr. Breseesee.

Can you maybe elaborate, how was the

length of the fish incorporated, or is it incorporated into the modeling of the mercury in here?

MR. BRESEE: Actually --

MR. YEE: It is the size really, because based on my knowledge that larger fish might have greater levels of mercury?

MR. BRESEE: Correct, the size of the fish would be an indicator of, or is positively correlated with the mercury concentrations in the fish. That's because a larger fish is usually older and has had more time to accumulate the mercury. The evidence, or the information that we used in our model was based on the evidence that was submitted in the aquatic assessment, or the aquatics component of the EIS, where they calculated a standardized fish size. I don't have the numbers -- I don't have them all in my head, but if I remember correctly, walleye was assumed a standard fish size of 400 millimetres, or 40 centimetres. And this was done to try and control for the differences that would be observed in different sized fish, and just sort of standardize when you are looking at a concentration in Split Lake, or Stephens Lake, or Gull Lake, that you are

looking at the same size fish. So if you see a difference in the mercury concentration, that it is not just because you are measuring a larger fish, but it is because there actually appears to be a difference in the population of the fish.

So in our assessment we used the standardized fish concentrations that were presented in the aquatic assessment. We would not have any other -- we didn't have access to the raw data to change those concentrations, and they appeared to be reasonable assumptions in terms of typical size of fish that's harvested. Not on a daily basis but, you know, over the time period of your life.

DR. BROWN: I would like to add to what Karl has just stated and, again, refer to the Manitoba guidelines for mercury. And we didn't consider, as Karl said, we used a standardized mercury concentration based on an average sized fish. But, again, this mercury guideline is very impressive for Manitoba. And on page 22, for example, they show that fish that have less than .2 micrograms per gram and are less than 38 centimetres would be in a category 1, low risk. But that fish in category 2, with a 0.2 to 0.5,

are between the range of 38 and 47, so they are bigger fish, so that puts them in the next category. Again, the guidelines are very valuable I think in the discussion about risk of people eating fish in Manitoba.

MR. YEE: Thank you.

MR. BRESEE: If you can hold on for two seconds, I will actually see if it is in our report, the size of the fish that we used.

MR. YEE: Okay. Great.

MR. BRESEE: That information isn't in our report, but I do remember, for example, walleye was probably 40 centimetres, and the other fish species were about the same length that was used to standardize the mercury concentrations.

MR. YEE: Okay. Thank you.

My next question is regarding your slide 12, the mercury in other Canadian lakes. I wonder if you could shed some light on why the whitefish mercury levels increased in post impoundment from .07 to .19 milligrams per kilogram compared to the sturgeon, which was .2 to .3?

DR. BROWN: The data that you see in that slide is not our data, it is from the Keeyask

EIS, and it is from the aquatic section of the EIS. So they are experts in aquatic, you know, fisheries and chemical information and they made those predictions, so we can't address that.

MR. YEE: Okay, thank you.

I have a question on slide 27. One of the things I was interested in, and this is just sort of off the cuff, most human health risks assessments, for instance, the one that was undertaken by the Partnership, tend to overestimate risk, as you've determined. And that's essentially to provide confidence in their risk estimates, as well as to deal with uncertainty, because there is usually a fair amount of uncertainty in risk analysis. So I was just wondering, given that you have, in this slide 27 you have modified the assumptions in your models, for instance, of the fish consumption rates and the amount of methylmercury, which have been lowered, how do you account for uncertainty, as well as how do you provide confidence in your estimates?

MR. BRESEE: Well, what we tried to look at was the variability in the information that we had. Uncertainty is basically lack of

knowledge. Some of the uncertainties that we would perhaps identify that we cannot include in our model would be other chemicals that are ingested with the fish that may actually mitigate, you know, or change the cumulative burden of mercury, and the individual's patterns in which people eat fish was not -- I think those are uncertainties. The other uncertainty would be in the measurement of the mercury concentrations, but we would expect that to be very small and would not influence outcomes of a risk assessment.

So, in terms of those uncertainties and how we addressed them in the assessment, I think we need to go back to some of the fundamental approaches that are used in risk assessment where, when you make what could be -- or if you are judged to be fairly conservative assumptions, you re-evaluate some of your input variables, and what you try to do is build a weight of evidence that has a consensus in the information that you feel is correct and that can be used in making a risk management decision.

One of the key pieces of information that I have to fall on is that the measured mercury levels in the hair of First Nations

population in Manitoba is very low. And if you look at what the predicted exposures were, they are much higher. So that to me is a critical piece of information that identifies there are some uncertainties in our model that we cannot incorporate, or have the scientific knowledge to use, to try and get our exposures exactly the way the measurements are. But we still feel it is conservative because we are over predicting the hair concentrations.

MR. YEE: Thank you.

DR. BROWN: If I can just add one thing? I totally agree with what Karl is saying, but in terms of point number 2, we made a big deal of fish consumption in our presentation obviously. But point number 2, as you stated, Mr. Yee, the assumptions in risk assessment typically start as being highly conservative, and if you do show an outcome that does predict a risk that is, you know, greater than one, then you take a look at your variables that are used as inputs, and you try to determine if you are being too conservative and if that's what is driving it over.

In the case of the methylmercury, Karl did a literature review and found that, you know,

based on measurements of methylmercury in fish throughout Canada and North America -- what were the averages, Karl, the range?

MR. BRESEE: Basically it ranges from 30 to 95 per cent methylmercury. However, I believe the lower portion of methylmercury probably comes from more marine fish as opposed to freshwater fish. I think you would have a more narrow range of methylmercury versus total mercury content in freshwater fish. The study that I quoted where the methylmercury content was 85 per cent of total mercury, I believe the author was Canuel, that was based on analysis done in lakes in Northern Quebec. That was information that I had found and I thought was suitable because it was a similar species of fish.

MR. YEE: Thank you.

MR. BRESEE: And it did provide a range, and I've selected the higher portion of mercury, or sorry, methylmercury.

MR. YEE: In slide 30, the FNFNES study, concentration of hair existing, in your opinion, why are the predicted mercury levels in the hair still higher than Chan's measured mercury levels in your model?

MR. BRESEE: That's a good question. I have asked it of myself. As performing exposure assessments, I rarely have the outcome where I get exact outcomes to measured information. But I think there are some other factors in the diet that may be contributing to a lower body burden.

The other question -- or sorry, the other question you could ask is, maybe the consumption rate isn't even 25 grams per day, maybe it is 2 grams per day over the long term. That's another question to ask.

There are other nutrients such as selenium in the fish which would interact with the mercury in the body and actually mitigate its cumulative effects.

So there is a lot of possibilities, but we really don't have the science to make this model exact. There could be genetic differences, there could be differences on the metabolism, or the disposition of how the mercury is deposited and accumulated in these individuals' bodies.

MR. YEE: Thank you for that answer. I was assuming there was other factors involved here, so thank you for that clarification.

Just a couple of more questions on

mercury in fish again. If fish consumption from off-system lakes is still high compared to the Nelson River system, how best would monitoring be structured for human health with respect to mercury exposure in fish consumption?

DR. BROWN: Well, we haven't been involved in the monitoring discussions or EIS or that type of thing. But, you know, just practically speaking, you know, where the Keeyask Cree Nations are obtaining their fish is obviously where the sampling should be done of the fish species, right? So, I am sorry --

MR. BRESEE: I can add to that. I think your fish monitoring would want to focus on two aspects. You would want to harvest fish that people are consuming, that are representative samples, so that you are capturing what people have been bringing back to their homes to eat. The other part is obviously a fish monitoring program would serve as an indicator of changes in fish. And in order to do, I'm not an expert in this area, but in terms of mercury you need to find a way to standardize your fish concentrations for the size of the fish, for the species of the fish, and the lake. So there is a lot of

statistical correlations that need to be accounted for. Therefore, that type of monitoring would be slightly different than what you would do in terms of just measuring the fish that people are harvesting and bringing home.

MR. YEE: Thank you. I just have a bit of a follow-up. Again, I'm just asking somewhat of a hypothetical question getting your opinion on monitoring here. Should monitoring incorporate different risks for the different segments of the population, vis a vis sensitive versus general and say elders versus younger people?

MR. BRESEE: The science has really, the toxicological science has really focused on the sensitive life stage, which is neural developmental effects from the mother to the fetus. There is information to look at other life stages. The original exposure limit derived for methylmercury by Health Canada back in the '70s was based on the Minamata information, and on an Iraq poisoning episode. In those studies they arrived at essentially a hair concentration without adverse effects of 10 PPM.

So it is possible to focus your

assessment on targeted people within the population and tailor it, but definitely most of the toxicological information right now, over the last 20 years, is focusing on fairly subtle neural developmental effects.

DR. BROWN: Could I just add to that? Something else popped into my head.

I agree with Karl's answer, but I think you asked if monitoring should focus on both the general population and on sensitive people in the population? What type of monitoring were you referring to? Were you referring to the fish mercury monitoring?

MR. YEE: No, I am referring more to the availability of country foods.

DR. BROWN: To the availability of country foods?

MR. YEE: Yes, going after country foods.

DR. BROWN: So not just fish, but game and plants?

MR. YEE: Yes, general consumption.

DR. BROWN: Okay. Well, the country foods, yes, there would be, as I understand it, there will be monitoring of the mercury

concentrations in all of the country foods. The way that you take into consideration, you know, I think there is probably a lot of different ways to answer and ask this question. But the way you take into consideration the sensitive people, the women and children, is by taking the quantity that's consumed, taking the concentration of mercury in that quantity that's consumed, and then applying a factor which is either for a general population, insensitive, or for the sensitive people.

And the sensitive individuals within the community, if they ate the same amount of food with the same amount of mercury in that food, they would have over twice the risk. Because your tolerable daily intake for insensitive is .47 and for sensitive is .2.

Does that help?

MR. YEE: Yes. Thank you very much.

MR. BRESEE: Just one thing. We focused on methylmercury in our assessment. One of the outcomes of the human health risk assessment that was submitted by Keeyask, they did -- obviously they looked at other diets, other game meat. And when you are looking at

methylmercury in terms of a risk assessment, the focus is the exposure and consumption of fish. That is the only dietary item that would accumulate higher levels of methylmercury. It is just a product of the aquatic system that causes it to build up.

MR. YEE: Thank you.

DR. BROWN: That's the driver.

MR. YEE: Thank you very much. I have no further questions, Mr. Chairman.

THE CHAIRMAN: I have one final question. It is for Dr. Lee.

How typical or widespread are outbreaks of communicable or infectious diseases in camps of this nature?

DR. LEE: My most recent experience with it has been by medical officers in health in northeastern BC where they are having the shale gas boom, and they have had reports in camps there. So I don't think that they are necessarily widespread, I don't think that any one camp is necessarily going to get multiple outbreaks per year, but it would be an expected possibility. I can't give you a number on it, but certainly I have heard reports of them happening.

THE CHAIRMAN: What kind of diseases?

DR. LEE: Generally gastrointestinal diseases, a lot of the usual viral gastroenteritis, plus some food borne diseases. The virals would be Norovirus, so have the possibility of campylobacter, other food borne stuff, depending on food handling. The respiratory disease would again include all of your usual viral winter time or cold type things that you have, plus influenza is one that would be concerning. Influenza would be probably the most concerning because it is highly infectious and is dangerous to people who are at risk.

THE CHAIRMAN: Thank you.

Mr. Williams, any re-direct?

MR. WILLIAMS: Yes, thank you, Mr. Chair.

Follow-up to two questions posed both by the Partnership and by the Concerned Citizens of Fox Lake, to you, Dr. Lee, in terms of offsetting programs for hunting and fishing.

Dr. Lee, first of all, when we talk about the concept of food security for country foods, are we generally approaching that issue

from the perspective that those foods should be locally sourced and widely available?

DR. LEE: Yes.

MR. WILLIAMS: Keeping in mind the issue of food security, does flying to a new different area to fish and hunt raise any concerns in terms of food security requirements?

DR. LEE: Definitely. I mean, not knowing the particulars of how that program could work, I mentioned before that I actually was concerned to see that it is a fly-in situation. Because food insecurity is a sporadic thing and it is not universal across the community, I would want to know who it is that is actually accessing the offsetting program, how consistently they are accessing it, and the distribution of food back into the community from the offsetting lakes to know that food insecurity is actually being addressed. And again, without much data on food insecurity at all, I don't really know if that has been addressed.

MR. WILLIAMS: Okay. Thank you.

Mr. Chair, may these witnesses be excused?

THE CHAIRMAN: They certainly may.

Thank you, gentlemen, thank you for the efforts you put into preparing your reports and thank you for coming here today to present them and respond to our queries about that. Thank you.

And Mr. Williams, your next panel is all set to go. Do you need a few minutes to turn around?

MR. WILLIAMS: The powerpoints are loaded, but it would be nice to give us just perhaps a brief break so they can get set up and settled and then --

THE CHAIRMAN: I will give you four or five minutes.

(Proceedings recessed at 2:39 p.m. and reconvened at 2:46 p.m.)

THE CHAIRMAN: Are we ready to reconvene, Mr. Williams?

MR. WILLIAMS: I note I didn't get a welcome back, but I'm sure you are happy to see me yet again.

THE CHAIRMAN: I only do that in the morning. I'm always happy to see you though.

MR. WILLIAMS: I would ask, just to start off, for introductions, and then we will

have Ms. Johnson swear or affirm you. So please proceed, Jerry?

MR. BUCKLAND: My name is Jerry Buckland, I'm a professor of Development Studies at the Menno Simons College, which is part of the Canadian Mennonite University and based at the University of Winnipeg.

DR. O'GORMAN: I'm Melanie O'Gorman, I'm an associate professor in the Department of Economics at the University of Winnipeg.

Jerry Buckland: Sworn

Melanie O'Gorman: Sworn

MR. WILLIAMS: For the panel, again, there will be a powerpoint and then a brief statement of qualifications, both for Dr. Buckland and for Dr. O'Gorman.

Starting with you, Dr. Buckland, would I be correct in characterizing your area of expertise as in development economics, including community development?

MR. BUCKLAND: That's correct.

MR. WILLIAMS: And you hold a Doctor of Philosophy and Economics, and in the course of obtaining that you specialized in development economics and the history of economic thought?

MR. BUCKLAND: Yes, that's right.

MR. WILLIAMS: Am I correct in suggesting that you are currently dean of Menno Simons College?

MR. BUCKLAND: Yes.

MR. WILLIAMS: But last year, would it be accurate to suggest that you were the acting director of the Masters in Development Practice Program at the University of Winnipeg.

MR. BUCKLAND: Yes.

MR. WILLIAMS: And that included an element devoted to indigenous development?

MR. BUCKLAND: The focus of the program is indigenous development.

MR. WILLIAMS: And you have served and continue to serve as a professor in international development studies at Menno Simons College?

MR. BUCKLAND: Yes, for 20 years.

MR. WILLIAMS: And I won't go through lengthy examination of your selected research and writing, but under journals and articles, am I correct in suggesting that one journal article that you produced was, "Community Development as Organization Learning, The Importance of Agent Participant Reciprocity"?

MR. BUCKLAND: Yes.

MR. WILLIAMS: And in terms of certain academic conference participation, you presented on community economic development response to business and financial service gaps, to the Canadian Political Science Association at the Congress of Humanities, correct?

MR. BUCKLAND: Yes.

MR. WILLIAMS: And in terms of community presentations or courses, you've presented to the Winnipeg Food Assembly on the inadequacy of liberalization and economic growth to overcome global poverty. Agreed?

MR. BUCKLAND: Yes.

MR. WILLIAMS: Okay, thank you.

And Dr. O'Gorman, would it be correct to describe your area of expertise as economics with a focus on economic development and macroeconomics?

DR. O'GORMAN: Yes.

MR. WILLIAMS: And among the courses that you teach, one of them would be economic development?

DR. O'GORMAN: Yes.

MR. WILLIAMS: And another would be

topics in economic development?

DR. O'GORMAN: Yes.

MR. WILLIAMS: As well as an intro course in that regard?

DR. O'GORMAN: Yes.

MR. WILLIAMS: And you were, or are the recipient of a SSHRC development grant addressing the Right to Clean Water in First Nations, The Most Precious Gift?

DR. O'GORMAN: Yes.

MR. WILLIAMS: And recognizing that there is some confidentiality associated with the communities that you are studying, would I be correct in suggesting to you that some would be Northern Manitoba communities?

DR. O'GORMAN: Yes.

MR. WILLIAMS: And am I also correct in suggesting that you are the recipient of a Social Sciences and Humanities Research Council grant aimed at examining -- aimed at examining barriers to high school completion among Aboriginal youth in northern communities?

DR. O'GORMAN: Yes.

MR. WILLIAMS: Thank you for that.

And with that, I'm going to ask you to

lead us into your -- Dr. Buckland, into your presentation.

MR. BUCKLAND: Thank you very much. Thank you, Mr. Chairperson and panel members. We are very pleased to be here this afternoon. And I just wanted to also thank, we had three research assistants that helped us with some of our work, and a couple of them are here this afternoon, Jazmin Alfaro, Alain Beaudry and Heidi Cook.

I wanted to start off by saying, acknowledging that neither Melanie O'Gorman nor I are Aboriginal people. And I think it's important that we state that up front and that that's clear.

I also wanted to say that the research methods we used for our report relied primarily on literature review, as well as the opportunities to speak to people from the communities while -- in one case when they were here in Winnipeg. We did not engage in field research.

What we've done in our report which we are going to highlight today is to use a community development, community economic framework or lens to assess the Keeyask model.

And I wanted to make a couple more introductory points before we get started. And so

first of all, I wanted to say that we realize that this is a very major project. This is a huge project for the northern communities that will be affected by it. It is a big project, I think also for Manitoba Hydro and the Partnership, but it is a huge project for those communities. And we certainly understand the burden that the Commission bears to work through all of the various aspects of this hearing process and come to a decision. So we wanted to say that.

We hope that our contribution is constructive. That's our goal, to constructively contribute to this process.

And we also want to recognize the hard work that Manitoba Hydro and the Keeyask Cree Nations have undertaken in developing this model.

So, the outline of the presentation is, Dr. O'Gorman and I will divide it up. I am going to present an overview, the CED framework that we used. Dr. O'Gorman will summarize the CED features of the Keeyask model. And we will begin the -- the heart of the presentation is under that analysis of the Keeyask model. Dr. O'Gorman will begin that, I will also add into that, and Dr. O'Gorman will finish that work as well as

present the conclusion. So that's sort of the outline.

So in terms of kind of a big picture overview, we wanted to present that, sort of an executive summary, what did we find, to give you kind of the overall view. So, first of all, we would like to say that we believe that the Keeyask model is an improvement over past hydro projects from a CED perspective. And I will talk about the CED thing in a minute.

The Keeyask Cree Nations have been engaged in conversation with Manitoba Hydro for years and there are plans to address potential harms. Moreover, the aggregate economic benefits to the communities are not trivial.

The positive aspects of the Keeyask model from a CED perspective include the establishment of the Manitoba Hydro Keeyask Cree Nation Partnership, the effort to deliberately include the Keeyask Cree Nations as economic beneficiaries, the Keeyask project training and the employment policies.

We will be going into each of these in more detail in our presentation.

We also believe that within the

Keeyask model there are challenges, as there are with all projects. And we think that these challenges could be addressed. The challenge that we want to identify are the question of causing local harm, disrupting traditional livelihoods, the issue of KCN participation in decision making, the issue of dynamic capacity building, the issue of small is beautiful, or beginning with a large project, and then finally the economic arrangements in the project.

We also wanted to identify that we believe there are major risks to the project, and that these risks are important because, as the project affects economic dimensions of people's lives, they will affect sociocultural, political and psychological dimensions of peoples' lives. And economic benefits alone cannot fully compensate for harms.

So, by way of background, what is community economic development framework, what are we getting at there?

Well, there is a literature and a practice that relates to a number of areas. I teach international development studies, much of it today focuses on the community level, but there

is also a literature and a practice that looks at community development. There is another overlapping literature and practice that looks at community economic development. So we are drawing on this sort of literature and practice to apply a lens to assess the Keeyask model. Because we believe it is very important, because the hydro dam is being placed in the region where small communities have been for many years.

Hydroelectric dams can contribute to economic growth, but they often place heavy and involuntary burdens on local, often indigenous peoples.

A new approach to hydro development is needed that includes benefits for, participation of, and permission from indigenous communities surrounding the proposed dam sites.

Community economic development, as I said, is a valuable framework that can be used to analyze the Keeyask model, and that's why we chose it.

By the way, the community development, community economic development literature -- I will just go back for a moment -- has a range of perspectives that one finds, and a range of

individuals that are talking within it. So it includes Indigenous People by Taiaike Alfred, and his recent book, Wasase, he reflects on a very much indigenous approach to community development. It includes international scholars like Mario Blaser, who look at the international situation of indigenous people in his book "In the Way of Development." And it includes a lot of work done by a group of people through the Manitoba Research Alliance, led by John Loxley and colleagues, that have looked at Aboriginal development, both urban and rural.

So there is a variety of perspectives within this literature.

What we did was we tried to identify five key principles that we think are common in much of the literature. Now, I'm not suggesting it is common in all of this CD, CED literature, but much of the literature.

The principles are five-fold. First of all, that a principled CED approach has project management that comes from a holistic perspective, that recognizes the interconnectedness of people's economic lives, their social lives, and the environment.

Secondly, a very common CED principle is that "small is beautiful." And the idea here is that because communities are generally small, it is important to start projects at a small scale. Now here the literature diverges. One group argues that once the community capacity is developed at the small level, the scaling up of a project is sensible. Another group says, no, it must stay small. But I think, you know, within that literature there is different views, but certainly scaling up is legitimate, is a principle that we find in some of the literature.

Number 3, protection of the environment and community interests is paramount within the CED approach.

Fourthly, participation in decision making is extremely important, particularly because communities often have relatively weaker voices. So it is so important to find ways to amplify that voice, to equalize that voice vis a vis partners.

And finally, the community economic development literature doesn't focus simply on a state of time, a moment in time, but is concerned with a dynamic process. And it is so critical

that the communities are able to engage in a dynamic process of capacity building. So that's another important dimension of the framework.

I'm going to pass this over to my colleague now.

DR. O'GORMAN: Thank you very much.

So what I will be doing in this section of the presentation is providing a summary of what we see as the Keeyask model. And by no means do I think this is the first time you will be hearing about these basic features of the model. Everyone in this room is quite familiar with the Keeyask project.

Why we refer to this as the Keeyask model is because we see it as a way of improving or potentially harming socio-economic development in the Keeyask Cree Nations. So we are basically asking that question, does the model of doing hydroelectric development, as represented by the Keeyask model, is it a positive one, a negative one, or is it more nuanced?

So, again, I'm going to go through these aspects of the project quite quickly because they are well known to all of us.

So Keeyask is a joint effort between

Manitoba Hydro and four Manitoba First Nations, in particular Tataskweyak Cree Nation, TCN, War Lake First Nation, York Factory First Nation and Fox Lake Cree Nation.

Discussion regarding the Keeyask project began a long time ago, 15 years ago, first between TCN and Manitoba Hydro, and then eventually the other three communities joined on. And all of that consultation culminated, as we know, in the JKDA, the Joint Keeyask Development Agreement, which was signed among all five parties in 2009.

In this partnership Manitoba Hydro can own a minimum of 75 per cent of the equity in the partnership, and the Keeyask Cree Nations in turn can own up to 25 per cent of the equity in the Partnership.

So in our report we have gone through three different phases of the project just to highlight different aspects of the project's features.

The first phase is one we are in now. This is pre construction of the dam. It consists largely of consultation. We know from the documents provided by the Partnership that there

has been extensive consultation, not only between Manitoba Hydro and the Keeyask Cree Nations, but also between the leadership of the Keeyask Cree Nations and members of those Keeyask Cree Nations.

There was large training initiative referred to as the Hydro Northern Training and Employment Initiative, that was conducted from 2001 until 2010, and it trained a large number of individuals in the area that the generating station will be operated in, to provide labour for that project.

The second phase of the project is the construction phase, which is estimated to run from 2014 to 2021. And the main benefits or features of the model in that phase is business opportunities. The Keeyask Cree Nations will have a chance to take on contracts involved in the construction of the generating station. Employment will be provided in three main broad categories. The first is designated trades, things such as electrician positions, plumbing positions, non-designated trades, jobs such as heavy equipment operators, labourers and drivers, and support occupations, things such as catering and security services.

Burntwood/Nelson agreement, the BNA, will direct hiring for the project, and that's a key aspect of the labour conditions on the project.

And finally, there is the post construction phase which will begin, it is estimated at roughly 2021. At this stage there will be operational jobs provided for certain Keeyask Cree Nation members. The KCNs will also earn investment income in proportion to the equity that they have invested in the project at that time. And in that regard they have two different choices for investment. They can either choose to invest in common units, which I will describe later, or preferred units.

Another key aspect of the post construction phase is the adverse effects agreements which were signed between Manitoba Hydro and each of the individual KCNs. These are very, what we consider to be a very crucial aspect of the project. They provide, and I quote from the Tataskweyak Cree Nation AEA, replacements, substitutions or opportunities to offset unavoidable Keeyask adverse effects.

So we predict, and anyone that has

read the material, there will be negative effects on the KCNs from the Keeyask project, and the AEAs attempt to mitigate some of those effects. And just to give one example, each AEA has some form of resource access program, which will help communities to substitute for lost hunting, trapping and fishing opportunities, either through the provision of equipment, or transportation funds, or via distribution centre, or healthy country foods program.

So those are the main aspects of the post construction phase, in our view.

So what I'm going to do in this section, section 4 of our presentation, as Jerry mentioned, this is the bulk of our work, is the analysis of the Keeyask model. And we have three main components of that analysis. The first is the section which I'm about to discuss, which is an illustration of the possible economic benefits accruing to the KCNs, resulting from the Keeyask project and the various phases of the Keeyask project. Then I will discuss the advantages or what we see to be the strengths of the Keeyask community development model. And finally Jerry will move on to discussing what we see as some of

the challenges that the Keeyask model presents for the KCNs.

So at this point I will discuss, as I just mentioned, the economic benefits. We conducted this analysis to serve as largely an illustration. As I mentioned, there are many variables involved in the analysis, and the analysis I'm about to present represents our knowledge of what the magnitude of these benefits could be.

So the first table, and I only show two tables, I'm not going to inundate the audience with a whole lot of numbers. But the first table I show shows the situation for KCNs as a whole, so we take the benefits for KCNs, all four KCNs all at once, in the case of 1.9 per cent preferred equity ownership. So we assume in both of the scenarios that the KCNs invest by preferred units rather than common units. And in the first case they are investing 1.9 per cent of the overall equity that is available for all partners.

So the first line in this table shows construction labour income, and it ranges from roughly $3 million per year, these are all annual figures, to roughly $8 million per year. The

second line shows business profits during the construction period, which are estimated to range from roughly 1.3 million to $1.9 million per year. And adding to that we include what we call a multiplier effect. So we know KCN members are predicted to obtain jobs on the Keeyask project, and the KCNs are expected to receive investment income, as I will discuss in just a second. Resulting from those extra monetary flows coming into the KCN Cree Nations, we expect a further round of expenditures. So as people get jobs, they are able to go out into the community and make purchases, which in turn generates more employment and so on. This is a common aspect to include in analyses of this type. And that ranges from roughly $800,000 per year to roughly $2 million per year for the KCNs as a whole.

Moving on to the post construction period, we take into account investment income, again, for the preferred investment option for 1.9 per cent equity stake. And in that regard investment income would range from $1.25 million per year to roughly $3 million per year.

We then must include operational income, so it is predicted that 182 KCN members

will obtain long-term employment with the Keeyask project, and that would provide gross labour income of roughly $20 million. We don't include variation for that estimate because we took that directly from the Partnership's literature.

And finally, we also include a multiplier effect for this phase as well. It is larger because the benefits overall are larger for this construction phase, which gives us a total estimated, and again this is just an illustration of the potential magnitudes of the economic benefits that could accrue to the KCNs, of between 25 and $27 million per year. So that's for 1.9 per cent equity ownership.

MR. WILLIAMS: Dr. O'Gorman, just before you leave this slide, a couple of questions, then I will have a couple for the next one. If you can flip back to the 1.9 for a second, the previous slide?

Just to be clear, what you have done is annualized your estimates here. And of course, you recognize there will be ebbs and flows, but am I right in suggesting that for purposes of simplicity you have annualized?

DR. O'GORMAN: Exactly. So we know

there will be increases towards the third and fourth year of construction of the Keeyask project, and then it will die down again, and the economic benefits for the construction phase will generally follow those labour flows.

MR. WILLIAMS: And again recognizing that these are scenarios just for illustrative purposes, but on this page you select the 1.9 per cent preferred equity, on the next page you select the 2.5 per cent preferred equity.

Is there any particular reason that you chose those numbers?

DR. O'GORMAN: Yes. So when we were coming together with these benefits, we were consulting the responses to the information requests on behalf of the NFAT proceedings. And the Partnership used a range of 1.9 per cent equity investment to 2.5 per cent equity investment. And I would like to note that for the preferred equity ownership option, 2.5 per cent is actually the maximum that the partners in aggregate could invest.

MR. WILLIAMS: Even leaving aside whether that's the maximum or not, but you -- those were the figures that you saw in the NFAT?

DR. O'GORMAN: Yes.

MR. WILLIAMS: Okay.

DR. O'GORMAN: So moving on to the table which shows potential economic benefits arising from 2.5 per cent preferred equity holdings for the KCNs, the only change relative to the last table would be investment income, which because of a higher equity investment, the KCNs would see a larger flow of investment income, ranging in this case from 1.64 million to $4 million per year for the KCNs as a whole. Because of that higher amount of investment income, we would also have a higher multiplier effect, this time ranging from $4.3 million per year to $4.7 million per year, and then resulting in a higher operational annual income, again, just as an illustration, ranging from roughly $25 million per year for the KCNs to $28 million per year.

MR. WILLIAMS: Could I stop you here again, just for a moment?

In terms of -- in terms of your written report, would I be correct that it also contains from the NFAT the most likely estimate provided by the Hydro in terms of preferred

income?

DR. O'GORMAN: Yes, that's correct. In those figures Manitoba Hydro finds that the distributions for the preferred option range from roughly $5 million to $8 million going out until about 2039.

MR. WILLIAMS: So that's under their most likely scenario in the NFAT?

DR. O'GORMAN: Yes.

MR. WILLIAMS: Again, before you leave this page, when we look at potential income from preferred equity holdings, would I be correct in suggesting that it is highly contingent upon what the actual adjusted gross revenue for the project is in any particular year?

DR. O'GORMAN: Definitely. So for the preferred option, in the case where the financial health or income for the Partnership is quite high, then in turn the investment income will also be high. And generally the adjusted gross revenue is a key variable in that calculation.

MR. WILLIAMS: So, for example, you used $200 million here for adjusted gross revenue. If it was 300 million or 400 million, accordingly your scenarios would be somewhat higher?

DR. O'GORMAN: Definitely.

MR. WILLIAMS: Thank you.

DR. O'GORMAN: Okay. So what I'm going to do at this stage is discuss some of those individual categories of economic benefits in a little bit more detail. The job target for the KCN members in the JKDA is 630 person hours. Naturally it is hoped that all of those person hours are achieved, however, there is some uncertainty that they will be, as there is with any aspect of a project which has yet to be implemented. We can look to Wuskwatim and the experience with hiring on Wuskwatim to provide some insight. So as of the most recent monitoring overview for Wuskwatim, it was found that 944 person years of employment were provided for Aboriginal individuals on the Wuskwatim project. And given that Wuskwatim is a smaller project, that lends some confidence that indeed the 630 person years will be achieved for the Keeyask Cree Nation employment target.

However, there is a high -- has been a high turnover rate on the Wuskwatim project during the construction period, estimated at roughly 39 per cent of individuals were either discharged of

their positions or resigned early. So to some extent that's a bit concerning, if we do expect Wuskwatim to give us some indication of long-term job tenure for the Keeyask projects.

The Partnership notes that the majority of positions generated during the construction phase of the Keeyask project will be in construction support and service jobs. And given the estimate, the low estimate that I presented earlier, which generally favours lower wage positions, that estimate is a little concerning from the perspective of overall labour income benefits for Keeyask Cree Nation members.

Moving on to business opportunities, a figure that is throughout the literature provided by the Partnership is that $203 million of business opportunities will be reserved for KCN contractors. We note that that is roughly 9 per cent of the overall value of construction. And this figure will also depend, of course, on the costs that such businesses experience, as well as the extent to which those businesses are jointly owned with non-KCN ownership.

The investment income, as I mentioned earlier, this is a very difficult aspect of the

Keeyask benefits to provide precise numbers to. There is a lot of uncertainty related to these figures. The two options are, first of all, a common option, which involves the Keeyask Cree Nations sharing in both the upside profits of the Keeyask project, as well as the downside. So this option is quite, is inherently risky. In the case of low financial performance, the Keeyask Cree Nations would still be repaying loans from Manitoba Hydro, which would involve a downside. That said, in the case of very high financial performance of the Keeyask project, then the KCNs would experience high investment income.

The preferred unit option, if they chose to hold their equity in the preferred option, there would be less risk. Some of their loans, the construction credit facility loans in particular would be forgiven by Manitoba Hydro, and there would be a guaranteed return that depends on the aggregate gross revenue, as I just mentioned, of the project.

182 jobs are predicted to be obtained by KCN members during the operational phase of the project, and that's over a 20-year target. And the multiplier effects, as I noted earlier, refer

to second and third and so on rounds of spending by KCN members resulting from increased monetary flows for the Keeyask Cree Nations. And we assumed a multiplier of 1.2.

So, we wanted to mention sources of uncertainty with regard to our illustration of economic benefits. Each aspect of economic benefits for the Keeyask Cree Nation naturally involves some uncertainty. With regard to jobs, we obviously face uncertainty with regard to what proportion of the target will be obtained, it could be 100 per cent, it could even be an overshoot of the target, or it could be that the target is not achieved. And that's the main source of uncertainty with regard to jobs.

However, with regard to skill level of the jobs, as noted earlier, the Partnership themselves estimate that the majority, over 50 per cent of the jobs will be in the service category relative to the designated trades category, which in turn leads to some concern over the extent to which high incomes will be received by Keeyask Cree Nation members, as well as the extent to which their developing skills -- for example, supervisory positions were not included in the job

preference within the Keeyask project.

Business profits, there is we estimated between 10 and 15 million, depending on the share of ownership that Keeyask Cree Nation members hold. And in our low estimate, we assumed that half of direct negotiated contracts were owned by Keeyask members. And at the high estimate we assumed that 75 per cent of direct negotiated contracts were owned by KCN members.

Another source of uncertainty is the extent to which they can keep costs down, which in turn would affect their profit margin.

Investment income revenue, as I noted, there is a lot of uncertainty with regard to these calculations, in particular the exact cash invested by the KCN members. We don't have a whole lot of information on how much own cash is estimated to be invested by the KCNs. And in the case of preferred units, the minimum distribution would depend on the level of both Manitoba, as well as Canadian long-term bond rates.

For the multiplier effects, again, I mentioned we use a number of 1.2, and we actually reduce that relative to the Provincial Manitoba multiplier to account for leakages. So

individuals that obtain positions on the Keeyask project could perhaps not spend their money within the KCN communities, but they potentially could spend their funds in Gillam or Thompson or Winnipeg, which would reduce the multiplier effect. So that has to be taken into account.

At this stage I will discuss the achievements of the Keeyask model, and as I mentioned, then we will move on to Jerry who will discuss what we see as key challenges of the Keeyask model.

So our first achievement that we think is significant is the fact that this is a partnership, it is a partnership between four Manitoba First Nations. From the very beginning of discussions surrounding the Keeyask Generating Station, it has been a partnership between Manitoba Hydro and First Nations, rather than just an initiative on behalf of Manitoba Hydro. It, therefore, serves the mutual interests, not only of Manitoba Hydro, but also of the Keeyask Cree Nations that have been involved and have been advocating to ensure that they receive significant benefits from the project. And consultation has been very strong, again, not only within the

Keeyask Cree Nations between leadership and members, but also between Manitoba Hydro and KCN members.

Secondly, we view this as a plan for equitable sharing of the benefits of this project. As I noted, in aggregate the benefits are large, and this begs the question of how will those benefits be distributed across -- between Manitoba Hydro and the KCNs. And we view them as on paper potentially equitably shared.

Local communities have a chance to share the benefits through the JKDA, which lays out all of the main features of the project. Many would say that this project is especially important, given the fact that there are relatively few job opportunities in the these communities. I quote Tataskweyak Chief Duke Beardy who said:

> "Keeyask provides an opportunity for us to join the mainstream Manitoba economy to build a future of hope that will sustain and provide for all citizens of Tataskweyak Cree Nation."

So it is viewed with a sense of optimism that this is a way to ensure that hydro

development in this area brings positive benefits for their members.

As I noted, the Keeyask Cree Nations have the option to either invest in preferred or common shares. In the case of common shares, while there could be a large downside, there could also be a large upside.

And we viewed the adverse effects agreements on pape to be quite innovative. Many negative impacts are predicted to stem from the Keeyask project, and the adverse effects agreements lay out ways that such effects could be mitigated, substituted for, or replaced.

Training and employment we also view as a strength of this model. The Hydro Northern Training and Employment Initiative was developed by First Nations, managed by First Nations, and will be for First Nations. It is a very large training initiative, the first of its type in Northern Manitoba. It trained over 1,000 First Nations individuals, so it surpassed its target for training, not only for Keeyask, but for other Hydro -- for Wuskwatim as well.

Keeyask, the JKDA includes employment targets, which we view as positive because it then

holds the Partnership accountable to achieve those targets, relative to Wuskwatim which did not include specific employment targets. And finally it follows the Burntwood/Nelson agreement, the BNA, which includes preference for the hiring of First Nations individuals on the project, which we applauded.

So, I will now pass it over to Jerry to discuss the challenges.

MR. BUCKLAND: Thank you.

What I want to do is to share a couple of introductory comments before I go into the challenges, because I think it is important to put in perspective the points that we are going to identify here.

Again, we are drawing primarily on the academic literature, as well as looking at the materials from the Partnership about the Keeyask model. And I want to name the fact that the literature, the historic literature that looks at hydro dams and local communities, including indigenous people, has found a lot of challenges. And I know that you have heard this before, but I wanted to name that, that there is a lot of difficult history for local people, indigenous

people, and large dam projects. This is reflected in my first two points, local harm and disrupting traditional livelihoods. Then I have four more points that I want to talk about that will look at, more from the CED perspective, and ask about the Keeyask model, has a new model been created that will address these concerns? So that's sort of -- there are sort of two dimensions to the next six points.

So the first point I wanted to raise in terms of challenges is that of local harm and inadequate compensation. So there is a literature on the consequences of hydro dams and their impact on local and indigenous people, and it is very troubling. In some cases people are moved to different locations. In other cases their traditional areas of livelihoods are flooded. But there is a large literature that has identified problems with large dams and local people.

And additionally, the benefits from the dams often accrue to one group. This one group may be living at some distance from the dam itself, whether that's farmers who are getting water for irrigation, or whether it is consumers who are getting electricity. And the negative

consequences historically have been the local people.

And finally in terms of the local harm, I wanted to mention this idea that has been presented in some hydro projects, that somehow the hydro project would modernize the communities. And historically that's been another source of a lot of trouble for indigenous people and local people.

I also wanted to mention, I'm going to draw on some quotes, actually these are quotes from the literature and from the hearings that we feel really highlight and illustrate some of the issues that we are getting at. So here is the first quote. The evidence, this is from Loney who has been looking at the impact of hydro dams in Manitoba.

"The evidence of pervasive and escalating social problems in communities impacted by hydro regulation gives resonance to the concept of community trauma. What has happened to many communities must be understood as more than simply the sum of a series of discrete impacts. The

cumulative effects of hydro regulation strike at the very core of a community's sense of self-confidence and well-being."

Now I also wanted to make a point about the question of compensation. And the interrogatory process gave us the opportunity to ask the Partnership about the housing and education situation at the Keeyask Cree Nations, to find out about how the Keeyask project might affect the housing and education there. And the response was, the response to us clarified the situation, and the response was that that was not a part of the Partnership's role. And I understand that. I understand the Partnership has a very particular role. But at the same time, I have to wonder if the dam is to go ahead and the electrical consumers are to benefit, but the indigenous communities are not experiencing benefits such as housing and education, that the outcome is not great.

So the question of local harm and inadequate compensation, I want to read another quote. Now this is from Robert Spence, who probably many of you heard on November 14th,

because he spoke here. I'm going to pick a part of this quote.

> "And I don't know if I can speak enough today, tonight on this occasion to tell you the hurt that I carry within me, that I carried all of my life because of Manitoba Hydro. My soul hurts and is dying. I feel as though I'm mourning every day while being at the lake and the land. You can't understand that because you don't want to go past that door. And you can't. I like to see you try. I live the life, we live as First Nations people, being as connected to the water and the land as we are. You killed the land. You killed the water. You killed the fish. You killed the Indian. Ininiw. Do you understand that? I come here with a rage built up inside me for so long that I can't hold it back anymore."

So I'm going to stop reading that quote at that point. This is a very powerful quote which many of you have heard, and we just

wanted to use that again to emphasize the issue of local harm.

A second point that is very much identified in the literature is that of disrupting traditional livelihoods. That in many cases dams are put in place, people are either moved to another location, or their land areas are flooded. And the local people are, their livelihoods are turned upside down. And this is I think particularly challenging for traditional livelihoods. So in communities where some of the people or all of the people are engaged in traditional livelihoods, I think this is a particular problem. Because if livelihoods are damaged, then that has a ripple effect on culture, the cultural, social and psychological realm, because of the interconnection in the traditional livelihood between the material and the social and psychological. So if a hunter's land is taken away, then that has a very strong impact on their social situation, their psychological situation.

And the question of replacing that traditional livelihood with, for instance, a modern job in service, that may be fine, but it is very much up to that person and that community to

make that decision. And to assume that a traditional livelihood can be replaced by a modern job and modern services is very troublesome to make that assumption. Because what it does is it feeds into this idea that traditional livelihoods are inferior and modern livelihoods are superior, which is very problematic.

So another point that I wanted to make in regards to the disruption of traditional livelihoods is one that Dr. O'Gorman mentioned under the adverse effects agreements and the offset programs. And the plan is that for certain traditional activities, like traditional livelihoods, there will be offset programs put in place to allow people to continue to pursue their traditional livelihoods. And I think this is a very interesting idea. And I think that what we had wanted to see was more evidence that it had been tested and that it had been successful. And I didn't feel that I got as much evidence as I would like to say that, yeah, that's going to work.

So one final quote on this issue of traditional livelihoods, or on the traditional livelihood disruption. And again, I will pick up

part of this long quote. This is from Janet McIvor on November 14 from the hearing. I quote her:

> "Traditional land uses has been passed on from generation to generation in our culture. Each family has their own territory. And to impose this on them will create conflict between families. That's what Hydro is trying to do to us, is to find another trapline for us. But every family member in our community has their own traditional land use. We can't go and impose on them."

I'm just going to skip forward now.

> "First of all, we find another -- if we find another suitable trapline area, it will never substitute for our homeland where we have always been. It will be like a forestry location. Anyone who understands Cree culture would never say to a Cree person, just pack up and move on. That would degrade who we are because we are about the relation to our land. The

land of the Creator gave to us to live on and to take care of it."

Okay. Now I would like to move to the next set of points that have more to do with the newness of the Keeyask model. And this is more than deliberately taking the CED community development framework and lands and looking at the Keeyask model.

Now, one of the things that I think is quite clear is that there is an inherent asymmetry of power in the Partnership. The asymmetry is that Manitoba Hydro is a very large corporation, public utility, and the Keeyask Cree Nations are small northern First Nations communities. So there is an asymmetry between these two players, meaning Manitoba Hydro and the Keeyask Cree Nations, and this asymmetry has to be addressed very deliberately and carefully, otherwise the power imbalance will just be reflected in ongoing management.

So one of the ways that we noted some evidence of this, now, again it is not, this is not a random sampled survey, this is -- I want to report on another quote. That we have heard from Marilyn Mazurat that there is a sense of

inevitability of the project, that whether the community supported it or not, it would go ahead. So this is I think coming from this asymmetry of power potentially. So I quote, this is Marilyn Mazurat.

> "We feel the First Nation got boxed in by all of the pressure. There was pressure from all of the damage that Hydro -- that the existing hydro project had done to us all and the pressure that came from the KGS itself. Many of us believe that KGS will get built regardless of what we want, that Manitoba Hydro has so much power that they will get what they want no matter what."

So moving on in regards to participation. I have a couple of more points. There has been a lot of interesting work done in the last ten years in an area called behavioral economics. And behavioral economics is the study of human behaviour, human decision making with respect to economic activities. And what the behavioral economists have done is they have realized, unlike other economists, that people

aren't fully rational, that we don't always behave fully rational. Sometimes we do things that actually can work against our self-interest. And one of the ways in which the behavioural economists have identified the bounded rationality of humans, in other words, when we are not fully rational, is how things are framed to us. And when things are framed to us in certain ways, we might make decisions that really aren't in our best interest.

So one of the questions we have about the Keeyask project and its presentation to the residents is how carefully was the project framed? Was it framed in an independent way that presented short and long-term benefits and costs clearly and distinctly? We don't provide evidence to support that that wasn't done, but we present this as a question. So that's one point.

Another point, additional point under participation is that there were important segments of the Keeyask Partner communities that did not agree with the project. So in the four communities when the referendums were held, a minority of each community disagreed with going ahead with the project. And one of the questions

we have, given the fundamentally important nature of this decision, build the dam or not, what happens to that minority group? Moreover, what happens if that minority group grows over time as the construction and then operation comes into play? How will their voices be reflected in the operation of the program?

Again, we don't have an answer there, we have a question.

Finally, in terms of participation, and this goes back to the harmful nature identified in the literature of many past dam projects, the harmful nature for local people. We feel that there is a history of distrust between some communities and Manitoba Hydro. And yet trust is the core of participation, it is the core of a good relationship, and it is the core of an effective organization. So how can that be overcome?

So again it is a question, it is not -- I'm not presenting evidence there.

Okay. The next point that I wanted to mention in terms of challenges has to do with the dynamic capacity building. Dr. O'Gorman outlined the various ways in which the Keeyask project will

employ Keeyask Cree Nation people, both in construction and in the operation. There are goals, there are, you know, plans in place there. And that's good, that's part of capacity building. In addition to creating jobs, capacity building requires that both leadership and community members experience a growing capacity. Because this is a big project and it requires that leaders and residents are continuously empowered to engage in the kind of decision making that they will need to be making. And whereas we found evidence in the model for the former types of activities, that is employment in construction and operations, we did not see evidence in the model in regards to education for leadership, education for capacity building within the community.

So another area that we looked at is the question of small is beautiful, and meeting local need is essential. These are kind of, as I mentioned, fundamental principles in community economic development. You might think, well, this is a hydro dam, this is huge, how can you bring in a community economic development lens to this project?

Well, the reason why we brought it in

is because it is a dam being built in an area where there are small communities. So I think it was important to bring in a framework that allows us to look at that community dimension.

And from the CED lens, the standard approach is that starting small is the most effective way to start, because it is by starting small and building capacity at that small level that people, communities have then the capacity to scale up. If one starts with a very large project, it is far more difficult to build that capacity and to meet those needs. So the Keeyask project is, you know, presents a challenge here.

Another challenge of the Keeyask project is it is export oriented, it is exporting electricity to southern consumers. Now, from a CED perspective, some people would argue that that's fundamentally a problem. I don't take that view, I don't think it is fundamentally a problem, I think it can work fine. However, it will succeed if acceptable benefits accrue to the communities. I mean, that's a key, that the electricity can be exported but not all of the benefits.

So I'm going to pass it over to my

colleague.

DR. O'GORMAN: Thank you.

The last challenge that we highlight in our report is entitled economic development and compensation. So what we highlight in this section is how some of the benefits that I mentioned earlier, we have significant concerns that they might not be materialized.

The first is the fact that we are concerned that employment will be largely short term. Again, if Wuskwatim is any indicator, much of the construction employment on Wuskwatim was short term. And we calculated that just by taking total person hours that were employed of Aboriginal individuals on the Wuskwatim project and dividing that by total hires, and we ended up finding that average job length was only half a year. So when you think about the benefits of 630 person hours, it sounds like a large benefit. But if each person is only experiencing a job of half a year, that reduces their total income gain as well as their experience on the job.

We are also concerned about the boom/bust nature of the construction period of the project. We know there will be a large increase

in hiring on the project until roughly 2017, and then it will die down. At that point many individuals will have skills to work in the Hydro sector. And following the construction period then, it is not clear where further long-term jobs will come from. And in general that's a concern with any project that involves a large scale, capital intensive construction period.

The important training initiative that I mentioned earlier, the HNTEI, which provided a great deal of training, we didn't understand why it would end so soon. So it ended in 2010, and we know construction is only scheduled to start next year, so it wasn't clear to us why the important training that has occurred in that initiative would be cut short.

Next, there are no plans for KCN members to receive audited financial statements. This was pointed out by the Hydro sustainability assessment protocol that was conducted this past summer. We think it is really important that community members within each KCN are consulted regarding the use of investment income, and also that of course they receive audited financial statements, and that requirement is absent from

the JKDA.

And finally, in our discussions with members of the Concerned Citizens of Fox Lake, it was noted that, at least in their community, there was a lack of transparency on financial flows, and yet a large amount of financial flows has already on paper flown into Fox Lake as a result of the adverse effects agreement signed with that community. And we are not saying that's a general phenomenon, but we are concerned with that information from one particular KCN.

So to conclude, our study takes the community economic development lens to analyze the Keeyask project, what we see as a potential community development model. We have a number of recommendations for the Keeyask project. The first is that the KHLP, the Partnership, should allow for more time to ensure that the project addresses what we see as significant harms to the KCNs. That the Partnership should consult further with all KCN members on measures that can ensure that the potential negative impacts, whether it is to traditional livelihoods, whether it is the access to country food, what have you, are mitigated to the best extent possible. In this

regard we draw attention to, as Jerry mentioned, the minority of individuals in each community that either did not participate in the referenda which approved the project in each community, or which have organized to express their discontent with the project.

As Jerry noted as well, we have some concerns regarding the AEAs and whether they are true substitutes for loss of traditional livelihoods. They are somewhat artificial with respect to the natural and organic process of hunting and trapping and fishing that occurs in these communities. And the important spiritual value of those communities indicates to us that the AEAs need to be further tested, not just in one community, but all four KCNs.

We feel that safeguards should be put into place to ensure that individual members benefit from the investment income that will flow into each community, and that investment income, which we estimated earlier in aggregate is a large number, but should be benefited as uniformly as possible.

Next, we argue that the KHLP should invest in programs that will bring about long-term

job opportunities, higher skill job opportunities. As I noted earlier, we are concerned about the boom/bust nature of the construction period in the Keeyask project. And there are important initiatives that could be enacted to mitigate such effects. So, for example, we argued in our information request to the Partnership that perhaps high school should be invested in by the Partnership, or post-secondary education in the area of the project, and these would help to ensure that KCN members are not only ready for hydroelectric employment, for construction jobs, but also for other positions within the area of the project.

In that regard we argue that the HNTEI could be expanded. We see it as a very positive initiative.

Finally, given the sense of inevitability that many KCN members felt that Keeyask was going to occur regardless of their own views on the project, as Jerry mentioned earlier, we argue that the KHLP should make it clear through further consultation that indeed KCN members have agency on the project, and that their views will be taken into account as the project

unfolds, as construction begins and so on. Thank you.

MR. WILLIAMS: Mr. Chair, certainly that concludes the direct. I wonder if we might have a brief break and then proceed to cross-examination?

THE CHAIRMAN: Yes. I would propose that we take not quite a 15 minutes break, so we will come back at five after 4:00. I would also note that the fourth presentation scheduled for today has been re-scheduled for two weeks down the road. We will continue today, I would propose, until about 5:30. And if we do not conclude the cross-examination, then we will have to make arrangements to have these witnesses return at some point in the future. So five after 4:00, please.

(Proceedings recessed at 3:52 p.m. and reconvened at 4:05 p.m.)

THE CHAIRMAN: We will reconvene in a minute. The first cross will come from the proponent, Mr. Bedford.

MR. BEDFORD: Dr. O'Gorman, Dr. Buckland, good afternoon.

DR. BUCKLAND: Good afternoon.

DR. O'GORMAN: Good afternoon.

MR. BEDFORD: My name is Doug Bedford, and I represent the Keeyask Hydropower Limited Partnership at this hearing. Could you please, for the time being, set aside the powerpoint presentation and take in hand the report that you both prepared and which was filed in this proceeding. I would like you to go to the end of the report, page 41, and cast your eyes at the second bullet point, which is the second recommendation that you make to these five commissioners, which is that they ought to consider recommending that the Keeyask project be delayed in order for the partners, my clients, to do a smaller project, such as a micro dam.

Now, I gather from the introduction that was given for each of you this afternoon, that either neither of you have been to any of these four communities. Did I understand that correctly?

DR. BUCKLAND: Yes.

DR. O'GORMAN: Yes.

MR. BEDFORD: And that's what I thought when I read your paper, because I concluded that neither of you are aware of the

fact that all four of these communities for a number of years now have had access to what can fairly be described as locally generated hydroelectricity. In effect, they have no need of a micro dam.

Now I saw that that wasn't in the power presentation, so I conclude that someone alerted you to that before this afternoon. Am I correct?

DR. BUCKLAND: Actually the reference to the micro dam was more a reference to small is beautiful and then scale up. A micro dam being an example of a project that could be done at a small scale and then expanded on to the Keeyask dam. It wasn't a prescribed project. It was more start with something small, and that's an example.

MR. BEDFORD: Can you tell us, one of you or both of you, how did you then go about informing yourselves about the concerns, the aspirations and the processes followed by each of the four First Nations who are partners in this project?

DR. O'GORMAN: I will address that. As I mentioned in my presentation, we met with representatives of the Concerned Citizens of Fox

Lake, and unfortunately we didn't have the chance to meet with the other three KCNs. So in that regard we read literature online and their documents that they had produced as part of the Keeyask process. And in terms of the Partnership, obviously there was a lot of literature produced by the Partnership, and throughout that literature there was a lot of description of the Keeyask Cree Nation members' aspirations with regard to the project.

DR. BUCKLAND: If I could jump in, Mr. Chairperson, probably the most foundational thing that I would recommend is that a needs and assets assessment be done in the communities for them to determine what direction they want to go. And now that doesn't necessarily imply that the Keeyask project be delayed. It is to say that we didn't see clear evidence in the Partnership material that reported on the results of a needs and assets analysis in the different communities.

MR. BEDFORD: So obviously we all learn from your answer that you were unable or chose not to interview any of the leadership from any of the four communities?

DR. BUCKLAND: What we relied on to

get a clear idea of the Partnership's model was the volumes of literature that are available. And we felt that that literature is very extensive and very clearly outlines the model. Time and resource constraints prevented us from going to the Keeyask communities. And so as Dr. O'Gorman mentioned, we had the opportunity to meet with some people here. But yeah, that's essentially how we collected the information that we got.

MR. BEDFORD: And I'm assuming, I know that you will immediately correct me if I'm wrong, that you are unaware that one of these communities owns an engineering firm and a construction company?

DR. O'GORMAN: Tataskweyak Cree Nation?

MR. BEDFORD: Yes.

DR. O'GORMAN: Yes, I'm aware of that.

MR. BEDFORD: And you are aware that one of the other communities owned a lumber company at one time?

DR. O'GORMAN: I wasn't aware of that.

MR. BEDFORD: On page 37 of the written report that lies before you, you write that the Keeyask project is, and the word you use

is "troubling" because of its size. And on page 35 of your report you write, "The communities do not have experience in developing and running a mega project like the Keeyask dam."

I suggest to you as gently as I can, that I'm sure you appreciate that when you write such things, you have caused some deep offence among some of our First Nation partners because the implication of that writing, and the choice of those words is a suggestion that these four Keeyask Cree Nations are not capable or sophisticated enough to engage in the Keeyask project.

DR. BUCKLAND: Could I just ask for clarification? Could you just help me find the point about troubling, and then also the point about can't run, just so that I could look at it carefully?

MR. BEDFORD: Page 37.

DR. BUCKLAND: And what paragraph is the troubling comment made?

MR. WILLIAMS: Mr. Bedford, I could assist him, if it would help.

MR. BEDFORD: You see the second full paragraph on page 37, the sentence begins,

"Arguably a far more troubling aspect of the Keeyask project is its large size."

DR. BUCKLAND: Thank you.

MR. BEDFORD: Page 35, towards the bottom of the page, the last full paragraph, midway in to the paragraph, "The communities do not have experience in developing and running a megaproject like the Keeyask dam."

DR. BUCKLAND: Can I respond to that now?

MR. BEDFORD: Yes, please.

DR. BUCKLAND: Well, the comment on page 37 about the large size, that's coming from the CED perspective, with the principle that small is beautiful, start small, generate capacity and then grow. So that's really where the trawling descriptor comes in. The point about the communities do not have experience in developing and running a megaproject, I intended that to be a descriptive statement, not a judgmental statement. And if there has been offence, you know, I'm very sorry, there was no offence intended, it was strictly intended as a descriptive comment.

MR. BEDFORD: Are each of you aware that in this country today there are over 30,000

businesses owned and operated by First Nations people, some of which employ more than 500 employees?

DR. O'GORMAN: I wasn't aware of that exact number, but it doesn't surprise me.

MR. BEDFORD: And so once again I will suggest to you as gently as possible, that one read of the paper that you filed is a concern that you appear to express that still views First Nations people in this country as inexperienced waifs in the marketplace who really need, as you keep saying, to develop skills and sophistication by engaging in small projects rather than large. Now have I again perhaps read too much in to the paper?

DR. BUCKLAND: I guess if you could locate a particular source of that idea, I would be interested, that's certainly not the point that we are making. I think the point we are making is that small communities, whether they are indigenous or not indigenous, would be challenged with a big dam project like the Keeyask project. So the fact is that the communities involved are indigenous, but if the same large dam was being built in a part of the province where there were

non-indigenous communities I think the same issue arises.

MR. BEDFORD: Well, that prompts me to suggest to you that I'm certain that each of you in your work as economists know that leading entrepreneurs, leading companies, indeed governments in this country always hire expert legal and financial advisors when they enter into complex mega transactions, don't they? In this process nodding of heads is great for me, but on the record we need either yes or no.

DR. BUCKLAND: I'm not sure of the question. I wonder if you could restate it. I'm not clear what you are asking.

MR. BEDFORD: Well, I'm asking you each to confirm that as economists, indeed as learned citizens of Canada, you are each aware that leading entrepreneurs, companies and indeed governments in this country, when they enter into complex transactions, they hire expert legal and financial advisors to assist them with the complexities of the transactions, do they not?

DR. BUCKLAND: Certainly.

MR. BEDFORD: And First Nations do that as well, don't they?

DR. O'GORMAN: Yes.

MR. BEDFORD: And the four First Nations who are partners in the Keeyask Hydropower Limited Partnership did that, didn't they?

DR. O'GORMAN: Yes.

MR. BEDFORD: Could you please go to page 14 of your report. My attention was drawn when I read the report under the heading that appears about two-thirds of the way down "Employment", I'm sure you will see that on page 14. First paragraph, last sentence in the first paragraph:

"No preferential employment for KCN members was specified for this aspect of the project."

And this aspect that's being referred to is the Keeyask infrastructure project. Do you see the sentence that I've just quoted?

DR. O'GORMAN: Yes.

MR. BEDFORD: I will suggest to you that when you wrote that you overlooked the fact that a significant portion of the contracting work for the Keeyask infrastructure project is in fact direct negotiated contracts with the First Nations, and as such, they get to hire their own

members first. Did you miss that when you wrote the paper?

DR. O'GORMAN: So if I could just clarify, the sentence refers to preferential employment within the JKDA, and that's what we were referring to in this sentence. We realize that there are KCN businesses that have been hired to do contract work for the Keeyask infrastructure project. What we are referring to here is the preference for employment.

MR. BEDFORD: And I suspect that you missed as well, the fact that the primary motivation of the Province of Manitoba in licensing the Keeyask infrastructure project was the fact that there would be significant Aboriginal employment created by proceeding with that work?

DR. O'GORMAN: Definitely.

MR. BEDFORD: And it struck me, having finished reading your paper and casting my mind back to page 14 and the Keeyask infrastructure project, that that project is in fact, perhaps ironically, something like a small is beautiful learning opportunity for the Keeyask Cree Nations, is it not?

DR. O'GORMAN: To the extent that it is a smaller project, yes.

MR. BEDFORD: Could you go to page 24, please. And I would like you to direct your attention towards the box towards the bottom on page 24. It bears the heading box 4, do you see that?

DR. O'GORMAN: Yes.

MR. BEDFORD: And the second sentence in the box is,

"Further, the common units option would entail significant losses for the KCNs if the Partnership were to earn no profits since they would still have to service their debt."

Now I suggest to you that that statement is plainly wrong because you have ignored the operating credit facilities in each of the three financing agreements, have you not?

DR. O'GORMAN: Are you referring to the fact that if the KCNs invested only cash and did not borrow to support their equity investment, then there wouldn't be that loss in the case of zero profits earned by the Partnership?

MR. BEDFORD: No. I'm suggesting that

clearly what was in the mind of whichever one of you or both of you who wrote the sentence, was that if the KCN partners choose to invest, which they have at this moment, in common units, that in the event there are unhappy years in which the Partnership realizes no profits, you express the opinion, having read all of the documentation apparently, that they will still have to service debt. And my suggestion to you is should they continue to maintain investments in common units, and should there be unhappy years in which there are no profits earned by the Partnership, the KCN investment units will not have to service the debt in those years as a consequence of the operating credit facilities to which they are each entitled?

DR. BUCKLAND: That doesn't mean that their debt is written down, or that the servicing of the debt for that year is paid by the credit facility. It simply means that the servicing of the debt is postponed, is that correct? In other words, what you have helpfully clarified is that the KCNs aren't on the hook in that year, that bad year, if I could call it that, however, they are still responsible for the debt in the servicing, nothing is forgiven.

MR. BEDFORD: Did you each read through the Cree Nations partners limited partnership financing agreement, the York Factory Limited Partnership Financing Agreement and the Fox Lake Cree Nation Investment Inc. Financing Agreement?

DR. O'GORMAN: Yes.

MR. BEDFORD: Dr. Buckland?

DR. BUCKLAND: No.

MR. BEDFORD: I would suggest to you that the most important protection to the economic well-being of each of these four Cree Nations in this partnership is the limited liability provided to them; correct?

DR. O'GORMAN: You are saying in the case of common unit investment that that aspect of the financial agreements is crucial to preventing a large downside?

MR. BEDFORD: I'm suggesting to you that given that they are partners in the Partnership, that the most important economic protection to them is the limited liability that this particular partnership structure provides to them?

DR. O'GORMAN: I can see how that's

important, yes.

MR. BEDFORD: You do observe in your paper that this will be a very expensive project and that the Partnership will have to borrow in excess of $5 billion, and given the limited liability protection you each do understand that no member of any of the four Cree Nations, nor the Cree Nations themselves, have any exposure to repay any of that borrowing by the Partnership; correct?

DR. O'GORMAN: I'm sorry, could you repeat that?

MR. BEDFORD: It will be an expensive project and aside from the equity, the Partnership will have to borrow in excess of $5 billion.

DR. O'GORMAN: Right.

MR. BEDFORD: And given that the Cree Nation investments are to be held by the limited partners, the purpose of the limited liability is that the investment entities, members of each of these four Cree Nations and the First Nations themselves bear no liability or risk to repay any of that $5 billion that the Partnership will have to borrow, correct?

DR. O'GORMAN: We understand that.

MR. BEDFORD: Thank you. And do you understand as well that in order to preserve that protection for the First Nations and their members, and their investment entities, the operation of the project on a day-to-day basis has to remain in the hands of the general partner?

DR. O'GORMAN: Yes.

MR. BEDFORD: Can you name the general partner?

DR. O'GORMAN: The official name for the general partner?

MR. BEDFORD: Yes.

DR. O'GORMAN: Manitoba Hydro.

MR. BEDFORD: Dr. Buckland?

DR. BUCKLAND: I thought it was a numbered company that was owned by Manitoba Hydro.

MR. BEDFORD: Dr. Buckland has done better than Dr. O'Gorman. Thank you.

Would you go to page 23 of the paper, please. Please look at the fine print at the bottom of the page, footnotes 13 and 14. Those are not information requests filed in this Clean Environment Commission, are they?

DR. O'GORMAN: No.

MR. BEDFORD: And in effect, they are

not on the reading list for persons participating in this hearing, are they?

DR. O'GORMAN: They are publicly available so we accessed them. Are you saying we can't include them in our report?

MR. BEDFORD: I'm suggesting it is not likely that anyone else in the room has read them or is likely to, given the mandate of these five commissioners. Would you look at page 26, please. One of the criticisms that you advance in the paper, which was repeated to some degree in the presentation this afternoon, is the Joint Keeyask Development Agreement does not assure uniform distribution of benefits to the members of the four First Nations. I'm sure you recall advancing that criticism?

DR. O'GORMAN: Yes.

MR. BEDFORD: And on page 31, you assert, towards the top of the page and I certainly heard a similar theme in the presentation this afternoon, you assert that the Partnership "must address head on" long term development in each of the four First Nations. Have I captured that accurately?

DR. BUCKLAND: Well, the preceding

sentence is trying to I guess draw into perspective the enormity of this decision, of building a dam in that particular area, and raising really an ethical question. Would an outcome where Manitoba consumers continue to get low priced electricity and some of it is exported, if that was the consequence of the Keeyask project, and the First Nations communities surrounding it, their living standards did not rise, this would present really a challenging ethical consequence. So I think that's what we are asking. Of course we can't answer that question. I mean, we don't know, we can't predict the future. We are just saying that to me ethically that would be incredibly troublesome, and so can safeguards be put in place to ensure that the communities are going to experience higher living standards.

MR. BEDFORD: What I would like you to, for the moment, direct your minds to when I cite these two themes in the paper is the criticism that the Partnership as a business arrangement is not addressing long term development, or the suggestion that if it is not, it ought to. And that the Partnership, or all of

these documents that form the legal basis for the Partnership, ought to have assured somehow uniform distribution of benefits to the members of the four First Nations. The suggestion I would like you to think about now is that is it not fundamentally objectionable for any First Nation to surrender its entitlement to self-governance, sometimes called self-determination, and to delegate to a business partnership that includes the utility and other First Nations the authority to distribute revenues to its members and to address the long term developments of its people?

DR. BUCKLAND: Well, and I think that is just an incredibly important question, that's probably one of the most, you know, incredibly important questions that the Commission is grappling with. And so I guess what I feel that we can offer is this CED framework, and with that CED framework, to say that the interests of the community and the environment have to be uppermost. Now who is responsible for that? I think that's what you are getting at, and I understand that's an incredibly sensitive and important issue. From the CED perspective we are saying we have not given a clear road map, that is

how it has to be done, but what we are saying is we think that's the destination.

DR. O'GORMAN: If I could add to that. The adverse effects agreements, as I mentioned earlier, are designed to mitigate potentially negative effects, whether it is on access to country food or the preservation of important cultural aspects of these KCNs. What we are arguing in this point that refers to investment in post secondary education, housing, et cetera, is similar to the extent that we are -- especially in the case of investment in post secondary education or high schools that we are asking the Partnership to take on is similar because the project will generate a boom/bust scenario where there is a big lead-up in employment in the construction period, which will then taper off and leave individuals that had developed skills to work in the hydro sector with no jobs. This is similar, it is just socio-economic relative to physical adverse effects of the project or natural effect of the project.

MR. BEDFORD: I would suggest to you like so many things in life, it is not quite that simple. Before you arrived today I recall someone

else in the room raised the fact that there is yet another project on the horizon that requires even more workers than what Keeyask does. So, in fact, there won't be an immediate bust, they will go on to other jobs, I would suggest to you. And I also reminded you, Dr. O'Gorman was alert to it, that one of the communities presently has a construction company and an engineering firm. Presumably those companies have a need for people skilled in construction activities. And whenever anyone predicts bust for the Keeyask project, we are always reminded that the project is going to exist for a long, long time, and it wouldn't be going forward today if there weren't going to be revenues flowing to communities for a long, long time, which revenues might quite usefully be spent, as you do suggest, on housing, and education. Correct?

DR. O'GORMAN: Yes.

MR. BEDFORD: One of the other recommendations that you do make in the paper, and I believe I saw it repeated in the presentation, was that there ought to be audited financial statements for each of the communities with respect to the Keeyask revenues, and what I rather

expect neither of you know, indeed I suspect that most people in this room don't know, but our members of parliament, notwithstanding that they have been recently debating Senator Duffy's expense account, did find the time to pass a piece of legislation which mandates that all First Nations in this country must have audited financial statements that reflect what is done with all revenues flowing to those First Nations, not just revenues that flow to them from the Federal government, what is left over presumably from Senator Duffy's spending. Were you aware of that?

DR. O'GORMAN: Now that you mention it, yes.

MR. BEDFORD: I think I can safely conclude that neither of you are resource users in this area where the Keeyask project is to be built?

DR. BUCKLAND: Correct.

DR. O'GORMAN: Correct.

MR. BEDFORD: And my understanding since I became involved a decade ago in negotiating this particular project is that the members of the four First Nations and their

ancestors have been hunting, and fishing, gathering plants and participating in their traditional activities since as they sometimes say from time immemorial. I once calculated that practically speaking time immemorial must be from the date the last ice age retreated which is about 10,000 years ago. So I would suggest to you that they are in fact the experts when it comes to resource use in their region, correct?

DR. O'GORMAN: Yes.

MR. BEDFORD: But I'm not sure that the two of you are aware that it is the members of these four First Nations who designed and sought the offsetting programs. Did you know that?

DR. O'GORMAN: Yes.

MR. BEDFORD: And do you each know that for the last 50 years the members of York Factory First Nation have been traveling each year from York Landing to York Factory, a distance of over 200 kilometres, to do their resource gathering?

DR. BUCKLAND: No, I wasn't aware of that.

DR. O'GORMAN: Neither was I.

MR. BEDFORD: 50 years is a pretty

decent period to test, even for an economics professor, an idea; correct?

DR. BUCKLAND: I think that what that demonstrates is that for that community they have a system that works from the one site to the other. And we know that other First Nations communities have similar kinds of arrangements, where they will go to another site in certain seasons. What we were looking for and we couldn't find was evidence of what seems to be a more elaborate kind of plan with the Keeyask offset programs involving flying, and other sorts of infrastructure at the locations that the hunters and fishers are going. And so that's what we were looking for, we were looking for evidence that this will work for all of the communities.

DR. O'GORMAN: If I could make another point on that. I just want to note that we did say that the AEAs were innovative. We thought they were an interesting way of mitigating some of the negative effects of this project. But also I wanted to draw attention to the fact that there is a significant portion of individuals that did not participate in the referenda that passed this project in the four KCNs, and we are not saying

that that entails that those people who did not vote are against the project. Our point is given the potentially significant harmful effects that will be caused by this project, we encourage additional consultation with individuals that did not participate in the referendum and for whom the project might be especially concerning.

MR. BEDFORD: I'm motivated to suggest to you that we often get careless when we talk about participation in an election or a referenda and we narrowly conclude that if we only count the votes cast, that tells us in a conclusive way who participated. But I would suggest to you that citizens participate in an election in a variety of ways which sometimes fall short of getting out of their homes and going to vote on election day, and that is that they participate by informing themselves of the issues, by attending meetings, by listening to broadcasts, by simply thinking about the issues, and sometimes for a variety of reasons they end up not voting. Sometimes because they do think that there is a foregone conclusion to the vote and their vote isn't essential to reach the conclusion that they desire. Am I not correct?

DR. O'GORMAN: You are exactly correct. We know that happens at the national level as well as in any community of the size of the KCNs. My point was more that we don't know, right? Those people, as you mentioned, could be thinking about the project, could be providing their consent without actually going to the ballot box. But we know that there are groups of individuals, and as I mentioned we did meet with the Concerned Citizens of Fox Lake, who indicated that there were segments of that community that are in opposition to the project. So we are not indicating that we know anyone that didn't vote was in opposition to the project, but just that given the importance of the AEA's and how they are in their current form untested, that the Partnership should go back and meet with as many individuals in the KCNs as possible to discuss those programs.

MR. BEDFORD: And I have oft heard it said that one of the sure evidences of a vibrant democracy is the existence of dissent and the fact that dissent can be heard and measured without suppression. Correct?

DR. O'GORMAN: Of course.

MR. BEDFORD: Would it not be far more alarming to us all if there were no dissent whatsoever in any of these four First Nations?

DR. O'GORMAN: It would be alarming if a project of this size was completely either opposed or agreed with.

DR. BUCKLAND: And if I could just add, Mr. Chairperson, I guess the magnitude of the decision is so big, it is so fundamental, putting the dam in place, flooding on to the land, the change in the communities' livelihoods and well-being, that if it is a minority of, you know, 30 per cent, that's a lot of people who don't like this big decision. So it seems like an ethically challenging issue.

MR. BEDFORD: Well, Dr. Buckland, haven't you carelessly made the mistake of assuming that those who chose not to vote were all opposed to the project?

DR. BUCKLAND: I'm sorry, I was unclear, I was referring to people who voted against, if people voted against the AEA or the dam, and so the minority that voted, so I have confused two issues.

MR. BEDFORD: Would you each look,

please, at page 36 of your report.

I'm going read to you the last sentence in the second paragraph. And I quote:

"Supporting leadership requires that local citizens participate in meetings to assert their interests, ask tough questions, listen to their peers and their leaders, and ultimately make their choices about the project's development."

And I will suggest to you that the record and documents before us tell us that that is precisely what occurred at Tataskweyak Cree Nation and War Lake First Nation, is it not?

DR. BUCKLAND: That I guess goes to the question of how fairly and evenly the projects benefits, costs, short term, long run were presented to the communities, to the individuals and if they felt they had true control over the decision. So if those things were in place, then yes, I think that you are right.

Now, we don't have widespread evidence that that wasn't the case. We have a few people who have said that to us, or that we have heard present here. And so it does make one wonder.

And moreover this question of the long term engagement, this question of the minority, if there is a minority who are opposed to the project, what happens to them in seven years, ten years, 15 years? Does their voice get heard somehow? And what if that minority grows? What if it turns into a majority? And how does that majority then interact with the dam -- with the project?

MR. BEDFORD: Did you each read the Cree Nation partners evaluation report?

DR. O'GORMAN: Yes.

DR. BUCKLAND: Yes.

MR. BEDFORD: Now I appreciate you don't have a copy in front of you, but you may still have a memory of reading it then. When I look at pages 31 and 32, I see pictures of community meetings where it is obvious that there is standing room only in what is clearly a large gymnasium. And I read about 30 general membership meetings, 1,455 information and planning meetings, 456 negotiating meetings. And that certainly does strike me as firm evidence of a lot of community involvement and consultation; correct?

DR. O'GORMAN: Yes, it is definitely a

lot of community consultation. As we noted in our presentation, we were impressed, this is one of our compliments to the project that we think that the engagement with the community has been strong.

Our point on this page is to highlight that there are individuals that were not engaged, it could be because of the framing of the project, it could be because of the sense of inevitability, we don't know. When coupled with a lack of participation in some referenda, we are concerned. We are not saying that there wasn't consultation and that there weren't individuals that were highly engaged with the process, questioning their leaders and asking tough questions, we are concerned about the segment of the population that may not have been engaged.

DR. BUCKLAND: Mr. Chairman, if I can add? I want to echo my colleague's compliment about what Hydro and the Partnership have done in terms of these consultations. At the same time, there is a -- Manitoba Hydro, for instance, in their public involvement program, they had three rounds where they went to the various communities and presented the plan and got feedback on the plan. And again, the glass is half full, there is

a strong compliment, but the glass is half empty as well in the sense that what I saw from the materials, the newsletter that was used for round one, was that Manitoba Hydro presented its best, put its best foot forward in a sense, which is completely understandable, I mean, an organization must do that, an organization must put its best foot forward. The challenge though is for the community members in the Keeyask Cree communities, do they necessarily then see the downside clearly enough? So I think what I'm trying to say is two things. Yes, Hydro did some really good work. However, is there something about the way it was framed to communities that might have put the emphasis on the upside.

MR. BEDFORD: Would you look, please, at page 34, the footnote at the bottom. I certainly was listening when you demonstrated through the presentation that you have been reading and following the transcripts of these proceedings. And I thought I would draw to your attention how, Dr. Buckland, you are certainly alert to this because it falls into one of the areas that you research, how human actions or behaviour and our interpretation of them is

sometimes wrong. Things are not always as obvious as they may appear at first glance. So while you did quote some of the testimony that's been given at this hearing, I notice that you haven't quoted Councillor George Neepin from Fox Lake. Councillor Neepin has told us at the hearing that some of his fellow members have been boycotting meetings because the people at Fox Lake firmly believe that it is the people at Fox Lake who shall decide what they want and what is best for them. And he says respectfully, that it will not be the Province of Manitoba, nor Manitoba Hydro, nor with respect the Clean Environment Commission that decides what the people at Fox Lake want. And I rather fear that he will now add the names Drs. Buckland and O'Gorman to his list.

I took it when I read the footnote that you were interpreting boycott as something entirely different, that it was people at Fox Lake who were alienated and frustrated by the concept of a complex partnership, and a partnership with Manitoba Hydro; was I right?

MR. WILLIAMS: Mr. Bedford, or if I might ask through the chair, Mr. Bedford, are you suggesting that this quote was made by Mr. Neepin?

MR. BEDFORD: No. No, I know it wasn't. Would you turn to your bibliography, please. I recall from my days as a student at the University of Winnipeg that the strength of an essay often depends to some extent on the sources one cites and uses in a bibliography, so I will suggest to you that when we look at your bibliography, and in particular your sources for the Wuskwatim project, Foth, Kulchyski, Neckoway, these are not peer reviewed studies, are they?

DR. BUCKLAND: Can you repeat the names of the studies that you are referring to?

MR. BEDFORD: Foth, F-O-T-H, it is on page 42.

DR. BUCKLAND: Which is a doctoral dissertation.

MR. BEDFORD: It is a masters thesis actually, isn't it?

DR. O'GORMAN: But it has been reviewed by the professors that supervise that student, so it is peer reviewed in that regard.

MR. BEDFORD: Mr. Foth didn't, for his dissertation, interview anyone from the Nisichawayasihk Cree Nation, nor Manitoba Hydro, for their firsthand recollections of negotiating

and implementing the Wuskwatim project, did he?

DR. O'GORMAN: I'm not sure.

MR. BEDFORD: Page 43, Dr. Buckland, the other items cited in the bibliography that I referenced are Kulchyski, and Kulchyski and Neckoway, and again I suggest to you those are not peer reviewed studies?

DR. BUCKLAND: Well, the Kulchyski sole author is a chapter in a book that's published by the University of Manitoba press. The Kulchyski and Neckoway is published through Canadian Centre for Policy Alternatives. And I think you are probably right, it --

DR. O'GORMAN: Actually, I think that would be peer reviewed.

DR. BUCKLAND: Okay.

MR. BEDFORD: I will suggest to you that they are polemical pieces, not examples of balanced research and analysis?

DR. BUCKLAND: I guess that's an opinion. And I guess what we believed was that these are authors that look at the situation in these communities and present an analysis of what is going on there. These were results of our literature review, and so we did our best to

collect literature that were looking at these issues, and these were some of the materials that we collected.

DR. O'GORMAN: If I could add to that? We also have two references in our bibliography, one from Fortan, 2001, or sorry -- yes, 2001, on page 42, and Wichinski (ph), Cole, Pachal, Goulet, 2010, on page 45, those are Hydro references. So you may argue that the latter references that you referred to are biased against Hydro, and we have these other references that could be argued to be biased for Hydro. So in that regard we tried to take that balanced view. Obviously we are researchers, so we entered this assignment with a view of objectively analyzing the issue, which may involve veering into literature that's not necessarily academic, but we still tried to remain balanced and unbiased.

MR. BEDFORD: True balance would have meant that you would have quoted somewhere in the paper these people, Wichinski, Pachal, but you didn't, they are in the bibliography, the other sources you cited in the paper. That does suggest a wee bit of lack of balance, does it not?

DR. O'GORMAN: All papers that are

cited in our bibliography were referenced in the paper. So they wouldn't have made it to the reference list if they weren't mentioned in the paper directly.

MR. BEDFORD: Would you go to page 38, please? I'm looking at the very bottom of the page, and I will quote for the last time.

"First Nations band councils are to administer all funds received for offsetting programs and from profit sharing with Manitoba Hydro. This places all chance that First Nation members benefit from this aspect of the Keeyask project on the strength of local governance."

And I will suggest to you, once again as gently as I can, that when you juxtaposed the word "chance" in the same sentence as "strength of local governance," you are in effect implying to some readers that flowing money to First Nations is akin to playing a game of chance. And I think having listened to you for an hour that surely that is not what you intended to convey.

DR. O'GORMAN: That was not the intention at all.

MR. BEDFORD: You will be relieved to know that exhausts my questions. On a very personal note I would like to reveal to each of you that my late father taught for many, many years at the University of Winnipeg and United College. In fact, I like to say, and I'm going to exploit this opportunity, that he had the longest teaching career at the University of Winnipeg than anyone who has ever taught there, with one exception; a gentleman who taught from the 1880s to the 1930s. So personally it is always a pleasure to meet people who teach at the University of Winnipeg. Thank you.

DR. BUCKLAND: Thank you very much.

DR. O'GORMAN: Thank you.

THE CHAIRMAN: Thank you, Mr. Bedford. Now I think on my rotating list, I think Pimicikamak would be first up.

MR. RODDICK: Mr. Chairman, I believe the representatives of the First Nations have some questions of these particular witnesses, given the very personal nature of this document in relation to their --

THE CHAIRMAN: No problem at all, I wasn't aware of that, but no problem at all. Go

ahead, sir.

MR. RODDICK: Good afternoon. My name is Bob Roddick. I am the lawyer for the Cree Nation Partners, being the Tataskweyak Cree Nation, the War Lake First Nation in these hearings.

I have spent some time reviewing your paper, and I think I have got to start with sort of a general observation. These hearings have been going on now since some time in September. There have been days and days and days of testimony from members of the Cree Nations at these hearings.

You have put together a presentation that has three quotes from Cree Nation people, two of them from the same individual and one of them from a third individual. All three of these quotes are negative quotes and quotes in opposition to the project.

Is there some particular reason for this?

DR. BUCKLAND: The quotes that we used were intended to highlight the challenges, in the areas of challenges that we identified. And so we were able to find quotes because we feel that the

quotes are far stronger than simply stating an issue, so that was why we used the quotes.

Now, in terms of the contributions of the Keeyask project, we could have used quotes. We didn't feel it was needed because I guess we felt that they were more straight forward.

MR. RODDICK: Well, I guess my problem is, this document is headed, "A Community Economic Development Assessment of the Keeyask Model." What do those quotes have to do with an assessment of the Keeyask model?

DR. O'GORMAN: So just to use an example, one of our, from our objective analysis of the Keeyask model, one of the themes that arose was local harm or tradition, reduction of traditional livelihoods. And as was noted, Jerry and I are not resource users, so we can not properly represent that aspect of what we view a challenge of the Keeyask model without directly quoting someone that is a resource user.

MR. RODDICK: You indicated in answer to my friend that you read the Keeyask environmental evaluation. Is that correct?

DR. O'GORMAN: Yes.

MR. RODDICK: I don't see it quoted

anywhere in your paper. It spends some hundred plus pages setting out the process that the Keeyask Cree Nations went through in coming to their conclusion to support that. And they wrestled mightily with resource users. I see no quotes or no reference to the wisdom they put forward in indicating how they came to these decisions. Is there some reason for that?

DR. BUCKLAND: Again, we are aware of that document, and we included within the positive contributions of the Keeyask project the description of those positive contributions without adding quotes for that.

MR. RODDICK: If you -- please, I have looked at your paper, and in your paper you spend a significant amount of time talking about community development frameworks and community economic development. What is the difference between a community development and a community economic development?

DR. BUCKLAND: Well, I would say that they are an area of both study and practice that are overlapping. So that the community development focus doesn't begin with the economic issue, whereas the community economic development

focus begins with that economic issue. The community economic development focus then puts the economic issue within a holistic framework. So I would say they are very much overlapping. Like if it was a venn diagram, there are two circles that much of it would be overlapping.

MR. RODDICK: Well, as I understand community development, it is some particular cause or some particular purpose is addressed, and a group of people, generally people who are disenfranchised or powerless, then focus to work on and deal with that particular problem. Is that a fair suggestion with regard to community development?

DR. BUCKLAND: I think that's a helpful conceptualisation.

DR. O'GORMAN: It could be, but you could also have a community development project that doesn't deal with individuals that are disenfranchised. You could have a community development project in an area that is poor but enfranchised.

MR. RODDICK: This is being looked at as a community economic development project. Am I correct with that?

DR. BUCKLAND: I mean, what we use is a community economic development lens. I mean, I don't think -- I mean, I'm totally open to saying this is consistent with a community development lens. Like I think, you know, these things are defined differently by different people, and I think there is quite a bit overlap between the two. So what we were doing was seeking to apply a community based, if you will, lens to assess the Keeyask project. So to try and understand, well, how is that Keeyask project going to affect those communities in the area?

MR. RODDICK: Well -- but this was an economic development project that did not come out of a community development vision. Am I correct in that?

DR. BUCKLAND: The Keeyask project?

MR. RODDICK: Yes?

DR. BUCKLAND: Absolutely.

MR. RODDICK: And then I'm having some problem, of course, I'm not the brightest guy in the room, but I'm having some problem understanding why you would in your paper spend all the time you do doing a community development assessment of it when it is not a community

development project?

DR. BUCKLAND: I think that's an excellent question, and it is again one of those really difficult parts of this hearing, that part of what the Partnership is doing is it is seeking to foster development in these communities, the Keeyask Cree Nation communities. And yet it is a very large dam. So what the -- the reason why we did the CED framework was because we wanted to put the light, we wanted to cast the light on the communities as best we could, and we felt that framework would do that casting of the light.

MR. RODDICK: The framework being the community development framework or the community economic development framework?

DR. BUCKLAND: We call it a community economic development framework.

MR. RODDICK: Are you telling me then that it is the same as community development framework?

DR. BUCKLAND: What I'm saying is that the community economic development framework that we have used has sought to cast a light on the community consequences of the Keeyask dam. Now, again, you know, community development, community

economic development, community based development, there is so many different definitions here. But, in essence, we are trying to understand how are these communities going to be affected?

MR. RODDICK: I guess one of the reasons I'm asking this is one of the principles I find somewhat troubling is this small is beautiful principle. I find it probably more than troubling, but I will settle for troubling today. I don't understand that to be an economic principle at all. I understand it perhaps to be a community development principle, but I do not understand that at all to be an economic development principle. And your paper, in fact, says that it is a community development principle, not an economic development principle. Am I correct in that?

DR. BUCKLAND: Well, we say it is a principle of community economic development. So the reason why we identify it as a principle is the idea that communities can begin to engage in new and formative activities more effectively if they are the scale of the community. And then once their capacities are improved, then they can scale up. So that's the rationale behind that.

MR. RODDICK: With respect, what do you know about the capacity of the Tataskweyak government?

DR. O'GORMAN: I think the point is more general than that. We are definitely not saying that the Tataskweyak government has any issues with capability. We are commenting on the fact that if this project is to be viewed with a community development lens, then it would be necessary that there were options on the table for these First Nations. And in our view, a large dam project was the only option on the table.

MR. RODDICK: I'm sorry, I missed the last part of that answer. Could you repeat it?

DR. O'GORMAN: The Keeyask Cree Nations weren't given a list of options for bringing about economic development in their communities, it was always only the Keeyask Generating Station.

MR. RODDICK: Who gave them this list of options?

DR. O'GORMAN: We are not talking about anyone giving them a list of options. We are saying that there were no alternatives to the Keeyask project presented at the time that the

Keeyask project was presented.

MR. RODDICK: The Keeyask project was, in fact, a proposal that the Tataskweyak Cree Nation made to Manitoba Hydro, not something that was presented to them. Are you aware of that? This whole process was instituted by the Tataskweyak Cree Nation approaching Manitoba Hydro and proposing a partnership. Were you aware that that's how this process started?

DR. O'GORMAN: I'm aware of that in the case of TCN.

MR. RODDICK: Yes.

DR. O'GORMAN: But for the other First Nations, was an alternative proposed?

MR. RODDICK: I believe they were invited to join if they would like to.

DR. O'GORMAN: Right. So that's our point, in the case of TCN, as you are noting, it was a leader in the project. For the other ones that might not have been the case.

MR. RODDICK: With regard to TCN and back to what you know about the capacity of its government, are you aware -- we have already spoken, my friend has talked about them owning an engineering and construction company. You are

aware of that?

THE WITNESS: Yes.

MR. RODDICK: Are you aware that they own a financial services company and have owned a company for in excess of 20 years, this company giving advice to both First Nations and non First Nations on financial management, operating a company that provides co-management for First Nations and other general financial services, were you aware that they owned such a company?

DR. BUCKLAND: No, I wasn't aware of that point. And indeed, there are many aspects of the communities that I'm not aware of. The fact that they are vibrant, vigorous communities doesn't surprise me. I mean, I'm very glad to hear these points.

The point about small is beautiful is not to say that a small community isn't sophisticated and able to run the various kinds of firms that you are describing. It is to say that to scale up to a large dam is a big step. That's the point.

MR. RODDICK: Well, it is only a big step if you are not prepared to accept that they may have significant capacity now, is it not? My

friend has spoken to you about how you hire expertise. This is a government that I'm suggesting to you, this big step that you keep taking about is not in fact such a big step and that you haven't looked at that?

DR. BUCKLAND: I want to reinforce your point that these communities are vibrant, vigorous, and many activities going on. At the same time, though, I do think there is evidence that moving from the kinds of activities going on in communities the size of War Lake and Tataskweyak with, you know, 1,000 to 3,000 members, to a $6 billion hydro dam, I think that is a big step. That is not to say that the capacity doesn't exist, but it is to say that there needs to be time to build that.

MR. RODDICK: What type of capacity are we talking about?

DR. BUCKLAND: The capacity to work within a partnership to effectively address the challenges that a big operation like the Keeyask dam will face on a regular basis.

MR. RODDICK: Well, the Cree Nation partners, along with their other First Nations partners, have hired somebody that we think is

reasonably good at operating dams, called Manitoba Hydro. So operating the dam is not something that the First Nation has ever intended to do. Their functioning in limited partnerships is quite frankly not that complex an issue, I don't think.

DR. BUCKLAND: That then brings to the fore the concern about the asymmetrical power, how Manitoba Hydro is much larger than the Keeyask Cree Nations. And therefore, as you said, they are operating the dam. Is there large size going to prevent the Keeyask Cree Nation Partners from asserting their interests in the control of the dam?

MR. RODDICK: You know, you mentioned the glass that's half full and it is half empty. I understood the definition of an optimist saw it half full and a pessimist saw it half empty. It appears to me that on every issue that's been discussed, you are the pessimist. You don't appear, in my view, to attribute capacity to the First Nation governments. You give quotes from people who clearly don't support the process, and they have that right. But with no disrespect, there doesn't appear to be any balance in the presentation, in the paper that you presented.

DR. BUCKLAND: Well, I certainly want to reinforce an affirming statement about the capacity of the Keeyask Cree Nation governance, so I want to reinforce that. Pessimist, optimist, realist, I guess maybe that's the issue. Am I pessimistic? Am I realistic? Are you pessimistic? Are you realistic? I guess that is sort of, you know, maybe there is some difference of opinions.

DR. O'GORMAN: If I could add to that? I do believe that our presentation and our report cites, I know it cites advantages of the Keeyask project. We compliment the Partnership in a number of ways, we did that in the presentation as well as the report. Again, just to point out that the reason why we used quotations is in areas that we feel our own words wouldn't properly represent the damage that will be done. It wasn't meant to bias the presentation of our argument at all.

MR. RODDICK: On page 26 of your report, you use the phrase "uniform distribution of economic benefits." You use then on page 28 the term "fairly distributed," and then on the page 39 you use the term "equitable financial distribution." First of all, I assume those three

terms fundamentally mean the same thing?

DR. O'GORMAN: To different degrees, what we are talking about is equity within a community.

MR. RODDICK: And what do you mean by equity within a community?

DR. O'GORMAN: For example, suppose one individual owned a company that was doing catering for the construction camp, and that same person was also able to obtain a long-term position on the project, that person's benefits would be disproportionate to someone else who didn't own a business that was involved in the project, or which didn't obtain a job on the project. So different people within the KCNs will benefit from the project in different ways. And a uniform distribution would be every single person having some benefit from the project, which in the real world we know will not happen, but to what extent are the benefits going to be concentrated relative to fairly equally distributed?

MR. RODDICK: And do I understand then that you think there should be something put in place to make sure that by somebody's judgment that they are fairly and equitably distributed?

DR. O'GORMAN: Definitely not. What we are saying is that we can provide an illustration of the potential magnitude of economic benefits coming to the KCNs as a whole. We do not know what the distribution of those benefits will be within each community.

MR. RODDICK: Is that something that is not -- is that not something that is best left to the government of that community?

DR. O'GORMAN: Of course it is. Our comment here was that we can not comment from a community development, or community economic development lens, that everyone in the KCNs, or a large proportion of the KCNs will benefit from the Keeyask project, because we simply don't know. We are not saying that we want any sort of outside body to come in and decide on that distribution, definitely not.

MR. RODDICK: On page 33 in your presentation, in the fourth paragraph it says:

"Given that support for the system, these offset programs is a new idea."

Are you aware that the Tataskweyak Cree Nation has been operating an offset program since 2005?

DR. BUCKLAND: Yes, we were aware, and we asked through the interrogatory procedure for more details on that, and were given basically a summary that it has worked well. And what we were hoping for was more detail, because of the fact that it does seem to be a very central part of the whole offset adverse effects agreement.

MR. RODDICK: And on page 38 of your presentation, in the first paragraph under 3.3.6, economic development compensation, you say that, the second sentence:

"Given the scarcity of economic opportunities in many of the communities surrounding the proposed Keeyask Generating Station, hydroelectric development is seen by some as a rare economic opportunity."

Who are you referring to as by some?

DR. O'GORMAN: We don't have a direct reference for that. What we are referring to there is the fact that these communities are located in a fairly remote area of the province, and in that regard, opportunities are less, but not necessarily -- we are not quoting anyone there.

MR. RODDICK: So you are not speaking of anyone in particular?

DR. O'GORMAN: No.

MR. RODDICK: You have spoken eloquently about the rights of the minority and the concerns about minority, and the concerns that they are being respected within the democratic system. What about the rights of the majority? Do they have the right to decide whether or not to go ahead with this process?

DR. O'GORMAN: Of course they do.

MR. RODDICK: Thank you. I have no further questions.

MR. WILLIAMS: Mr. Chair, we are happy to go on forever. I'm just, if I might request if we are going to continue, Drs. Buckland and O'Gorman have been up for a bit, and if they might be given a brief opportunity to stretch their legs, that would be appreciated.

THE CHAIRMAN: Well, you may be prepared to go on forever, Mr. Williams, but the Chair is not, and I think most of us are not. It has been a very long day.

Before we leave, Mr. Roddick, if for the record, could you identify the names of the

engineering construction company and the financial services group that you mentioned?

MR. RODDICK: They own Ininew Project Management and Aboriginal Strategies Inc. I forgot to mention that they also own a large chunk of railroad that owns the line from The Pas to Lynn Lake.

THE CHAIRMAN: And which is the engineering company and which is the financial services?

MR. RODDICK: It's name is Ininew, I-N-I-N-E-W, Project Management.

THE CHAIRMAN: Thank you.

Now, I said we would go to about 5:30, it is now 5:23. If either of you have about five minutes of questioning, I will continue. If not, I would suggest that we adjourn for today, and unfortunately, we will have to bring these witnesses back. But you can make arrangements in consultation with the Commission secretary.

Mr. Regehr?

MR. REGEHR: I have spoken to my friend, Mr. London, and we both --

THE CHAIRMAN: I am sorry?

MR. REGEHR: I have just spoken to

Mr. London and both of us will have at least ten minutes each.

THE CHAIRMAN: Okay. I would just as soon break then for today. I believe we have a number of documents to register.

MS. JOHNSON: Yes, we do. Dr. Lee's statement of qualifications will be CAC 21; his report will be CAC 22; his presentation is 23. Dr. Brown's and Mr. Breseesee's statement of qualification is number 24, their report is 25, the presentation is number 26. Dr. Buckland's and Dr. O'Gorman's report is CAC 28, and their presentation is number 29.

THE CHAIRMAN: That's it?

MS. JOHNSON: I think I forgot one, number 27 would be the qualification statement for Drs. Buckland and O'Gorman.

(EXHIBIT CAC21: Dr. Lee's statement of qualifications)

(EXHIBIT CAC22: Dr. Lee's report)

(EXHIBIT CAC23: Dr. Lee's presentation)

(EXHIBIT CAC24: Dr. Brown's and Mr. Breseesee's statement of qualifications)

(EXHIBIT CAC25: Dr. Brown's and Mr. Bresee's report)

(EXHIBIT CAC26: Dr. Brown's and Mr. Bresee's presentation)

(EXHIBIT CAC27: Drs. Buckland's and O'Gorman's qualification statement)

(EXHIBIT CAC28: Dr. Buckland's and Dr. O'Gorman's report)

(EXHIBIT CAC29: Dr. Buckland's and Dr. O'Gorman's presentation)

THE CHAIRMAN: Thank you. We will adjourn, and be back here tomorrow morning at 9:30.

(Adjourned at 5:25 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 my Stenotype notes as taken by us at the time and place hereinbefore stated to the best of our skill and ability.

Cecelia Reid

Official Examiner, Q.B.

Debra Kot

Official Examiner Q.B.