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Chair

Mr. James Bezan

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● (0805)

[*English*]

The Vice-Chair (Mr. Francis Scarpaleggia (Lac-Saint-Louis, Lib.)): Welcome, everyone, to this more or less first formal hearing as part of our trip out west to study the oil sands and their impact on water.

I'd like to welcome our first two witnesses, Dr. Selma Guigard, who's an associate professor in the environmental engineering program at the University of Alberta; and Dr. Murray Gray, who is a professor at the University of Alberta.

We'll start with a ten-minute presentation from each witness, and then we'll proceed to our usual round of questioning.

Who would like to go first?

Dr. Murray R. Gray (Professor, University of Alberta, As an Individual): Thank you, Mr. Vice-Chair.

I'm delighted to be able to meet with the committee this morning. I'm in perfect position to follow your tour of the oil sands yesterday, as well as your meeting with the community in Fort Chipewyan.

I'm a professor of chemical engineering at the University of Alberta, and I'm director of the Centre for Oil Sands Innovation—and I've provided you with some written material on the latter. I'd like to briefly address two questions this morning that are at the top of my mind as a researcher working in the oil sands. The first question is whether the oil sands industry can adopt new technologies to improve its environmental performance. Second, what research is required to develop what we call transformative technologies that can be applied to the oil sands?

On the first question, for an industry that involves enormous capital investments in the range of tens of billions of dollars, the history has been that this industry has been enormously innovative and willing to embrace change. The plants that you flew over yesterday are nothing like what Suncor looked like in 1967 or what Syncrude looked like in 1978. The operations have been completely transformed through the mining and extraction operations, and those transformations are based on research and development, pilot testing, and industry innovation here in Canada. The oil sands industry has demonstrated a capacity for technical innovation that I think is unparalleled in the Canadian resource extraction industries.

Now, the major driver for this change has been cost. The industry has been striving through the last two decades to reduce its expenses to make itself more profitable. It may seem strange, but in 1990 Suncor Energy was seriously contemplating shutting down its oil sands division. This is the company that has at times been one of the darlings of the Canadian stock exchange and is currently in the process of taking over Petro-Canada. In 1990 it was looking at getting rid of its oil sands operation altogether because it was so marginal. Instead, they embraced technological change, revamped their mining and extraction operations, and turned the oil sands into a major profit centre.

The other driver for these companies, as we move into the future, is public pressure on the environmental front. I think you have to be realistic as to what the incentives are for companies to embrace innovation and technology change. Cost is always a factor, and environmental regulation and public expectation is, of course, the other.

I'm a researcher at the university. My particular focus is on research into long-term innovation. I'm not so much focused on what technology is available today as on what we need to do now to develop technologies that will be available five, ten, and fifteen years out. The oil sands of Alberta are an enormous strategic resource, and it would be a mistake to focus only on the near term; it's important to position ourselves not only for next year, but decades into the future.

I'd like to tell you a little bit about a unique centre at the University of Alberta that I direct, the Centre for Oil Sands Innovation. In 2003, five years ago, the international interest in the oil sands was really just ramping up. The industry was starting to expand, and at that time the president of Imperial Oil, Mr. Tim Hearn, came to the president of the University of Alberta with a unique proposition. He said, “We need help. We have major resources in northern Alberta but we do not believe that the current technology is sustainable for the long term, so we want to work with you on long-term research and development to try to come up with transformative technologies for the oil sands.”

What I'm talking about in transformative technologies is mining that has much less impact on the landscape, extraction technologies that do not use large amounts of fresh water from the Athabasca River and do not create tailings ponds, and upgrading processes that minimize energy consumption and greenhouse gas emissions.

Imagine a university president being confronted with a leader from industry saying, we want you to do long-term basic research. Of course the answer was an immediate yes, and we worked to establish a centre that has now grown into one that is national in scope.

Why did Hearn come to the University of Alberta? It wasn't just because Edmonton is the closest major centre to the oil sands. Through support from the Government of Canada through the Natural Sciences and Engineering Research Council, in partnership with companies such as Syncrude and Suncor, the University of Alberta had built up a group of professors who were unparallelled in their ability to conduct research and innovation related to oil sands. So it was a long-term investment by the Government of Canada that created the intellectual capacity—the people who were able to undertake this challenge. In particular, the industrial chairs program and the partnerships programs of NSERC were keys in developing that capability at the university.

From an official launch in 2005, I am proud to report that the Centre for Oil Sands Innovation has grown to encompass 20 different projects spanning basic chemistry, biology, physics, and engineering. The successful collaboration with Imperial Oil has led them to renew their commitment. They're providing us with another five years of funding, at $10 million total, because they've been so pleased with the success over the initial five years. In partnership with the Province of Alberta and the Government of Canada, we're moving forward on another five years of research on oil sands innovation.

While I'm immensely proud of the University of Alberta and our intellectual capacity, when it comes to such major research challenges we don't have quite enough intellectual capacity ourselves. So we've been building a research network on oil sands that now includes the University of British Columbia, the University of Victoria, Queen's University, and we'll soon be starting projects in collaboration with Natural Resources Canada, the National Research Council, and the University of Ottawa.

As director of the Centre for Oil Sands Innovation, I have a fascinating challenge. I'm in the job of teaching professors about the oil sands and some of the challenges they present and trying to enlist and engage their interest and attention.

In the oil sands of western Canada, which span Alberta and Saskatchewan, we have a world-scale resource. We have, in the oil sands industry, an amazing receptor capacity for new technologies and new ideas, and we have a strong foundation in science and engineering to conduct research and development for new technologies that can develop this resource in an environmentally sustainable way.

I'd like to thank you for your invitation to speak this morning, and I look forward to questions and discussion on the topic of innovation in the oil sands.

Thank you very much.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Dr. Gray.

We will now move on to Dr. Guigard.

● (0820)

Dr. Selma Guigard (Associate Professor, Environmental Engineering Program, University of Alberta, As an Individual): Thank you very much, Mr. Vice-Chair.

Thank you to the committee for allowing me to present here today. I have a little brief that I was hoping to develop as a powerpoint presentation. I'd like to take some time and go through this handout if I may.

[*Translation*]

With your permission, I'm going to speak a little in French.

[*English*]

I'm a professor from the University of Alberta in the environmental engineering group of the Department of Civil and Environmental Engineering. I've focused a little bit on the environmental issues related to the oil sands. These are things I believe you've seen in your previous committee meetings, but I thought I'd go back over them and set the stage in terms of the technologies we're looking at to resolve some of those environmental issues.

Some of this information you saw first-hand yesterday in your flyover, and you'll see the oil sands cover a very large surface area. We have a lot of known reserves. Most of those reserves are accessible by the in situ technologies, but about 20% of reserves are also currently accessible by surface mining. So what you might have seen yesterday was probably surface mining activities, and that's what I would like to focus on a little bit here.

What are those environmental issues that are related to oil sand surface mining? The one you're here today to discuss is the environmental issues surrounding the water use of oil sands mining and oil sands surface mining. But directly related to that is the issue of tailings ponds. And also, as Murray Gray pointed out, energy use is another one of those environmental issues. I'd like to talk a little bit about each of those.

The first one I'd like to talk about is water use. We use the Clark hot water extraction process to extract the bitumen from the oil sands. There has always been a little bit of confusion, I think, regarding how much water it actually takes to extract bitumen from the oil sands. You'll notice I've given you a figure of about 12 to 13 barrels of water per barrel of bitumen. The process uses that much water, but 80% to 90% of that water is recycled. Two to about 4.5 barrels of fresh water are needed to make up for some of the water we can't recycle. So I think that's an important figure for us to look at when we're discussing those water issues surrounding oil sands development.

What that translates into is an excessive amount of fresh water is used from the Athabasca River. The water demands on the Athabasca River will continue to grow with further oil sands development. Most of that water that's used ends up in tailings ponds. With the zero discharge policy the oil sands companies have, we don't release that water back into the environment.

Directly related to water use is the problem of tailings ponds.

[*Translation*]

I'm going to continue in French.

I want to talk about tailings ponds. These are structures that we've put in place to hold extraction residues. These residues are placed in the tailings ponds and, after three to five years, the residues form what is called mature fine tailings, which consist of approximately 30% solids, the remainder being mainly water. This water is very difficult to recycle because it is tied up in the tailings.

The tailings take a very long time to settle, which means that our tailings ponds will remain there for many years. It must also be admitted that there are nearly 130 km^2 of tailings ponds. The figure you often hear is 50 km^2, but the Alberta government has revised its estimates, and we're now talking about 130 km^2 of tailings ponds. So these tailings ponds will increase considerably. We also need new tailings ponds to store the tailings from our development.

You unfortunately noticed the deaths of a number of ducks. When you flew over the tailings ponds, you noted that they contain bitumen, which remains from the process that has not been extracted. There is also a lot of salt and toxic compounds such as naphthenic acids and other compounds such as heavy metals.

The consequence of the presence of these compounds is that the water cannot be released to the environment. We have to retain that water, which is currently recycled, but it cannot be recycled indefinitely. This water should be treated using quite major resources in order to be able to continue using it in future.

[*English*]

I'd like to continue then briefly with the energy use. I know this is not necessarily the focus, but it is an important environmental issue that we must address.

The energy use, for oil sands extraction and mining and upgrading, ranges in the order of 0.7 to 1.3 gigajoules per barrel of bitumen. By calculation, that translates to about 20% of a barrel of bitumen that's needed to produce one barrel of bitumen in terms of energy. The consequence of this is essentially increased greenhouse gas emissions, which we have seen with increased oil sands development. When we look at those environmental issues, we really need to think about what we can do to alleviate these environmental issues. As Murray Gray pointed out, we need new and innovative technologies, sort of the standout or transformative technology.

I look at these technologies in two ways. I look at technologies within the paradigm—within the technology we're currently using—and outside the paradigm, really taking that sort of leap forward and looking at new technologies that would really transform the way things are done in the oil sands industry. What do we need to get to these new technologies, these either inside- or outside-of-the-paradigm technologies? There are challenges there. For example, there is a large infrastructure, and you all saw it as you flew over the oil sands yesterday. There's a very large infrastructure. Often, the comment that has come back about new and innovative outside-of-the-paradigm technologies is that we can accommodate some incremental changes—minor incremental changes, but changes that are definitely needed, no question about it.

There's this infrastructure that we can't just abandon sort of overnight to allow for these new big-leap transformative technologies. So what we need to do and should do and can do, I believe, is encourage research into new innovative technologies. For that, we need to develop policies that will drive innovation, and we also need to provide some sort of framework that would allow the development of these technologies and demonstration of these technologies beyond the basic research.

So we need to have that extra step, extra framework, in place so we can take these technologies from the lab to the field and potentially apply those in the field. We also need to continue to support research and development in improving the current process. That's a very important part of it. We need to deal with the problems now, but we also need to look into the future and develop very transformative technologies.

In summary, I'd just like to say that there are environmental issues you're all aware of related to the oil sands, but we have to believe innovation is possible, and we have to believe substantial improvements are possible—not just some improvement, but substantial improvement—and we need to develop the oil sands in a more responsible way into the future.

Thank you.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much to both witnesses.

We'll start with the first round of questions. Mr. Trudeau, you have seven minutes.

Mr. Justin Trudeau (Papineau, Lib.): Thank you very much for your presentation. It is nice to hear the scientific and the research background here.

Yesterday we had a very full day. We had a tour by industry, presenting us some of the positive sides of things, and we had a very heart-wrenching afternoon with native communities who have tremendous concerns about the impact on their lives and their livelihoods. So I'd like to get right into it.

Dr. Guigard, you talk about the water in tailings ponds that cannot be released into the environment unless they are treated. One of the things we saw yesterday morning was much to-do about reclaimed tailing ponds and restoring them. What then happens to the water that was in those tailing ponds, as it is removed from the sands in terms of reclaiming the tailings pond? Where does it go? As you said, it cannot be recycled indefinitely.

● (0825)

Dr. Selma Guigard: We are recycling most of the water right now.

Right now, there are two types of reclaiming of tailings ponds that we're trying to pursue. There is what we call the "wet landscapes" and the "dry landscapes". Some of the reclaiming is with the wet landscapes—the water remains, and it caps those tailings ponds, so the tailings ponds become, essentially, a lake. So it is a wet landscape. There's a lot of work going on right now looking at the dry landscape option, looking at technologies that would allow for the tailings to settle and become geotechnically sound to be able to allow for dry landscapes.

Currently the water is not released. As far as I understand, it is capped in end pit lakes if we're trying to reclaim the tailings pond. There is only the one tailings pond that is currently under reclamation, which is Suncor's tailings pond.

Mr. Justin Trudeau: Even in the potentially dry reclaimed tailings ponds, can you tell me a bit about the nature of the soil? Much was made about it returning to boreal forest. Having been processed and returned to sand, what remains in the soil that would encourage us to believe that it would be able to return to natural forest? Or will it not be possible? What is the science on that?

Dr. Selma Guigard: As far as I understand it, the solids in the dry landscape would be placed and buried in much the same way as the solids in a landfill. The solids would be capped with soils that could support biotic life.

Mr. Justin Trudeau: The numbers you gave, that 20% of the energy of a barrel of bitumen needs to go into creating that barrel of bitumen, does the bitumen then need to be transformed, itself, into synthetic crude and to other things, or is bitumen largely used as is?

Dr. Selma Guigard: That calculation includes upgrading, so it's the energy requirements for upgrading. By no means is it a complete life cycle of bitumen, but it does include the mining, the extraction, and the upgrading of the bitumen.

Mr. Justin Trudeau: But into bitumen.

Dr. Selma Guigard: Into crude, which then has to be refined.

Mr. Justin Trudeau: Do you have the numbers on the "then" processing? I'm trying to get a sense of how much energy in bitumen goes into getting it into a format that we can then use and consume, either in our cars or in heavy industry, in that level of transformation. Do you have any idea how much energy goes into that?

Dr. Selma Guigard: I don't have those numbers.

Mr. Justin Trudeau: Does Dr. Gray, perhaps?

Dr. Murray R. Gray: Once the bitumen has been transformed into synthetic crude oil, it takes about 10% further energy use to make transportation fuels, transport it to the end user and so on. The refining side, once you have a synthetic crude, is quite efficient.

The only other comment on the energy requirement to transform and recover the bitumen, as Dr. Guigard mentioned, is that there are two main technologies that are in use. There's the in-situ technology. I'm not sure if you saw any of those operations in your flyover yesterday. It's a completely different approach but with much higher energy consumption. Then there's the mining technology, which, as Dr. Guigard mentioned, is about 20% of the resource, and has much more land and water disturbance but much higher energy efficiency. So there are two sides of the industry. It's a little bit schizophrenic. So when you look at the statistics, you're looking at two very different sets of issues in terms of the pattern of environmental impact and the pattern of energy use.

Mr. Justin Trudeau: So is the 20% in situ, or is it open mine?

Dr. Murray R. Gray: That would be an average.

Dr. Selma Guigard: It's an average.

Mr. Justin Trudeau: Can you give me a sense—I won't hold you to the exact numbers—of what in situ does use up in terms of percentage?

● (0830)

Dr. Selma Guigard: My calculations went from roughly 15% to as high as 25%, I believe. Roughly 15% to 30% would probably be the range.

Mr. Justin Trudeau: How does that compare to other technologies or other sources of energy—coal, natural gas—in terms of energy costs for extraction?

Dr. Murray R. Gray: I think the appropriate comparison is to look at alternate technologies. Don't look at conventional crude oil, because we don't have that available, and don't look at normal natural gas. The two comparisons I like to make are to coal, which is abundant in western Canada and western United States, and the other would be ethanol from farming operations.

In the case of coal, the oil sands are much cleaner in terms of carbon emission, and much more efficient from an energy perspective. To make liquid transportation fuels from coal is much worse in terms of the energy balance.

The other comparison is to ethanol. The current ethanol plants in the United States and in Canada get about 1.25 to 1.4 units of energy for every unit of energy put in. Most of the energy put in is from fossil sources. So their yield of energy is actually much worse than from the oil sands. The difference, of course, is when you burn a litre of ethanol, that carbon is from plants and not from fossil fuels.

The Vice-Chair (Mr. Francis Scarpaleggia): We have to go to Monsieur Ouellet.

Monsieur Ouellet.

[*Translation*]

Mr. Christian Ouellet (Brome—Missisquoi, BQ): May I speak in French or English?

The Vice-Chair (Mr. Francis Scarpaleggia): You can try French. I'm told the simultaneous interpretation devices are working now.

Mr. Christian Ouellet: Thank you.

I apologize for being late; I misunderstood the meeting start time and I unfortunately missed part of your presentation.

Ms. Guigard, I believe you mentioned the "natural" pollution of the water table by the oil sands. In any case, they contain agents that are present and that have always been pollutants.

What exactly is "natural" pollution of the water table?

Dr. Selma Guigard: We're talking about the water table, not the river.

They do a lot of studies at Waterloo University on the compounds present in the water table around the oil sands. This isn't my field. Consequently, I don't have a lot of information on the subject. However, the toxic compound that I know little about concerns the naphthenic acids.

I know that the concentrations of naphthenic acids are much higher in the tailings ponds than in the water table. The studies being conducted at Waterloo University and the University of Alberta are attempting to establish whether there is a way of distinguishing the naphthenic acids naturally present from those present as a result of the extraction of bitumen. They're currently trying to determine whether those compounds come from bitumen that is naturally present or are there as a result of bitumen extraction and, consequently, whether it comes from the tailings ponds.

I don't know the current levels. Also, all the data from the Regional Aquatic Monitoring Program, which of course studies the Athabasca River, not only the water tables, have shown that there weren't a lot of naphthenic acids in the Athabasca River. I suppose the same is true of the water tables, but I don't have the data with me.

Mr. Christian Ouellet: So the water was relatively hazardous to health. The wells were naturally relatively dangerous.

Dr. Selma Guigard: The concentrations weren't high. From what I know, the naphthenic acid concentrations are very low in the water tables. They are very high in the tailings ponds, but the concentrations are quite low, indeed non-toxic, in the water tables.

● (0835)

Mr. Christian Ouellet: Are they low enough for people to be able to draw the water without any danger to their health?

Dr. Selma Guigard: Once again, I don't have the figures with me. I haven't monitored the concentrations. So I'm not sure. Perhaps we should look at the data that Waterloo University has published in this field.

Mr. Christian Ouellet: Are heavy metals released into the river?

Dr. Selma Guigard: Not as far as I know.

Mr. Christian Ouellet: Are there any heavy metals in the tailings ponds?

Dr. Selma Guigard: There are heavy metals in the ores. These are heavy metals that were present, but the concentration levels of which have greatly increased as a result of the process.

Mr. Christian Ouellet: One day or another, can it filter through the soil or wind up in the river in some other way?

Dr. Selma Guigard: Heavy metals are not very mobile in the environment. You often find them in solid tailings, but not in the liquid part. They are often associated with solids, not with liquids, except if they are chemically combined with other compounds. However, they often stay with solid tailings.

Mr. Christian Ouellet: Could heavy metals be transported long distances by the river? If they pass through the soil, could they wind up a few kilometers downstream?

Dr. Selma Guigard: Heavy metals are often associated with solids. Consequently, if heavy metals wind up in the rivers, they'll be found in river sediments.

Mr. Christian Ouellet: When the river was not being used and was in a natural state, did heavy metals that degraded from the river banks flow into the river?

Dr. Selma Guigard: I don't know. You should perhaps consult the data of the Regional Aquatic Monitoring Program.

[*English*]

Dr. Murray R. Gray: May I add to Dr. Guigard's comments?

The heavy metals are extremely difficult to remove from the bitumen. They have no mobility in the ecosystem. My own personal research has been in finding ways to try to remove those metals from the oil sands system. So far we have not succeeded. It's so difficult that even in a laboratory we have not found effective ways to remove those metals and get them to mobilize. If anyone could come up with a method, we would be thrilled to use it in processing this heavy material so that the metals are not an issue.

The tailings material and the nature of the oil sands are unique compared to mining anywhere else in the world. If you hear about tailings problems in mines elsewhere in Canada, the tailings are fundamentally different for the oil sands. The contamination is organic material. It's partly biodegradable, as Dr. Guigard said, based on studies at Waterloo and Alberta. It's not things like arsenic, cyanide, nickel, or other heavy metals, which are so much of a problem with tailings elsewhere in Canada.

So it's a completely unique system. If you canoe through these rivers, which I have, you find that oil is part of the natural ecosystem in the Fort McMurray area. You go to a campsite on the Clearwater River, and you see little droplets of oil coming up out of the riverbank with naphthenic acids at low concentration. As Dr. Guigard said, the key question for the ecosystem is not whether these compounds are present, it's the concentration. It's a unique system. The Athabasca River has an amazing capacity to degrade oil. You can watch little oil slicks form and then disappear as the organisms in the water degrade the material.

The load is the key question. How much release, how much concentration, and how much of that material will go downstream to communities like Fort Chipewyan? That's the question for which, as Dr. Guigard said, we don't yet have the answers.

The Vice-Chair (Mr. Francis Scarpaleggia): Ms. Duncan.

Ms. Linda Duncan (Edmonton—Strathcona, NDP): Thank you.

I was very interested, Dr. Gray, at the very beginning when you talked about what the barriers are to advancing, making the tar sands profitable and environmentally benign. I'm encouraged that you've identified not only that it's a cost but it's a regulation. Do you think the regulations there are strong enough to drive the adoption of better innovations and cleaner production?

● (0840)

Dr. Murray R. Gray: I think you need to look at which impact you're concerned about. You need to partition them, I think, a little bit. The impacts that I see are on land and land reclamation, water use and tailings, energy use and greenhouse gases.

The first two I think are much more amenable to regulation and getting the industry to speed up reclamation and to minimize the accumulation of tailings. The greenhouse gas issues I think are much less amenable to relatively painless regulatory implementation because the technologies that are available for dealing with carbon dioxide are significantly more expensive.

Ms. Linda Duncan: If I could, I'll just interject, because I'm not understanding your answer.

My question is, do you think that the regulations are stringent enough now on the impacts on the land and water that they're actually driving the investment in the improved technology?

Dr. Murray R. Gray: Yes, I think they are. But the other side of it that you need to keep in mind is, at least in the industry as it stands now, when a new mine is opened, it's opened after a regulatory process that approves the plan of how that resource will be developed, how the tailings will be managed, and how the mine will be closed. The opportunity in terms of regulation and public discourse is essentially at the stage when a mine project comes up for approval. When it's approved, that's essentially a contract between the regulatory agencies and the companies that then governs how that particular lease will be developed over the course of its life.

If I look at the history in Alberta, you can't rewrite the book with a company. My personal feeling is that you can't try to change the rules once the company has done half of its plan. The plan that Syncrude filed, for example, was before it opened its mine in 1978. They laid out, based on the technology of the day, what they were going to do with the oil sand and how they were going to reclaim the mine site, and they're proceeding with that reclamation process.

Ms. Linda Duncan: But the current regulations—and I'm actually looking at the federal regulations as well, because our panel is federal.... I know how the regulatory system works and I know it could also be opened up, if we find that we need to improve the standards.

I'd actually like to ask this question of Dr. Guigard, because in your presentation you had suggested there were a number of serious problems with the tar sands and issues that we needed to address. You'd mentioned that in the lab you seem to be moving forward with some solutions. But these are not moving into the field. This is what I'm trying to get at. I'm trying to understand why.

First of all, could you tell me if you think there are some advances where we could in fact be using substantially less water, or where we could having a mechanism for developing the tar sands with less impact on the land and so forth?

Are the things you're developing in the lab actually moving out to the field in the new developments? If they're not, why are they not?

Dr. Selma Guigard: There are some developments that are happening in the lab, looking at waterless extraction technologies, for example. You might have seen some of the work that I've been doing in looking at a waterless extraction process. We've been working on that in the lab. And I've seen some others publicized a little bit in the newspapers, and less so in the peer-reviewed journals, because I think there are a lot of issues regarding patents and what not. But there are technologies out there. Which technology is the best? We still don't have the answers.

If I can speak a little bit from personal experience, one of the challenges we've been facing with this research—and which I've also seen from other people who have been doing similar work—is that going from the lab to a pilot scale project to prove its economic potential and environmental gains is a very expensive process. We're talking several millions of dollars, and it's very high risk. So balancing the cost of that with the high risk is a difficult sell for a researcher and potentially for some of the people proposing some new innovative technologies.

Then, as I mentioned in my presentation, there's the issue that if we have such large infrastructure in place, how can we move ahead with these new technologies and leave that infrastructure in behind? I think those have been two of the challenges that I have faced, basically the risk and the associated costs of moving it into a provable—

● (0845)

Ms. Linda Duncan: Dr. Guigard, are you seeing any movement in this? I appreciate your testimony, which is actually very informative, but we have a lot of applications in the hopper. We have a lot of proposals, and once they get the funding the investments are going to be moving forward again. So it sounds like we're putting lots of federal money into the R and D, but it's not going anywhere, because nobody wants to spend the money, or it's too risky, and so forth.

How much of the R and D being done across Canada is actually being deployed and incorporated into permitting and development?

Dr. Selma Guigard: I would say that's a difficult question to answer, because when we do research and development, it's just that, research and development, and all of those things that are tested in the lab and work in the lab might not work when we go up to pilot scale. For example, there are technologies that really work well in the lab, but to scale them up poses a whole host of new challenges.

So I don't think we're investing dollars that aren't going to bear fruit. Eventually, there might be some other innovation that comes out of that, but there are some technologies.... I guess we feel, my collaborators and I on this project, that there seems to be a chasm that makes going from that basic small pilot scale to the large pilot scale a very difficult leap. We found there has been a little bit of movement with private and venture capitalists, if you will, or angel investors. Those seem to be the people who are willing to take a little bit more of a risk.

Ms. Linda Duncan: Who decides what moneys will be spent on an innovation centre? Is it simply the scientists? Is it the people who provide the funding? Are there first nations involved? I'm curious to know who sets the priorities for the innovation centre.

Dr. Murray R. Gray: For our innovation centre, the priorities are set by the people who are providing the funding, along with the University of Alberta. So we have an executive committee that consists of representatives from industry, the Government of Alberta, and from the University of Alberta, the major partners in the centre, and they decide on the scientific direction.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

I'm going to have to go to Mr. Warawa.

Mr. Mark Warawa (Langley, CPC): Thank you, Chair.

Thank you to the witnesses for being here. You were both highly recommended, so it's good to hear your testimony this morning.

The focus has been on the open pit mining as opposed to the in situ. Is that where your expertise is? Should I be asking questions about the open pit and not in situ?

Dr. Selma Guigard: I know a little bit about in situ, but not as much as some of my work, which is on surface mining.

Dr. Murray R. Gray: You can try us.

Mr. Mark Warawa: The main focus of this committee was to focus on water. As we've already seen this morning, the questions have been quite broad, talking about energy impacts with Mr. Trudeau, and so on. Yesterday we heard about treaty issues. We're finding that our discussion is evolving quite quickly.

When I was here two years ago, I took a trip on the Athabasca, by river. I was not able to fly over, as we did yesterday, so I've had both perspectives, and also did the tourist information centre. I'm finding this quite edifying, so I appreciate your input.

Two years ago I saw that the hydrocarbons were naturally leaching right into the Athabasca, as you've said. Dr. Gray, you said that organisms in the Fort McMurray oil sands area deal uniquely with the oil. As human beings, do we deal with these hydrocarbons in a unique way? Or are they unique organisms? In other words, are human beings being affected in a constant that would be harmful to be drinking water in the area from the Athabasca that has a hydrocarbon content that is higher than the norm? Do we react and get sick or have diseases or cancers because we're drinking water that has maybe been contaminated naturally?

● (0850)

Dr. Murray R. Gray: I'm a professor of chemical engineering, so I have to beg ignorance on the detailed medical aspects. I know I've tasted the water. As I mentioned to Monsieur Ouellet, the key is in concentration. The big issue for anyone who's interested in the effect on drinking water is what is the concentration of these compounds in the water? That's key to how it affects any organism, whether it's a micro-organism that loves to eat the oil, or whether it's fish or larger animals like humans, moose, and what not.

Mr. Mark Warawa: Some of these toxins are biocumulative, and in humans it may continue to build and build and build to a point where the amount that you've accumulated in your body now has a manifestation in the form of your becoming sick. It's a natural occurrence, because of drinking water with hydrocarbons in it.

Dr. Selma Guigard: This is actually a question for a toxicologist, I'd say, an environmental toxicologist.

Dr. Murray R. Gray: In terms of hydrocarbons, which I can answer your question on, hydrocarbons, in general, do not typically bioaccumulate in humans. That doesn't mean there's no health impact. Some of the light hydrocarbons that are present in gasoline, for example, can cause cancer in humans, but they don't tend to accumulate.

Mr. Mark Warawa: Okay. I'm going to switch gears—and thank you for that.

I want to talk about the tailings ponds that we saw. They talked about adding gypsum. Right now we have the water and the sand that's part of this water, that's pouring into this big reservoir, the tailing ponds. The sand, because it's heavy, drops down to the bottom, but you have this clay that stays suspended for years. We've heard and in reading that it could be 30 years, 40 years. So to speed that process up, they add gypsum into the water, and suddenly the clay's now dropped to the bottom and your water is cleaner. Therefore, it's possible to reclaim those tailing ponds in a very short period of time by adding the gypsum. Is this one of the new transformative technologies we found through research and development, that by adding gypsum, suddenly you could reclaim very quickly?

Dr. Murray R. Gray: The addition of gypsum, or calcium sulphate, has been quite well known for a long time. What's been more transformative is the techniques the companies have developed to mix it. They take the tailings, mix in gypsum and sand, and then they can put that mixture back into the mine. Basically, they can empty the sludge from the tailings pond and put it back into the mine.

The difficulty in this whole process is that once you add gypsum, the resulting water is awful for recycling into the plant to recover the bitumen. In the past, companies picked their water composition to get the most oil possible out of the oil sands. The downside was that it created the worst possible tailings problem. If you treat the water to get the best possible tailings behaviour, you get the worst possible bitumen recovery when you recycle that water. That's the challenge they're trying to juggle right now.

To me, this provides an opportunity to come up with new approaches. If you can change the water chemistry between the tailings pond and the plant, you may be able to get the bitumen and get rid of the tailings problem at the same time. That's one of the potential paths forward, using water. The other path forward is to use technologies that don't use water at all—you don't remove water from the Athabasca River and you don't create wet tailings in the first place. There's certainly a lot of merit in those approaches.

Dr. Selma Guigard: That's what they call the “CT”, or composite tailings, process. They've been investigating it for several years now. There are problems with the quality of the recycled water. There are very high levels of calcium—because they're adding gypsum—that have caused problems in the extraction process.

The processes of tailings and extraction, the water extraction process, are intimately integrated. The issue has been whether to emphasize the extraction, the bread and butter, or the tailings problem. There has been a real challenge in dealing with tailings, because you also want to make sure that you have good quality recycled water to lower the water demands on the Athabasca River. It's a difficult problem, and a challenge for the water extraction process.

● (0855)

Mr. Mark Warawa: We saw the tailing ponds, and we saw a ditch around them. Around the base there was a system to ensure that there was no leaching of the tailing ponds into the Athabasca. The groundwater below it was being sucked up and pumped back into the tailing ponds. So it seemed to be designed quite well to ensure protection against leaching into the Athabasca.

Are you aware of any leaching from tailing ponds into the Athabasca?

Dr. Selma Guigard: What you saw were the seepage dikes and the channels around the tailings ponds to capture any of the seepage. These tailings ponds are not lined, so systems are in place to capture any seepage and return it to the tailings ponds. A study out of the University of Waterloo is looking at groundwater, with a view to ensuring that there's no seepage. What they're trying to use are these naphthenic acids, looking at their fingerprint in the tailings ponds and trying to learn whether there is seepage into adjacent water bodies, like the Athabasca River, or groundwater.

Mr. Mark Warawa: Is the study ongoing? Is there any indication of a leaching problem?

Dr. Selma Guigard: Right now the science and engineering, as far as I understand it, is looking at the analytical technologies to measure naphthenic acids. As the name implies, naphthenic acids are a group of acids. There's a lot of research going into developing analytical techniques that are sensitive enough to detect low concentrations of naphthenic acids, along with analytical techniques that can actually see the fingerprints of those naphthenic acids. This would allow us to say for sure whether there is seepage or not.

Mr. Mark Warawa: But at this point, we don't know.

Dr. Selma Guigard: As far as I understand it, we don't have a clear understanding, from an analytical point of view, whether there is or not.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Mr. Warawa.

We have to freelance a bit, since we're travelling. And we have only a few minutes left in this particular segment. I would suggest, if the committee members are in agreement, that we allow four-minute questions to anyone who hasn't had a question. And I would like to ask one too. That will take us pretty much to 9:15. Is that okay?

Some hon. members: Agreed.

The Vice-Chair (Mr. Francis Scarpaleggia): Okay.

I have a quick question. Are consolidated tailings stackable tailings? Are they the same thing?

Dr. Murray R. Gray: No.

The Vice-Chair (Mr. Francis Scarpaleggia): That term has come up, “stackable tailings”.

Dr. Murray R. Gray: Stackable tailings, I think, are the dream for the mining side of the industry. It would mean you could immediately put tailings back into the mine and start reclaiming right away.

One of the unique characteristics of these mines is that because of the tailings, they have a very long delay between opening the mine and being able to begin reclamation. The consolidated tailings release a lot of water, and this requires a basin. With stackable tailings, you could immediately put solid material back into the mine site.

The Vice-Chair (Mr. Francis Scarpaleggia): Without going through a tailings pond?

Dr. Murray R. Gray: Without going through a pond at all.

The Vice-Chair (Mr. Francis Scarpaleggia): I imagine you're familiar with Dr. Randy Mikula. Is that what he's working on, stackable tailings?

Dr. Murray R. Gray: Yes. He's a world expert in dealing with tailings in any conceivable way.

The Vice-Chair (Mr. Francis Scarpaleggia): You were saying that the water that is left over after the consolidation process is quite degraded and can't really be used for extraction. Are you saying it can't be used efficiently, that it still is being used for extraction, but they're not getting the best results, or are they just not using it, and if not, where is that water going?

Dr. Selma Guigard: The water is still going into the tailings ponds, but they are investigating technologies to treat that water to get a sufficiently good quality for extraction. So they have been using that, but they've noticed that the quality.... With the CT process—and I'm not sure how many years it's been in place—most of the tailings ponds still contain these mature, fine tails that haven't necessarily been touched by CT, and the water is still being used for recycling. They realize that they might need to do some water treatment with the water that's coming off the CT prior to extraction.

● (0900)

The Vice-Chair (Mr. Francis Scarpaleggia): So right now when they're reclaiming a pond—I think Suncor is reclaiming a pond—what are they doing with the water that is so degraded they can't use it for extraction and they can't put it in the river?

I'm wondering if we're just moving the water around.

Dr. Selma Guigard: I think.... I'm not sure.

The Vice-Chair (Mr. Francis Scarpaleggia): I know you're doing some interesting research, Dr. Guigard. Maybe you could tell us a bit about that.

The sense I'm getting from you is that these outside-the-box technologies are receiving little funding, maybe partially because from an oil company's perspective, if they funded your technologies and they worked, it would require even more funding for major pilot projects. And if the pilot projects worked, they'd have to rethink their whole infrastructure. Is that a block?

I put that question up against the idea that the industry is giving you $10 million, Dr. Gray, which is nothing to sneeze at, but when you consider the global investments, when we talk about the upcoming investments over the next whatever it is—10, 20 years—we're talking about $120 billion. The industry is giving you only $10 million. Again, it's nothing to sneeze at, but given the problems that we have, it seems like a drop in the bucket. I'm sure you appreciate it and your researchers appreciate it, and it's keeping research in Canada, but I'd like your take on that.

Then we'll go on to Mr. Braid.

Dr. Selma Guigard: The technology that I'm using is called supercritical fluid extraction, which has been used on a lab scale to extract bitumen from oil sands successfully.

Right now we're looking at carbon dioxide. It uses carbon dioxide at about 40 degrees and at relatively high pressure. It acts as a solvent that can extract the bitumen from the oil sands, and it can do that with little or no water.

Carbon dioxide is one example of a supercritical solvent, but there are many other compounds that could be used as supercritical solvents. You bring them up to pressure and temperature, you use them, you bring the pressure down, you recover your bitumen, and you recycle your solvent. So it's essentially almost a closed process in terms of the solvent. It needs little to no water.

Right now we're looking at water to develop a continuous process that would be able to handle large masses of ore, but that's what we need to prove on a pilot scale. Can we do this at a large enough scale?

One of the big challenges is looking at changing their infrastructure completely, changing the way things are done completely. It's also a technology that needs development, and it's going to take some time to develop.

The water extraction process is working. We're fine-tuning it, but it's working. How do we impose such a large change?

The Vice-Chair (Mr. Francis Scarpaleggia): That's the question.

Dr. Selma Guigard: That's the big challenge.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

Go ahead, Dr. Gray.

Dr. Murray R. Gray: I'll just follow up on a couple of comments by Dr. Guigard.

When you look at technology development, to come up with a transformative technology you expect to have to look at 10 to 20 different ideas that you pursue through university-type research. Then you decide which are the most promising ones to spend tens of millions of dollars on to fully develop and commercialize. So I think the important thing to ask the industry is what kind of list of opportunities they're looking at. Don't anticipate that each one of those ideas is necessarily a feasible answer that would be commercializable.

On the research side, we expect to have a lot of ideas in the hopper. Some of them work and some of them don't work in terms of coming up with new technology. You have to have as many failures as successes.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

We'll go to Mr. Braid.

Mr. Peter Braid (Kitchener—Waterloo, CPC): Thank you very much, Mr. Vice-Chair.

I have four minutes. Is that correct? I want to make sure that I don't run out of time. Could you give me a 30-second warning?

The Vice-Chair (Mr. Francis Scarpaleggia): Absolutely. You'll be okay. I'm sure you'll be fine.

Mr. Peter Braid: Thank you very much.

Thank you, Drs. Gray and Guigard, for being here this morning and for your testimony. I was very interested to learn more about the Centre for Oil Sands Innovation and the work you're doing as well, Dr. Guigard.

Dr. Gray, I wonder if I could start with you. Could you just briefly touch on the main areas or themes of innovation your institute is pursuing? I presume that one is carbon capture and storage. I've heard a little bit about waterless extraction as well. What are the key areas, as you see them?

● (0905)

Dr. Murray R. Gray: There are three key themes we're working on. One is improved mining technology that allows mining without as much impact on the landscape. Another is waterless or near-waterless extraction to particularly minimize the tailings. The use of water is less of an issue, in my mind, than the accumulation of tailings and the contamination of water that comes out of the tailings. But a major theme for us is moving away from that technology completely. The third theme is new technology for upgrading the bitumen.

Ironically, we are not currently doing any work on carbon capture, and the reason for that is simple. We have not yet found a unique opportunity in the oil sands that links to carbon capture. Carbon capture is a huge issue for the industry, but it has it in common with the electric power industry, which burns coal in western Canada, and with other aspects of refining and processing hydrocarbon fuels. What we're trying to do at our centre is look for unique opportunities for research that can be transformative for the oil sands industry. We're still looking for that opportunity in the area of carbon capture that would be uniquely applicable to the oil sands.

Mr. Peter Braid: And are you collaborating with any universities, either in Canada or the U.S.?

Dr. Murray R. Gray: We are collaborating. As I mentioned earlier, our centre has projects with the University of British Columbia, the University of Victoria, and Queen's University. We hope within a few weeks to start a project at the University of Ottawa. I was down at Rice University in Houston last week talking about potential collaboration, and we've been talking with groups at Tohoku University in Sendai, Japan, about potential collaboration. So we're reaching out where we see particular expertise that we need to try to enlist in this enterprise.

Mr. Peter Braid: Great.

I'm the member of Parliament for Kitchener—Waterloo. The University of Waterloo is in my riding, and I'm a little bit familiar with the great work they're doing there in the faculty of environment and the water institute. Do you think that the work Dr. George Dixon and Professor David Rudolph and others are doing would be of value for this committee to learn more about?

Dr. Selma Guigard: Yes.

Mr. Peter Braid: It was a rhetorical question. Thank you.

Let's touch on the reclamation process. Could you provide your assessment of the success of the reclamation process and any areas of improvement with respect to that sort of thing?

Dr. Selma Guigard: There's a lot of research going on in tailings reclamation basically looking at trying to get the tailings ponds to settle faster so we can reclaim. But the other issue in getting the tailings ponds to settle faster is that if they settle faster, they'll release more water, which we can then recycle. So there is a lot of work going on in that area.

There are two beliefs in terms of what a reclaimed tailings pond looks like. Does it look like a dry landscape where we can put in trees and restore the forest? Or is it a wet landscape where there could be a lake that could eventually be used? So there are those two different approaches, and there's a lot of debate about which approach is the better approach to be used.

I'm currently involved in the tailings project at the University of Alberta through the Alberta Water Research Institute. It is looking at accelerated tailings densification, if you will, to try to get more recycled water and to eventually reclaim the tailings.

So there's a lot of research going on in that area.

Mr. Peter Braid: Very good.

Dr. Murray R. Gray: I was just going to add that I'm not an expert in this area at all, but for me as a Canadian, one of the key policy issues is what constitutes successful reclamation. This has been an area of huge debate. Does reclamation constitute putting the landscape back into a productive mode for recreation and other human activity, or does it constitute putting the landscape back to exactly the same way it was before?

I've seen criticism of reclaimed areas in the Fort McMurray area, because they're not going back to muskeg. Is that an issue or not? That's a policy issue.

The Vice-Chair (Mr. Francis Scarpaleggia): One more quick question, Mr. Braid.

Mr. Peter Braid: I'm just looking for a one-sentence answer on this next one. What's your vision of what the oil sands development should look like ten years from now?

Dr. Murray R. Gray: I would say no more tailings ponds. That would be my vision. If we could eliminate tailings ponds, that would transform the mining side of the industry completely. You would see much faster movement from mining to reclamation, and a much reduced area of land disturbance at any given time.

● (0910)

The Vice-Chair (Mr. Francis Scarpaleggia): Great.

Mr. Calkins.

Mr. Blaine Calkins (Wetaskiwin, CPC): Thank you, Mr. Chair.

I certainly appreciate the testimony. I'm going to be quite quick and direct and focused in my questions.

Are you familiar with work that's now being done by Mr. Gradek, of Gradek Energy, insofar as a bipolymer bead designed to attract hydrocarbons and repel water is concerned? Do you know about that technology or where that's at?

Dr. Selma Guigard: I don't know where it's at. I've heard of it, and I know you will be talking to him tomorrow.

Mr. Blaine Calkins: I was just hoping to get some insight before we had that opportunity.

Obviously there's the work that you do in high-level research at the university level, and we talked about the next step, which is the applied research, taking the useful things you guys can do in the laboratory and extending that out into the field.

How far away is the next great leap in technology?

Dr. Murray R. Gray: If I look at the history of the industry, about the shortest cycle I've seen for implementing a transformative new technology has been in the range of five years, from initial conception through to the start of construction. So it's seven years or more from the initial idea through to being able to start a full-scale operation. That's the time scale.

Mr. Blaine Calkins: And that's going to require a lot of investment, obviously, and it's obviously going to involve the right decisions being made by policy-makers as far as approvals and permits to move forward with those new technologies are concerned, because with every new technology come new challenges—and new things, expected or unexpected, often come with that.

A question I have is about water usage. Is the water that comes out of the Athabasca River treated, or is it raw water that simply goes into the process and is heated up for the extraction process? Do you know?

Dr. Selma Guigard: I don't think it's treated. It's used for a number of different applications. The water that comes out of the Athabasca River is used for the extraction, but it's also used for the industrial or mining purposes as well.

Mr. Blaine Calkins: My understanding of the process is that no chemicals are really added into the process. Everything that we have in the tailings ponds, all the heavy metals, everything that we see in the tailings ponds, was actually naturally occurring. It either got pumped in through the process.... It was naturally occurring in the Athabasca River, or it was naturally occurring in the soils.

Is that true, or is there a chemical solvent, a diluent or something like that, that's added into the process we should know about?

Dr. Murray R. Gray: All of the technologies use solvent in treating the bitumen at one point of the process. So all of the tailings ponds contain solvents. In comparison with the naphthenic acid material, the solvents are readily biodegradable. So they pose a short-term environmental issue, but they don't have the kind of persistence in the environment that the naphthenic acid material has.

As for other chemicals that are added, some of the companies use sodium hydroxide or lye to adjust the pH to make the water less acidic, but that's a relatively benign additive. One company uses a citric acid, which is found in orange juice. So it's readily biodegradable.

So there are some additives used, but for the most part, they're less of a concern in terms of environmental impact than the acids that come out of the bitumen.

Dr. Selma Guigard: Some of these compounds, as Dr. Gray mentioned, are biodegradable, but this makes for some interesting challenges in the tailings ponds when they do biodegrade. We all think that these ponds are dead and there's nothing there, but micro-organisms exist everywhere, and they exist in those tailings ponds. And it's been noticed that with the addition of certain of these compounds, when the micro-organisms that actually exist in these tailings ponds are degrading, they produce gases. Some of these gases—such as methane, when it starts to be generated in the tailings ponds—actually help densification, so the tailings settle faster. However, you do have tailings ponds producing methane and some other gases.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

We're going to have to move on to Mr. Watson now, for four minutes.

Mr. Jeff Watson (Essex, CPC): Thank you, Mr. Vice-Chair.

Thank you to our witnesses for appearing.

Maybe I missed this because I was writing a lot of notes down, but I want to come back to the number of barrels of water per barrel of bitumen in production. What is that total number again, and what is the split of freshwater versus recycled water?

Dr. Selma Guigard: The total amount of water is of the order of 12 to 13 barrels, as some of the publications suggest. Of that, about 80% to 90% is recycled. Syncrude, in their last sustainability report, published a figure of 88% recycled.

So if you take the 12 to 13 barrels and recycle 80% to 90% of that water, you will need some water to make up for what is still needed. That comes from the Athabasca River. It's about two to four and a half barrels.

● (0915)

Mr. Jeff Watson: Four and a half?

Dr. Selma Guigard: Yes. It depends. There is a large range out there right now. If you look at some of the recent sustainability reports, it's 2, 2.7, and 3, but it's been as high as 4.5 barrels.

Mr. Jeff Watson: Okay. I asked because I'm trying to reconcile the idea of 90% recycled water per barrel with the idea it could take up to four barrels of fresh draw on that. I'm doing the math at 1,000 barrels, and then the second thousand and the third thousand barrels, and I'm not quite getting the same calculation. I'm not a great mathematician, but I just wanted to know.

Where do those numbers come from, by the way? Sometimes statistics just get quoted and after a while become truth themselves and people forget where they came from.

Dr. Selma Guigard: They're from the National Energy Board.

Also, if you go back to the sustainability reports for each of the oil sands developers, such as Shell, Syncrude, and Suncor, you can actually calculate that number.

Mr. Jeff Watson: Returning to reclamation for just a moment here, are we on the verge of significantly increasing the pace of reclamation? We're beginning to assess the first major reclamation project and the first tailings pond is about to be reclaimed. How many decades was that pond in use before it was reclaimed?

What can you anticipate the future pace being? Is the next three- to five-year window going to see significant progress in that direction? How many years will it take from the opening of a new tailings pond to reclamation? Are we about to improve on that pace or not? Will it be significant, in your estimation, or is it still going to be a long-term process?

Dr. Selma Guigard: There was recently a directive put out by the Alberta government to try to give a bit of a regulatory push to speed up reclamation of tailings ponds. My personal opinion is there's still a lot of work to be done on the research side, in terms of reclaiming those tailings ponds. And again, it depends how we see those tailings ponds being reclaimed. Is it an end-pit lake? Is it a return to muskeg forest? What does that reclamation look like?

So there has been a little bit of a regulatory push from the Alberta government, but how that is going to translate, I'm not sure.

Mr. Jeff Watson: Okay.

The Vice-Chair (Mr. Francis Scarpaleggia): Good. Thank you very much, Mr. Watson.

Thank you so much for your presentations. They were a great way to kick off our hearings here. I think we clarified a lot of things in our minds about the technological aspects.

I wish you continued success and good work. Thanks again.

● (0918)

_____(Pause)_____

● (0920)

● (0920)

The Vice-Chair (Mr. Francis Scarpaleggia): We are a bit pressed for time, so I would ask that we resume now.

We have with us for our second segment Mary Griffiths; Dr. David Schindler, from the University of Alberta; and William Donahue, an independent researcher in limnology and biochemistry.

Each witness will have ten minutes to present, and then we'll move on to questioning, as we normally do.

Dr. Donahue, I'm told that you'll be starting. So without further ado, please go ahead.

Mr. William F. Donahue (Independent Researcher, Limology and Biogeochemistry, As an Individual): What I'm going to do is talk about the changing water supply in the Athabasca River, focusing on the entire basin, and general implications in terms of what that might mean for water-intensive development.

I think I'll start with a basic summary of what science is. I don't know if anyone has talked to you about what science is, but according to some, science consists of formulation and testing of hypotheses based on observational evidence. In this, experiments are important or applicable, but their function is to verify observation and impose controlled conditions. According to Richard Feynman, a Nobel-Prize-winning physicist and popular writer, science alone, of all subjects, contains within itself the lesson of the danger of belief in the infallability of the greatest teachers in the preceding generation.

As a matter of fact, I can also define science another way. Science is the belief in the ignorance of experts. I'd qualify that by saying it's the belief of experts in the ignorance of experts.

Generally, I would say that I would describe science as the systematic observation of natural events and conditions in order to discover facts about them and from which explanations for them are formulated, subsequently asking and attempting to answer directed critical questions that are inspired by evident disagreement between observed fact and the explanations we have previously formulated. In other words, science is a process by which we learn, and it involves constant attempts to disprove what we think we know, by asking critical questions and rationally seeking their answers.

The next slide is “What is not science?” What is not science is anything that doesn't involve the collection of data and the attempt to formulate general explanations for them or the subsequent testing of such prior explanations via further observation and hypothesis-forming. Alternatively, what is not science is anything that has been shown scientifically to be incorrect and yet it's still presented as conclusive. The second aspect, I would say, is what we see a lot of in what we're talking about today in terms of environmental science.

Now on to some other topics.

This is table 1 in the submission I gave you. Basically what it shows is changes in temperature and precipitation for northern Alberta. Much of this was presented in part in a paper Dr. Schindler and I published in 2006. The general message is that in the majority of centres in northern Alberta, as well as much of the western prairie provinces, there have been fairly substantial increases in temperature since about 1970. I looked at 1970 for a number of reasons, which I explain in the submission.

Generally, the pattern is significant increases in temperature, significant declines in total precipitation, and generally either no change in rain or decreases, depending on where you are. If you're interested in water supply, certainly increased temperatures and declining precipitation are critical in that.

The next slide is changes in winter snowpack in northern Alberta. Again, these patterns are evident across the prairies. We live in the rain shadow of the Rockies here in Alberta, and ultimately a lot of our water supply comes from snowpack in the spring, and we rely upon a lot of that. As you can see here, what's in red shows changes in the number of days per year in which there's snow on the ground and changes in the absolute depth of snowpack at its maximum. The general trend, again, is that the majority of places have shown, since 1970, a significant decline in the length of time during the winter in which snow is on the ground and the total depth of the snowpack. Again, if you're relying on winter snowpack for a lot of spring melt water and all of the pulse-oriented, ecological processes that occur in a river with declining snowpack, you can expect fairly substantial ecological effects in surface waters.

What I show here is total summer flow in the Athabasca River at Fort McMurray. This is figure 1 in the submission.

● (0925)

In general, as you can see, there is a fair amount of variation from year to year, but ultimately the trend since about 1970 is a fairly significant decline. 1998 was a pretty wet year across the prairies. Ultimately, from year to year, you don't really know whether there's going to be quite a bit of water or very little water, but as I said, the trend is generally downwards. And this consideration of long-term trends is probably the first thing you should attempt to use in order to inform some kind of plan that is dependent on water supply.

Ms. Griffiths is going to be talking about the Cold Lake area and groundwater, and I just thought I'd toss this one on. This isn't in my submission, but this is the Beaver River near Cold Lake. It's the major river in that part of the world and it's a basin that's independent to itself in east central Alberta.

As you can see again, there's substantial variation from year to year in terms of total flow in the Beaver River, but ultimately in the last 40 to 50 years the decline has been pretty substantial. And you can see this a lot in the lakes and other surface waters in that area. A lot of lakes in that area are down substantially.

Another thing I presented in my submission was what's happening in the Athabasca basin on a sub-basin level? What I did, and I explained this in the submission, is took a bunch of monitoring points on the Athabasca River and looked at the changes in water flow between those points: What is added? How is the flow different at a downstream point from an upstream point? This is with the assumption that this change in water is the water that's added from the basin between those points.

As you can see, if you head up into the Sunwapta River, which is the tributary of the Athabasca that drains some of the glaciers in the Rockies, since the early seventies up until the mid-nineties there was actually an increase in the amount of water coming off the catchment. This is because of increases in glacial melt.

As you move downstream to Jasper, the flow hasn't really changed much. The farther downstream into the basin and away from the mountains you get, the greater the decline in the amount of water coming off the basin. For those of you who aren't really aware of the geography of the Athabasca basin, Hinton is about 80 kilometres east of Jasper, just outside the mountains in the foothills of the Athabasca basin. The basin that's downstream of Hinton comprises 94% of the total area of the basin.

What this analysis shows is that in all points between Hinton and Fort McMurray, the amount of water coming off the basin into the river has declined by about 50% since the early 1970s up until 2001 to 2005.

What I've given you now is a picture of where things have been and how things have been changing in terms of climate change and water supply. Looking to the future, out of the University of Victoria there are some climate change projects there. They have created one of the main models for the global circulation models that predict future changes in temperature for much of Canada. What I did here was summarize the output of ten regional models for the western prairie provinces. This shows you the degree of temperature change that is anticipated as a result of one of these models. As you can see, it's anticipated that in the 21st century, the temperature for the western prairie provinces is going to increase, on average, 6.5 degrees.

In the next diagram I've shown you what this means in terms of changes in climate. That's approximately the same as the difference in climate between Calgary and Fort Smith in the Northwest Territories. So what we could expect, if we realize that degree of temperature change, is that the climate in Calgary moves north to Fort Smith.

What does that mean in terms of water supply? I did some modelling. I haven't included many of the details, but I created some models that predicted river flow and water yield, based solely on climate variables, things like temperature, snowpack, evaporation. In that way I remove a lot of the other information that other modellers need that is much more detailed, simply because there's an abject lack of data when it comes to this sort of thing, in terms of hydro-geological information, sediment types, ground cover, detailed evaporation measurements. Much of the water modelling that's out there is being produced as a result of intensive research on a very small scale, catchments that are of the order of less than a hectare in size. So trying to scale those results up to an area that's tens of thousands of kilometres square is impossible at this time.

● (0930)

Based on my models, I looked at a series of catchments in northeastern Alberta that ranged from about 300 square kilometres to 30,000 square kilometres. In trying to replicate what's happened in the past in terms of water flow, the model predicts about 75% of the variation in historical data, so it's fairly accurate in terms of replicating what's happened in the past.

I then tweaked the model to basically put forward scenarios of increases of three degrees and six degrees centigrade and looked at how that would conceivably affect water supply. In the blue, you see changes that are predicted as a result of a three-degree centigrade increase, and in the red, changes as a result of a six-degree centigrade increase.

On average, with a three-degree centigrade increase—and this encompasses all the years and all the catchments—the model suggests an anticipated 15% decline in the amount of water coming off these basins of this area of northeastern Alberta between April and October.

For a six-degree increase, the average was 39%. The numbers below each of the bars represent the worst case, the worst year, of the data that I used for each of the basins. There are going to be wet years and there are going to be dry years, just as there have been in the past. However, it's the really dry years that likely will concern most people. The numbers below each bar represent the worst-case scenario in terms of dry years for the three- and six-degree centigrade changes.

As you can see, it ranged from percentages in the high 30s to about 70%, depending on the basin, for the three-degree increase. For the six-degree increase, in dry years it was very, very bad, ranging from 50% to 100% on the basin. For the most part, it's in the range of a 60-70% decline.

If you're not looking at changing trends in water in the past when you formulate your management plans in terms of what you're going to rely on for water and what kind of buildup you're going to do that's heavily water-reliant, and you're not going to consider the possibility in the future that climate change is going to seriously affect the amount of water in that part of the world, then you stand the risk of running into some pretty catastrophic effects economically as a result of potentially catastrophic effects of climate change ecologically.

I'm on the next slide. I talked a little bit in my presentation about the lower Athabasca River management framework. There are three stages: green, yellow, and red. The message I wanted to convey was that the framework, as it is now, isn't based on any kind of observational science. It ignores the past trends. It basically ranks all of the historical flow from highest to lowest and then looks at the changes in that trend itself. It doesn't look at how it's changing over time, and it makes some assumptions that if you get a dramatic change in the ranked flow, that represents some sort of ecological effect.

Basically what they've done is design a model that more accurately reflects the geometry of the bed of the river than anything else. It ignores all sorts of ecological processes that are dependent on flow, such as the periodic reflooding of suspended wetlands in the basin, sediment transport, scouring, effects on fisheries, and that sort of thing. They've arbitrarily decided that 90% of the time, there will be no ecological effect and no need to limit flow extractions; about 5% of the time, they'll have to do some moderate extraction limits; and 5% of the time, historically, there would be more serious extraction limits under the right conditions.

I'm now on the next slide.

I included these figures in my report. The upper figure is basically the trends in the September flows of the Athabasca. This is to illustrate where they've gone. It's variable, but since about 1970, there's been a downward trend, as I showed. In the bottom slide, you can see that I've ranked them all. Under the framework, there'd be an arbitrary conclusion that 5% of the time it's in the red, 5% of the time it's in the yellow, and the rest of the time it's green. Green represents fine ecological conditions.

● (0935)

This ignores the fact that 50% of the last ten years would have been either in yellow or in red. If we're looking to the future in changing water supply, if water supply goes down, the frequency of yellow and red conditions will dramatically increase.

A paper in press from the University of Alberta argues that if the current water management framework had been in place in 2000, the Athabasca river flows would have been in yellow or red condition for up to 40 weeks per year and in the red for at least 20 weeks per year.

If climate change causes a 10% decline in flow, it's going to result in a substantial increase in binding flow conditions for the oil industry. I would suggest that this 10% figure is fairly conservative and conceivably a best-case scenario, since we're looking at a 50% decline coming off the basin downstream in the last 30 years, and since expected growth in the oil sands extraction is projected to go up to 2.3 million barrels per day by 2020. This means one of three things: they're going to have to find some substantial off-stream storage representing approximately 15% of the total annual water supply; they're going to have to reduce the amount of water they pull out of the river by about 50% below currently permitted levels; or they're going to have to find a way to reduce water use to less than 0.2 cubic metres per barrel of oil, which is substantially less than what they're currently using.

Basically, my message is that we're on a collision course between declining water supply and rapidly ramping up water consumption demands. Dave Sauchyn and some others at the University of Regina did some modelling of climate for the prairie provinces. In the northeastern part of Alberta, they're predicting a change from moist sub-humid to dry sub-humid or even semi-arid conditions. The amount of precipitation between northern and southern Alberta is now approximately the same and has been for the last 30 or 40 years. The difference is that the south is a lot warmer and that net water balance means there's less free water and it's much more arid. In the Palliser's Triangle in southeastern Alberta and southwestern Saskatchewan, if we get increased evaporation and increased temperature in the north, there's going to be less free water, and that means much less surface available for ecological and industrial use.

That's the end of my presentation.

● (0940)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Dr. Donahue.

Dr. Schindler.

Dr. David Schindler (Professor of Ecology, University of Alberta, As an Individual): I'm going to show you some photos and maps to illustrate the material that's in the briefs you have. I explain there the reason for our study.

This is a natural seep of oil sands, of which there are several along the Athabasca River. Of course, industry's position has been that all of the pollutants in the river come from such natural seeps. To me, as someone who works with watersheds and waters all the time, it's inconceivable that going from a footprint like that in 1974 to that on the same scale in 2008 would not cause a lot of chemical releases from the watershed to the river. We undertook to study that.

I pointed out in my brief the deficiencies of the regional aquatic monitoring program. What we did instead was to take 18 sites up and down the Athabasca River, from above Fort McMurray to the end of the river, and then a few, as you'll see, around Fort Chipewyan, and superimpose them on a geological map. The white area in the centre is the McMurray formation that is the focus of much of the oil sands activity. We also went to every major tributary in that stretch and sampled above the McMurray formation, in the McMurray formation but above oil sands mining, and at the river mouth below any activity. We had a few reference streams and a half dozen streams that ran through mined areas.

I'll just go through these in order to show you a general pattern. These are in the brief.

The black bars are winter flows, and the white bars are summer flows. In general, on this and subsequent slides, you'll see that there really is not much evidence of an oil sands effect during the wintertime. As you go from the Fort McMurray end at the bottom to the Fort Chipewyan end at the top, the little side panels represent the various tributaries. However, if you look at the summer panels, during the period that the river is ice-free you'll see a considerable effect, in this case, on dissolved polycyclic aromatic hydrocarbons. We chose to study this group of compounds because it contained several known carcinogens that we know are high in bitumen and were also high in previous studies, such as the *Exxon Valdez* spill and the notorious Wabamun Lake spill. I'm going to flick through these fairly quickly, but look for that consistency in pattern.

Aluminum is not necessarily such a toxic metal, but as you'll see by the red lines, there are some Canadian Council of Ministers of the Environment guidelines that are exceeded in most of these samples. Again you'll see the levels pick up greatly going downstream, as you get into the oil sands area in summer, not in winter.

Arsenic has much the same pattern, with again about a doubling downstream of the mines during the summertime. For lead, again, a number of the summer values there exceed CCME guidelines. As for mercury, again you can see very little in the winter, but note the increase as you get into and beyond the oil sands during the summer.

Uranium is one about which there has been a fair amount of concern. In this case, you really see no influence of the oil sands either winter or summer. The pattern is pretty consistent, indicating that most of the source is upstream.

It's the same for cadmium. Note that cadmium, especially in summer, exceeds CCME guidelines by a considerable amount, but again, there's no clear evidence in this case of a contribution from the oil sands.

● (0945)

The reason for that winter to summer difference is that the river is encased in ice for about four months—and this winter for practically five months—during the winter season. So things entering tend to accumulate on the ice.

There has been a considerable amount of airborne input, which surprised us. This is a snow layer on the Muskeg River. It isn't the worst one we've seen, but you can see the black layers and the black surface on this snow as a result of airborne contamination.

At each of these sites, the same sites as shown in our earliest slide, we took a sample of the total snowpack, melted it down, and then filtered 900 millilitres of each snowpack. These filters were all white when we started. They're very fine—they have about half-micron pores. The yellow numbers are distances between the sites. In this case, Fort McMurray is at the left, going downstream to Fort Chipewyan on the right, and the little side legs are the six major tributaries. So you can see, visually even, a high contribution of suspended particulates in snow in the area for a considerable distance around the tar sands plants, but note tailing off quite a bit downstream.

In the next several panels, again, this is total PAH. In this case, we did a polycyclic aromatic analysis of both the filters, which you saw, and the filtered material, the dissolved portion. The dissolved portion is in red. The particulate portion on the filter is in black. The total concentration is represented by the end of the bar. Again, you can see this big contribution of airbornes in the vicinity of the tar sands and tailing off going downstream, with Fort Chipewyan at the top, and of course almost nothing upstream of Fort McMurray at the bottom.

Again, there is a very similar pattern for aluminum, except that more is in particulate form.

For arsenic, you see the same pattern. It is clearly an airborne contribution from the tar sands mining. Lead has much the same pattern.

All of these, again, show the CCME guidelines.

For mercury, there is a big contribution of mercury via airbornes, largely in the particulate fraction. Note that these values are very low. They're in parts per trillion. But this isn't where mercury is a problem. It biomagnifies up food chains up to a million-fold. Concentrations as high as these have been shown to result in serious contamination problems in other systems. Again, it indicates that there is some mercury coming from upstream, but a big contribution is from the mining to the airborne mercury loads to the snowpack.

Cadmium doesn't show any contribution. The one contribution it shows is just below the outfall for Fort McMurray, and it may represent some sort of urban influence. Cadmium, of course, is in various parts of automobiles, and so on. So that isn't too surprising. Again, note that most of these values are at or above CCME guidelines for cadmium in parts per billion.

There is accumulating evidence that the concentrations of polycyclic aromatics, particularly in their alkaloidal forms, which are very common in this river, are causing deformities in fish. I've given you two references. I could have given you a dozen. There is clear evidence of deformities in eggs and embryos in contact, particularly, with the particulate forms of PAH right at the sediment surface, which of course is where eggs are laid. This is a government study under the northern river ecosystem initiative, with some actual pictures of deformities.

● (0950)

The study also indicates that there were deformities in the Athabasca formation upstream of the mines, but that the incidences increased downstream of the mines, indicating that these particulate inputs from the mines are having an influence—up to 95% embryonic mortalities and a high incidence of deformities in the embryos that survived. The CCME has this covered with its interim sediment quality guidelines. But this same study indicates that both the regional aquatics monitoring program and the Peace-Athabasca Delta program, in measuring the same compounds, found fairly high incidences in which the CCME interim sediment quality guidelines were exceeded.

The big concern that I'm sure you heard yesterday in Fort Chipewyan is that some of the cancer rates noted in the community are attributed to some of the compounds, which are at least in part the result of mining activity.

We have found big northern pikes loaded with mercury. I don't think the water should be the sole focus of this program. If you look at all of the problems associated with the oil sands, this is clearly a black star program. You've heard a lot about in situ, and I think in situ has some big implications for water. It's already been shown to have big implications for wildlife. The northwest corner of Fort McMurray will be developed by Opti-Nexen, and this is the sort of developmental intensity that will be a part of these in situ things. High density of well pads and interconnecting roads and pipelines are very inhospitable to wildlife. Almost the whole corridor is alienated. But it's also big enough to vastly affect supplies of freshwater, both surface water and groundwater.

Of more concern than the average flow, in my opinion, is the winter low flows in the Athabasca. Industry is fond of saying that they use only 2% of the average flow of the Athabasca. That's an irrelevant factoid. We know there's lots of water in the Athabasca in summer. In winter, the flows are very low and decline very rapidly, and this is probably the most sensitive point in the river. At this point, industry uses 7% or 8% of the Athabasca's flow. The flows are declining and industry is increasing. You can see where all this is headed.

That's the end of my presentation.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Dr. Schindler.

Dr. Mary Griffiths.

Dr. Mary Griffiths (As an Individual): Yes, that's right.

I'll start straightaway. I appreciate the opportunity to present to the committee, and I am speaking today in a personal capacity.

I would like to start with my key messages. You know that the Athabasca is required to produce a lot of water for the oil sands, but I want to look at not only the Athabasca but also the influence of the oil sands development on groundwater quantity and quality. I think we're going to see a lot more impacts in the future with the cumulative effects of many projects. We're not really seeing yet the effects that we can expect in the future, so my real message is that we need a lot more information and a process to implement sound science to ensure that we do have sustainable management of groundwater resources.

We can see what's happening in the river. We're getting a lot of warnings. There's a lot of research on the river, but my concern is perhaps more with the groundwater, which is out of sight, and that tends to be more out of mind.

By way of background, I think sometimes it is useful to have absolute figures so you'll know what we're talking about. We know that the water allocated from the Athabasca River basin for the oil sands mining is by far the largest quantity: 550 million cubic metres were allocated by the end of 2007. The allocations already exceed current use, because a lot of projects have got their allocations but they're not yet operating, so therefore we're not yet seeing the impacts on the environment. In 2007 the volume of water actually being used was only roughly 130 million cubic metres, and of that about three-quarters came from the Athabasca River, surface runoff of over 20%, and non-saline groundwater 5%. This is for the mining operations. So you see, it's not just the Athabasca River that is providing water.

I think it's useful to have a comparison to get an idea of what 129 million cubic metres of water is like. The City of Edmonton, which supplies a population of about one million people, including the people around the city, treats every year about 130 million cubic metres, roughly what is being used in 2007 for the oil sands mining. But with the city, the water goes to the waste treatment plant, and only about 10% or less is actually consumed; the rest eventually flows back to the river. Of course that's not the case with the oil sands mining, because all the water is consumed. It actually gets put into a tailings pond; it does not flow back to the river, so it affects the river flow.

Now to the water used for in situ operations. David showed a slide just now to give the impression of how in the future it's going to have a huge impact, because you'll realize that 80% of the bitumen will be coming from in situ operations, not from the mining operations. In fact, more than 90% of the bitumen area is too deep to mine, and we'll be getting a lot of the bitumen in the future in particular from the in situ operations.

In 2007, total water use for the in situ was far less than the mining. The mining, if you remember, was 129 million cubic metres; in situ it's 31 million cubic metres, and half of that was saline groundwater. You might think we don't need to worry so much about saline groundwater, but of course it doesn't get replenished so rapidly, so I think the companies are going to be very concerned on the availability of the saline groundwater. But of course from the public perspective it's the shallow, non-saline groundwater that's of more concern. In 2007, nine million cubic metres of non-saline groundwater was already being used for in situ operations. To put that in perspective, more groundwater was being used for in situ operations than for oil sands mining even in 2007, and even though we are still only at the early stages of bitumen production. Eventually far more will come from in situ, but in 2007 only 40% was coming from in situ and 60% of the bitumen was coming from mining.

So what will be the impacts on the groundwater quantity as a result of the mining operations? The drawdown of groundwater for in situ projects lasts for the length of a project, and that can be several decades. It will affect both the shallow non-saline aquifers and the deeper saline water. Some projects have used saline water, some use non-saline groundwater, some use surface water, and some use a mixture, but the groundwater recharge is very slow. Groundwater can move very slowly, perhaps one to 35 metres a year, or up to perhaps 130 metres a year in a buried channel aquifer, which we'll see later.

● (0955)

The groundwater recharge can be affected by the drainage of wetlands. We've already seen a lot of that from the mining operations. It can be affected by use of surface water and surface water flows. Of course, groundwater and rivers are very closely interlinked. If you reduce groundwater, it can affect the volume of water in the river.

I think the main problem would be the cumulative impact of so many overlapping projects. When a company does an environmental impact assessment, it looks at its immediate neighbours and sees what impacts their own development will have on the companies immediately around. But there's no regional modelling to see what the overall cumulative impacts will be of a lot of development, and the use of water in one area can affect the recharge for another area. Then of course climate change will also affect the groundwater precipitation and groundwater recharge.

So we need a lot more information about the aquifers in the in situ areas, to provide basic background data. We don't have a lot of good density of data for a long period of time. We need a lot more monitoring and we need surface and groundwater monitoring models, the interrelationship between surface water and groundwater. We also need to remember that in this region we don't just have what I call horizontal aquifers. The aquifers are interspersed with buried channels and the geology is much more complicated than one would be led to believe by the surface topography because of these glacial meltwater channels, which are filled with sand or till and are not evident on the surface.

The next slide just shows briefly the area north of Fort McMurray. Fort McMurray is where the blue comes to the bottom at the centre there. This is an area of about 130 kilometres by about 145 kilometres. It does not show the area of Cold Lake, which is farther south. But even within this area we've got roughly 20 buried channels, and certainly in the area farther south the Alberta Geological Survey thinks we will still find more buried channels.

In the interests of brevity I will not go on further about that now, but I'd be happy to answer more questions about that.

I would like just to mention that there are not only considerable concerns about the impacts on groundwater quantity, but also on groundwater quality. We already know about the release of some oil sands mining operations, and there's the potential and actual leakage of contaminated water from tailings ponds. But within the in situ operations, we have the heating of aquifers that has led in several cases to well blowouts, casings failures, and steam releases. In the Cold Lake area, where they use not SAGD but cyclical steam stimulation, the temperatures are much higher. It releases arsenic, which is naturally occurring in the formation, and then one tends to get an arsenic plume moving down away from the heated area. So there are impacts on groundwater quality.

Of course it's great that we're doing a lot of water recycling to reduce the use freshwater. If one is using saline water and it's going to be used to make steam, it has to be treated before it can be used, and when one recycles water, again, the water has to be treated before it can be used and the waste products of the treatment have either to be sent to landfill or to deep well disposal. So the handling of those wastes also creates further problems.

Finally, in the interest of brevity, I will just sum up to say that we expect the scale of operations to increase. In the latest predictions in the Canadian Association of Petroleum Producers they're still looking for perhaps three million barrels of bitumen a day by 2020. That's more than two and a half times what was produced last year. We're going to see a lot more cumulative impacts in the mining areas and even greater in the long term in the in situ, and the expansion could also extend right down to the Edmonton area if as many upgraders go ahead as originally planned. We could also see a lot of water being used from the North Saskatchewan River, which is the river that supplies Edmonton.

So we need to minimize water use for all oil sands operations. We need to improve the monitoring of all water quantity and water quality, and we need much more research to increase our understanding of the cumulative impact, including the surface and groundwater interactions. I do believe there is a role for the federal government in this work.

Thank you.

● (1000)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much, Dr. Griffiths.

I would now like to go to questions, the seven-minute round, beginning with Mr. Trudeau.

Mr. Justin Trudeau: Thank you. I'd like to get right into it.

Dr. Donahue, you spoke about the water management framework. The way you framed it at first was saying that it's only based on the geology and geometry of the rivers and not really taking much into account. Then you went on to say that even with that level of limitations in terms of understanding what it is, we're still in some real trouble with those links to it. Is it worth it, then, to try to improve the framework to understand some of the data you've brought in if it's only going to show us to a greater extent that we're in even greater trouble? What are the next steps on there?

● (1005)

Mr. William F. Donahue: My comments were in terms of the framework, and what it appeared to be based on, and ultimately the implications. My point in saying that we're in trouble was to go back to what is science. The basic assumption of the water framework, when they put it together, was that the amount of water isn't changing in the river, historically. The assumption will be that it won't change in the future. On average, 5% of the time we can expect this limitation or that limitation. My point is that simply by saying what years were the lowest flows, and where are we, and what would that mean in terms of trends.... So a very simple consideration of which years were the lowest flows and which were the highs, to contextualize that ranking of the flows, pretty much skewers the framework as it is.

So my critique on that one was because we've been spending no time or money on figuring out the state of a water resource upon which we are entirely dependent for this activity, we're now stuck with very little knowledge of what's happened, what's going to happen, and what the implications are.

My basic message was that the framework as it is now really isn't of a lot of use. It's very arbitrary. In terms of where we're going, certainly there's a great need for getting sufficient information to produce what I would consider a valid water management framework. We can't go forward in terms of managing the water or development in the basin that's dependent on water if we don't know what the effects are going to be.

I know the Alberta government has come up with an in-stream flow needs water management basin framework technique for southern Alberta and the South Saskatchewan River basin. It involved detailed sampling, detailed studies of things like the effects of flow on riparian communities, effects of flow on fisheries. Ultimately, though, what you need is to determine where the ecological thresholds are. As flow declines, at some point you can expect an ecological effect on whatever it is you're looking at, whether it's the suspended wetlands and lakes that are in the basin.... Periodic flooding of the river results in a recharge of these systems that keeps all of these vast wetlands healthy. At what point, as time goes on, does the river no longer exceed its banks in sufficient frequency to affect those things? At what point in the flow do fisheries start to collapse because of loss of habitat or loss of spawning, that sort of thing? At what point are the hydro-dynamics of the river in terms of sediment changes affected so that you're not getting the channelization and all the other things that are necessary for ecological function in the river?

The framework as it is considers none of that, simply because we have none of that information. My basic point was if we want to create a picture of what's going on in the river that is based on an understanding of what's happening in the river, what's most sensitive in the river, if we don't have that picture, we can't possibly hope to manage the river properly.

In one of the previous questions from the presenters before was something along the lines of, with $120 billion in development planned, and the industry contributing tens of millions of dollars to research, the amount of money being contributed to what I would call valid environmental research is a drop in the bucket of what's going into the industrial research. Provincially, we've seen water sampling for lakes in Alberta get cut 70% or 80% just in the last few weeks. If you're looking at trying to figure out what's going on with a resource that forms a foundation of a $100-billion-plus industry, you'd better start putting some serious thought and money into it.

Mr. Justin Trudeau: You're saying it was done in the southern regions, but it hasn't been done around the oil sands area.

Mr. William F. Donahue: Yes, and that's simply because I think a lot of it was out of sight, out of mind. The presumption is there's a lot of water in the north, it's water-rich; therefore, we don't really need to address it all that much.

● (1010)

Mr. Justin Trudeau: Thank you.

Dr. Schindler, yesterday afternoon we had presentations from various leaders and elders in the Fort Chipewyan area, and they brought up a number of anecdotal examples of fish deformities and concerns around that. Obviously your charts with the parts per billion and parts per trillion indicate the impacts of the magnification of those effects that go up the food chain.

I know you mentioned the larval examples of contamination and bitumen. I'm just wondering about the transition between what the native wisdom is telling us anecdotally around deformations and concretely in Lake Athabasca.

Dr. David Schindler: We did take fish samples as part of the study and we're analysing them as we speak. I don't have any results back yet, except to know that some of the fish are very, very high in mercury, and we're looking to see if they've increased over previous studies.

We have archived samples of fish and also mercury analyses that have gone back for almost 20 years now. In a couple of months we should know the answer to that.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

Mr. Ouellet, please.

I would remind those in attendance that there are interpreters and there are devices available at the back if you need them for the interpretation from one language to another.

Mr. Christian Ouellet: You better use it, because I'm dangerous. I'm going to speak French.

[*Translation*]

Are you following me in French?

First, Dr. Griffiths, I would like to ask you something. At the end of your presentation, you say that the federal government's role is important—

[*English*]

Dr. Mary Griffiths: I was not going to go into the federal role in detail because I know that somebody else tomorrow is going to be speaking to that. I think there is a role through the Canadian Environmental Assessment Act. As well, of course, there's a trigger with the Department of Fisheries and Oceans on water quality. There is also sometimes an opportunity for the toxic substances with the Canadian Environmental Protection Act, as well as, of course, for the federal role for the first nations people and transboundary waters.

There are a lot of ways in which the federal government can get involved. What interests me the most is the work that has been done by Natural Resources Canada, and a Dr. Alfonso Rivera, in groundwater aquifer monitoring. There have been a number of aquifers monitored across Canada. There's a plan to do about 30 of them. One of them that has been identified is within the Athabasca oil sands region, but that has not yet been tackled.

I would hope that perhaps there will be an opportunity for the federal government to work probably with the Alberta Geological Survey. The Alberta Geological Survey has been doing some great work as well, but they are also limited in their resources. There is so much work that needs to be done. If we could get additional resources for monitoring and learning more about our groundwater aquifers in the oil sands region—not just in the Athabasca area but also in the Peace River and the Cold Lake area—I think this would be really valuable.

[*Translation*]

Mr. Christian Ouellet: Thank you very much.

So that means that, in your opinion, the federal government has an important role to play in research. It must determine how we should behave with water.

[*English*]

Dr. Mary Griffiths: I think the research will help us to make better decisions. At the moment, I don't think we have enough information on the cumulative impacts. More projects are approved, but we don't know enough about the cumulative impact of so many projects going ahead, especially on groundwater. There was a plan by some companies working on in situ operations south of Fort McMurray to develop a model to link surface and groundwater, but there were never any resources for that to go ahead. They got to stage one, decided that it was an important thing to do, but it has not gone ahead. But I was pleased that industry actually recognized there was a need here.

Even for each individual environmental impact assessment, they are not looking at the overall implications on a watershed basis or a regional area. That needs to be done.

● (1015)

[*Translation*]

Mr. Christian Ouellet: Thank you. What you're telling us is important.

Dr. Schindler, do you also see a specific role that the federal government could play in your research?

[*English*]

Dr. David Schindler: The monitoring of the river was actually started in a very good fashion by the federal government, but over the years they've gradually turned the monitoring over to the province of Alberta, which in turn has turned a lot of it over to industry itself. As a result, we have a database that's not available to independent scientists to see. We have no public transparency in the database.

I think there's a clear role for the federal government indicated simply by how close this development is to the Northwest Territories, which is clearly within federal jurisdiction. Those huge tailings ponds and, as I showed, input pollutants to the Athabasca River going downstream clearly pose a threat to the territories. If the federal government doesn't have a clear role in Alberta, it clearly has one in the Northwest Territories.

That being said, on the compounds like the polycyclic aromatic hydrocarbons that I showed, the best experts in Canada belong to the federal Department of the Environment and the Department of Fisheries and Oceans. I find it rather scandalous that those people are not involved in this area. The reason they're not involved is that they have insufficient budget to allow them to operate.

[*Translation*]

Mr. Christian Ouellet: Thank you.

Mr. Donahue, may I ask you the same question?

[*English*]

Mr. William F. Donahue: I would say yes, the federal government does have a role. The climate data, especially, that I showed as an example was from Environment Canada. One of the things I noticed when I was going through the climate data was that starting from the 1970s, going up to the mid-1990s or before that, in many of these monitoring sites there was data going back almost a century; but in the mid-1990s, I can only presume that budget cuts were the reason there began to be bigger and bigger gaps in the data.

For example, regarding the snowpack for much of the prairie, if you look at historical data, it's there, it's regular, it's always there, and it's a great database. Starting in the mid-1990s, for increasingly more and more stations, there was data missing. What I thought was ironic was that in some cases there would be data for the summer for snowpack but not for the winter. So you'd have no data for the winter and then a bunch of zeros for the summer. Is that a monitoring program? Maybe, but ultimately you can't really get to conclusions if you don't have the data.

The currency of scientists is data. Routine monitoring of things such as climate and river flow aren't exciting. It's a constant cost, and I assume there are bean-counters in bureaucracies who wonder if we're getting a bang for our buck with this. So in many cases that's the first thing that gets cut.

I showed the data on the river flows. You'll notice that the data for the Sunwapta River stopped around 1995-96. Again, that was because that station was pulled. It's the only station from which we had substantial data for glacial meltwater in the Rockies. After two or three decades, you begin to be able to interpret trends and the data becomes more and more valuable. If you cut it off, you're left with a vacuum. That station has since been put back in—two years ago, I think.

At a critical point, all these long-term data sets are becoming more and more valuable. Unfortunately, over the last 10 to 15 years, the data sets have become more and more spotty. So for me in terms of this kind of work, that's the simplest recommendation.

In terms of other things, there has been almost an evisceration of freshwater research capacity in the Department of Fisheries and Oceans and Environment Canada. Why is that? I assume it's a budgetary thing, but I don't know.

● (1020)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much. I'm sure there will be follow-up questions.

We have to move on now to Ms. Duncan for seven minutes.

Ms. Linda Duncan: Thank you, Mr. Chair.

I thank all three of you for your time. I'm sure Dr. Schindler would rather be in the field. It's very appreciated that you would take the time to be before us instead.

Dr. Schindler, you're an incredibly modest man, but you are an internationally renowned ecologist. We're fortunate to have you at the University of Alberta.

We heard in earlier presentations from the engineering side that the innovation centre is getting tens of millions of dollars. Are you and your scientists getting similar volumes of money from the federal government and from industry to look at the ecological impacts of the tar sands?

Dr. David Schindler: No, we're not. I haven't really applied for any in industry for 20 years. They funded some of my research 30 years ago in the early days of the oil sands. It's not a place I want to go for money. I want to maintain my independence to do the research and publish the research that I think is necessary.

Ms. Linda Duncan: Has the federal government been providing substantial amounts of funds for your science work?

Dr. David Schindler: A small part of it has come from the Natural Sciences and Engineering Research Council. Most of the rest of it I've raised from foundations such as Ducks Unlimited and the Walter and Duncan Gordon Foundation.

Ms. Linda Duncan: If we were to recommend that there be more substantial money towards looking at this side, would that be helpful in moving forward the research, improving the monitoring, and so forth?

Dr. David Schindler: It would, but there are also some aspects of the federal funding that I don't like. For example, for anything bigger than an ordinary discovery grant, they want letters of endorsement from clients such as oil sands companies to say how great your research is. Well, if four or five times you've found out bad things about the industry, it's hard to get those letters. Also, at my age, I want to do the research, not run around schmoozing people to get letters of support.

With foundations, you can usually raise the same money with a simple letter outlining what you want to do, and that's what I've chosen to do.

Ms. Linda Duncan: We had a helicopter tour over the tar sands yesterday, which was really helpful. From that and from having read your presentations, something that really struck me and that I hadn't thought of before is the impact of the mining and the loss of streams. In one of your presentations, somebody showed us how, just over a four-year or five-year period recently, the streams that feed into the river are gone. I know from my work in the Wabamun area the impact of the mining on the lake regime and the water table.

I'm wondering whether that is being factored into these water models, not just climate change and so forth. Does this have any impact on the ecology and on the eventual water levels of the river?

Dr. David Schindler: I'm sure it has. About 50% of that area is underlain by peatlands, including the forested areas, probably at a mean depth of three or four metres. These have taken 3,000 or 4,000 years to accumulate. They act like a giant sponge, absorbing snowpack and the rainfall that falls in thunderstorms and releasing the moisture slowly over time. Industry knows full well, based on research that they have funded by a number of consultants, that they can't restore that sort of ecosystem, not unless they wait 3,000 or 4,000 years. There's no hope of reconstructing the hydrology of those systems, or for that matter the aquifers, because the layers are dug up and put in a pile; there's no attempt to put them back in strata that would restore the aquifers.

This probably wouldn't be a big concern if it were in a small area, but of course it's no longer a small area. I predict it will disrupt the whole hydrology of that lower Athabasca system.

● (1025)

Ms. Linda Duncan: So it basically can't be reclaimed to serve the watershed.

Dr. David Schindler: I don't believe it can, and I think it's so unrealistic to expect it that it's time for some new restoration goals. We have a history in this country of never having enough money put aside to reclaim after mining. We have several cases that have been outlined in the 2002 Auditor General's report. All of them were tiny compared with this operation.

The cost of the small part that has been certified reclaimed—Syncrude's Buffalo site—was ten times what's being put aside, and yet it's acknowledged that it was an easy site to reclaim. I really fear that two generations from now we'll still be looking at huge mine pits in that area.

Ms. Linda Duncan: Okay, thanks.

Dr. Griffiths, it's lovely to see you. Thank you for coming out of your retirement to help us out. It's very appreciated.

We haven't looked at the North Saskatchewan River, and it's helpful that you mentioned it. I think it's important for us to understand the scale and the breadth of impact of the tar sands development. It's not just in the immediate Fort McMurray area. I wonder whether you could elaborate a bit more on the implications for water of the upgraders, if they proceed.

Dr. Mary Griffiths: The big question is whether they proceed. When I wrote a report on upgraders, *Upgrader Alley*, last year, it was expected that we would have about eight upgraders within the Edmonton area and that the net consumption of water would be about 80 million cubic metres; in other words, they would take from the river about eight times the volume of water taken by the city of Edmonton. I had real concerns about the implications for the water.

Since the change in the economy, several of those plans have been put on hold or temporarily withdrawn, and I don't now know how many of the upgraders will go ahead. Again I think we need to continue with good monitoring and to get in place a process whereby we can ensure the minimum use of water in the future, if those upgraders do actually proceed.

Ms. Linda Duncan: Thanks.

You also mentioned groundwater. I understand a groundbreaking report, the first big report on groundwater, was released yesterday. Are you somewhat aware of it? Can you tell us whether they discuss potential implications for the oil sands as well?

Dr. Mary Griffiths: Yes, I was one of the people who reviewed a draft of it. It was a report by the Council of Canadian Academies, and it's entitled *Sustainable Management of Groundwater in Canada*. It was released yesterday and it has one subsection dealing purely with the oil sands and the concerns about the impacts of the oil sands on groundwater. It's not a long piece; I would encourage the whole committee to read that section in the report, because it is a very good synopsis.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much.

That's interesting information, that you were involved in a review of that. Thank you for telling us that.

Mr. Warawa, you have seven minutes.

Mr. Mark Warawa: Thank you, Chair.

Thank you to the witnesses for being with us today.

I saw Dr. Schindler in the back as I was sharing in questioning the witnesses in the first hour. I think Dr. Schindler heard me share that I had taken a tour by river of the oil sands a couple of years ago. In that tour we stopped along the shoreline, and I saw the bitumen leaching into the soil. This was, I think, probably in June. It wasn't a terribly warm day, but warm enough, of course, that the bitumen was leaching out of the rocks of the shoreline.

In the Athabasca region, what toxins do we see naturally occurring in the boreal wetlands feeding into the Athabasca? What toxins are we seeing naturally occurring as a baseline?

● (1030)

Dr. David Schindler: I would say that we see all of the toxins I mentioned. There's a wide suite of polycyclic aromatic hydrocarbons, including several known carcinogens; some related compounds that have one of the carbons substituted by a sulphur, known as dibenzothiophenes; and then a suite of toxic trace metals that are bound up in this bitumen matrix too. Basically, any water that runs through those wetlands leaches small amounts of those pollutants out.

That being said, some odd times the overlying vegetation can be helpful. For example, wetlands with peat as a base are known to retain mercury very strongly. But I think it's also fair to say that if you go in and disturb either the geology or the ecosystem in those areas, you expose fresh surfaces to weathering by air and rainfall, so that the amount of those things that are mobilized, either by water or airborne, is increased. That's something you can find 40 or 50 years of studies to show, pretty well all over North America and Europe.

So in this case, it isn't a surprise that materials tied up in this bitumen are mobilized and it isn't a surprise that some are there naturally either. I think the situation is that there are natural levels, as industry and Alberta Environment have correctly stated, but those amounts are clearly enhanced by digging up the watershed of the Athabasca and its tributaries.

Mr. Mark Warawa: Are there comments from anybody else, or is that okay?

I have a follow-up question, then.

In the history of the development in the Athabasca region there was a uranium mine, which in my understanding is not operating any more; there's a pulp and paper mill; there's development within Fort McMurray itself, so that we have residential and commercial operations. What role does that further development play in the mix? The focus is on the oil sands, but how has the other development, present and in the past, played into the mix?

Dr. David Schindler: I can probably address that. I've been involved in some of that work for 20 years.

There are actually several pulp and paper mills upstream on the Athabasca, but over the past 20 years they have really cleaned up their act. The one at Hinton, for example, spewed huge amounts of dioxins and furans into the river in the early years of its operation. I think the watershed was when the Alberta-Pacific mill, which is near Athabasca, several hundred kilometres above the area we're talking about, in a dispute in the early nineties that I was a part of, produced a process that eliminated dioxin from effluents. Since that time, dioxins are no longer a part of the effluents from pulp mills. There are still some organic compounds and so forth. One source of worry, actually the source of worry that drove the northern river basins study of the 1990s, has been eliminated.

I think the development in Fort McMurray is probably contributing several of the toxic trace metals. For example, copper is released from wearing brake shoes, and nickel and cadmium and mercury are associated with other parts of automobiles, and zinc from wearing tires. In many communities that's washed from the streets into effluents and into the nearest watercourse. I'm sure, as Fort McMurray grows, that will become an increasing problem. But right now, even at 80,000 people, I'd say it's a fairly small contribution to a river the size of the Athabasca.

● (1035)

Mr. Mark Warawa: In the history of development over the years, as toxins and contaminants flow north, would they be deposited into Athabasca Lake and cause problems decades later for people living in Fort Chipewyan?

Dr. David Schindler: That was looked at in some detail by the northern river basins study, which saw no evidence. The problem has been that the big development in the oil sands has occurred since the northern river basins study took place. At that time, there were only two rather sleepy little oil sands plants in operation. The huge development we see today really started rolling about 2003.

There is now some debate over whether polycyclic aromatics and mercury deposited in the sediments near the river's mouth and the lake are increasing. Again, I think the regional aquatics monitoring program has some data. I haven't seen the results of independent studies, which have largely been done in the last year or so, but it is a matter of some debate at the present time.

Mr. Mark Warawa: My final question has to do with RAMP, the regional aquatics monitoring program, which you've just mentioned. Are you involved with RAMP? This is an industry-funded monitoring program. I believe it started in the late nineties, I think around 1997.

When we were at Fort Chipewyan yesterday, we heard there was concern from first nations about the consultation process or their involvement with RAMP. They had concerns about that. So if it's a monitoring program that industry is required to be involved in, along with NGOs and first nations, Cree, could you comment on RAMP? Do you see it being successful, or are improvements needed?

Dr. David Schindler: I would say it has been very unsuccessful.

I had a small role in a 2004 review of the program. It was largely done by three federal scientists from the fisheries and environment departments. Of a 100-page report, about 99 pages were scathing criticisms of how they changed chemical analyses, changed sites of sampling, changed timing of sampling, all the things that violate all of the first principles of monitoring programs.

What I've heard since from people who have been involved leads me to believe that it hasn't improved very much. The other thing I find deficient in the program is that it's not transparent. There have been no analyses of the data. The data are not available to the scientific community at large to analyze and there has been no public release of what the program shows. Probably if there were, because of the deficiencies in design, it would show nothing. You can show no effect either by designing a very poor study or by nothing happening, and my guess is it's the poor design that's at fault here.

I think that program really needs to be changed. I would recommend an oversight by an independent committee of scientists and some first nations representatives, and that the program be required to report every three years, perhaps, with a public report as well so that people can understand what's happening to the river, if anything.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Dr. Schindler.

We'll move on now to the second round of five minutes. We'll do it like the last time. We'll give everyone who hasn't asked a question an opportunity to ask a question, and I'd like to start off.

Dr. Schindler, I was—

● (1040)

[*Translation*]

Mr. Christian Ouellet: Mr. Chairman, we have to be able to ask another question.

The Vice-Chair (Mr. Francis Scarpaleggia): Yes, if we have the time.

Mr. Christian Ouellet: We'll take the time, Mr. Chairman. We're going to ask other questions.

The Vice-Chair (Mr. Francis Scarpaleggia): We're supposed to stop—

Mr. Christian Ouellet: It's not normal for him to be able to ask four questions and for him and me to ask only one.

The Vice-Chair (Mr. Francis Scarpaleggia): I understand.

Mr. Christian Ouellet: I would like us to do a second round, for both Mr. Trudeau and me.

The Vice-Chair (Mr. Francis Scarpaleggia): We'll be able to come back to that after the second round.

Mr. Christian Ouellet: If we have the time, we'll finish with them.

The Vice-Chair (Mr. Francis Scarpaleggia): The clerk tells me the committee has adopted a procedure. The first round is done by party, and the second is reserved for those who haven't asked questions.

Mr. Christian Ouellet: There are only two of us. There is he and I. So on a by-party basis, it should come back.

[*English*]

Yes, he's here. My buddy is here. I'm asking questions for him.

[*Translation*]

The Vice-Chair (Mr. Francis Scarpaleggia): I'm going to ask my question and thus take the Liberal Party's turn.

[*English*]

Dr. Schindler, in the data that you showed us, could you just explain to me again what it's showing? It's showing that there are more chemicals in the river than there would be naturally, especially around oil sands developments, and then of course it tapers off as we go down the river. You were saying some of that presence of chemicals, as I understand it, comes from airborne sources, from the operations of maybe the disturbance of the natural ecosystem, and that some has come through the water as well. Have you speculated as to the source of the water-borne chemicals, if you will? Would that be tailings ponds? Are you prepared to make that link, or is it up in the air?

Dr. David Schindler: I'm really not prepared at this point. We were surprised at the high indication of airborne input. It's probably not too surprising when you think of strong winds blowing across huge expanses of the sort of landscape you saw yesterday. Also, I don't know if you saw any of those monster trucks going across. Often all you see is a great big black moving dust cloud around those, so they mobilize a lot of material as well.

Of course the only period we have that for is the winter four months. What we don't know is how much of that will run off with the snowpack into the river or its tributaries during spring melt, and that's something we plan to try to do next year. We were simply unable to raise the money to do it for this year, but there's really no way right now. We're hoping that via fingerprints we can separate perhaps tailings ponds from stacks from mobilization of surface material, but I don't know how probable that is at this stage in our analysis.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

My next question is to Dr. Donahue.

In terms of the framework that was developed with the help of the Department of Fisheries and Oceans and the Alberta government, you were saying it's really not very useful because we don't have much science. Obviously we'd be speculating, but how would they go about it? What would the conversation be between DFO and the Alberta government in creating this framework? Obviously the scientists involved from DFO would know that the framework is inadequate. Would they just say, "Well, sorry, we don't have the data, so let's do our second-best effort, or let's throw a few darts at the board"? I'm being facetious here. What would the conversation be if you had to write a play about this?

Mr. William F. Donahue: Well, it would be a comedy.

I don't really know. I do know that in one of the draft frameworks it was reviewed by DFO scientists, and they concluded that it was not protective of fisheries. Somewhere along the line DFO's role became minimized, I think, and the science and the conclusions were removed as it approached this final phase-one framework.

In terms of where they go from there, I would say the conversation probably excluded the scientists at some point. It became more like "We need to put something in place, so let's maybe take a good stab at something that might work".

● (1045)

The Vice-Chair (Mr. Francis Scarpaleggia): Okay, thank you very much.

We'll go with Mr. Braid for five minutes.

Mr. Peter Braid: Thank you, Mr. Chair.

Thank you to our witnesses for their participation here this morning, for their time.

I'd like to start perhaps with you, Dr. Donahue, just to understand some of the work that you've done with respect to research on the flow of the Athabasca River. Perhaps I could just start with a basic question: Is the flow of the river and the water level of the river one and the same, or two different things?

Mr. William F. Donahue: It's two different things. The water level basically is a function of the geometry of the river. If it's deeper, the river's likely narrower. If the depth is low in some areas, that may be because the river's either wide or there's low flow. Water depth will be a function of the geometry in the amount of water that's flowing through.

Mr. Peter Braid: If I could go off on a tangent, then, have water levels changed in the river, to your knowledge?

Mr. William F. Donahue: I'm pretty sure water levels are available. I didn't really consider them, because they're going to change. In any river there will be shallow areas and deep areas, so the level ultimately will vary as you move up and down the river. Certainly as flow declines at any point in the river, the depth will decline also.

Mr. Peter Braid: Okay, great.

With respect to your studies on flow, then, what year did the studies that you covered in your paper start? Was it 1970?

Mr. William F. Donahue: In this paper I presented I focused on the period from 1970 on, for a couple of reasons. One, the data weren't available necessarily that went back further beyond that, for example, in the Sunwapta River, at the headwaters. It was a case of comparing apples to apples.

I've looked at long-term flow records, where they've been available.

Mr. Peter Braid: Your paper indicates that precipitation has decreased as well over that time period.

Mr. William F. Donahue: I believe at four of the stations there was a 20% to 30% decline in precipitation, and at the other ones there was no significant change over that 35-year period.

Mr. Peter Braid: I'm just trying to understand what the root causes of the changes in flow may have been. Is it decreased precipitation, or are there root causes beneath that?

Mr. William F. Donahue: Ultimately, the amount of water that's flowing in a river will at some point be tied to the balance between precipitation and evaporation in its basin. So depending on what the groundwater flow is, there may be lags between what goes on.

I would suggest in the glaciated Rocky Mountain headwaters there's going to be a very short time lag between snow melt or big precipitation events and what happens in the river. You see that in very periodic and big changes in river flow. Somewhere down in the Fort McMurray area there may be a greater lag because, as Dr. Schindler said, you have these vast wetland complexes that act as sponges. They dampen fluctuations that you might otherwise see over a short period. At some point, it's going to be tied to precipitation—snow melt, that sort of thing.

Mr. Peter Braid: In your mind, then, what's the single key factor affecting the flow of the Athabasca River?

Mr. William F. Donahue: It's hard to say. What I've presented for the most part has been descriptive, what has happened in flow, what has happened in things such as precipitation, snowpack, and temperatures. The model I put together, which ties together climate variables and flow, isn't what would be described as a mechanistic model. It's not something where you absolutely understand the interactions between the different variables and the outcome. It's more a correlative model where I've put together a bunch of variables, created some formulas and a way of putting them together that fairly accurately predicted the outcome. But in terms of what the most critical factor is, it's hard to say.

● (1050)

Mr. Peter Braid: I'd like to ask Dr. Schindler a question if I have time, but have you compared the Athabasca River to any other rivers?

Mr. William F. Donahue: Certainly. Dr. Schindler and I published a couple of papers in the last few years that looked at river flow throughout the prairies.

River flow throughout the prairies has been on a dramatic downswing. River flow in the South Saskatchewan at Saskatoon is down over 80% since the beginning of the 20th century.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

Mr. Calkins.

Mr. William F. Donahue: That's summer flow that I looked at, in terms of river flows all over the place.

The Vice-Chair (Mr. Francis Scarpaleggia): Would you like to go ahead?

Mr. Blaine Calkins: Yes, Mr. Chair. Thank you,

It's certainly a pleasure to have an opportunity to have you here to testify and to rekindle some old connections.

Dr. Schindler, I'm looking at the slides here. When I look at cadmium and at surface water in comparison to the snowpack, the Athabasca River 2 and the Muskeg River 2 sites seem to have very high amounts of cadmium in relation to the snowpack. In terms of surface water, at Beaver River, Steepbank River, and basically throughout all the various testing points on the Athabasca River there are elevated amounts.

I don't know if it's filtered out or if it settles out, but for example if you look at AR17, which is downstream of Fort McMurray, it has a higher rate of cadmium than Athabasca River 3, which is significantly lower. Then we go up to Athabasca River 12, and the rate is quite high again. Could you explain to me how, in that flow, the cadmium levels can change or alter so dramatically, given the same testing cycles, the same testing techniques?

What happens with cadmium? Does it settle out?

Dr. David Schindler: I think the reason is, as you saw, a lot of it is connected with that particulate fraction that will settle, but also, water is added by the tributaries downstream. If the downstream tributaries don't have much cadmium in them, they're going to dilute the upstream sources.

I think the only interpretation I could make of that entire pattern is that there's a considerable variation in sources of cadmium. There must be small deposits of high-cadmium soils in some of those tributaries. One thing that stood out, though, is that there is no clear relation to industry, as there is for some of the other metals.

I think those high values, regardless of the source, are of some concern. They're at levels where there has been demonstrated toxicity to aquatic invertebrates, for example.

Mr. Blaine Calkins: You've been quite articulate in your presentation in regard to the reality that most of the stuff is naturally occurring there. That's not really much in dispute, but the question remains, how much is the current level of activity one of disturbance, of removing the overburden, of just moving things around, changing stream flows, changing the natural habitat that has existed there for so long?

In your work, have you been able to look at anything for the region of airshed monitoring? When we look at this, I'm assuming that with the mining activity we're obviously going to see wind. We're going to see these trucks moving up. We watched it yesterday from the helicopters. There are these dust plumes that follow the trucks around. We're going to see some airborne particulate matter obviously created simply because of the open pit mining activity. Have you been able to link any of the airshed monitoring of any of the particulate matter with any of your findings in the various testing locations that you have?

Dr. David Schindler: So far we haven't. We started to analyze regional airborne patterns, but we've only had the results for a few weeks now and we're just beginning that work. It's clear there are a few metals that don't seem to be related to the industrial activity at all—most notably uranium and cadmium. With some of the others, such as mercury, aluminum, and arsenic, clearly there is a fair contribution from the mining.

● (1055)

Mr. Blaine Calkins: I have a great interest in fish. That's what I took when I was at the University of Alberta; I took most of the fisheries and aquatic sciences courses that I could. I'm concerned about what we're seeing. I heard anecdotally yesterday, talking to a commercial fisherman on Lake Athabasca, that he's seeing some semblance of deformity, disease, or whatever the case might be, in about one in a hundred fish that they're taking out of there.

That's not uncommon. I worked as a fisheries technician for Alberta Fish and Wildlife for a number of years, and it's not actually uncommon, when you look at the Lakeland area or other parts of the province that I've worked in, to find a few fish with deformations or various diseases. Particularly with walleye in the spring, you'll have the various diseases and so on that simply go away as the summer progresses.

I'm wondering if there's anything being done through your study. Is it going to leverage any further research? This is an important commercial fishery on Lake Athabasca. I'm actually quite concerned about what I've heard insofar as some of the problems you've noted here.

Dr. David Schindler: We aren't doing any studies of that sort of thing ourselves, but I know there are programs now that are beginning to collect some actual statistics on deformities of fish, rather than just collecting anecdotes.

I should point out something you may know. There was already one significant spill from the oil sands plants to the Athabasca. It occurred under winter ice in 1982. It was enough to close the fishery, at least at the western end of the lake, for a couple of years. There has been a long history of at least some industrial effect. The fact that this spill occurred under winter ice meant it was impossible to clean up. It made its way down the 250-some kilometres of river and into the lake. I think it's fair to say that scenario could repeat itself.

The Vice-Chair (Mr. Francis Scarpaleggia): We'll have to go to Mr. Watson now.

Mr. Jeff Watson: Thank you, Mr. Vice-Chair.

I thank our witnesses for appearing today.

Let me start with Dr. Schindler.

Looking at your results with respect to heavy metals, for example, how do they compare with other types of minings and tailings? Have you done any comparative work, or can you point us to some comparative work between what's going on in this particular watershed and what's going on in other watersheds or in different mining operations? Can you give a sense of some of the differences? Is this worse, better, or the same as what you'd expect with other mining operations? Can you give us some sort of qualitative or quantitative indication on that?

Dr. David Schindler: I'd say with respect to trace metals, it's probably better than something like a lead-zinc mine or a gold mine, because those are mining areas where metals are concentrated. One area where it's significantly worse is polycyclic aromatics and other organic compounds, because this area is much higher in those sorts of compounds than a typical base metal mine would be, for example. Of course, it's the reason why there's mining activity there, so it's really not a surprise that would be the case.

Mr. Jeff Watson: With respect to PAH's ability to be transported airborne, what are the prevailing winds? Are they typically westerly? In different areas it depends, as there may be micro-climates and things like that.

Dr. David Schindler: I'd say both. The prevailing directions are northwest and southwest, but I've also noticed when I've been in the area that you'll often see smoke plumes channelled right down the Athabasca River, either to the north or to the south. So I think the micro-climate around that steep valley does affect a lot of the patterns in the area.

Mr. Jeff Watson: Okay.

With respect to your study, do you expect to replicate the monitoring at various locations, or is this your one-time snapshot and you're hoping others, perhaps governments, will pick up and do continuous monitoring, understanding that to some degree, if I do a political poll or something, it's a snapshot in time of a particular thing? Is there any intention to do that, or are you moving on to different areas of study that will build on this? In other words, are you satisfied with your conclusions? Can you give me a sense of where your work is going?

● (1100)

Dr. David Schindler: We designed it, at this point, for a snapshot. Since we've demonstrated that you can pick up clear effects with a well-designed monitoring program, I'm hoping that someone, whether it be a federal government or a provincial government, will step in and see that this type of program is maintained.

One area I'd like to do more on—and, again, it will be a snapshot—will be the contribution of what's in the snowpack to the river at spring melt, when four months of deposition could potentially be dumped into the river.

Mr. Jeff Watson: I want to open this one up to everybody here on the panel too. It's my last question, and it's with respect to the issue of reclamation.

This was my first chance to see the oil sands. I traveled half a continent, from as far south as you can go in Canada, right down on Lake Erie, and there were a number of things that I found very interesting in a flyover of the area. They were pointing out spots where reclamation is going on. What I also found very interesting was the natural topography as it exists in areas where there hasn't been any extraction yet, but will be.

Can you weigh in a little bit on concerns about the change in topography, the interrelationship between surface water and groundwater through changing topography, and those types of things? There's been some talk that on some projects there's the idea of compensation lakes or compensation wetlands. Is that a satisfactory mechanism?

I think what we're accepting in that principle, if we go that route, is that there will be changes in habitats, drainage, and things like that. I don't know if that will change the interrelationships between surface water and groundwater access. Can you comment on that for the committee?

Dr. David Schindler: I could maybe start.

I think one of the big factors that will hinder some of the reclamation will be that the base, after the mining is done, is very saline, and a lot of the wetland species that naturally occur in the area will not grow under those saline conditions.

There is some work being done in trying to synthesize wetlands from saline-tolerant plants, such as those that occur in Saskatchewan in some of the closed-basin lakes, and come up with something that will fulfill some of the same functions as perhaps a waterfowl habitat.

It won't look the same, clearly. As I mentioned briefly earlier, the aquifers will be disrupted. There will not be the same relationship between aquifers and surface waters, which really are one water body. I suspect the hydrology will get much more flashy. Rain and snowmelt will hit the river and flow downstream rapidly. It will be the sort of situation we see in the Red River basin in Manitoba every spring as a result of land-use change. But those are just predictions.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much.

[*Translation*]

I would be ready to deviate somewhat from the rules to allow you to ask a brief question at the end, but I need the committee's consent, particularly that of the Conservatives.

[*English*]

Would you allow one short question from Mr. Ouellet?

Mr. Mark Warawa: Well, Chair, we're five minutes over for these witnesses.

The Vice-Chair (Mr. Francis Scarpaleggia): Okay, I just had to ask the question.

Mr. Mark Warawa: We have first nations waiting to testify.

The Vice-Chair (Mr. Francis Scarpaleggia): Okay. Thank you.

[*Translation*]

Mr. Christian Ouellet: I have a point of order, Mr. Chairman. When we're in a normal meeting, the Liberals have three questions, the Bloc has two and they have five. I'm not opposed to them asking five questions, but I want to be able to ask two questions.

The Vice-Chair (Mr. Francis Scarpaleggia): The Liberal Party would have had one more question if a third member had been present.

Mr. Christian Ouellet: It's not a question of attendance. When we are in a normal meeting, even if the person isn't present, there are two questions that come—

The Vice-Chair (Mr. Francis Scarpaleggia): According to the Standing Orders, the second round is not by party but by member. So if a third person from our party had been present, that person would have been able to ask a question. If a second person from your party had been present, the same thing would have occurred.

Whatever the case may be, I requested the committee's consent, but unfortunately, we've completed that segment and we'll have to move on to the First Nations.

● (1105)

[*English*]

Mr. Christian Ouellet: Do I have to beg you? I only have a small question I would like to ask. I'm begging you, please. It's a short question.

The Vice-Chair (Mr. Francis Scarpaleggia): No, I think we have to have a very eminent panel of experts here, and I really don't want to get into some internal housekeeping.

Thank you so much for being here. It was extremely informative. I think you've opened the door to many more questions. I think you've breathed some oxygen into this study. Thank you again for making yourselves available. I really appreciate it.

We'll have a short break and then we'll move on to the first nations panel.

● (1106)

_____(Pause)_____

● (1114)

● (1110)

The Vice-Chair (Mr. Francis Scarpaleggia): Welcome to our witnesses.

We have with us Chief Jim Boucher, from Fort McKay First Nation; Chief Allan Adam, from the Athabasca Chipewyan First Nation; Chief Roxanne Marcel, from the Mikisew Cree First Nation; and Regional Chief Bill Erasmus, from the Assembly of First Nations.

We also have with us Mr. Georges Poitras. Thank you for your help through this whole process, Mr. Poitras.

We were thinking of having five-minute presentations from each panellist, and then we would be open for questions from the members, if that works for the panellists. Okay? Perfect.

Who would like to start?

Chief Boucher.

● (1115)

Chief Jim Boucher (Chief, Fort McKay First Nation): Thank you, Mr. Chairman.

Good morning. Welcome to Edmonton.

I would like to make a brief presentation. Recognizing that we have only five minutes, I have provided a document to the committee with respect to our presentation, which will elaborate on the points I'm going to make today.

Fort McKay is a small first nation community. Our first nation is surrounded by oil sands development. We are in the geographic centre of a massive industrial development. We are surrounded by tailings ponds and we have experienced the oil sands development for the past forty years.

My members have lost approximately 60% of their traplines to oil sands development, and 57% of our lands within 20 kilometres of our communities have been mined or approved for mining. Oil sands leases cover almost our traditional territory and have effectively extinguished the exercise of our treaty rights to hunt, fish, trap, and gather.

Our Industry Relations Corporation has been extensively involved in consultation with industry, intervention with regulatory agencies, and negotiations with government. The IRC has prepared backup documentation for this presentation and would be pleased to provide to the committee any further technical reports on the subject matter of my presentation.

In a global economy with global environmental concerns, the interests and perceptions of the consumers of the oil sands products are important. There is a growing perception that oil sands development is proceeding without a coherent, sustainable development or regulatory plan and that it is irreparably damaging the environment and the first nations communities. The result is a product widely perceived as dirty oil.

Unfortunately, much of the perception is accurate. There is at present no cohesive federal or provincial economic, environmental, or regulatory framework or blueprint to address not only the sustainability of oil sands production, but also its cumulative and long-term environmental impacts on water, land, air, and aboriginal rights.

To date, oil sands development has proceeded on an ad hoc, project-by-project basis within a fiscal and environmental regulatory framework that is seriously out of date. Lacking a coherent and overall plan and strategy, there is only an ineffective, reactive, piecemeal approach to environmental issues, such as water management, cumulative effects, and reclamation planning. The lack of political will and federal-provincial cooperation, competing corporate interests, and the inherent economic instability of resource-based industries have each in their own way undermined the development of a coherent, sustainable blueprint for the second-largest hydrocarbon resource in the world, and the world is noticing.

All Canadians have an interest in changing the world's perceptions of the oil sands, but perceptions will not be changed until Canada, Alberta, and industry put in place sustainable economic and environmental blueprints, as well as effective regulatory regimes for the development and reclamation of the oil sands.

Industry requires withdrawals of enough water from the Athabasca River to sustain a city of two million people every year. Despite some recycling, the majority of this water never returns to the river and is pumped into some of the world's largest man-made dikes, containing toxic waste.

The current licensed level of 550 million cubic metres per year of water withdrawal and the growing demand is not sustainable, particularly in light of the diminished flows of the Athabasca River. DFO has failed to set a minimum flow level for the Athabasca River. Current oil sands operators continue to draw water, regardless of how low the river flow is. The risk of irreparably damaging the fishery or treaty rights threatens our oil sands development production.

● (1120)

We support the following conclusions of the report entitled *Running out of Steam? Oil Sands Development and Water Use in the Athabasca River Watershed: Science and Market-Based Solutions*, prepared by the University of Alberta and the Munk Centre in 2007.

At present, water is a public resource that is given freely to the energy industry. A lack of regulatory limits has enabled companies to rely on extraction and reclamation technologies dependent on the endless free supply of an increasingly scarce and valuable public resource. Consequently, it is used excessively and undervalued, and the real environmental economic opportunity costs are not fully accounted for.

As part of a water conservation strategy, we recommend that governments must initiate a long-term plan, with firm regulatory standards that over time both cap and diminish the licensed volumes of water available to each of the oil sands producers. Knowing that their supplies of water will be reduced will require industry to invest in available technology and research to create extraction technologies that are more efficient and less wasteful of fresh water.

I believe that a cap on water withdrawals to each project and to the industry as a whole needs to be established. Limited but transferable water rights, i.e., a “cap and trade” system, would provide an economic rationale for technological improvements and generate cost-effective solutions, clearly protecting the Athabasca in-stream flow needs.

Ninety percent of the water intake ends up in the tailing ponds. Tailing ponds, which are 70% water, are the world's largest waste water storage facilities, and by 2025 there will be one billion cubic metres of degraded processed water in tailing ponds.

In 1995, our first nation appeared before the Energy Resource Conservation Board to oppose granting a reclamation certificate for the Syncrude tailings pond. A number of recommendation for research and action came out of this hearing, but it appears that since that time there has been little if any progress made on developing reclamation plans wherein strategies are both achievable and acceptable either to industry, governments, or to the neighbouring communities. After 40 years of operations, there are no proven and viable reclamation plans for old tailing ponds.

Recently, in February 2009, the Energy Resource Conservation Board issued its first directive to industry on tailing ponds reclamation performance, which is supported by the community of Fort McKay. However, the main problem, among others, with this directive and its goals is the lack of proven technology to treat water adequately to remove chemicals in fine tails to enable recycling whereby they can return the water to the river.

Federal and provincial governments need to become actively involved in creating appropriate regulatory standards and fiscal incentives for transparent and proven reclamation technologies. They must also ensure that the outcomes of this publicly supported research and technology for water treatment and cost-effective production of dry tailings serves the public interest and is not limited in its availability or use by the proprietary rights of the developer.

The federal government has important areas of jurisdiction that, if asserted, could directly impact oil sands development. The Fisheries Act, the Indian Act, the Migratory Birds Act, and the Species at Risk Act are some areas of jurisdiction that the federal government has to date failed to meaningfully assert in the oil sands. In particular, DFO has stood by for decades and watched the deterioration of the water quality and quantity of the Athabasca River, its tributaries, and downstream lakes.

Our community had relied for generations on the exercise of our treaty rights to fish and to provide a good food staple. This treaty right has been effectively extinguished in our region without any consultation, accommodation, or compensation by Canada. Fort McKay will shortly be taking measures to ensure that the failure of the federal government to protect our treaty rights and the important natural resource of water quality and quantity, including the fisheries upon which our treaty rights depend, does not continue.

● (1125)

The federal government acquires billions of dollars annually from the oil sands through taxes and other means. By 2020—

The Vice-Chair (Mr. Francis Scarpaleggia): Chief Boucher, this is an excellent brief, which we are going to incorporate into our report. Respectfully, are there two or three points that you'd like to hit on before we move on to some of the other chiefs? We're trying to get as much information as we can in the hour that we have.

Chief Jim Boucher: Thank you, Mr. Chairman. There are just two more points and I'll be finished with my presentation.

I just wanted to make the point that the federal government acquires billions of dollars from the oil sands through taxes and royalties. By 2020 the federal revenue is expected to be $51 billion per year. The federal and provincial governments also provide royalty holidays and other fiscal incentives to industry, and Canada needs to use its fiscal levers with the oil sands industry to ensure that failure to meet publicly monitored, performance-based standards for environmental protection, including tailings pond reclamation, have meaningful fiscal consequences. For example, royalty holidays or favourable tax treatment would end when industries fail to meet performance-based environmental mitigation or reclamation standards.

Thank you, Mr. Chairman.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much, Chief Boucher.

Who would like to go next?

Chief Marcel, go ahead, please.

Chief Roxanne Marcel (Chief, Mikisew Cree First Nation): I'll get George to do mine, because I don't think I can do it within five minutes.

The Vice-Chair (Mr. Francis Scarpaleggia): Let me just say we really appreciated your presentation yesterday as well. So your points will not be missed, I can assure you.

Go ahead, Mr. Poitras.

Mr. Georges Poitras (Consultation Coordinator, Government and Industry Relations, Mikisew Cree First Nation): Thank you, Mr. Chair.

The Mikisew Cree have submitted on many occasions to the governments of Alberta and Canada concerns regarding the pace and extent of oil sands development. Unfettered exploitation of oil sands with little to no regard to the Mikisew Cree's concerns and claims have left the first nation to conclude that both levels of government have de facto extinguished the treaty rights of the Mikisew Cree.

The populations most affected by development are the aboriginal peoples, who have been raising concerns of regional impacts since the early 1960s. The Mikisew Cree have questioned and will continue to question the extent of these impacts on treaty and aboriginal rights. Whether referring to the lack of reconciliation of indigenous rights and past and current infringements on those rights, the unconstitutionality of the Government of Alberta's first nations consultation policy and guidelines, the instream flow needs and the water management framework—which we have constantly suggested is wholly inadequate and totally unprotective of the Athabasca River—the provincial regulatory process, the Alberta Energy and Resource Conservation Board and its federal counterpart, the CEAA, or the proposed land use framework, there is a need for greater recognition and incorporation of aboriginal feedback, knowledge, and concerns into the resource management slated for this region of Alberta.

Since 2003, the Mikisew Cree have participated in five oil sands hearings, including three in 2006 in which treaty and aboriginal rights were not considered. The Mikisew Cree have not been adequately consulted by any government with respect to oil sands development, with the exception of certain water licence approvals in 2004. The first nation considers that treaty and aboriginal rights are constitutionally protected and that these rights to hunt, fish, and trap reflect the core essence of the long-standing traditional lifestyle and heritage of the Mikisew Cree. Governments may not simply expropriate those rights to allow for oil sands development. The Mikisew Cree people believe it is their sacred obligation to act as a steward of the environment in cooperation with the government. At stake are precious living ecosystems, the survival of the Mikisew Cree culture, and the economic and physical well-being of the first nation people.

Oil sands leases cover more than half the Mikisew Cree's traditional lands. The scale of the ecological devastation proposed is on a scale that has never been seen or experienced in North America. The oil sands development, in combination with the effects of the W.A.C. Bennett Dam and other demands on the Arthabasca River, will significantly reduce the ability of the Mikisew Cree people to live as we have in the past, and that is off the land. We are simply not prepared to watch more and more of our territory be infringed, nor are we prepared to accept a just-trust-us approach of government and industry while our health is impaired and cancer rates continue to rise in Fort Chipewyan.

The federal government has both the legal tools and the legal obligation to protect our rights and our health. We have already set out our views about the potential for further development to adversely affect and infringe on our section 35 rights, as well as the ongoing concerns of our first nation in respect to negative health-related impacts flowing from oil sands development.

In light of these concerns, we respectfully request there be a moratorium on further development within our traditional territory until such time as there are proper studies completed, including health-related studies, to sufficiently and credibly assess such impacts and until there is proper land use and other planning in place. In particular, we ask the federal government to refrain from issuing any more permits, licences, or approvals in respect to federal areas of jurisdiction within our traditional territory until such steps are taken. We are not against all development. However, we are against the continued infringement of our rights and negative impacts to our health that flow from such oil sands development. We are of the view that calling for a moratorium until proper studies are done is a reasonable response to what has been virtually unchecked development.

● (1130)

As a final point, there is some precedent for the kind of moratorium we are seeking: a full public inquiry. In response to the concerns of the first nations north of 60 degrees, the Berger inquiry was established. The inquiry sought to study the potential impacts of development on those first nations, their social, health, economic, and cultural sectors in respect of the MacKenzie gas project.

Finally, if the potential adverse impacts of a single project were enough to stop oil development, pending proper study, surely a similar request in the face of years of negative impacts is not unreasonable.

Thank you.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Mr. Poitras.

We move on now to Chief Adam, please. It's good to see you again, Chief Adam.

Chief Allan Adam (Chief, Athabasca Chipewyan First Nation): Good morning, Mr. Chairman.

One of the things we want to talk about, from our point of view, is the health issues in relation to the amount of development in the area, in respect of no regulatory systems being in place at this point.

The Athabasca Chipewyan First Nation has numerous reserves located along the Athabasca River and on the shores of Lake Athabasca. With the amount of activity in the region and with the amount of activity that's yet to come, in regard to the issues of the water, we know for a fact that the health issues in the community of Fort Chipewyan have drastically increased over the years. Since the early 1970s and into the 1980s, 1990s, and into the 2000s, numerous cancer rates, lupus, asthma, and skin diseases have escalated in the community of Fort Chipewyan. Not only are the elderly getting sick, but the young ones are as well.

We do not know what is causing the effects of what is going on in the region, but when the community questions the amount of development in the region, they all have one concern: the water issue.

The community of Fort Chipewyan still heavily exercises our treaty right, our inherent right to the land and to the water resources we are surrounded by. As spoken to you yesterday in Fort Chipewyan, I said that 78% of the community still utilizes the traditional ways of life by harvesting off the land. We harvest the food off the land and from the waters. Those very animals, on a daily basis, drink from the Athabasca River and other water bodies around the area. Our people still consume the food, the wildlife that is out there, on a daily basis, to provide for their families.

We live in a remote community. We don't have all the luxuries of the people from down south, where they can just go to a store and buy a jug of milk for three dollars and something. We have to spend upwards of thirteen dollars for a four-litre jug of milk. On fixed incomes, our elders, our single parents, many of whom don't have any jobs to go to, have no choice but to reside on and live off the land.

With all the defects, with the health concerns that are coming up in the region, we asked for a community-based monitoring program to be developed. They keep on asking us to give a solution to fix this problem, but when we ask for funding for a community-based monitoring program they shut us down because they say “We don't want you to duplicate what we're already doing”.

We cannot provide solutions if you do not provide the funding we need for us to go out there to conduct our findings. Only then would we be able to provide a solution, because if we do not know the cause of the problem, we cannot offer a solution.

● (1135)

I've echoed these words many times and sometimes get labelled as the bad guy for speaking out. When you talk about radical behaviour, I am being a profoundly radical person in speaking up to protect the land, the environment, the air, the water resources, and human health. When you have this amount of destruction going on, with industry ripping up the land, polluting the water and air, and displacing animals, that's radical behaviour, in our view.

We do not oppose development. As I stated yesterday, Canada will probably be one of the leading countries in the world that's industry-driven. But Canada will not have the leading industries in the world if it does not deal with all the issues of first nations people, because the areas that are up for development lie within the traditional territories of first nations people.

When Dr. O'Connor raised undue alarm for indicating the health issues in Fort Chipewyan were a cause for concern, he was slapped with four charges. As of today, three have been dropped, but one remains. The people of Fort Chipewyan back up Dr. O'Connor 100% for raising the alarm. He was sent by Health Canada to represent the community of Fort Chipewyan and to take care of our health. He was doing his job. We are asking Canada and Health Canada to drop the remaining charges against Dr. O'Connor and to look into the findings of what is going on in the region.

In closing, I don't have much to say because of the limited time available, but I assure you, and I'll put Canada on notice for this, that under section 35 of the Constitution Act, we have protected rights that Canada is not meeting its obligations for right now. We left this land in trust, not in devastation. We feel that if nothing is being done to address the issues coming out of the community of Fort Chipewyan—and I can only speak for Fort Chipewyan at this point in time, and more so for the Athabasca Chipewyan First Nation, because I am the chief—we will have no other choice but to look to other means, and to find ways through the court system, to address these issues.

I said this yesterday and I say it again today: we will not bear arms against Canada or its people in protecting our traditional territories. There is a legal system that's been put in place for all Canadians. We as first nations people are part of the Canadian society. The only thing that makes us different is the treaty that we signed in 1899, and that treaty has to be honoured by Canada to protect our rights.

Thank you, Mr. Chairman.

● (1140)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Chief Adam.

I'd like to say in passing how affected we were by our visit yesterday afternoon to Fort Chipewyan. Members were talking about it for a long time afterward.

With regard to the issues you raised today, including the issue of monitoring, if you were here for the first couple of hours, you would have seen that it was a big topic with Dr. Schindler and Dr. Donahue. So thank you for touching on that issue in particular, among others.

Chief Erasmus.

Chief Bill Erasmus (Regional Chief, Northwest Territories, Assembly of First Nations): Thank you, Mr. Chairman.

Thank you for the opportunity to present to you.

I have copies here of a resolution that our chiefs passed earlier this year, which I'd like handed out to the committee members. Also, I'm here on short notice and I will make a copy of my presentation for the clerk. I think I can present this within the timeframe allotted.

For the record, my name is Bill Erasmus. I'm the regional chief of the Assembly of First Nations for the Northwest Territories, and I'm also the Dene national chief. We have 30 communities downstream from the development in northern Alberta, and it is of huge concern to us. I am also a member of Treaty 8, the same treaty as the other members from first nations here at the table. We're the farthest community north under Treaty 8, so we cover essentially the same territory.

As you know, the tar sands development is located in and around the Fort McMurray and Fort McKay area, as mentioned by the chief earlier, and it is upstream of the Athabasca River basin.

Current tar sands development has completely altered the landscape of the Athabasca delta and watershed. The tar sands development and exploitation has resulted in many negative impacts, including deforestation of the boreal forests, open-pit mining, de-watering of water systems and watersheds, toxic contamination, disruption of habitat and biodiversity, and disruption of Dene, Cree, and Métis hunting and trapping rights.

Many first nations people do not know the levels of contamination of the traditional wild foods that we consume. We would like regular government testing of our traditional foods to ensure that contaminants and toxins do not exceed recommended levels.

The multiple effects of tar sand operations on water are of great concern to first nations communities. For example, vast quantities of water are used for tar sands development, amounting to approximately 349 million cubic metres per year. As people have mentioned, that's twice the amount of water used by the city of Calgary, and 90% of the water used cannot be returned to the water system afterwards.

Greenhouse gas emissions from tar sands production are three times those of conventional oil and gas production. We've been advised that current tar sands production emits 27 megatonnes per annum, and it is expected to rise to 108 to 126 megatonnes by 2015. Thus the tar sands are poised to become Canada's largest single emitter of greenhouse gases, compounding this country's contribution to global warming.

First nations communities who live near tar sands projects in northern Alberta have been noticing decreasing water levels in lakes and rivers as oil production has increased.

There's also a noticeable peak in negative health impacts in first nation populations due to their close dependence on the land and river. Rare and strange cancers are increasing, and abnormalities in wildlife are becoming commonplace. Unfortunately, the public and the governments of Canada and Alberta still do not understand that first nations communities are the populations most negatively impacted and affected by tar sands development.

The traditional lands of first nations in Alberta, Saskatchewan, and the Northwest Territories are being destroyed for tar sands exploration and extraction. And first nations are not being included or properly compensated for those lost and destroyed lands, water supplies, breaches of treaty rights, and loss of traditional foods. The Dene and the Cree first nations and the Métis live close to or in the midst of these tar sands deposits, mostly along the Athabasca River basin area.

From February 16 to 19, 2009, the Dene Nation convened a leadership meeting in Yellowknife for the purpose of addressing issues concerning the Dene. During this meeting, a number of resolutions were put forward regarding the impact of the Alberta tar sands—and especially concerning the impact on water. We are providing you with a copy of the resolution we adopted.

● (1145)

We are disappointed that the governments of Alberta and Canada failed to live up to the financial, fiduciary, and moral responsibilities to manage the Alberta tar sands in an environmentally responsible way. We are disappointed that the Government of Alberta has encouraged the rapid expansion of the Alberta tar sands without implementing adequate regulatory or environmental protections to reduce negative impacts of individual projects or the cumulative impacts of all projects considered together. We are also disappointed that the Government of Alberta has failed to take adequate steps to protect water, fish, and migratory species.

This mismanagement is no longer an issue just for Albertans. It is now an urgent threat to all downstream communities in the Mackenzie basin, most critically, at this point in time, in terms of risk to water quality posed by leaks from the huge tailings ponds into the Athabasca River. A large-scale breach of tailings ponds with a resulting massive uncontrolled inflow of highly toxic poisonous water into the Athabasca River and the rest of the Mackenzie basin would be an unmanageable catastrophe.

Therefore, it was resolved that all members of the NWT Association of Communities call on the Government of Alberta to immediately halt tar sands expansion until the following provisions are in place: one, public contingency plans for catastrophic breaches of tar sands tailings ponds; two, a plan to fix existing leaks in current tailings ponds; three, a ten-year plan to reclaim all existing tailings ponds that do not involve any release of toxic effluents into the river system; four, a commitment to use dry tailings technology for all future tar sands development; and five, a commitment to hold extensive environmental hearings—with standing for NWT communities—on the cumulative impacts of the tar sands projects, including any plans to allow water from the tailings ponds into the Athabasca River.

It is further resolved that until these conditions are in place, all governments in the Northwest Territories and across North America be called upon to implement a low-carbon fuel standard that would decrease reliance on or entirely eliminate the use of dirty tar sands oil.

Now to recommendations. Turning to our purpose for being here today, Mr. Chairman, we are pleased to offer this committee our perspectives on the negative impacts of tar sands exploitation on first nation communities and lands.

Apart from calls for consultation and accommodation, the free and prior informed consent of first nations interests must be carried out before any further activity in the oil sands.

A federal and provincial governance must incorporate first nations' unique knowledge into decision-making. This is because first nations' knowledge comes from their historic current and ongoing relationship with the land and water.

In conclusion, Mr. Chairman, it is essential that the federal government recognize first nation jurisdictions and authorities. Government cannot continue to work in isolation, as first nations have much to offer. We insist that the governments of Canada and Alberta meet their responsibility to ensure that the cumulative and environmental impacts of the exploitation of the tar sands oil do not irreparably damage the planet for future generations.

Again, Mr. Chairman, we ask this committee to include in their report our recommendations and resolutions with regard to the halting of further expansion of tar sands operations until the abovementioned tailings ponds provisions are met.

Thank you, Mr. Chairman.

● (1150)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much, Chief Erasmus.

We have time for a six-minute traditional first round, starting with Mr. Trudeau.

Mr. Justin Trudeau: Thank you very much, all of you, for your presentations. *Masi cho.*

I will start with Chief Boucher to stay in order. We flew over Fort McKay yesterday morning, and it was pointed out to us that many or most of the citizens living in Fort McKay are in the employ of the oil sands projects and development. Is that indeed the case?

You mentioned that you had lost 60% of your traplines to mine sites, for example. Has there been a shift in lifestyle and in work for the people of Fort McKay?

Chief Jim Boucher: Yes, that's correct. When the animal fur activists were successful in the fur ban in the 1980s, our community had no economic means of being sustainable any more. The only opportunities we had for employment were with the resource extraction industry, so we changed our focus with respect to economic opportunities. We have been very successful with respect to obtaining employment for our people as well as with obtaining contracts for our companies. We're one of the more successful entities in the region. We're still struggling, of course, with the economic interests versus the environmental effects and we're dealing with that on a constant basis.

● (1155)

Mr. Justin Trudeau: Thank you.

You mention also in your brief that the water management framework was perhaps not being followed—"the lack of effects on key regulatory decisions" is the language you use—for water management. Is it your perception and conclusion that the existing water management framework isn't being applied, or isn't sufficient?

Chief Jim Boucher: I presume you're talking about the IFN stream flow needs in respect to this question. We were engaged in early 2005, I believe—I have some correspondence regarding this—when the decision was made at the Energy Resource Conservation Board level with respect to an application by Shell Canada and CNRL. The recommendation that came out of that was that the IFN number would be set by CEMA. Well, CEMA undertook the exercise and didn't come up with a number for the IFN that would be protective of the fisheries and the ecosystem in the Athabasca River basin.

DFO made a commitment that they would set the standard, if CEMA was not able to come up with a number within a set timeframe. The timeframe expired, and DFO came up with a proposition, which we supported initially—without any scientific basis, but it was more protective of the interests of the Athabasca River system. We agreed that this should be the number on an interim basis while the scientific work was conducted on the Athabasca River.

Alberta Environment got involved in the exercise, as well as the industry folks in Calgary. My understanding is that a meeting occurred between industry and Alberta Environment. They raised concerns with respect to the proposal by DFO. As a result of that meeting, the numbers were changed regarding what the targets were going to be.

As a result, we lost faith in DFO's setting the targets, the instream flow need number, which was protecting the Athabasca River. We also asked for more scientific work to be done with respect to the Athabasca River system so that we could protect the ecological integrity of the river. No work has been done with our community to establish this since that point in time.

Mr. Justin Trudeau: Thank you.

Here is a question for Chief Adam. I'm jumping ahead, as I have too many questions for the time given. This concerns the reliance on country food by elders and people in your community.

We talked about this yesterday. When you go out onto the land, it is now the practice to bring bottled water or jugs of water with you, because you're no longer able to drink from rivers and streams that you cross and travel through. Is concern about consuming food off the land that is itself dependent on rivers and streams you're not drinking from linked to the health problems you're bringing forward?

Chief Allan Adam: That is what we are assuming at this point in time, that all related health issues in regard to rare diseases that are coming into the community are from the water in the area, because of the massive body of water we live beside. We still go out to the land and harvest from the land.

Back in the late eighties, we began to notice in the community that people had started bringing water from Fort Chipewyan to the bush, because they would no longer drink the water from Lake Athabasca, and from the rivers as well, because something was going on and they just weren't too sure. They don't trust the water any more, ever since then.

That's the issue that's always been coming up: the water issue. When you ask community members what is the cause of all these problems, most likely ten out of ten would tell you it's related to a water issue.

● (1200)

[*Translation*]

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Chief Adam.

We'll now go to Mr. Ouellet.

[*English*]

Mr. Christian Ouellet: I thank you.

I'll be very short, because I don't have any specific question. You were very clear this morning. I thank you very much for coming again; I think you made some of your points even more clearly than yesterday.

I think the most important thing is to remember what you said and to remember that the treaty is between two nations. I shall do my best about that, because I think you're right.

Thank you very much for coming.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Mr. Ouellet.

Ms. Duncan.

Ms. Linda Duncan: Thank you, Mr. Chair.

Thank you again for your presentations and for the time you gave to us yesterday. It's very much appreciated.

I wonder whether the chiefs could provide to us at a later date maps showing where your traditional lands and your reserves are, because the question was raised yesterday and it's raised here today on the record. Regrettably, we don't have available to us the maps showing these. I think it would be helpful, if we could actually see....

Oh, we have the Treaty 8, but it would be important to see both the traditional harvesting areas and also where the actual reserve lands are. I think that would be really helpful to us.

I have a couple of questions.

I think it was you, Chief Adam—or was it the Mikisew Cree?—who raised the issue about the lack of community-based monitoring.

Was it you, Chief Adam?

Chief Allan Adam: Yes.

Ms. Linda Duncan: It's a very important point, and I'm happy that you raised it.

I used to be on the board that provides a program for training for first nations in how to do community-based monitoring, but it has been pointed out to me that it's a rather senseless practice, if the funds aren't then made available to have you deliver the monitoring program. I wonder whether you could elaborate a bit more on that.

To be efficient, I'll just put out my second question, because you might want to connect the two. It's my understanding that you want to initiate community-based monitoring. I'm presuming it's for the fishery, the wildlife, the water quality, and possibly air quality, but perhaps also health studies. I'll let you elaborate on that.

My second area of questioning, and I'll leave this to each of the chiefs to speak to, is on the health study. Something I remain puzzled about is that it's my understanding that Health Canada is responsible for helping to finance and support health services for first nations peoples, and yet when issues have been raised, it's the Alberta Cancer Board that has done the study.

Perhaps you can explain to me how that filtered down to a provincial agency. But I want to know whether you have ever been consulted on the methodology, the terms, and so forth for these studies.

Secondly, as the cancer board has said, there need to be follow-up studies on some of the cancer rates. Are you being consulted in those follow-up studies, on methodologies, timing, and so on?

The Vice-Chair (Mr. Francis Scarpaleggia): Chief Adam.

Chief Allan Adam: It relates to the community-based monitoring program. We've been talking about community-based monitoring numerous times at different tables in order to raise this issue. Regardless of the health issues in Fort Chipewyan and the extensive development in the region, it was only apparent to us that we needed to conduct a community-based monitoring program in the community of Fort Chipewyan when all of the issues were coming out.

As I said earlier, in order for us to conduct our findings to give solutions to the problems it's only adequate that we provide fair information to the public. Without funding in place, we cannot do that. We wanted to take samples of water, sediment, vegetation, air quality, and food from the wild game in the region to conduct our findings and to pick a certain area where we thought the problems could be occurring. If we came up with findings, then we would look at a methodology to try to find a solution to fix the problem. That was the reason we pushed for it.

Somewhere along the line, there was the misconception that we were trying to dig up findings for legal action in the future. The only reason legal action is being considered for the future is that nothing is being done at this point in time in regards to the issues. When nothing is being done and we feel we're being neglected, what other means do we have to turn to? We have no other means but to turn to the court system.

That's why we need the community-based monitoring program. We need to train our people to monitor certain areas. When I talk about monitoring, I'm talking about picking an area and constantly using that area for three years. You cannot pick one area, then walk away from it, and then go and pick another area, because you will not then know what is happening on a year-to-year basis in the first area. Different areas will have different findings, and so you have to keep going back. That's how you do your analysis and that's how scientists do their analysis today.

We use the format of providing general information. You don't have to be rocket scientist to develop proper guidelines; all you need is common sense, and we all have common sense. When we neglect common sense, the problems start here, there, and everywhere. Therefore, I can speak to community-based monitoring.

I think Chief Marcel, or Georges, could elaborate more on the health issues.

● (1205)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much, Chief Adam.

We'll now have to move to Mr. Warawa, if that is all right, because Ms. Duncan's six minutes are up.

Mr. Warawa.

Mr. Mark Warawa: Okay, thank you, Mr. Chair.

Thank you for coming to the committee.

I had a chance to meet many of you yesterday at Fort Chipewyan. Thank you for your efforts to come down to the committee.

Where do each of the communities you represent get their drinking water, and how is it tested? Who is doing the testing?

I'll maybe start with Chief Erasmus.

Chief Bill Erasmus: We get our drinking water from the Yellowknife River, which fortunately flows the other way; it comes from the barren lands, and we're downstream. The water from the Mackenzie River water basin goes into Great Slave Lake, but we don't consume that water. So we're fortunate that we don't have to take water from this basin we're talking about.

Mr. Mark Warawa: Who does the testing of the water?

Chief Bill Erasmus: There are federal-territorial monitoring systems in place. As far as I know, we as first nations are also engaged. It's quite a different regime in the Northwest Territories, as you probably know.

Mr. Mark Warawa: You're saying the testing is federal.

Chief Bill Erasmus: Primarily it is, yes.

Mr. Mark Warawa: Thank you.

Go ahead, Chief Adam.

Chief Allan Adam: We get our drinking water from Lake Athabasca. Our intake valve is situated down by Monument Hill. It comes out from the Athabasca River into Lake Athabasca, which in turn goes downstream from there, where it passes through the community of Fort Chipewyan. We get our drinking water directly from Lake Athabasca.

The testing that's done is being conducted by the municipality. They govern the water. It's municipally regulated. They send it out on a daily basis to certain labs in the area, probably U of A or other labs. They just look for basic contaminants like E. coli or stuff like that, but they don't conduct thorough investigations into the source, so the community always raises the issue that maybe it's time to move the intake valve from Lake Athabasca somewhere instream or to an inland lake to provide safe drinking water for the community.

Only then would they feel secure, but at this point in time they just don't feel secure about it. We have no choice but to drink the water from the tap. A bottle of water is $3. That's just 750 millilitres of water, not even one litre, but we pay $3 for that.

● (1210)

Mr. Mark Warawa: What's the result of the testing by the municipality on the water? Are they saying it's safe to drink?

Chief Allan Adam: They're saying it's safe to drink. It's safe water to drink and everything like that, but then we have a different issue in that area. Because of all the heavy metals they're not testing for, we feel the testing and results in that area are inadequate. That's why the community wants the intake valve to be removed from the area where it's situated now.

Mr. Mark Warawa: Have you asked the municipality to ask the University of Alberta to test for heavy metals?

Chief Allan Adam: We've clearly asked at meetings for them to start testing all these things, but because of the high cost of testing here and there, they refuse to do so. Therefore, they just do the regular thing. They just check the common occurrence of what they consume.

Only when there's a problem will Health Canada step in, put a ban on drinking water from the taps, and say that until further notice you have to boil your water in the community. It's happened a few times in previous years.

Mr. Mark Warawa: Is there time for the other...?

The Vice-Chair (Mr. Francis Scarpaleggia): Yes, if you would like to.

Mr. Mark Warawa: Please go ahead, Chief Boucher.

Chief Jim Boucher: We chose to take our drinking water out of the Ells River, which comes from the Birch Mountains and flows into the Athabasca River. The municipality also operates the water treatment plant by virtue of an agreement we struck with them a number of years ago, and it's a requirement of that agreement that they do sampling with respect to the production of water.

As part of our administrative effort, we also take grab samples, I think on a daily basis, from various points in the community. Either it's institutional or it's within homes. We send it out for analysis and get the results back through Health Canada.

The water is deemed to be safe and meets the Canadian water standards for drinking.

Mr. Mark Warawa: Thank you.

Go ahead, Chief Marcel.

Chief Roxanne Marcel: It's the same as Chief Adam; we get our water from the community.

On the reserve, we do have our own water. We transport the water from the community onto the reserve, and then we have the Nunee Health Authority, which in turn takes samples twice a week and sends them to Health Canada and gets the results back. They don't test for any chemicals. They just ensure that the water is safe, that there are no high levels of chemicals in there like bleach or iron and things like that.

Mr. Mark Warawa: What role would you see the federal government playing in helping with the monitoring to ensure safe drinking water?

Chief Roxanne Marcel: The role I see them playing is in ensuring that the water is safe to drink. People in communities still drink it, even though they're not one hundred per cent sure; they still have their doubts that it's not safe. They need to do more testing, ensuring that the chemicals, such as the PHAs and things like that, are not at a high level. I don't know the scientific names of all the chemicals, but that's the testing that needs to be conducted, so that we can feel safe.

We can't all buy bottled water in the communities. Some of the communities still boil their water. Even though the Alberta government says it's okay to drink, they still boil it to ensure that it's safe. They're getting something out of it, I guess, for protection for themselves.

Mr. Mark Warawa: Thank you.

Do I have time for one last question for Chief Erasmus?

The Vice-Chair (Mr. Francis Scarpaleggia): Your time is just about up, but go ahead.

Mr. Mark Warawa: In the resolution that you presented to us today, you had five points. Point 2 says “a plan to fix existing leaks in current tailings ponds”. In point 5 you said “to hold extensive environmental hearings...including any plans to allow water from the tailings ponds into the Athabasca River”.

What we heard on our tour and in the testimony we heard from witnesses on these points is that there aren't any leaks from the tailings ponds and that there's no water being discharged from the tailings ponds into the Athabasca. Dealing with those two points, do you have evidence you could provide to the committee that there are tailings ponds leaking? And do you have any evidence that there are plans in the future to allow tailings pond water to be discharged into the Athabasca?

● (1215)

The Vice-Chair (Mr. Francis Scarpaleggia): Was that addressed to Chief Erasmus?

Go ahead, Chief Erasmus.

Chief Bill Erasmus: Thank you for the question.

Before I get into that, in my previous answer to your question on water intake, I only referred to my own community in Yellowknife, but there are 30 other communities down the river system from there who may take water from the Mackenzie River, for example. They may take direct water. I wanted to have that on the record.

As for whether we have evidence of leaks, I don't have such evidence with me. I can certainly go back and check, and whatever I can I will bring forward to the committee concerning the tailing ponds. I will provide that kind of material to you.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Chief Erasmus.

That wraps up this segment. Thank you very much to the panellists. It was very nice to have you with us here today.

We'll suspend until one o'clock and resume then.

Thank you.

● (1217)

_____(Pause)_____

● (1303)

● (1300)

The Vice-Chair (Mr. Francis Scarpaleggia) I'll invite the witnesses to take their seats at the table so that we can proceed.

We have three witnesses: Mr. Tom Unka, Mr. Sam Gargan, and Chief Mercredi.

I would like to underscore to members that Chief Mercredi drove 12 hours to be here. We appreciate that.

We're looking at five-minute presentations, followed by questions. We'll be very liberal—small-L liberal.

Chief Mercredi, would you like to go first?

Chief Albert Mercredi (Chief, Fond du Lac First Nation, As an Individual): Thank you for the opportunity.

My name is Albert Mercredi. I'm a chief at the Fond du Lac First Nation. I'm one of the community members downstream from the tar sands development.

To make references in my presentation, I have had the organizers put up the mapping system of where we come from in the Athabasca region. Also, the Athabasca land use vision planning process will be displayed for reference.

With that, good afternoon to the elected representatives, the elders, members, ladies and gentlemen. Thank you. I am honoured to be here representing my community, the Denesuline people, and to have this opportunity to speak to you this day and address these important issues.

I will speak from the perspective of my people, the Denesuline of the Athabasca, both north and south of the 60th region. In Dene, we call the land Dene Nene. It's “the land”, as it's called in the English version.

We note from the agenda that the topic of sustaining the environment and the economic wealth of the western economies is of significant importance. The importance to our people is that the land and the waters of the Athabasca Dene have sustained our people for thousands of years, and our Dene people have sustained the lands and the waters.

Our elders teach us, and we believe, that if we take care of the lands and the waters, they will take care of us. For these reasons, as Dene people we believe we are already wealthy if we possess clean air, clean water, and clean land within which we hunt and trap and gather for a livelihood. Our wealth is of secondary importance.

Today, our lands and waters and resources are being demanded for use by international and national resource companies. They are taking over the land faster than we have ever experienced before. This has alarmed our people, along with the reports of the degradation of both our environment and the Dene people.

The energy industry has encroached greatly upon the lands and the waters, in most cases without consultation or regard for our people; however, our greatest threat is the encroachment on our territory of the oil and gas industry and activities in the Fort McMurray area on the Alberta side. The Oilsands Quest area on the Saskatchewan side recently has publicized its thousands of kilometres of new cut lines and roads in our territory, with the intention of production within one to two years.

Our Athabasca Dene people are very alarmed by the recent reports from Alberta disclosing the toxic nature of the Athabasca tar sands being developed in the Fort McMurray area, which are a concern on an international scale. Our Dene people are alarmed at the published suffering of our friends and relatives of the Fort Chip Denesuline First Nation—the highest incidence of deaths in the Denesuline community—from cancer and disease that is suspected to be linked from the poisons flowing into our water from the Fort McMurray tar sands production.

Our Dene people are alarmed that the waters flowing north in the Athabasca River are bringing these poisons into our Lake Athabasca and to our doorstep on the Saskatchewan side. In addition, the reports from Alberta and Saskatchewan disclose increasing levels of acid rain linked to the Fort McMurray tar sands. Our Dene people are experiencing the harmful effects of these poisonous projects on the fish and the wildlife, which we rely upon for sustenance and which contribute to our Denesuline economy.

● (1305)

Both the Fort McMurray tar sands and the Saskatchewan Oilsands Quest projects have proceeded without any consultation or involvement of the Athabasca Denesuline people. A letter from one company to me discloses that they believe they have no obligation to consult with our people and that the duty and obligation rests exclusively with the provinces.

Our Denesuline elders have spoken for years and warned us of the destruction of the environment if we do not take care of the lands, the waters, and wildlife, and if we give up our responsibility as stewards of the homeland. At a time when the world and the nation of Canada are in a crisis and crave clean sources of energy, the provinces of Alberta and Saskatchewan and all western provinces must show leadership to keep our lands and waters pristine. The Province of Alberta needs to focus on cleaning up their environmental mess, and our Province of Saskatchewan should be concerned about the harm and destruction of promoting and allowing similar projects to proceed.

We are aware that the Athabasca region is one of the most active energy resource exploration and resource extraction regions in the world because of the demand for the energy formed from the hydrocarbons and from uranium. The activities involved in the oil and gas and nuclear energy industries are threatening the traditional livelihood, the culture, and the values of my people. Many times our people are surprised while out on the land to come upon exploration camps that have permission from the provinces to go onto our Denesuline lands and waters without notice or consultation, and without the consent of our first nation government.

Our people for many years have not been provided with the opportunities they should have to develop themselves, their education, their training, and their own businesses, and to take advantage of the opportunities that the energy industry presents. These outside companies, with their Canadian workers, have benefited to a far greater extent than our people over the years. We do recognize that the energy industry has benefited our people to some extent through employment, but the energy companies and the provincial economies have benefited themselves far more in comparison.

As a result, our first nations have decided to take a proactive and a two-part approach to preserving the Athabasca Denesuline interests now and for the future generations.

First, we have created our own regional development corporation to attempt to control development in ways that benefit the Athabasca Dene people and that, above all, allow our leadership to have some involvement from an industrial perspective in how the lands could be developed. This has allowed us to benefit from some opportunities, including education and training, employment, and business development.

Second, we are taking a proactive approach to enforcing our rights and demanding that both the provinces and the energy companies follow a process that includes both providing Denesuline leadership with information on company exploration, which involves meeting as often as necessary to consult with our first nations government before any permits are granted.

Third, we have developed an Athabasca land use plan, which has been approved by all Athabasca Denesuline chiefs and their neighbouring Dene communities. It is displayed in the room here. The Athabasca land use plan has also been ignored by the provinces, resulting in the advantages of the territory going to outsiders for far too long.

Fourth, we have developed a protocol to establish a framework for the crown's duty to consult and accommodate, which includes a resource development project review and approval process. The protocol is in direct response to the lack of formal process developed to date, which appears to reflect the lack of political will on the part of Canada and the provinces to take the leadership role. In the experience of the Athabascan Denesuline, the crown seems to be content to delegate the responsibility and duty to consult to the energy industry. This is unacceptable, and the Athabascan Denesuline are experiencing the impacts of the crown policy.

● (1310)

Our Athabascan Denesuline leadership must take an active role to ensure that the potential for harmful and destructive projects cannot take place in a provincial environment that ignores and does not involve our Athabascan Denesuline people through a formal process of consultation and accommodation.

For these reasons, our Athabascan Denesuline people must plan the enforcement of our rights, interests, and title against Canada, the provinces, and those corporate developments that fail to consult with us. We are prepared to act as necessary to be involved in negotiating the conditions and addressing the potential impacts under which we would allow access to our lands and waters. The duty to consult must extend and be discharged to our Athabasca communities, and their interests must be accommodated.

The Athabasca can no longer wait. We must take this opportunity to make our stand, as we have everything to lose. To our Denesuline people, this is not an option for us.

We come from an Athabasca perspective. The region I represent, with over 67 years of mining in the area, includes three abandoned mine sites and 39 satellite exploration sites that to this day have never been cleaned up. We come from a region that is wealthy in uranium and is still growing strong in the near future, and now Oilsands Quest is taking part.

Thank you for this opportunity, ladies and gentlemen. Thank you very much.

● (1315)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Chief Mercredi.

Now we'll move to Mr. Paulette, or to whoever wants to go.

Go ahead, please.

Mr. François Paulette (Fort Fitzgerald First Nation, As an Individual): *Sela tena.*

I want to address this committee.

When we say in our language, "*Tu degiha*", it means "Water is sacred"; "*Tubeta tsina*", "Water is life"; "*Tu nere dela tulahta*", "Water is like our bloodline that flows in Mother Earth".

I want to say that water, which we're talking about today, versus oil is the subject of what this hearing is about. As the chiefs mentioned before, we have a treaty right to water. The UN Declaration on the Rights of Indigenous Peoples, which was passed at the UN, refers to water and the rights to water.

Spring, as we know, brings forth life. It brings forth life, but this poisonous, toxic material that's put into the earth—and you saw it, you flew over it.... When life comes forth like a mother bringing forth life in the spring, you give a needle of that toxic material to a pregnant woman and you will kill her and the child. That is how Dene people see what is taking place.

I was part of the Berger inquiry in the 1970s. I want to talk about two views of the world that we see. One is colonization. The colonizers' perspective is that indigenous people need to be assimilated so that they can become part of a wage economy. That's a very colonial mentality, and it still goes on today. It means that the wage economy must flourish over our *Dene chanie*, our culture. Literally translated, it means "the path we walk". It means that our way of life, the way we view the world, is backwards—we lead a simple life, so therefore we need to be colonized.

Our people have now been struggling to decolonize, simply decolonize. The Berger inquiry was a very significant part of that history, and we're doing it again here, but in a very much smaller way. To decolonize simply means to decode and to be in charge of our way of life, so that our culture, our *Dene chanie*, survives in the future, like every other culture in the history of peoples in the world who have preserved their way of life, protected it, and practised it. I just want to say that our investors ask us not to, and will not allow us to, destroy her future. It's as simple as that.

● (1320)

I live by the Northwest Territories border. I have provided maps of the Slave River. We are known as the Phabettie Dene, meaning "the head of the rapids". The history of this set of rapids is very rich. All of our existence and survival depend on this part of the world. We are adjacent to Wood Buffalo National Park. The Alberta government recognizes this corridor as a heritage site.

We are polluting the river. Now, ATCO and TransCanada PipeLines are proposing to build a run from the reservoir to obstruct the river so they can produce 1,000 to 1,500 megawatts of power. This is insane. The water is polluted. It is like plugging up your sewer system in this city. You will find very soon that your whole system is polluted. But this is what ATCO and TransCanada are proposing. So the river is now going to be dead—our fish, wildlife, and so on. This beautiful territory that I come from has now been affected by the tar sands. It is real.

I'm by the river, about 180 miles, if not 200 miles, from the tar sands. Two years ago I was up the river, but I forgot to bring fresh drinking water and I was sick for three days because that water is polluted. How is the water? How are the fish? The fish are a species at risk in this river, in this water. We have witnessed green sludge in the water. When people put nets in the water to catch fish, they're catching green algae. We've never seen or witnessed this before. There's foam on the water that is building up, and it has never been seen before. The only monitoring system on the river is where I live, in Fort Fitzgerald. All this monitoring system does is measure the flow and depth of the water. That's all it does.

The finding of the Pembina Institute is that the river has dropped 35% since 1971. I live on the river. I go up and down the river all the way to Fort Chipewyan. This past fall I would say that the water has been down by 40%—that's 40%.

● (1325)

This winter I took part in an NWT water strategy plan. Our job was to consult with the leadership and the chiefs in the Mackenzie Valley. I must say that the chiefs and the elders have a great concern about their river system in the north. They're concerned about the fish, the wildlife. They say that the fish is not normal, that the fish is fleshy when you eat it, when you open it up.

Health is a great concern to the elders because there's a lot of cancer down the river. There's just as much as what's taking place in Fort Chipewyan. In Fort Chipewyan, there is probably more than in other areas of the Mackenzie Valley. The biggest concern they have is that there's absolutely no data on the waters, rivers, or lakes about what's happening. Where I live there is no monitoring. There is no data, except for water flow and depth.

Have I ever seen the provincial government in my community? Never. Have I ever seen a federal official in my community to look at the water? Never.

Wood Buffalo National Park, which is close to me, also doesn't have a system for looking at water. Right now, the way we see it, until things are finalized, there should be no more new projects. There should be a moratorium on projects.

I know that the time is up. I'm used to making...not long presentations, but I'll make it short—

The Vice-Chair (Mr. Francis Scarpaleggia): No, no, your presentation is fascinating. Because of the pivotal role you've played in the history of the region and with respect to the Mackenzie Valley pipeline, I think some members have some very good questions for you. I just want to make sure there's enough time at the end for questions for you and the other panellists.

● (1330)

Mr. François Paulette: Thank you.

I want to present this to the people. It is *Tubeta Tsina*. It's a one hour and 15 minute documentary. I really urge you to view this. These are witnesses. They are people I spoke to with regard to water.

I really want to thank you for taking the time to listen to me. *Merci.*

The Vice-Chair (Mr. Francis Scarpaleggia): We'll definitely be getting back to you with questions.

Go ahead, Mr. Gargan, please.

Mr. Sam Gargan (Dehcho First Nation, As an Individual): Thank you, Mr. Chairman. Good afternoon, members.

Ideology can be western, European, oriental, black, or native American. Regardless of status, we all need each other. We all value the principles and beliefs that guide our everyday lives.

It is because of Mother Earth's good grace that we are here today, yet we keep creating innovative ways of ignoring the obvious, creating an illusion of misconceptions, playing Russian roulette, screwing around, and tinkering with her generosity. We need to honour her sacred elements of water, air, earth, and fire. Without any of these elements, mankind as we know it will not exist.

Indigenous people of the Americas have much to offer: a vast knowledge of what was good, what has gone wrong, and what could be recuperated in terms of our relationship with the broader environment.

Before contact, the Dehcho Dene lived with and from the land to sustain societies and to grow and develop. Relationships were organized to ensure both Dene and all living things continued to thrive and flourish. This required the development of systems of traditional knowledge that were precise and disciplined, and in what we would call today a material or scientific sense of having to deal with resource protection, renewal, and regeneration.

In this century, our environment is being destroyed to a point of no return. The very ground we walk on, the water we drink, and the air we breathe threaten to make us ill rather than being a source of our health and well-being. To this, Dehcho has much to offer.

Traditional knowledge is central to managing our environment. The land use plan passed in 2006 is a prime example of that. This essential document that creates harmony between governments, industry, and first nations is no longer relevant because of tinkering with what we consider survival mechanisms. Industries and governments seem to miss the point of this document.

Mr. Chairman, the Dehcho land use plan is a blueprint for industry to use when planning potential development. It is a good working document that industry can use to guide its direction. This responsible, perfect document is now being changed, based on a phase called conformity. These conformity requirements do not make sense to those who have used the land and the waters since time immemorial. Conservation zones have been replaced with special development zones by people who have never set foot on our lands.

In a contemporary developed country such as Canada, politicians often debate ideas in the abstract. Alienation of people by ideas can lead to war to defend one theory or another about the best way to govern, each proclaiming that their way is the best and only way. Politicians tend to become stagnant and defensive, seeming to care more about being right than doing right. The Dene way of governing is to see government as a constantly evolving and dynamic set of relationships between people. It must be open to adapt to changing conditions and circumstance. The Dehcho modes of government, like all forms of government, are not necessarily perfect, but we have a very important contribution to make to the contemporary debate on how we should care, govern, and live in harmony with one another.

The Dehcho can pass on traditional knowledge about trade and commerce and about peace, order, and good government by exploring first nations modes of government and the relationships between diverse people or ethnic groups of people. We are also living in a rapidly and dynamically changing world. We are in a recession. All systems of government are vulnerable, and they all have strengths and weaknesses. Indigenous values and principles have largely been cast aside and replaced by an administrative government driven by economic interests.

● (1335)

Canada relegated their values and principles to the past and deemed the Dehcho system of government inappropriate to present circumstances. To disregard ways of life and knowledge that organized the Dehcho Dene for thousands of years was a dreadful error and a grave loss that our people are suffering from, as are the land, skies, and water.

To recuperate these losses and to open the eyes, ears, and minds of the world's people to this historic tragedy will require much more than remorse and regret. It will require first acknowledgement and then respect. It will also require government to make brave decisions and to have the courage to act on them.

We have a vested interest. As stewards, we have a duty to protect what we have. However, for the time being we rely on governments that have only economic interests in mind. Recession gives us a time to reflect, evaluate, and refocus on why we are on this planet. Timing is everything. The opportunity exists now.

Mr. Chairman, being keepers of the water happens now. There's nothing new in that word. Since time immemorial we have been sharing our knowledge, stories, and legends regarding our lands and water. We have learned from nature the gift of survival. We have also learned in this generation about industrial development and the devastation and destructive measures it can bring in the name of progress.

First nations of this continent have become a collective force, through our moccasin telegraph, regarding our most precious resource, water. A humanitarian issue that started in the north is now spreading across the country, across this continent, and across this world. The collective network, the Keepers of the Water, and the water keepers, the indigenous water network, water strategy, and environmental forums are collectively furthering this struggle toward a common goal of protecting Mother Earth and her sacred elements. As stewards, our focus should remain consistent with human evolution, not material wealth. Our focus should be protecting water resources and the cultural use and traditional values of water, and our conservation practice should that ensure future generations are not denied those elements that sustain us today.

We are not missing any points here. While I agree a little money in the pocket is good, we must raise the bar to a higher level if mankind as we know it is to survive. We must have the courage to challenge the status quo. We must be vigilant and open our eyes. We haven't survived on this continent by denying others a means of survival. We all have a vested interest. How we survive will not be dependent on governments. Stupid decisions that compromise our survival will not go unchallenged.

Since global warming has become an issue, we have made half-hearted attempts to address it by seeming to care. We act concerned, while pondering, with our fingers crossed behind our backs, that it won't change by itself.

The Vice-Chair (Mr. Francis Scarpaleggia): Mr. Gargan, are you able to wrap up briefly so that we can go to questions?

Mr. Sam Gargan: Yes, I'm skipping some.

There are those who died, those who are ill, and those who are living downstream. What about those who depend on the wildlife? What are we doing? Committee members, we desperately need your strength and your foresight in determining that the survival of mankind is at stake. Therefore, half measures are no longer an option. Bold action is required now.

Mr. Chairman, I thank you, and I wish you all the best in your deliberations.

● (1340)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Mr. Gargan.

We'll start our first round of seven-minute questions with Mr. Trudeau.

Mr. Justin Trudeau: Thank you, Chair.

Thank you for the presentations.

I think one of the things we spend a lot of time talking about around here is the Alberta situation and the oil sands exploitation, but could I ask you, Chief Mercredi, to talk a little bit about the Saskatchewan provincial government? Does the relationship seem to you to be similar to what we've heard in terms of the behaviour and the partnership with both the federal and the Alberta governments?

I know from the last time I was up in your area that there are still plenty of uranium mines. Are there any current oil sands explorations upstream of Stony Rapids, for example, other than the ones upstream on the Athabasca?

Chief Albert Mercredi: To the left, you see the Athabasca land use vision planning process area; on the southwest corner, in the Axe Lake area, we're pretty well adjacent to the Athabasca Sand Dunes, which are one of the seven magnificent sights in the world to see. There is oil in that area.

On the question about the relations with the current Government of Saskatchewan, there is no protocol system in place by the province on what was handed down by the federal government during the 1930s mineral transfer agreement. To this day, there has been no duty to consult and accommodate. As a result, we initiated our own protocol system, which we gave to CNSC last week during the public hearing in Ottawa. It's our version of the protocol system and how we want to do business and how the consultation process should work.

As of June 1, 2009, the Province of Saskatchewan will be coming up with its protocol system on the duty to consult and accommodate. The process had been taken on for a lot of years without any kind of policy from industry, nor the Province of Saskatchewan, to accommodate the needs of first nations in the region they do development in. We have five existing uranium mines just southwest of the Fond du Lac, and currently there are deposits that could go on for the next three or four decades.

Mr. Justin Trudeau: Thank you.

The land use planning area in Saskatchewan that is designated was not done in partnership with the Saskatchewan government; it is your own designation. Is that it?

Chief Albert Mercredi: It has been submitted to the Province of Saskatchewan. The Province of Saskatchewan was involved at stage one level. I have my coordinator here with me, who could answer a lot of these technical terms. Yes, it has been submitted, but to this day, there has been nothing from the province supporting our situation in the Athabasca.

We have brought that map on the watershed system for a reason. Regarding the tar sands that enter Lake Athabasca, we are one of the last communities on Lake Athabasca from the Fond du Lac and associated perspective. Our neighbouring community is Fort Chipewyan, in Alberta, and the Mikisew Cree First Nation is on the west side of Lake Athabasca.

Mr. Justin Trudeau: Thank you.

My next question is for François. You've had a tremendous amount of experience, both in court challenges and in negotiations, over environmental issues and putting native groups and various levels of government into the discussion. What do you see as the outcome of this? Where do you think these conversations should go? How do you see the future shaping up in terms of this relationship we're working on?

● (1345)

Mr. François Paulette: Thank you.

From where I stand, in this house that I belong to, my Dene home, and looking outside of it, I know that it's the gold standard people who control the government. We need to really bring this discussion and the public forum to people who invest in these tar sands. We need to talk to people who are high-minded in money but have no relationship with the land. We need to talk to these people.

The government here, these officials, are elected by people who have money. You would have to be as tough as I am if you were going to make some hard decisions. I await that. I encourage you to take the discussions to heart, if you honestly believe in the survival of the investors that I talk about—that's the land, that's the water, that's the air, that's the fish, that's the moose, all of these creatures. I don't think this parliamentary discussion should end here. It should move on.

I just want to say one thing. There were 129 billion litres of water taken out in 2007. Right now, a bottle of water is $2 per litre of bottled water—this is quite modest. If you were to charge that for every litre, you would make $258 billion a year from the 129 billion litres of water you're taking out of the river. We are willing to pay—I'm willing to pay, and I pay—$2 a litre, but we undervalue the natural origin of the environment. Why aren't the tar sands paying for that water, as I am?

The Acting Chair (Mr. Blaine Calkins): Thank you, Mr. Paulette. We have to move on.

Monsieur Ouellet, vous avez sept minutes, s'il vous plaît.

[*Translation*]

Mr. Christian Ouellet: I'm going to speak in French.

Before asking my questions, I'm going to say that I very much appreciated your presentation, Mr. Paulette.

I would just like to make one comment, without however diminishing what you said about the life that is being destroyed on the reserves. I get the impression that the entire "developed" world is destroying the entire planet in any case. With greenhouse gases, we are putting ourselves in a situation in which, very soon, there may be no more humanity. We share the same view on that subject.

You mentioned this map. You were 150 to 200 miles from Fort McMurray. Are there any rapids along that distance?

● (1350)

Mr. François Paulette: Yes.

Mr. Christian Ouellet: Don't the rapids normally clean water?

I did a lot of canoeing when I was young. People said that, when water flows over a distance of three miles through rapids—we used miles at the time—it's pure when it gets to the bottom, whatever its previous condition was.

Have you noticed a change in the quality of water after it passes through the rapids?

[*English*]

Mr. François Paulette: There are rapids where I live in Fort Fitzgerald, four major sets of rapids. As for these rapids cleaning the water, that might have been possible maybe 100 years ago, but not today, because the water is too low. You need a huge flush, and we do not have that right now. On Friday at precisely 1:15 p.m, I witnessed the river breaking up . The water is very low. The ice went and the water dropped in about half an hour. There was still ice on the shores of the river, and that's very unusual. The natural phenomena that normally take place don't happen right now.

[*Translation*]

Mr. Christian Ouellet: Mr. Paulette, you said that you recently saw ice. However, during the summer, isn't the water warmer than it previously was? Have you taken the temperature of the water? It seems to me that may be one of the reasons why the fish are of lesser quality. If there's less water, could the water temperature be higher?

[*English*]

Mr. François Paulette: Not this past winter. But the winter before, the river didn't freeze until January 31. From where I live in Fitzgerald on to about 14 miles up the river, there was open water all the way. Normally you could walk across the river by November. People couldn't get to their trap lines, couldn't do any hunting, couldn't do any fishing. That indicates to me that the water is warmer.

[*Translation*]

Mr. Christian Ouellet: Mr. Chairman, do I still have some time left?

The Vice-Chair (Mr. Francis Scarpaleggia): Yes, absolutely.

Mr. Christian Ouellet: If the companies didn't operate on site, if they didn't remove earth, which they must subsequently clean, do you think the river could be clean again?

[*English*]

Mr. François Paulette: No, I think it's gone beyond fixing.

● (1355)

[*Translation*]

Mr. Christian Ouellet: In your opinion, the entire river bed is polluted. That's why, even though they have stopped polluting at Fort McMurray, the river is still polluted. Is that what you think?

[*English*]

Mr. François Paulette: There are other factors. If you were to stop what is happening in McMurray, there would still be this big huge pond. There is pollution there, and it is still going underground. There are other factors like the pulp mills up the river. They're there, that's reality, but to raise the water back to where it was, no, that would not happen.

[*Translation*]

Mr. Christian Ouellet: Perhaps Mr. Mercredi could also answer my question. Are there any uranium mines on the reserve?

[*English*]

Chief Albert Mercredi: Fond du Lac has no uranium mines on the reserve, but we do have exploration activity with a partnership we had joined to do exploration activity on reserve.

[*Translation*]

Mr. Christian Ouellet: I suppose my time is up.

The Vice-Chair (Mr. Francis Scarpaleggia): In fact, yes, it is.

Ms. Duncan.

[*English*]

Ms. Linda Duncan: Thank you, Mr. Chair.

Thank you, all of you, for your presentations. They are very important.

I certainly recognize that each of you is here representing your own nation and that you have orders of government similar to the federal government and the provincial government. Has your nation ever been directly consulted by the federal government as it has gone through reviews on each of these individual tar sands operations ? Have you been directly consulted by the federal government, in its review of the environmental impact assessments, about whether or not you had concerns and issues that you wanted addressed by the federal government?

Go ahead, Chief Mercredi.

Chief Albert Mercredi: Thank you for the question. Fond du Lac has made history by being part of this hearing today on the development of the tar sands.

To answer the question, no, downriver on the Athabasca side, we have never been consulted regarding the impacts and the devastation that comes along with it, and we've never been part of the environmental assessment process.

Mr. Sam Gargan: No. I'm downstream from François Paulette's area, the Dehcho region, and we've never been consulted or advised of this development that is now in progress.

Mr. François Paulette: *Eelna* in my language means no.

Ms. Linda Duncan: Today, by coincidence, the federal commissioner for sustainable development has issued his report. He sits in the Office of the Auditor General of Canada. Among the reports he has issued today is his report on water and oil sands and whether federal fisheries are adequately protecting habitat and protection from toxins.

In his report, he expresses that there is an agreement between the Alberta government and Canada on the administration of toxins as they impact water, which includes in the tar sands area. He has reported concerns that the committee has not even met in two years and the fact that the federal government has for quite some time been relying completely on the provincial government to be monitoring the impact on the tar sands.

I'm wondering if either of your governments have ever been approached by the federal government to become a party to these administrative agreements on managing the waterways.

● (1400)

Mr. François Paulette: No.

I just want to just say that when the water is down right now at 35% or 40%, all these little rivers that flow into the Slave River are dried up and these fish can't go to spawn. They can't take refuge from this polluted water that's there; they're stuck with having to be in this river that is polluted, so I imagine that the health of these fish would decrease.

Ms. Linda Duncan: Chief Mercredi.

Chief Albert Mercredi: First of all, from the perspective of the Athabasca government, we have put a system in place to define what we see as a protocol system and a duty to consult and accommodate. The Province of Saskatchewan was putting laws on the land that had never been in place before, not even under the duty to consult and accommodate from the Province of Saskatchewan, and in Alberta also. We have made those laws by putting a protocol system into place and a version of what we want to do in protecting the interest of the land, especially the indigenous species and the environment and everything that goes with it, including the drinking water.

Ms. Diane McDonald (Coordinator, Prince Albert Grand Council): You made a point about the agreement. We've never been approached—not by Alberta, Saskatchewan, or Canada.

The Vice-Chair (Mr. Francis Scarpaleggia): Could you introduce yourself, give your names for the record, please?

Ms. Diane McDonald: For the record, I'm Diane McDonald, Prince Albert Grand Council, representing the Athabasca region.

Chief Albert Mercredi: We are in discussions with the territorial government, and we are also involved with the Keepers of the Water to bring our issues to the attention of governments, industry, and the world.

Mr. François Paulette: We are on the Alberta side, but the DNR that is doing this water strategy plan has visited our community. They are from the territorial side. We haven't seen anybody from the federal or provincial governments. The other guys from the other side came to visit us.

Ms. Linda Duncan: You have been consulted, Chief Paulette, by the territorial government but not by Alberta or the federal government? Okay.

You mentioned the proposed hydro dam on the Slave River. I met you 25 years ago when the first proposal came forward. Do you have any concerns about the potential build-up of toxins back of the dam they're considering? Do you have any idea where that dam might be built and what the implications might be upstream for the Athabasca Lake and the Athabasca region?

Mr. François Paulette: If you look at the map, there are rapids at Fort Smith. Back in the late seventies and early eighties, the Alberta government was planning to dam the whole river and create 2,000 megawatts.

Nancy Southern of ATCO said in a newspaper article on Friday, I believe, that they're going produce 1,000 to 1,500 megawatts, run of the river. They cannot do that; it's impossible. I think her consultants, her engineers, are giving her the wrong information. We have hired an independent consultant to look at this. If you look at what they're proposing, the run of the river would start from Dog River on the east side, and they would have to make a trench right back into Fort Smith. That is the run of the river.

That will produce only 500 megawatts at the maximum—at the maximum. To produce 1,500 or 1,000 megawatts at the Mountain Rapids, for what they call run of the reservoir, you would have to obstruct the whole river. That would mean that all our territory, all our gravesites and archaeological sites, would be under water. Hunting, trapping, fishing would be no more. This will kill the river. It's like plugging up your sewer system here in Edmonton. If we did that, we'd have a pretty smelly city in a pretty short time. That's what will happen here.

● (1405)

The Vice-Chair (Mr. Francis Scarpaleggia): Mr. Warawa.

Mr. Mark Warawa: My thanks to the witnesses for being here today.

Chief Mercredi, where are your communities getting their drinking water? Is it being tested? What are the results of those tests?

Chief Albert Mercredi: In our community we get the drinking water from the groundwater system adjacent to the lake.

Throughout the day I've been listening to what you've been asking on the drinking water, and with that question you've raised, I guess the other issue is that we're trying to approach this whole consultation right into the safe drinking water process. In actuality, the acid rain, the effluents that are being discharged, are on the outside part of what the question is, but it is an issue, especially with the fish habitat and all of that.

We are under regulations, like anybody else, for a safe drinking water system, but we do not have the modern-day water treatment plant to treat the water system if we were to become contaminated.

Mr. Mark Warawa: Your drinking water is from groundwater, so you're using wells. How deep are your wells?

Chief Albert Mercredi: It is a groundwater system using well water pumps along the shorelines of Lake Athabasca.

Mr. Mark Warawa: How deep do your wells go?

Chief Albert Mercredi: The deepest one, I believe, is equivalent to the water level on Lake Athabasca, but because of the fluctuation of the water levels in the past year we have run into some difficulties.

I am surprised about the question that was asked here about the water system. We have experienced difficulties with our pumps running out of water, and I believe that was related to the water entering in from the Peace River into Lake Athabasca that had fluctuated the water levels and created some problems for us.

Mr. Mark Warawa: Is it municipal testing of the water?

● (1410)

Chief Albert Mercredi: No, it's a federal requirement, federal standards.

Mr. Mark Warawa: It's federal testing. What are the results of the testing of the water? Is it done daily or weekly?

Chief Albert Mercredi: We have technical people who do it. If we are outside of the limits, we would be told, but we only check it for specific things.

To answer your technical question, I do not have the documents with me, so it would be hard to answer.

Mr. Mark Warawa: You said the water is being tested by the federal government. What are the results of those tests? Is the water is safe or unsafe?

Chief Albert Mercredi: The water right now is to a standard where it's drinkable through the taps.

Mr. Mark Warawa: Thank you.

Chief Gargan.

Mr. Sam Gargan: The Athabasca, Peace, Hay, and Slave rivers all drain into the Mackenzie River. As François said, we do have foams on the river. We also have scum. When we boil our water from the river to make tea, we do have scum on our cups and that. But the river is being monitored, and we still drink from the river.

Mr. Mark Warawa: Who does the monitoring?

Mr. Sam Gargan: The municipalities do, the Government of the NWT.

Mr. Mark Warawa: Are they determining with their monitoring that it's safe to drink?

Mr. Sam Gargan: If there is a concern, the communities would be made aware of it.

Mr. Mark Warawa: Okay, thank you.

Chief Paulette.

Mr. François Paulette: In the past three years or so, our drinking water has been trucked in from Fort Smith. Before that...do you see that beautiful river across there called the Dog River? That's where we took our water from. The water came from the Canadian Shield. Right now we don't have wells or clean water pumping systems in our territory, so we truck it in from Fort Smith.

I want to go back to this question. If there are three litres of water to make one litre of oil, if you were to charge these guys money for every litre of water, you could spend $258 billion to give every reserve drinking water, with pipes right to their homes.

Right now, where I live, there is no clean drinking water that we can get. We have to go to Fort Smith.

Mr. Mark Warawa: Chief Paulette, you mentioned a number of other industries and users on the Athabasca River. You talked about the pulp and paper mills. I don't know if you mentioned the former uranium mine and the communities along the Athabasca River. Fort McMurray has grown at a tremendously fast pace.

In your comments, it sounded as if you were saying that there were pollutants left in the sediment of Lake Athabasca. I think you were asked by Mr. Ouellet whether going from open pit to in situ would solve the problem. Your answer was no, that it was too late. I think you then talked about the toxic residue left in the sediment on the base of Athabasca Lake. Do you believe that this has built up over the years? Is the lake is ruined? Has it become so toxic that it's no longer usable?

Mr. François Paulette: The question he was asking was about the river. I'm not familiar with Lake Athabasca. It's about 90 miles from where I am. What I'm very familiar with is the river.

Mr. Mark Warawa: Thank you.

The Vice-Chair (Mr. Francis Scarpaleggia): I would like to thank our witnesses for bringing the Northwest Territories and Saskatchewan perspective to our hearings. It was very helpful. Thank you for driving so far to get here.

● (1415)

Chief Albert Mercredi: I looked at the maps of the river system and the Athabasca. If there is further development, we'd like to be contacted and be part of the process. We would even like to visit the community.

The Vice-Chair (Mr. Francis Scarpaleggia): Maps are important to us. They help us see things clearly.

It's nice meeting you, Mr. Paulette, former grand chief.

Next, we have the Honourable Michael Miltenberger, Deputy Premier and Minister of Environment and Natural Resources, Government of the Northwest Territories.

Hon. J. Michael Miltenberger (Deputy Premier and Minister of Environment and Natural Resources, Government of the Northwest Territories): I'd like to thank you for this opportunity to appear before the committee. For the record, my name is Michael Miltenberger and I'm the Minister of Environment and Natural Resources. I'm also the Deputy Premier, as well as the Minister of Finance.

I want to talk to you about the Mackenzie River Basin, the Northwest Territories, the issue of water, and the issue of cumulative impact. I want to touch on some of the context for us, some of the threats that we are facing on the issue of water. I want to lay out some of the challenges and steps we're taking through our water strategy, and I want to make some recommendations for this committee to consider, particularly in regard to the federal government.

We're 1.2 million square kilometres, about 12% of Canada. We have 33 communities, and every one of them is on a body of water in the Mackenzie River Basin. We have 42,000 people, and half of them are of aboriginal descent. A common unifying issue in the Northwest Territories is the importance of water and protecting the quantity and quality of water. The Northwest Territories lies almost entirely within the Mackenzie River Basin. We're the largest downstream jurisdiction in the basin. In the Northwest Territories, there are two major deltas—the Slave Delta and the Mackenzie River Basin Delta.

We are very concerned about what's happening in the Mackenzie River Basin. I want to refer to the transboundary agreement that was signed in 1997. The federal government played an initiating role, and it tied the signatories together in a common agreement. Those signatories are Saskatchewan, Alberta, B.C., the Yukon, and the Northwest Territories. We have aboriginal representation. However, it is an underutilized agreement.

We are very interested in working out the issue of transboundary agreements. If I can mangle John Donne just a bit, when it comes to water, no jurisdiction is an island unto itself. We all have common interests. We are concerned because the Northwest Territories government in the fifteenth assembly, the last assembly, passed a unanimous motion declaring water as a fundamental human right. I think we're the only jurisdiction in the country that's done that. While the federal government has the legal mandate over water management in the Northwest Territories on behalf of northerners, the government of the Northwest Territories, along with the aboriginal governments, has been exercising what we see as our political and moral authority and responsibility to deal with issues that affect us deeply and personally—issues that we can't rely solely on the federal government to resolve.

We also recognize the relationship with the aboriginal governments. As you've heard from some of the preceding panellists, the issue of aboriginal treaty rights is sooner or later going to get tested in the courts, when the fundamental rights enshrined in these agreements are challenged. We recognize them and we work with them. I'm going to speak briefly about the issue of traditional knowledge and what we all talk about as natural capital.

One of the threats we see to our water system, in addition to the issues we have within the Northwest Territories, is upstream development. I want to talk about cumulative impact. You've been talking about the oil sands here today. There are pulp mills; there are over a million head of livestock; there are communities; there's a proposed nuclear reactor up on Lac Cardinal on the Peace River side; you have the proposed Bennett Dam; and we have unknown things happening in the headwaters, on both the Alberta and B.C. side, in both the Peace and Athabasca, as the glaciers retreat and the snowpack diminishes because of global warming; and you have a huge lack of knowledge.

● (1420)

We're also very concerned about things from the air that are sifting down upon all our jurisdictions. You heard today about naphthenic acids, polycyclic aromatic hydrocarbons, bitumen, mercury, and the heavy metals. A lot of that is airborne. You can read the literature. It blankets the Arctic.

We also have our own issues in the Northwest Territories. We're trying to get a better handle on how we proceed with development, be that pipelines or mines in general. We have a giant defunct mine on the edge of Great Slave Lake, which has 230,000 metric tonnes of arsenic trioxide stored in the mine shafts below the water level of Great Slave Lake—a billion dollar cleanup we will have to deal with. Another threat is the climate change impact from permafrost. The fire seasons are extending. Snowpack ice is disappearing. There are low water events across the land. In every community, the people will tell you that the land is changing, the water is changing.

Some of the challenges are because there's no national water strategy that allows the federal government to play a clear leadership role on an issue that touches every jurisdiction, without exception. These are challenges that affect every community, every Canadian.

We support the work and the efforts being put forward by the environment ministers and the federal government to get this national water strategy up and going. The last serious work was done in 1987, and not a lot has happened since then. There was a Senate panel that did a review, which was chaired by an Alberta Senator, Tommy Banks. It laid out all the issues: the lack of resources, the cutting of programs, the inability of the federal jurisdiction to do the work that's necessary for both surface water and groundwater.

At the same time, we have what has been, up until this recession, an unbridled rate and state of development, often moving far faster than the assessments were able to keep up. In our jurisdiction, we have a somewhat confused regulatory regime. Once again, the federal government has come in and set up a process that is often very difficult and frustrating for all concerned.

One of the challenges, as well, is the linking of traditional knowledge and the European sciences as we move forward in all the areas in the Northwest Territories where the aboriginal governments are one of the major land owners. No comprehensive research partnerships at all have been established to do a lot of the work that's necessary.

We have a Mackenzie River Basin transboundary agreement that has been quietly sitting, almost in neutral, that has not had any funding increases since 1997. They operate with a $250,000 budget. The ministers have yet to gather around the table. We see this as a mechanism that has tremendous potential if it's revitalized, if the players, led by the federal government, come to the table to talk about how we manage the water on an integrated watershed management approach in the Mackenzie River Basin. That has yet to happen.

You heard today, from all the panellists, about the issues of concern because of the lack of any mechanism to allow people to come to the table. Alberta looks after its interests within Alberta. Unless the federal government uses the legislation it has, there's very little opportunity to trigger the involvement of other jurisdictions. One of the communities in the Northwest Territories, Fort Resolution, tried to attend one of the hearings on the development in Fort McMurray, and it had a very difficult time to get any kind of hearing that was considered to be serious. It pointed out the need for us, as a government, to work with the aboriginal governments to come up with a plan and policy base that's going to allow us to deal with that issue.

I touched very quickly on the lack of research monitoring. It's an issue in the Northwest Territories, but it's an issue in the Mackenzie River Basin, right from the headwaters to the Arctic Ocean. There's the aquatic ecosystem health. Most jurisdictions in this Mackenzie River Basin agreement are silent on groundwater, yet a report released yesterday, referenced by Dr. Griffiths, states very clearly that it's a critical part of the hydrological cycle.

● (1425)

There are huge climate change issues. There are supply issues in jurisdictions. We all have to work together to monitor and manage them. We need to make use of traditional knowledge. People who have inhabited the watershed for thousands of years are telling us that things are changing, and not for the better.

We are working together to develop an NWT water strategy called Northern Voices, Northern Waters. We want to have a strong northern voice. We recognize that if we're going to be effective in a jurisdiction of 42,000 people, we have to work shoulder to shoulder with the aboriginal governments to develop a plan that will allow us to look more clearly at resource development as we negotiate agreements with Alberta, Saskatchewan, B.C., the Yukon, and the federal government.

We have to be clear about what's entailed in negotiating a very complex agreement. It's not just flow and quality. There is a huge number of other issues. It's not just surface water. We want to be prepared to deal with everything. We see a clear link in the issue of natural capital, which has become a topic of some discussion here. We recognize that there is a value to the intact ecosystems. It's not just overburden to be stripped away to get at the oil, diamonds, gold, and other minerals. Aboriginal people have been telling us this for decades through traditional knowledge. We've come to recognize that they are right. It is not only a spiritual, cultural, and social value; you could also put an economic value on it now in a language that everybody understands, including business. We are trying to build that into our approach.

What we are recommending is a revitalizing and strengthening of the transboundary mechanisms through the Mackenzie River Basin Waters Master Transboundary Agreement. They speak of an integrated watershed management approach, which we support. We support the federal government's being involved and providing a leadership role. This is a national issue, not just one for the Northwest Territories or individual jurisdictions. We all have an interest in this.

We have to come up with ways for downstream jurisdictions to be more effectively involved. Consulting 12 kilometres below site C, say, does not constitute adequate consultation for anybody. We need timely and clear notification when there are things that go wrong, as they invariably do. Most of the time, we find out about things in the newspaper or on CBC Radio.

We want to recommend that this committee support and push for a national water strategy in which the federal government can play a leadership role in bringing the jurisdictions together. We believe there is a place in this for traditional knowledge along with western science, as we look at the watersheds across the land and deal with people who have thousands of years of experience that we do not have.

There has to be more money spent on research. We cannot make informed decisions without research. Without research, we are forced to rely on the precautionary principle, which means we go with the best information we have. This invariably leads to problems; however, we need to commit. I was recently at a conference in Canmore with all the specialists and scientists who measure water and snowpack in glaciers. They said that there is a significant dearth and a gap in our systems.

Groundwater, surface water, we are all facing these challenges, not only in the Northwest Territories but throughout the Mackenzie River Basin. As northerners in the Northwest Territories, we see things happening upstream from us, and we are particularly concerned that wise decisions be made in the Mackenzie River Basin.

Thank you.

● (1430)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you. That was a very comprehensive look at water issues from a Northwest Territories perspective.

Mr. Trudeau.

Mr. Justin Trudeau: Thank you, Deputy Premier.

What sort of response have you been getting from the various levels of government as you've approached them about this comprehensive strategy?

Hon. J. Michael Miltenberger: We have had strong support from the aboriginal governments. Within the Northwest Territories, the federal government, through Indian Affairs, has provided us with the support and resources to help move this forward.

Mr. Justin Trudeau: Have other potential partners such as the Government of Alberta and the Government of Saskatchewan been coming to the table as partners in this discussion?

Hon. J. Michael Miltenberger: Our relationship with the provinces and the Yukon is built mainly on the Mackenzie River Basin transboundary agreement, under which we have to negotiate these bilaterals. This agreement was signed in 1997, and bilaterals were supposed to be negotiated. After 11 years, though, there's only one that exists, and it's between the Northwest Territories and the Yukon.

We have some significant challenges. People are becoming more and more aware of how complex the issue of watershed management is. It can't be addressed with a simple agreement. It will have to be more complex than the agreements that were negotiated with Saskatchewan and the Yukon. Science and understanding have progressed significantly, and our strongest relationships are with the provinces and territories.

Mr. Justin Trudeau: To return to the federal government, you mentioned a certain amount of cooperation from the Department of Indian and northern affairs. Is there a sense that the federal government, as a whole, is politically interested in working out these agreements on watershed management?

Hon. J. Michael Miltenberger: At the last environment ministers gathering, we did get inclusion of the need to look towards national principles when it comes to dealing with water. I think it's an issue that is gathering significant momentum as people recognize what's happening.

At this point, I wouldn't say it has been fully embraced, but I think at the federal-provincial-territorial table there's a growing sense of urgency that we have to get ahead of this. That's not only within Canada; we have any number of other transboundary agreements, with the United States, for example, where I don't think we got the best deal possible when the Columbia River Basin agreement was signed.

Mr. Justin Trudeau: Moving to other partners, involvement of industry, involvement of some of the NGOs and ENGOs, how are the working relationships with those various stakeholder groups?

Hon. J. Michael Miltenberger: For the most part, they've been very supportive. The Canadian Boreal Initiative has offered some money. We've had some interest from ATCO, but that's mainly to see what's being proposed because they're one of the proponents for the potential Slave River dam. But without exception, the NGOs see this as a very positive step forward.

● (1435)

Mr. Justin Trudeau: Has industry been cooperative?

Hon. J. Michael Miltenberger: At this point, I think it's wait and see. The ATCO folks, as I indicated, have asked for a copy of our draft of what's being proposed, and they have given us some feedback. But for the most part, I think they're waiting to see what fruit comes from these efforts.

Mr. Justin Trudeau: Do you have any international or other models of watershed management you're looking to in terms of helping inspire you with structure?

Hon. J. Michael Miltenberger: We've been working with Mr. Bob Sandford, who is the chair of the United Nations International Decade “Water for Life” in Canada. He has been extremely helpful.

We've been put in contact with the Rosenberg foundation, which is an international body that deals with water issues. It is working with us in the Northwest Territories on the strategy, the model we're considering. I've also done some reading on the trials and tribulations of those folks around the Nile River Basin and the various countries that have worked for about 150 years to sort themselves out. I think there is a lot to be learned from mistakes that we will hopefully not duplicate.

Mr. Justin Trudeau: Thank you.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

Mr. Ouellet.

[*Translation*]

Mr. Christian Ouellet: Thank you, Mr. Deputy Premier, for coming to meet with us. I believe this is important, particularly when it comes to water. You mentioned a number of times the need for a national water policy. You aren't unaware that, in Quebec, we're going to fight a national water policy for all of Canada because Quebec already has one. Don't you think it would be better, since Canada is so diversified, to have policies by watershed? What do you think of that solution?

The federal government definitely has a role to play in water and even a role to play with regard to the United States. There is the question of boundary basins under various jurisdictions. If we proceeded by watershed, that would mean that we could group populations together. That could mean Americans, in this case, or perhaps the people of Alberta, the territories, Saskatchewan and also British Columbia, who would establish a policy by watershed. What do you think of that?

[*English*]

Hon. J. Michael Miltenberger: I think we have to do both. For example, we have very little understanding of groundwater mapping and aquifers. In the United States, the Ogallala Aquifer spans four or five states. I would suggest that we have the same situation in Canada. Once our groundwater mapping is done, we'll know the extent of the situation. We need to do this in the Mackenzie River Basin and in Quebec. Wherever there's a watershed, we need to have the ability to manage it.

But we also need some common standards. When we deal with provincial transboundary issues, we need the federal government to play a leadership role in bringing the jurisdictions together. When we deal with transboundary issues with the United States—and water is going to be increasingly important for both countries—then we are going to need to have a national presence.

I recognize the concern of Quebec, but when it comes to water, no jurisdiction is an island unto itself. That water moves. The water doesn't recognize political boundaries. It comes from the sky. It comes from upstream. It comes from the groundwater. We have to work out ways to manage that resource as a country.

● (1440)

[*Translation*]

Mr. Christian Ouellet: In your presentation, you often mentioned climate change and water supply, as well as the significant changes that result therefrom. That is indeed the case, particularly with regard to rain. Rain will be abundant in certain regions of Canada and will leave other regions in a complete desert state.

Are you considering a structure in order to be able to manage climate change that will have as significant short-term effects as those of the oil sands?

[*English*]

Hon. J. Michael Miltenberger: We're going to have to figure out how we're going to respond. We have to adapt to things that are happening. We also have to take the strong steps necessary to mitigate what's causing climate change.

In our jurisdiction, the changes that we know are there didn't start in the Northwest Territories; they came from somewhere else. As Canadians, we have to do our part in the global scheme of things to manage the effect of climate change. Things like rain patterns, droughts, and snow patterns are changing. Rain comes in a deluge and then it's gone. We have invasive species coming north. B.C. has already struggled with the pine beetle.

There's a whole range of issues that are going to require us, as a country and as individual jurisdictions, to put our heads together. The western premiers have found that out. Provinces and states found that out when they formed their own climate groups to deal with climate change. We're going to have to do this together.

[*Translation*]

Mr. Christian Ouellet: Would the structure you're proposing be regional and would it include the First Nations, on an equal footing with the other governments?

[*English*]

Hon. J. Michael Miltenberger: We're going to need a range of structures, from the community to the national-international level, with all of the different levels being linked vertically and across. We definitely have to recognize the role of the aboriginal governments. In the Northwest Territories, they are one of the largest landowners. They have agreements that are unique. They are recognized as unique in our Constitution. We have to have room for everybody at the table.

[*Translation*]

Mr. Christian Ouellet: Thank you, sir.

[*English*]

The Vice-Chair (Mr. Francis Scarpaleggia): Ms. Duncan.

Ms. Linda Duncan: I want to thank you, Deputy Premier, for taking the time to come to Alberta to address us.

I feel that I need to apologize to you. We ought to have gone to the Northwest Territories so that we could hear from you and your government. We have had some of the first nations governments attend, but I know that there are lots of others along the river who would like to be heard.

I appreciate your mentioning the long-ago-signed-on-to Peace-Athabasca Delta and Mackenzie River Basin agreements. Those are now almost a quarter of a century old. Do you feel that it's necessary to sit down and completely revamp those agreements, or do you think we should be turning our attention to implementing, finally, the undertakings in those agreements?

Hon. J. Michael Miltenberger: If you put that agreement on the table and got agreement to open it up, I think it would look substantially different when the process was finished. I don't think any aboriginal government would be content to have the Northwest Territories or Alberta.... I think we have one representative per jurisdiction for aboriginal people.

On things like groundwater, I think we have to look at what has happened around the world. For example, in the Nile, after about 100 years of wars, fighting, feuding, and water boycotts, they realized that bilateral agreements don't work when you have to manage a water basin; you want to look at multilateral agreements.

But we do have that agreement as a starting point. It hasn't been fully implemented, and I've been suggesting that this is the place we should start, to see if we can revitalize it.

● (1445)

Ms. Linda Duncan: Has your government been directly consulted by the federal government in its reviews of the project approval and review processes for the tar sands?

Hon. J. Michael Miltenberger: Not to my knowledge. We're struggling to sort out the review processes for the pipeline within our own jurisdiction.

But that's why we're here. We recognized with the start of this government, the 16th assembly, about a year and a half ago now, that it is a fundamental issue and we have to get organized. We can't just sit silently by and not push the issue of watershed management in the Mackenzie River Basin agreement and the need to have these bilaterals implemented at this point.

Ms. Linda Duncan: Mr. Deputy Premier, do you think it's simply that so much has been given up by the federal government to the Alberta government over the years that we've lost sight that many downstream jurisdictions are potentially impacted by the development of the tar sands and that we may need to reconsider who has responsibility in addressing these developments into the future?

Hon. J. Michael Miltenberger: The federal government has some clear responsibilities in our jurisdiction when it comes to issues like water, and I have indicated the legal responsibility.

It gets back to the national water strategy and the need for the federal government to play a leadership role to make sure the processes are agreed to, that transboundary agreements can be resolved in an effective, fair, and timely manner, and to work with the jurisdictions to have those processes in place. It has a unique opportunity and role to do that better than it has.

Ms. Linda Duncan: The federal government has undertaken, I think by the end of this year, to finally release its promised legislation to protect first nations' safe drinking water, but it is my understanding that this legislation is simply dealing with the treatment of the water and its distribution. Given the issues that have been raised in this review and what you've presented, particularly the issues you have for the provision of safe water to your first nations and other communities, do you think we should be expanding our look at whether we are adequately protecting the source water that is in turn to be regulated by this law?

Hon. J. Michael Miltenberger: I think we have to once again look at that whole range.

For example, we were in Whitehorse a few months back and we signed a federal waste water agreement. Most jurisdictions have signed on to that. Of course, implementation will be the challenge. In our jurisdiction, we only have two small reserves. As a public government, we provide the services to all the communities and we work with the federal government in terms of the testing. We monitor that, right from the environmental monitoring that goes on with the federal government to the tap, so we've avoided some of the unfortunate occurrences that have happened on federal reserves.

Clearly, if water is a fundamental right for aboriginal people, as we've asserted, then we all have to do a better job.

Ms. Linda Duncan: In his testimony this morning, Dr. Schindler said his findings were suggesting that the problem with contamination of the waterways may be because of airborne emissions. Is there any initiative by the federal or territorial governments, or by someone, to begin monitoring the lichens and the snowfall in the Northwest Territories?

Hon. J. Michael Miltenberger: Not at this point. This strategy has consumed a significant amount of our resources. We're a small jurisdiction. While we're aware of the pollutants coming out of the air—from industry, coal-fired plants, and major dust storms—it's just another issue on our list. We're trying to get through this in an orderly fashion, and we're focusing first on getting our policy thinking clear so we can move forward.

Ms. Linda Duncan: Are you recommending increased involvement on the part of the federal government in both strategy and monitoring?

● (1450)

Hon. J. Michael Miltenberger: I went to a conference in Canmore that looked at all these issues. Hydrological monitoring has identified tremendous gaps across the land—right from the headwaters, in every direction from what is hydrologically the highest point in Canada, somewhere just outside of Canmore. There are huge gaps in our knowledge about the headwaters, all that flows downstream, and our groundwater. We have an enormous challenge as a country to sort this out, and some jurisdictions are going to be in dire straits, probably much sooner than they thought.

The Vice-Chair (Mr. Francis Scarpaleggia): Mr. Braid.

Mr. Peter Braid: Thank you, Deputy Premier, for travelling to Edmonton today and for participating in our hearings.

What are the sources of the impacts on the water systems in the Northwest Territories?

Hon. J. Michael Miltenberger: About 70% of the water that comes into the Mackenzie River Basin comes through the Slave River, which for the most part is made up of the Athabasca and the Peace. About 30% comes from the Athabasca and about 70% comes from the Peace River. So we have concerns right from the headwaters, from what's happening in the mountains, to the actual flow. We are concerned about the cumulative impact of development in the Mackenzie River Basin, the climate change issues that are exacerbating some of the effects of that development, and managing the development properly.

I agree with a comment made by François Paulette that we in the Northwest Territories and also, I believe, in Alberta undervalue the water we supply for industrial use. We give out millions of gallons of water for the administrative cost of a licence. If we don't put a value on water, it will be perceived of as without value, as a limitless substance to be used in any way whatever. Simple things like that have to be looked at.

Mr. Peter Braid: Are there any reports or sources of information that show trends or patterns with respect to the impacts on the water systems in the Northwest Territories? I appreciate that aboriginal peoples perceive impacts through their traditional knowledge, but what about scientific information?

Hon. J. Michael Miltenberger: We have to recognize that there are enormous gaps. The federal government has a few monitoring stations that perform some very basic measurements. But from the headwaters up the Mackenzie to the Arctic Ocean, there's very little monitoring of either the surface water or the surrounding groundwater. That's one of the challenges we have. We have all sorts of anecdotal reports. In the community where François and I live, two years ago the river was down about ten feet. Dr. Schindler has reported that in the prairie provinces the flows have diminished. The water that flows through the Peace and Athabasca down into the Slave and into the Mackenzie has diminished from 30% to 80%.

We know that when they built the Bennett Dam, the Peace-Athabasca Delta, which was then one of the biggest deltas in the world, was pretty well done away with. The only time it came back was when they had those sink holes in the Bennett Dam. They released all the water for a few years and the delta reflourished. We don't have much scientific information, so we're relying on what we're seeing and hearing, together with what little information is out there. That's one of our biggest collective challenges.

Mr. Peter Braid: Finally, with respect to the national water management strategy, what's needed to kick-start that process and take it to the next level and get it going?

● (1455)

Hon. J. Michael Miltenberger: I've been raising the issue. I was Minister of Environment and Natural Resources for some time in the last assembly as well. Politically it has to be raised at that table. There is a receptiveness there currently. The other thing that is going to push it is people squeezing their representatives to tell them they have to get a handle on this in every jurisdiction. They have to go to their elected officials, right from the community level on up, to start taking the steps, because it's not a matter that can be taken for granted.

We've all been learning that the hard way, in many cases.

Mr. Peter Braid: Thank you very much.

The Vice-Chair (Mr. Francis Scarpaleggia): We have time for a second round. I have a few questions, Deputy Premier.

I really enjoyed your testimony. In terms of basins in the Northwest Territories, other than the Mackenzie basin, how many other basins are there?

Hon. J. Michael Miltenberger: Within the Mackenzie River Basin, I believe there are about six sub-basins: the Peace, the Athabasca, the Peel, the Great Slave, the Great Bear, and the Liard.

The Vice-Chair (Mr. Francis Scarpaleggia): But other than the Mackenzie, there are no other ones? Does the Mackenzie River Basin cover all of it? How about Hudson Bay?

Hon. J. Michael Miltenberger: The Mackenzie River Basin is the big area where the water drains. Within that, there are sub-basins. Right next door, to the east of us, is Hudson Bay.

The Vice-Chair (Mr. Francis Scarpaleggia): In terms of that, how much aquifer mapping has been done in the Northwest Territories?

Hon. J. Michael Miltenberger: Zero, that I'm aware of. It has been identified, and a report was released yesterday, which I read yesterday on the plane. There are huge gaps in groundwater mapping, and many jurisdictions. The transboundary agreement leaves out the Mackenzie River Basin. They don't even want to talk about it, unless it comes up through bilaterals.

The Vice-Chair (Mr. Francis Scarpaleggia): I didn't get that point. Who doesn't want to talk about it?

Hon. J. Michael Miltenberger: The transboundary agreement on the Mackenzie River Basin that was signed in 1997 is silent on the issue of groundwater. The one reference in it is that groundwater can be discussed if it's agreed to at the bilateral level between individual provinces or territories.

When you look at their strategies, most jurisdictions overlook groundwater.

The Vice-Chair (Mr. Francis Scarpaleggia): Yet aquifers cross provincial boundaries.

Hon. J. Michael Miltenberger: Absolutely.

The Vice-Chair (Mr. Francis Scarpaleggia): This brings me to the issue of the Mackenzie River Basin Transboundary Waters Master Agreement.

You say it should revitalized, and I agree. I'm just wondering how we can do that when you have parties to this agreement that won't even discuss shared aquifers. How can we revitalize the agreement? How can the federal government play a role in revitalizing the agreement when provinces and territories guard their jurisdictions so jealously.

What was the goal of the Mackenzie River Basin Transboundary Waters Master Agreement? Did it have any teeth from day one or was it just a press release—I'm not trying to be cynical or facetious—to show that governments were curious about water issues? Can some provisions be activated rather simply, or do we have to reopen it and renegotiate it? How can we do that to give it teeth?

What leadership role could the federal government play in either revitalizing the existing one or creating a new agreement?

Hon. J. Michael Miltenberger: The question, I think, could be phrased this way: how can the federal government not play a role? There are jurisdictions, some with competing interests, conflicting agendas. The federal government played a role when it was originally signed in 1997. It took a considerable number of years to get it to the signing point. It speaks to the issue of the need. It's not going to be easy. Water is a very difficult issue. Civilizations have risen and fallen on the issue of water. Wars have been fought. But the federal government has that ability and, I think, responsibility to bring us all back to the table.

We managed to have a meeting last July here in Edmonton. We wrote to the signatories—Alberta, British Columbia, and us—and we managed to get the ministers to the table. That's the first gathering since 1997. I've made the case to the Minister of the Environment as well as to the Minister of Indian Affairs that there's a need for the minister to call all the players together and put that document on the table. Let's talk about it. Let's dust it off and talk about how we can build off this document.

It's a different time, a different place. Enormous things have happened in the last dozen years. People are going to pay attention to that document. There's a need for us to recognize, collectively, that we have a huge vested interest, that our futures and fates are inextricably linked to the Mackenzie River Basin. And for the federal government in this jurisdiction, because it's the north where they have such responsibility, the responsibility is even greater.

So I've been pushing the federal, provincial, and territorial ministers, and I'm confident that within the next six months we will have the first-ever meeting of the Mackenzie River Basin signatories.

● (1500)

The Vice-Chair (Mr. Francis Scarpaleggia): Who does the water monitoring in the Northwest Territories—the federal government or the Northwest Territories government on behalf of the federal government? It sounded as though you were saying there were very few monitoring stations.

Hon. J. Michael Miltenberger: There are very few monitoring stations. We test the water that we take out of waterways for municipal and community use. The other monitoring is done by the federal government.

The Mackenzie River Basin Board, as well, has tried to do some assessments of the aquatic ecosystems, and they've done reports, but with a budget of a quarter of a million dollars, the majority of which goes to the three staff, it's very difficult to do that kind of work. Senator Banks pointed out in his report that there has been a tremendous diminishment in federal resources to the appropriate departments in the federal government that do this work, and that if you looked at the shelf of research that's there for monitoring of surface water and/or groundwater, you would see enormous gaps; it's either outdated or non-existent.

The Vice-Chair (Mr. Francis Scarpaleggia): As an aside, I know that when one asks the federal government about water monitoring, they say, well, the provinces are doing it on our behalf, and they're doing a good job. Yet just a couple of weeks ago there was a story in the news where the Alberta government said it was going to cut back on water monitoring. So it seems to be a cascading devolution of responsibility.

I've gone over my own time here, so we'll move on.

Mr. Calkins, please.

Mr. Blaine Calkins: Thank you, Mr. Chair.

I certainly appreciate the presentation here today.

I'm just going through this master agreement, and I noticed that under “Duties of the Board”, paragraphs (a) through (s) outline the things that it can do. If you take a look under “Cost Sharing”, for all of the items listed under (a) through (s) there's a $280,000 commitment to carry out all those responsibilities.

Do you think that at the time this agreement was struck, in 1997, it was struck with any realistic intentions of carrying out any of those objectives? What needs to happen now in order to carry it through or to improve upon it? It seems to be a great start to cover off some of the issues, especially when it comes to downstream monitoring, downstream effects on the various parties involved, and especially when it comes to the balance that's met with economic development and exploration.

Hon. J. Michael Miltenberger: That budget hasn't changed since they signed it. So when you consider inflation and wage increases and such, there's very little money left, other than to pay wages and office space. They've been getting some other help off the books to do some things. But one of the things we've been pushing for in the Northwest Territories, at the very minimum, is to get the jurisdictions to agree to at least double that budget as a start, recognizing there's been no increase for a dozen years.

It was signed, I think, with the best of intentions. But if you think back a dozen years or so ago, water was not very high on anybody's agenda. There were other issues of the day. But it has now become a major issue. The Mackenzie River Basin Board has now been pulled out of the shadows into the political arena, and it's now getting the hot political light shone on it. There is work to do, collectively, and we're pushing to get that work started.

● (1505)

Mr. Blaine Calkins: Thank you. I appreciate that.

I went through your deck here, and you had recommendations on transboundary mechanisms that talk about revitalizing this agreement, an ecosystem-based approach; and then there was a second recommendation, to establish a national water strategy; and the third recommendation was science and technology, where you had a number of bulleted points.

You didn't have any bulleted points under establishing a national water strategy, so I was wondering if you could elaborate for me some of the subpoints or some of the finer details, as you see them or as the Government of the Northwest Territories would see them, as to what exactly needs to happen for the establishment of a national water strategy and what the Government of the Northwest Territories' position would be going forward to provide input on that water strategy.

Hon. J. Michael Miltenberger: What I would suggest is very similar to what we're suggesting with the Mackenzie River Basin transboundary agreement, that as the government of the land, it has a leadership role to play. And if you look over the whole Canadian landscape, there are overlapping issues of water tied in with climate change, tied in with resource development. The water crosses all jurisdictions. It doesn't stop because there's a political line there.

At the very least, environment ministers are now talking about the need to look at how we coordinate our efforts. We've done some things, wastewater management. We're working toward national standards.

But in terms of linking and bringing the parties together, like the Mackenzie River Basin, to get everybody around the table to talk about how the world has changed since that agreement was done and how we move forward to manage the very complex issues, often with very little information, commitments to doing the work with jurisdictions to have a national data bank that allows us to make the right decisions, we have to deal with some of the issues as they relate to other agreements we have with other countries, like the United States.

Mapping all the stuff that's happening across the land, in terms of the flows and the headwaters and the diminishing snowpack, glaciers, all the things that feed our water systems—there are enormous challenges. Sixty per cent of the water in the country flows north. Eighty per cent of the population is below the 60th parallel. There are huge national issues. If you don't have a national round table, then everybody is going to be going to their own corners, trying to look after themselves. No jurisdiction is an island entirely unto itself when it comes to water.

Mr. Blaine Calkins: When it comes to the Bennett Dam and so on—and I brought this up yesterday, as well—the Chisasibi Cree Nation on the east side of James Bay have testified before the fisheries committee, which I'm also a member of, about the disappearance of habitat, eelgrass, and fish. When the eelgrass goes, the migratory birds go. We heard department officials say that the west side isn't affected. The eelgrass is still there, and the migratory birds have changed their route and they're now going up the west side of James Bay. A lot of things were brought up as possible problems, but in terms of what has really changed on the eastern side of James Bay, it's the massive river diversions for the James Bay hydroelectric project.

Yesterday when we were in Fort Chipewyan, we heard about the massive drop in the water levels of Lake Athabasca. There were some vivid photographs, and we could see the high-water mark on the rocks on the shoreline. The reality is that the river used to be a two-way river, depending on the flow rate of the Peace River. I would surmise that that would have helped fill up Lake Athabasca. From some of the testimony I heard, it was at about the time of the hydroelectric dams, or the damming of the Peace River, that they started noticing a gradual decline of Lake Athabasca. I'm assuming it's stabilized now, because most lakes do eventually stabilize when you have multiple input rivers and one outflowing river.

What thoughts do you have on any further proposals for hydroelectric dams, given the fact that we have so little water, as you aptly pointed out? There has been pressure put on from various interest groups to sequester water, to use it for supposedly much cleaner technology than oil sands development. Yet depending on where you look, it seems to cause an equivalent amount of concern and damage to the environment.

Can you bring anything to light for this committee about problems with hydroelectric, with damming on any of these river systems? What is the position of the NWT on further development, given the fact that you have a multilateral document here and the discussion and negotiations would have to go on with everybody downstream?

● (1510)

Hon. J. Michael Miltenberger: There is going to have to be a considerable amount of technical, environmental, and scientific work done for anybody to make an informed decision.

The Government of the Northwest Territories has some of its own hydroelectric aspirations. We have one small development, but it's big for us; it could go up to 120 megawatts. We are actively pursuing mini-hydro where it makes sense in a number of communities.

When it comes to the big river, the Slave River, the concerns are going to be around the cumulative impact—Bennett Dam, Site C, Dunvegan—and what's happening in the mountains. The issue for me keeps coming back to the headwaters and what's happening in the mountains, where the water emanates from, with global warming, the shrinking glacier snowpack. Also, there's the cumulative impact going downstream with extraction or impoundment for different human activities, the increased evaporation, the warming temperatures, the changed snowfall and rain patterns.

I've been telling people that we have to get the work done so they can make an informed decision. The dam on the Slave River is going to be somewhere around a $5 billion-plus project if they were to proceed. That's a serious amount of money. The last time the Alberta government was there was in the 1980s. They looked at it, and at the time they walked away. The minister of the day was Minister Bob Bogle. He said they'd be back, and they're back. Now we have to see. The environment has changed. They have a lot of baseline data from the 1980s and a lot of work to do to fill in the gaps.

You're going to have folks like François from the Smith's Landing First Nation, which will be fighting passionately and desperately to protect their traditional lands. It's going to be a very complicated, protracted process. We have a huge World Heritage Site with the Wood Buffalo National Park, pelicans, any number of things around there. People all the way to the Arctic Ocean are going to want to know what's going to be happening. It's not going to be like last time, where they looked at it just as a regional issue. People know only too well, after the Bennett Dam, that we are all going to be affected.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you.

We have time for one last question. Mr. Warawa.

Mr. Mark Warawa: Thank you.

Deputy Premier, I also want to thank you for the effort you've made to be here with us today and for your very enlightening testimony.

I want to bring us back to focusing on the oil sands and the direct impact the oil sands may have on water.

We've heard a number of people testify concerning the coming health impacts, and I believe those comments were indicating their concerns that the primary source of the pollution is coming from the oil sands. We've heard testimony that there are naturally occurring contaminants from the bitumen, but this has been increased dramatically, they believe, because of the oil sands activity.

There was a question in the last panel: if the oil sands were to switch to in situ instead of open pit, you would not have the tailings ponds issues. One witness felt switching to in situ would not solve the problem. In situ, of course, will be dealing with about 80% of the resource, and about 20% of the resource would be mined by using the open pit. So the vast majority of that resource would be using a different technology.

Has the Northwest Territories had input as we move to this different technology, in situ? Has the Northwest Territories been involved with the RAMP program, which is involved with monitoring with different levels of government, NGOs, aboriginals, all this input, and industry, of course?

I want your insight on what role the oil sands play in pollution. We have transboundary pollution that can move globally, and the north is impacted quite severely when it comes to mercury. What are the major sources, and what role do you believe the oil sands play in that?

Thank you.

● (1515)

Hon. J. Michael Miltenberger: To date, our involvement has tended to be writing letters of concern at the senior bureaucratic level. When development is being proposed or moving through the approval process in Alberta at a rapid pace, the citizens from the aboriginal governments whom you've heard, the people, are very concerned about what's happening in Fort McMurray.

We recognize, which is why we're getting organized with our water strategy, that we have to be able to come to the table as a collective so we have a northern voice on issues about consultation, about prior notification, about systems that engage outside the boundaries, in this case Alberta, where the federal government can trigger that with their own legislation, so there's an opportunity to raise those concerns.

Currently, of course, some of the big concerns are the massive tailings ponds. Because of the prevailing winds, the airborne pollution tends to go from west to east, which is often in our favour, but they do periodically blow toward the north, and we're not very far away. Those stacks are fairly high, so there are all the airborne issues as well through the particulate matter.

One of the big issues we're concerned about is what's happening upstream from us, and we're trying to get ourselves organized to deal with it as constructively as possible through our strategy so we can negotiate bilaterals in a very clear and effective way, get the federal government engaged, and look at how we do this because we are neighbours with Alberta. We have huge ties. They're one of our biggest trading partners.

There's a history that goes back hundreds of years, thousands if you count the aboriginal peoples' ties. It's a common trade route. So they're not the enemy; it's just that we're involved in very difficult situations as we balance the need for resource development and the protection of the environment. We want to make sure we're organized in the north, that our thinking is clear, and that we can come forward with a position.

While we're neighbours and friends, it's not going to preclude us from having hard negotiations. We want to be able to protect what we think are some critical values, and that's one of the areas where we have a concern.

The Vice-Chair (Mr. Francis Scarpaleggia): We really appreciated your testimony, Deputy Premier. It sounds like water is an issue that takes up a lot of your thinking and your efforts. We really appreciated your insight. Thank you for coming.

We'll have a five-minute break, and then we'll resume with our segment on technology.

● (1519)

_____(Pause)_____

● (1531)

● (1530)

The Vice-Chair (Mr. Francis Scarpaleggia): We're set to resume with the last segment of the day, dealing with technology.

We have with us Dr. Hassan Hamza, from Natural Resources Canada; Mr. Thomas Gradek, president of Gradek Energy Inc.; and of course, Dr. Kim Kasperski, whom we met in Ottawa a month or two ago.

Welcome.

We normally do ten-minute presentations, as you know.

Dr. Hamza.

Dr. Hassan Hamza (Director General, Department of Natural Resources, CANMET Energy Technology Centre (CETC) - Devon): Thank you, Mr. Chairman.

First of all, I have to apologize for the quality of my voice. I am struggling with a cold virus that I can't get rid of. No, I'm not spreading it, and it is not the swine flu. Don't go back to Ottawa and say I did it.

With your permission, Mr. Chair, I have a presentation here, but I'll skim through it to allow more time for questions. It shouldn't take more than five minutes. I will be discussing challenges to the oil sands development.

Page 2 of the presentation talks about why the oil sands are very important for the economy of Alberta and Canada. It is very important for the citizens economically, and also for the prosperity of future generations. You must have heard a lot about that in the last little while, so I'm not going to repeat it. But if you look at the numbers on page 2, you can see a very large number of direct and indirect jobs, and revenues to the government.

There are two methods of extracting oil sands. One of them is in situ and the other is surface mining. Both of them have their own particular challenges. They both have impacts on the land, on the air, and on the water. These impacts vary depending on the method of extraction, but they are significant and we must deal with them.

On page 4, there is a diagram showing the water use in the oil sands in surface mining. Page 5 shows it for in situ. In the diagram on surface mining, we'll start with the 100 units—whatever units you would like to use. Of these 100 units, 74 are recycled, and 26 are entrained in tailings, which makes them very difficult to get rid of under normal circumstances. We have 74 units coming back, so we must make up the 26 units from other sources. There's water that comes with the ore, which is the four units, and where it says “River” here it's a misnomer; it actually should be fresh water coming from the river, and runoff and all of that, making up 22 units. Evaporation is about four units and precipitation is about four units. So this is neutral here. The 26 units are equivalent to three to four barrels of water per barrel of bitumen.

We try to make it very succinct so that at least we're talking about the same issues.

In situ, we selected the SAGD, which, as you might have heard, is steam-assisted gravity drainage. Again, if we start with the steam, which is 100 units, the steam goes into the reservoir. Ten units stay behind, and 90 units are recycled. Sometimes you need some water treatment for that. You have to get fresh water, so you need 10 units of fresh water. This is the balance between 27.6 units of fresh and salt water...[*Inaudible—Editor*]...to treat it, and you lose about 17.6. So the balance is 10 units.

The 10 units are equivalent to about 0.7 barrels of water per barrel of bitumen, or many estimates say it is about one barrel for the in situ.

● (1535)

I refer you to page 6.

We believe that technologies are the only way you can resolve some of these challenges. We must have technologies to address water challenges in surface mining. We have to squeeze out the water in the tailings, and when this water comes out it is not in ideal condition sometimes. So you have to treat it, and improved water treatment is important.

In situ gets around the water problem by using less water, by using technologies that use this water like solvent-assisted SAGD, or air injection and combustion, and so on. Again, you need water treatment in this case.

The tailings ponds have been in the public eye for a very long time because of their enormity and because of other recent circumstances that highlighted the tailings ponds issue.

Again, at the very beginning of the mining process, the tailings ponds were estimated to be much less than that because they was based on the number of fines, the number of very fine particles, and no attention was paid at the time to the nature of the fines. The fines immobilize water around them, so a lot of water is immobilized, not based only on the size of the particles but because of the nature of the clays, and so on.

Understanding that will help a lot. It can help more if we pay more attention to it.

We put together a research consortium in the late eighties. Almost everybody in this consortium was a researcher from the provincial or federal government or the universities. They worked for five years for $25 million and they came up with a lot of conclusions that have been applied in the field.

I have a summary of these conclusions. The industry called that the silver bullet. They referred to it a lot, and I would say it focused information here that can be used. You got the companies, NRCan, and the Alberta government. We all contributed to that, and so did two universities.

This was the beginning. I think there's a lot to be done, and we should pay attention to various technologies.

Again, another issue that has recently had more attention paid to it is the volatile organic compounds, which come out from the tailings and the mine face and so on. I would say it affects both health and the environment. It has some GHG components to it. Again, some work has been done in different places on understanding what these compounds are and how to characterize them and how to look at their influence on the environment.

In summary, the oil sands are very important. We cannot abandon them. Improvements are made, but you have to keep in mind that if you have improvements in one area you have to look at other areas these improvements may impact, either positively or negatively. So we have to look at this as a whole rather than as one individual unit. It's very important, and we are committed to working toward a resolution to make it a responsible resource.

Thank you.

● (1540)

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much. Next will be Mr. Gradek.

Mr. Thomas Gradek (President, Gradek Energy Inc.): Before I start, Mr. Chair, I brought some samples with me just to show what our technology looks like so that everybody has a hands-on view in front of them. Our technology is essentially based around these organic polymer beads that are an absorbent for the hydrocarbons. This is the residual sand from our process.

In these jars.... We have one here that we haven't disturbed, but this is essentially what we could end up looking at in terms of treatment, where bitumen is on the beads and you have clear water and residual solids at the bottom, which are settled. With this one, we can go ahead and see how fast the settling is by just turning it upside down. We'll see that the settled solids in a water column do become somewhat trafficable. They settle and they've compacted. They're not moving around.

This is a solution that we are proposing. It's based on the laws of Mother Nature, which I'm going to go ahead and expose here with my documentation.

Mr. Chair and distinguished members of the committee, my name is Thomas Gradek. I am the inventor and developer of a leading Canadian technology. My small company, Gradek Energy Inc., is based out of Montreal, with operational headquarters in Calgary. Gradek Energy proposes to eliminate tailing streams from the oil sand operations and over time eliminate the existing tailing ponds at no cost to oil sands operating companies. Our objective is to reclassify oil sands production as clean oil. The key is RHS technology.

Gradek Energy is developing a hydrocarbon capture technology, called RHST, for application in any media. RHST has been proven through extensive testing in the laboratory, and Gradek Energy is designing a pilot project with oil sands operator participation to prove its performance in eliminating hydrocarbons and tailings streams that proliferate massive ponds.

Present technology of air flotation is adversely affected with fines and dissolved minerals, which alter the chemistry of water into slurry. As such, the inefficiency losses leave bitumen attached to the fines. Those fines remain in suspension in the water, hence the need to have tailing ponds for long-term settling of those fines.

The oil sands industry has invested billions of dollars into building their present production facilities and has spent decades doing it. It is of necessity that the industry focus on its production. Gradek Energy's business model takes the tailing liability off-line to build, own, and operate the tailing streams and ponds through a mediation plant, all off-line, and internally finances a profitable and sustainable enterprise, having no risk impact on the existing operations.

What is the technology? The illustration of the bitumen-coated beads in clear water with settled solids is the result that can be obtained with our technology. As you can witness with the samples that I have brought to the session, the bitumen-free fines readily settle.

How does it work? The beads are essentially a better air bubble and, as such, are more efficient in attaching the bitumen. This is an applied nanotechnology that uses the laws of nature to selectively capture the hydrocarbons. Equilibrium is reached with the hydrocarbon on the bead's surface, at which point the bitumen is at its minimum free-energy level. Afterwards, the solvent wash is used to remove the bitumen from the bead and produce a quality dilbit.

This slide shows the bitumen extraction process and demonstrates the use of fresh tailings blended with tailings pond sludge to obtain our optimum temperature of about 40° Celsius. The blended slurry is introduced into the mixer with the RHS beads, and then contact is made between the bitumen-coated particles and the beads. The bitumen migrates onto the beads. The slurry is then moved into a second compartment in which the clean water and solids are removed, and the bitumen-coated beads are directed into a solvent wash unit. There the beads are washed with a solvent to produce the dilbit. Then the beads are recovered, dried, and can be reused.

The RHST project is a planned two-phase piloting program. We are in the design stage of the first phase of the program at present. The first pilot phase will demonstrate the continuous-flow operation feasibility. The second phase will demonstrate the scalability of the process for ultimate commercial-scale operations.

● (1545)

This slide shows how demonstration and validation of the technology involved various institutions and facilities. The multitude of tests undertaken during the development stages have been numerous and with successful results.

The benefits of the RHS technology described in the following slides, numbers 12 through 16, are summarized as follows:

Environmental performance: RHST has the potential to reduce the environmental impact of the oil sands operations overall.

Social performance: it has the potential to provide a healthier environment by reducing the effects of effluents and their emissions.

Economic performance: it has the potential for overall improvement on operational costs by eliminating tailings management expenses and future liabilities.

Technological issues: RHST has the potential to enable the operators to achieve their bitumen recovery efficiency obligations with the ERCB.

Political issues: RHST has the potential to facilitate compliance with U.S. regulations and policy on transportation fuels.

As a result of implemention of the technology, RHST addresses the proliferation of tailing ponds by recovering the residual bitumen attached to fine particles such as clays and oxides. RHST is a no-cost solution for the industry. It results in water that can be directly treated and recycled, and soil ready for reclamation that is trafficable.

It's also a process that addresses U.S. regulations directly and completely. Reduced carbon intensity overall is in accordance with the low-carbon fuel supply act, greenhouse gas emissions are eliminated from tailing ponds in accordance with the climate change act, and waste fuel designation with a RIN value is in accordance with the renewable fuel supply act.

The oil sands present a tremendous economic opportunity for Canada constrained by an environmental impasse. Implementation of the RHS technology will help the Government of Canada and the industry balance these competing interests. Funding from government sources is essential to accelerate the piloting phases of this project. The entire country can benefit from the economic activity generated by our solution. Implementation will reduce and eventually eliminate tailing ponds, and the RHS technology promises to be an expanding and diversified export opportunity.

Mr. Chair, I thank you for the opportunity and I welcome your committee's questions.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Mr. Gradek.

Dr. Kasperski, do you have any comments?

Dr. Kim Kasperski (Manager, Water Management, Department of Natural Resources): No, just the opening presentation.

The Vice-Chair (Mr. Francis Scarpaleggia): Okay, so why don't we move to the first round of questioning.

Mr. Trudeau.

Mr. Justin Trudeau: Thank you, Mr. Chair.

My first question is for Dr. Hamza.

The numbers you quote, $14 billion over the past while to governments, 120,000 jobs.... Obviously this is an industry that is of serious size and of serious importance to our economy and to Canadian jobs. Do you know how much has been invested in science and in research around that, all told?

● (1550)

Dr. Hassan Hamza: Actually, I don't have an exact number. But we are currently sponsoring a study that first looks at how much money is spent from all sources on oil sands research. The second part would be the outputs of this research in numbers of things—the number of people educated, the number of engineers. And the third part would be the impact: how much of this research is being used?

I should get preliminary results of that study in June. I will be very happy to share it. Actually, we're sharing it with the Alberta government. They are sharing with us some of their results in a similar direction, but not all the way, as we are going. We are also sharing it with them. We want to know that the dollars spent have a value at the end. We're not just creating jobs in research. There is a reason for doing it.

Mr. Justin Trudeau: So it's excellent that we're looking at the amount of money in research and development, science, and that knowledge economy spinoff of oil sands development.

Would you be able to say if this study is going to spin off into research and science, into the impact of oil sands development on communities, individuals, ecosystems, and future results—the kind of science that monitors the actual industry? Is that in your study as well?

Dr. Hassan Hamza: It's part of the study—on the fringe, I would say. This is a very good point. I'll make sure to go back and see if we can get some firm numbers on that. If I do not, we may come back and say we want to extend the study. I'm very glad you're asking these questions.

Mr. Justin Trudeau: Would it be fair, then, to say the emphasis around science is much more on technological and advanced research into the industry side of things, rather than on monitoring impacts? Just from your answer you—

Dr. Hassan Hamza: I would say that's what they expected in this study. I haven't seen the draft yet. It will be more on the science side, but even on the social side you need some science facts. You can go with anecdotes and you can go with somebody's impression, but you need the facts to be able to translate this into real numbers you can rely on.

Even if it is not focused on that last type of translation between the results we have—for example, if there's work on water, and the work is saying the inflow, outflow, etc., with numbers and how much was spent on monitoring water—it has a social impact. The social impact might be implied. As I said, I can't say for sure but I'll find out in June. It may just be implied. We may have to force it a little bit to make sure there is an element there.

We may have to extend the study a little bit to get more numbers, but the facts are very important. A lot of information is going around. How much of it is fact, based on getting the right numbers, is your guess and my guess.

Mr. Justin Trudeau: That guessing is what we're trying to get away from. Obviously that's why we're out here, trying to separate fact from guesses and mythologies and misinformation, to find out where the information is coming from and how much study is being done, and how much science is being done around the impact of the industry and not just in improving the industry. Expanding the industry would be a very valuable part to fold into that study or a later study.

Thank you.

Dr. Hassan Hamza: Absolutely. That's one of our main mandates in NRCan.

● (1555)

Mr. Justin Trudeau: Earlier today Dr. Schindler talked a lot about airborne deposits. Have you looked into airborne deposits? You talk about volatile organic compounds and such. Are you looking primarily at the direct output, or are you also looking at the impacts of airborne emissions?

Dr. Hassan Hamza: I think Dr. Kasperski can answer that.

Dr. Kim Kasperski: We're mainly looking at what leads to certain amounts of VOC release and any way to reduce that. We are not looking specifically at the impacts of VOC release on the environment. We're looking at technologies, the science behind reducing those releases, and technologies to reduce those releases.

Mr. Justin Trudeau: So the science and technology we would be looking at is what's coming out of smokestacks and such as well.

Dr. Kim Kasperski: Our particular focus is mostly on surface mining issues around the VOC release to the tailings ponds from solvent use and so on.

Mr. Justin Trudeau: We're talking about solvents—

Dr. Kim Kasperski: During the extraction process they add solvents, which are quite volatile. They do try to recover as much as they can during the process, but some is lost to the tailings streams they send to the pond. We're asking why they can't recover as much and then what technologies can improve that recovery.

Mr. Justin Trudeau: There was a reference earlier during the testimony to the fact that the solvents become food for micro-organisms within the tailings ponds, which then emit them as methane.

Dr. Kim Kasperski: That observation has been made at the Syncrude ponds, but not at the Suncor ponds. Why do you have different populations of microbes in one versus the other? I'm not a biologist, so I can't address that.

Mr. Justin Trudeau: Again, that highlights the need for more science and more investment in science.

Thank you. I'll use the remainder of my time to turn to Dr. Gradek.

Dr. Gradek, first of all, what does RHS stand for?

Mr. Thomas Gradek: Reusable hydrocarbon sorbent.

Mr. Justin Trudeau: Why are you here?

Mr. Thomas Gradek: We've been undertaking vast amounts of time in exploring, developing, and working with the oil sands industry to come up with a very simple solution to tackling their tailing ponds. Hydrocarbon losses in tailings are a source of—

Mr. Justin Trudeau: I'm sorry, I don't mean to interrupt—

The Acting Chair (Mr. Blaine Calkins): You're out of time, Mr. Trudeau.

Mr. Ouellet, seven minutes.

[*Translation*]

Mr. Christian Ouellet: Yes, thank you.

First of all, Mr. Hamza, I would like to ask you the question concerning the 120,000 direct and indirect jobs generated by the oil sands operation. That's significant, and 45% of those jobs are outside Alberta. At CANMET, have you conducted any studies to determine how many jobs would have been created if the same amount of money had been spent since 1913—the federal government has been spending since that date—in the renewable energy sector? How many jobs would have been created, decentralized jobs across Canada, from Newfoundland and Labrador to British Columbia? How many jobs would have been created in each province and territory? Have you conducted that study at CANMET?

[*English*]

Dr. Hassan Hamza: Not in my area. I really cannot answer that question. I think it's a very valid question, and it's based on scenarios that some economists can dig down into it and get the information.

[*Translation*]

Mr. Christian Ouellet: Does Ms. Kasperski know?

Dr. Kim Kasperski: You're asking me the same question?

Mr. Christian Ouellet: Have any studies been conducted to determine how many jobs would have been created in green energy production if the same amount of money had been spent, in addition to environmental costs?

[*English*]

Dr. Kim Kasperski: I'm sorry, I would have no idea what that would be.

[*Translation*]

Mr. Christian Ouellet: Mr. Gradek, that's very nice, but I don't understand. At the end of the process, do you extract bitumen or beads?

Mr. Thomas Gradek: We recover bitumen, granules. The beads are reusable, clean and the entire cycle takes five minutes. In less than five minutes, we've recovered the bitumen on the beads and we use them again.

● (1600)

Mr. Christian Ouellet: When did you make this discovery?

Mr. Thomas Gradek: We've been developing this technology for 14 years. We did some validation tests at CANMET in 2002, 2003 and 2004 with SNC Lavalin, the University of Alberta and others, and the results were conclusive. That encouraged us to continue, to involve oil sands operators in a pilot project to take the next step. That's where we stand today.

Mr. Christian Ouellet: You are developing a pilot project?

Mr. Thomas Gradek: Exactly. We've reached an agreement with one operator. We're going to develop a project and they will be taking part in a test protocol this fall.

Mr. Christian Ouellet: So, starting in the fall, we'll be able to know whether your method works really well?

Mr. Thomas Gradek: We'll be able to know whether the engineering was well designed by people like those at SNC Lavalin.

Mr. Christian Ouellet: Yes, all right. You say you're reducing the quantity of methane, but by how much?

Mr. Thomas Gradek: The methane source in the tailings ponds consists of organics. We're talking about bitumen and naphtha, which are lost during the processes. If you remove the organics, in this case the hydrocarbons, there's nothing to digest, no biodegradation; it's comparable to a sand pit.

Mr. Christian Ouellet: Do you use water?

Mr. Thomas Gradek: We don't use any water; we use the product that is to be processed. We take the product; we add beads. This is a technology based on the laws of nature; it's basic. The hydrocarbons migrate onto the beads. They stay there and there is no [*Inaudible—Editor*]. They can stay there for months, years; no [*Inaudible—Editor*] occurs. They're unprocessable. After that it's a matter of management.

Mr. Christian Ouellet: And the sand falls off?

Mr. Thomas Gradek: The sand falls off and it's clean.

Mr. Christian Ouellet: It falls off.

Mr. Thomas Gradek: Yes.

Mr. Christian Ouellet: That's fantastic.

Mr. Thomas Gradek: In one hour, the jar that was slightly grey will be clear. The solution is simple. You don't have to think too hard. If we apply the laws of nature at our convenience and for our good, we can do anything. The technology is there. You simply have to be interested in doing it.

Mr. Christian Ouellet: Is it an expensive technology? Perhaps that's why it hasn't been used.

Mr. Thomas Gradek: We've indicated that this technology ultimately costs nothing: no cost.

Mr. Christian Ouellet: People work in mines—

Mr. Thomas Gradek: That's their primary operation. The volumes for processing are enormous. This is engineering that is now becoming what's called material handling, the handling of sand, water and everything else. We have to prove that we have a really reliable and robust process to manage all these products, these components.

Mr. Christian Ouellet: Is this ultimately sweet crude that you're making?

Mr. Thomas Gradek: No, it's bitumen. It's simply an attraction site. The beads, in simple terms, are like a big velcro strap to which the hydrocarbon adheres on contact and sticks.

Mr. Christian Ouellet: The purpose is to separate the sand from the bitumen. So, at that point, the bitumen could be transported by pipeline. The bitumen is done; you don't need to do anything else.

Mr. Thomas Gradek: Exactly.

Mr. Christian Ouellet: It doesn't change the extraction, but rather the way of extracting the sand from—

Mr. Thomas Gradek: After the operation, the waste is cleaned. That's the objective.

Mr. Christian Ouellet: There's no water?

Mr. Thomas Gradek: The water and sand are clean, and the bitumen is extracted. We take maximum advantage of all the resources: we've increased bitumen extraction and improved water quality. Thus we enable them to reclaim the site immediately because the soil is clean and can be used for vegetation. It's a clean habitat. For example, the Pointe-Calumet sand pit has become an aquatic park. The only difference between the two places is the bitumen.

● (1605)

[*English*]

The Acting Chair (Mr. Blaine Calkins): *Merci*, Mr. Ouellet.

Ms. Duncan, you have seven minutes.

Ms. Linda Duncan: Thank you, Mr. Acting Chair. You're doing a great job.

I have a question for either Dr. Kasperski or Dr. Hamza.

I found your presentations very interesting. You can correct me if I'm following it wrong, but as I understand it, particularly from your handout, page 7, you're saying that the reason we have the system we have now for dealing with the tailings and tailings ponds is because that's the science that the consortium put together and that's what they decided to proceed with.

How long has it been that we've had better technologies but they're not being required to be taken up by the companies?

Dr. Hassan Hamza: First of all, the statement, if I can just say it again, is that the lack of science at the beginning caused the situation where there was underestimation of the size required for the tailings ponds. When you put the tailings in tailings ponds, the fluid tailings stay in the pond for a very long time before they compact. So they needed more and more tailing ponds.

It may not have been expressed very well here, but the lack of science at the beginning in understanding the clays, rather than the fines, created that.

Ms. Linda Duncan: My question was, how long have we known that?

Dr. Hassan Hamza: I'm coming to that. I'm sorry, I just wanted to set that straight first.

We have been working in this area for maybe twelve years or so. You have visited the oil sands and seen how large they are. It is very difficult to move all that huge machinery. So we have worked with the industry since that time to convince them to try new technologies. They started with this consortium. They started implementing consolidated tailings, adding some gypsum and so on to it to make it more trafficable and get the water out quickly. Suncor started using it in one or two applications. They had to give it a couple of years before they could evaluate the results to see if it works or not. Actually, in this case it works very well. There were some problems, but they worked on the problems. Syncrude had started doing that also. So this was one technology.

But since then we've come up with two or three technologies, and one of them is, I would say, close to commercialization. It is in the field now. It's called dry stackable tailings. But dry is a misnomer. It's not really dry; it still has about 15% water in it. But you can drive a Caterpillar and things like that on it, which is the criterion for that.

So we have been working with them for quite a while. We have been publishing for quite a while, because this is the influence we have. We can influence what's going on by publishing in the general—

Ms. Linda Duncan: I'm sorry, I have to intervene here, because it's a bit long and I don't have very much time.

I'm trying to draw a line in the sand. It sounds like you've been working for quite some time on developing better technologies. But do new technologies become utilized only because you persuade the companies, or is there a role for government to say that they must now use these technologies? That's what I'm trying to get an answer on.

Dr. Kim Kasperski: There are two main drivers. One is the government coming down with new directives saying they must do this, that they must accomplish this amount of fines capture by this year to produce this kind of trafficable solid. That has happened with the Alberta government. Also, the companies are driven by themselves because they're running out of space to put all this stuff. So they have their own internal drivers to reduce the sheer size of these ponds, because they don't have anywhere else to put it.

So there's the economic driver of their own self-interest, and then there is the provincial directive that's saying they must meet certain requirements for, especially, the fluid fine tailings capture.

● (1610)

Ms. Linda Duncan: Am I understanding correctly that it's the same with the coal-fired cooling ponds, or the discharge ponds? They're running out of space, so they're being allowed to make them go up because they can't go out any more. The stackable tailings simply mean that we're building up; we're not reducing the amount of tailings.

Dr. Kim Kasperski: Dry stackable means that you don't need containment. It means you can put them anywhere; they will not flow. You can then reclaim the areas if you have this solid surface. That's the difference between that and the tailings ponds, where you have to contain them. With dry stackable, the definition is that you don't need a containment system.

In terms of what you said about their just going higher, to do that they need sand, and often that's an issue. They just don't have enough sand to build up these dikes higher and higher. It's a numbers game. It's a very complex system they have to manage. There's the amount of sand they need to build dikes. They don't have enough sand. They're running out of area. So they need another method. Hence, they're going to the technologies that—

Dr. Hassan Hamza: If I can add one thing, the dry stackable tailings have only 15% water left. The other tailings have much more than that. The tailings in the tailings ponds have 75% water. So having only 15% water in the tailings is great.

Ms. Linda Duncan: I have one final question, if I have time.

I've read some of your papers, and I think some might be yours, jointly written, Dr. Kasperski. I was given a number of papers by the Alberta government. As I understand, there's a dichotomy, because there's a competition between removing the water and getting more bitumen out. Am I correct? There's a kind of competition between better technologies to reclaim and better technologies to profit more by taking more bitumen out.

Am I not understanding that?

Dr. Kim Kasperski: Not really. It was something Dr. Hamza mentioned earlier. Anything you do to the tailings to improve water recovery—and one that was commercially applied was adding calcium sulphate to the system to improve water recovery and, ultimately, reclamation. Unfortunately, the extra calcium could hurt recovery, so they have to make sure they add the correct amount, that the recycled water doesn't kill recovery or scale up the plant and shut everything down.

So there's always that issue of what you do to treat the tailings to get more water back. You do not want it to have a deleterious effect on bitumen recovery. So that's why they're looking at different methods.

The Acting Chair (Mr. Blaine Calkins): Thank you, Ms. Duncan.

The first round of questioning from the Conservatives was to go to Mr. Warawa.

Mr. Mark Warawa: Thank you for your good work, Chair, on the environment and for suggesting some of these very interesting witnesses to be before us today. That was a shameless promotion of your good work, Chair.

I want to thank the witnesses so much for being here.

I'm going to start with Mr. Gradek. I'm trying to grasp this technology. It seems so simple, and I'm bewildered as to why this hasn't been commercialized yet. You said you've been working on this for 14 years, that you've been working with the University of Alberta. We had Dr. Murray Gray with us this morning, Dr. Selma Guigard, and Dr. Schindler. Have you worked with any of these people? I think that when I was asking Drs. Gray and Guigard about coming technologies, that was not mentioned. Have you been working with any of the industries in the oil sands? Could you elaborate?

Page 8 of your handout shows a brief on the process. My understanding, and what we've heard in other testimony, is that you have a problem with getting the clay out of the water. You can remove the bitumen, but the clay will stay suspended in the tailing water for years, maybe 30 or 40 years, and that's what makes it so difficult. In your demonstration, you're suggesting the beads are picking up the bitumen and the clay, because when they run through the process it says clay and other fine particles are separated from the bitumen-coated beads.

Is the clay also removed from the water so you end up with clean water?

● (1615)

Mr. Thomas Gradek: Those jars I brought probably are the best visual explanation you can get that the clays and the sand will not adhere to the bitumen coating, and that's because of the minimum free energy level of the bitumen on the bead. There's not enough energy in the hydrocarbon coating to adhere to the soil particles. You have an interfacial surface tension factor of about 33 dynes per centimetre for sand to bitumen, or clay to bitumen. Bitumen to our bead is 13 dynes per centimetre. That discrepancy of 20 dynes per centimetre is energy that was released by the hydrocarbon into the system. So at 13 it won't stick to the hydrocarbon coating on the bead.

Next, the water that was in one of the jugs that was shaken around is getting pretty well clear. That takes one hour, natural decanting, which is a 50-year term in the tailings pond at Mildred Lake. There's a huge difference. If you remove all the hydrocarbons you alter the zeta potential on the clay particles. They can agglomerate and they settle. You don't have to add chemicals, no flocs whatsoever.

The real component here that is making a mess of the tailings is the hydrocarbon component. If you remove it, you now have something that's very easy to work with that you have in waste water treatment system plants. People know how to deal with flocs and clays and sand. It's standard procedure.

Mr. Mark Warawa: Mr. Chair, I could imagine these beads for spills. It's the same principle.

Mr. Thomas Gradek: Oil spills, exactly.

Mr. Mark Warawa: If you've been working on this for 14 years, why have we not seen it used yet? We've heard about adding gypsum to the water to help the clay settle up. If the industry has been trying all these different things over the last number of years, why are we not hearing about your beads being used?

Mr. Thomas Gradek: Industry is starting to take a serious look at external technologies that they are not developing themselves within their corporate structure. They like to own the technologies that they use.

Secondly, they have a certain scaling-up process. When you take a technology from an incubation stage and ramp it up to a commercial deployment stage, you have to be able to handle large volumes. That's material handling, and those are engineering design issues. You have to make those steps. That is a standard procedure, and it's very hard to circumvent that and say, "I've got it in a test tube. Now it's going to work on a 48-inch pipeline." A lot of things can go wrong.

This is why. It's a procedure that takes time. You have to demonstrate it, prove it out, see how robust the process is, because the greater the size, the more problems can crop up.

Mr. Mark Warawa: When we did our flyover, we saw tailings ponds and we could see a bit of steam coming from part of the tailings pond. That was the inlet where the warm water was being put into the tailings pond.

Are you dealing with this before the water gets into the tailings pond so that it's part of the process and you're able to then recover the actual heat?

Mr. Thomas Gradek: Yes. What we intend to do, on the tailings stream at the end of the pipe, between the plant and the tailings pond, is set up an off-line facility that would take in that tailings stream. It's very hot. It's about 75°C, 80°C. Some streams are 50°C to 60°C. There's a lot of heat there that we don't require.

In striving to clean up the tailings ponds that exist, we have to raise that temperature. So why not use this excess heat from the tailings stream and blend it with tailings pond sludge to reach our temperature, so we don't add any energy into the system, we're not burning fuel and generating CO_2 emissions and so on, and use that in our process starting at 40°C? When the water comes out of our process, it's at about 38°C, so it's quite warm and it's suitable to be put back into the extraction process up front.

● (1620)

Mr. Mark Warawa: That would result, then, in less energy being needed to heat up the water for extraction.

Mr. Thomas Gradek: Correct.

Mr. Mark Warawa: As an end result, then, what kinds of savings in efficiency would we be looking at?

Mr. Thomas Gradek: We would be able to save the industry somewhere in the area of about 8% carbon intensity on their overall production.

Mr. Mark Warawa: Would that be immediately?

The Acting Chair (Mr. Blaine Calkins): Thank you, Mr. Warawa.

Normally at this point we would proceed to a second round, which would start with Mr. Scarpaleggia, but given the fact that he's not here, I think we'll wait for him to come back. There are other questioners here who would like to have an opportunity.

We'll go with five-minute rounds.

Mr. Peter Braid: Thank you, Mr. Acting Chair.

Mr. Mark Warawa: On a point of order, Mr. Chair, the normal procedure is that no one gets a second question until everybody has had their first.

The Acting Chair (Mr. Blaine Calkins): I think that was the process that had previously been established.

Mr. Scarpaleggia has returned.

Francis, do you want to let somebody go here while you gather your thoughts? We're actually at your particular round of questions.

Mr. Braid, you can proceed, and then Mr. Scarpaleggia will assume the chair.

Mr. Peter Braid: Thank you very much.

Mr. Gradek, thank you very much for your attendance here today and for all the work that you've put into this very exciting and promising technology. I'd like to continue the line of questioning of my colleague with respect to the process chart, if I could, just to understand the ultimate end process a little further.

I'm looking at the step here where the bitumen is washed from the coated beads. What happens with the dilbit or diluted bitumen? Where does it go after this step?

Mr. Thomas Gradek: The dilbit goes into the pipeline up to the upgrader. All of our testing, with the collaboration of the oil sands industry partners, has been.... They want us to come in with a process that can be easily integrated into their present operations. We'll give you a feed stream, which is our tailings, you process it, and what we want back from you is a spec product that we can go ahead and tie into our pipeline going to the upgrader.

That's why we were obliged to come up with a dilbit and use the naphtha wash process. That was developed in order to comply with that request from the oil sands industry.

Mr. Peter Braid: Okay. Is the dilbit usable material, then?

Mr. Thomas Gradek: It's quality dilbit that goes into their upgrader.

Mr. Peter Braid: Okay. And ultimately is turned into...?

Mr. Thomas Gradek: Synthetic crude oil and diesel and so on.

Mr. Peter Braid: Okay. So it goes right into the process. Fantastic.

The naphtha that's required to wash the magic beads, if you will, is obviously a chemical. How are you protected from any adverse impacts of the naphtha on the environment?

Mr. Thomas Gradek: It's a completely enclosed system. It's all under nitrogen purge, completely enclosed. It's enclosed, stainless steel, finished.

Mr. Peter Braid: Okay. That's actually a good segue, then. Help me visualize what this process looks like on a grand actual operational scale.

Mr. Thomas Gradek: Okay.

Our mixer is essentially off the shelf. It was patented in 1876. It's very robust, it's proven, and it does the job extremely well, and 100% mixing efficiency is obtained in less than 60 seconds. The company that manufactures it, the OEM, is over 485 years old, so they know what they're doing.

We've tested it on that unit, and essentially, you have very thorough mixing to ensure that you have many contacts between the beads and the clay particles or the fine particles that have the bitumen coating so that you have the migration of the bitumen onto the bead.

At the end of this mixer, it goes into a settling compartment. The beads are extremely buoyant and they float to the top. Your water and your solids sink to the bottom, so they come up from your settling compartment in the bottom. That can be sent to the tailings disposal pit for reclamation, and your water can go ahead and be recycled back into the primary extraction sector.

Your beads are transported into what we call the bead washer. The bead washer is essentially a bath which has dilbit on the top that come in and they are transported into a rotating, perforated drum, like a trommel. There's a shower head, and they get sprayed with naphtha and everything gets washed off. They come up to the top with a very fine film of naphtha, which is a hydrocarbon, and which displaced all of the bitumen because it dissolved it. And that goes into a dryer, which is under partial vacuum. Naphtha has a boiling point between 40° and 65° Celsius at one atmosphere. When it's under partial vacuum, the temperature is lower so you use less energy.

You recover and recycle that naphtha that was on the bead, so you have a dry bead that is back at its natural surface state. The surface energetics of the bead are not changed and they're able to refunction back in another cycle.

● (1625)

Mr. Peter Braid: Very good.

Later on in your presentation, you indicate that this process, this technology, will help reduce and then ultimately eliminate the need for tailings ponds. Why is that an incremental process?

Mr. Thomas Gradek: Tailings ponds are an accumulation of some 30 years of operation. You need a huge volume to ramp up to that scale of processing capacity. Because we want to blend the end-of-pipe tailing stream and cool it down with tailing-pond sludge, I have to measure both streams and ramp up. So I'm going to try to reach coverage of their end-of-pipe streams and then match that with tailing inventory.

Mr. Peter Braid: Finally, have you had any discussions with oil companies about this technology and a partnership? But nothing stuck yet?

Mr. Thomas Gradek: As we said, at this stage we are undertaking to do a pilot project with an oil sands operator.

Mr. Peter Braid: Good. And when will that occur?

Mr. Thomas Gradek: This fall.

Mr. Peter Braid: Great.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you, Mr. Braid. I'll just follow up on your line of questioning. This may have been covered while I was not here briefly.

This pilot project is with Syncrude?

Mr. Thomas Gradek: Syncrude.

The Vice-Chair (Mr. Francis Scarpaleggia): Will that involve building a mini-plant by the side of a tailings pond?

Mr. Thomas Gradek: We've opted to go and set up the pilot plant north of Edmonton, a Fort Saskatchewan site that is suitable, to have access to resources for machining and so on, to do changes on the fly, to correct any problems that may crop up during our pilot. Piloting is R and D.

For that, we have to look at whether the engineering design is suitable. Did they mess up somewhere? As for the beads, that part of the technology is failsafe because the beads work no matter how you use them.

The Vice-Chair (Mr. Francis Scarpaleggia): But then what? You have to import the—

Mr. Thomas Gradek: We truck.

The Vice-Chair (Mr. Francis Scarpaleggia): You truck in the tailings effluent.

Mr. Thomas Gradek: Yes. We process it, and then all the data gets analyzed; the dilbit gets analyzed.

The Vice-Chair (Mr. Francis Scarpaleggia): How long do you figure before you get such a positive result that Syncrude and all the other oil sands producers decide to make your process a permanent part of their operation?

Mr. Thomas Gradek: There could be wishful thinking. We don't know.

The Vice-Chair (Mr. Francis Scarpaleggia): I imagine you would expect—

● (1630)

Mr. Thomas Gradek: Three to six months.

The Vice-Chair (Mr. Francis Scarpaleggia): Three to six months. You've been working on this technology for how long now?

Mr. Thomas Gradek: Fourteen years.

The Vice-Chair (Mr. Francis Scarpaleggia): Fourteen years. When did you start talking to the government or oil sands producers about the technology?

Mr. Thomas Gradek: Initially we started on the environmental aspect for oil spills, and we worked with the Canadian Coast Guard, Environment Canada, and it was strictly for oil spills.

There was a huge change in Canada's policies regarding oil spills, and the Canadian Coast Guard started outsourcing work. They are no longer a responder; they are simply an observer. They don't respond. It has gone to private industry. So to have a suitable business model that would make sense, we had to go and look at something where there was a daily occurrence of a spill. The oil sands industry invited us to take a look at tailings.

The Vice-Chair (Mr. Francis Scarpaleggia): How long ago was that?

Mr. Thomas Gradek: This started in 1996.

The Vice-Chair (Mr. Francis Scarpaleggia): That's 12 years to get to this point. Did things go smoothly? Were there funding issues? Did you approach the government as well? Did you approach NRCan? I know they do a lot of work on water, on tailings ponds.

Mr. Thomas Gradek: We worked with NRCan in our batch testing. A protocol was set up with SNC Lavalin, and all the tests were executed at NRCan facilities in CANMET, Devon, with the assistance of Dr. Hamza. We also had it at the University of Alberta with Dr. Jacob Masliyah, who was twice NSERC chair on the oil sands. They cross-validated all the data.

The oil sands industry participated with us in all those tests. The positive results led to the conclusion that this technology does have potential. Let's bring it to the next phase. Let's do it at the preliminary engineering design for continuous flow process.

From there we went and tested each component at the OEM to see what the reaction would be in that component.

So we've lined everything up. We've got all the components sized properly, lined up properly, and we can go ahead and execute our pilot project, which will be good.

The Vice-Chair (Mr. Francis Scarpaleggia): You say it will eliminate the need for tailings ponds. Does that mean that at some point the water from the process of separation is just going to flow straight into your plant and then there won't be a need to store what is now tailings effluent? It will just go through your plant and there won't need to be—

Mr. Thomas Gradek: Any tailings ponds like we see today.

Mr. Francis Scarpaleggia: Any tailings ponds?

Mr. Thomas Gradek: No. Absolutely not.

The Vice-Chair (Mr. Francis Scarpaleggia): How long will it take to get to that point, do you think?

Mr. Thomas Gradek: It all depends on how much financing and we can go ahead.

The Vice-Chair (Mr. Francis Scarpaleggia): You need money from the federal government and from the industry.

Mr. Thomas Gradek: Correct.

The Vice-Chair (Mr. Francis Scarpaleggia): Why wouldn't the industry cover it 100%? This sounds wonderful.

Mr. Thomas Gradek: They made billions of dollars last year and they're cutting their budget this year.

The Vice-Chair (Mr. Francis Scarpaleggia): What does this do to the research that you and NRCan are doing on—you mention it here—developing new technologies to maximize water recovery from tailings? Does it say to you, we've got the magic bullet now, let's stop these other projects, or is it complementary to what you're doing?

Dr. Hassan Hamza: I can answer that.

As part of our activities we actually look at different technologies, and we look at it for small companies like Mr. Gradek's. We also look at it for maybe larger companies that are interested in certain technologies. So we actually evaluate a lot of these technologies. The issue is not as simple as we think it is. There are many factors that come in.

If I talk about recovering bitumen or oil from the tailings ponds or others using hydrophobic surfaces, or oliophilic surfaces, there are about three or four similar ones started in the eighties by somebody called Kryer. It's the Kryer process and Kryer used to work at ARC. He developed this sieve through which you pass the oil...and it goes out.

● (1635)

The Vice-Chair (Mr. Francis Scarpaleggia): So there are similar competing technologies in the same vein.

Dr. Hassan Hamza: They have similar principles, but the application is different.

There is another company called Minminer that's almost at the same stage as Mr. Gradek and is working currently with Suncor. They are all trying very hard to convince the industry that these things work.

We looked at this and we looked at many others. For example, we have one or two technologies—I cannot mention the name of the company—but it is to put all the oil sands in and apply heat to it and recover the light ends. So it recovers close to a very light oil that can be used in refineries and so on. We have two technologies that we are evaluating now with the Alberta government in our pilot plant. This is another way of looking at technologies.

The Vice-Chair (Mr. Francis Scarpaleggia): Will there be room for all of these technologies on the market or will one win out?

Dr. Hassan Hamza: I think maybe one of them will move much faster than the others, depending on the acceptance of the oil industry.

Talking about government money to support these things is a good push, but ultimately, no matter how much you spend on supporting the technology, if the industry is not accepting that technology, it is not going to go anywhere.

The Vice-Chair (Mr. Francis Scarpaleggia): Okay. That's it for my questions.

Mr. Calkins, do you have a question?

Mr. Blaine Calkins: Sure, certainly. Thank you, Mr. Chair. It was certainly an honour to fill in for you for a few minutes and I appreciate your confidence in me.

I just have a couple of questions to ask Dr. Hamza and Dr. Kasperski.

My understanding of the oil sands is.... When you take a look at conventional oil, it's down there thousands of feet below the surface in the geological formations. It's in an anaerobic environment.

When you take a look at the oil sands, the formations of Alberta, it's presumed that the oil has gone through the geologic formations and has come out in the oil sands deposits right now, and the bitumen is different because it has been exposed to an aerobic process.

Do I have that understanding right? That is why the bitumen is thick. It is not as clean as, let's say, a sweet crude. Do I understand the basics of that?

Dr. Kim Kasperski: Yes. It is not my area of expertise, but that's what I have understood. The geologists say that it has undergone degradation by bacteria over geological time, broken off the light ends, and you're left with the heavy big molecules and the heavy oil.

Mr. Blaine Calkins: My understanding is that there was a component there of exposure to some level of oxygen as well. Has it been a completely anaerobic process or is there an aerobic process in there?

Dr. Kim Kasperski: I don't know, sorry.

Mr. Blaine Calkins: Where I'm going with this is that we have a number of contaminated sites across Canada. One of them is the Sydney Tar Ponds, where crude oil has been exposed in the tar pond for periods of time. We have those kinds of contaminated sites around the country, where we have conventional oil exploration and we've had spills. I'm wondering if the same process could be applied where we could heat up, say, the sludge mixture of the contaminated soil. We could basically melt off the oil that's there, and that would be a kind of environmental cleaning process. That could be followed up by the technology that Mr. Gradek is proposing through his process. Is that something that could be used?

If you look at it from a technical perspective, the oil companies are simply cleaning the oil out of the sand and putting the sand back into the tailings pond and it's settling out. My understanding of the technology that Mr. Gradek is proposing is that it will actually get rid of the remaining bits of bitumen or oil in the process that are interfering with the ability of the settling in the tailings ponds. From your perspective, are there applications of this technology that we're not even looking at in this particular point of time?

Dr. Hassan Hamza: In principle, what you need to do is remove the oil from the sand, or from the soil that it's attached to, with any process that will dislodge the oil from the sand. The way they used to do it in the oil sands, in the early days, was like a washing machine. You put all of the oil in a drum with some detergent, you tumble it around, and it detaches from the sand. This can be applied.

● (1640)

Mr. Blaine Calkins: The same concept can be applied across the board.

Mr. Thomas Gradek: Absolutely.

Mr. Blaine Calkins: I think Mr. Warawa hinted at this and you've alluded to it as well. When it comes to cleanup capabilities, I think that's where the original idea for this technology came from in dealing with oil spills. We had an incident in Alberta a number of years ago where we had a railcar dump a bunch of oil into Wabamun Lake. We've seen some incidents where we have discharges, whether accidental or on purpose, along our coastlines. We've seen what has happened to wildlife.

Would it be fair to say that we could literally take a bunch of these beads, throw them on the surface of the tailings pond, they'd collect all of the bitumen that's floating on top of the tailings ponds, and it would simply be a matter of collecting them off the top of the tailings pond?

Mr. Thomas Gradek: Definitely.

Mr. Blaine Calkins: Have you done any studies with this technology? We talk about the strength of the bond between the bitumen and the bead. Would it be fair to say that it takes a lot of energy to break that bond, which is why you have the wash with the naphtha in your enclosed facility?

And would it be fair to say that if a bead with bitumen on it was floating on a tailings pond and came in contact with waterfowl or some other species of wildlife, that the contact with the wildlife would break the bond of the bitumen to the bead?

Mr. Thomas Gradek: As long as there's water, no. If it's floating on water, no.

Mr. Blaine Calkins: It would stay stuck to the bead.

Mr. Thomas Gradek: Yes. For reference, Mr. Calkins, when you ask about oil spills, we've done tests with our technology on beach sand from the coast of Normandy after the *Prestige* spill. It was weathered crude, the viscosity was 10,000 centipoise. In 60 seconds, all of the oil was removed. It brought it down to a level which was non-detectable. You put the sand in a zip-lock bag, and three months later when you open the zip-lock bag, you smell sea salt and not oil.

Mr. Blaine Calkins: The last question I have is based on the process that you've shown us. The naphtha is basically the catalyst that breaks the bond. That's your diluent, or solvent.

Mr. Thomas Gradek: It doesn't break the bond, it displaces it. It dissolves the bitumen, which is a high-viscosity component, and it displaces, or replaces, and spreads over the surface area of the bead.

Mr. Blaine Calkins: Would you upgrade the naphtha off the oil before you send it up to the plant, so you could reuse the naphtha in your enclosed facility? Or would it go up there and ship back as a diluent later on?

Mr. Thomas Gradek: It would be the second choice. It would be used for pipelining. We have to have the same spec in delivering a product to the oil company as their pipeline, in order to introduce it into their pipeline going to the upgrader. If it's 50% diluent and 50% bitumen, I have to meet that spec.

Mr. Blaine Calkins: These beads, once they've formed that bond with...?

Mr. Thomas Gradek: Hydrocarbon.

Mr. Blaine Calkins: They'll float on top of the...?

Mr. Thomas Gradek: Forever.

Mr. Blaine Calkins: Forever.

Mr. Thomas Gradek: Forever. No leaching. It can freeze. Put it in the freezer on ice and six months later thaw it out. You've still got your oil.

The Vice-Chair (Mr. Francis Scarpaleggia): I think your time is up.

Are there any more questions?

Yes, Mr. Watson, go ahead.

Mr. Jeff Watson: Thank you, Mr. Chair.

Blaine was having too much fun here. I almost feel like I shouldn't be taking his time. If I have anything left over, I'll cede it to you. How about that?

I want to start with Mr. Hamza. I just have a quick question about your slide deck here. You talk about the economic impact of the oil sands, 120,000 direct and indirect jobs. Forty-one per cent of the jobs are outside Alberta. What is the jobs impact or the investment impact, if you will, for the province of Ontario?

Dr. Hassan Hamza: Actually, I don't have the numbers with me, but it is in manufacturing and in secondary-type industries. It's in equipment, monitors, and this high-tech type of activity. The numbers are available, and actually CERI published a report maybe three years ago that has all of the numbers broken down, from Statistics Canada and so on, across the whole country.

● (1645)

Mr. Jeff Watson: I'm told it's in the neighbourhood of $500 million for the province of Ontario in terms of activity.

I want to move on to Mr. Gradek. I have a couple of questions here.

You've said that at the end of your process the water can be reintroduced to extraction activities on the front end. What kind of impact is that going to have in terms of freshwater withdrawals, in terms of new water into the—

Mr. Thomas Gradek: With the present inventory of tailings ponds, they won't need water, no freshwater uptake.

Mr. Jeff Watson: Okay.

If we're eliminating the ultimate use of existing tailings ponds and, as you're suggesting, freshwater draws, will this encourage new mining operations as opposed to a shift to in situ?

Mr. Thomas Gradek: I think mining operations are limited by the economics of overburden removal. Therefore, that's the word, "limitations". If I remember correctly, the estimates were to ramp up mining operations to a production level of 2,125,000 barrels per day by the year 2025. This was the AERCB or EUB's estimate in 2007.

Mr. Jeff Watson: Mr. Hamza, you may have suggested that one of the reasons industry hasn't taken this particular technology up on a large scale is that there may be competing technologies that address the water issue on the back end. Is it fair to say that industry is maybe looking beyond that, to how to lower water use on the front end?

You may want to comment on that as well, Mr. Gradek.

Dr. Hassan Hamza: Actually, I have a correction. I tried to get away from—

Mr. Jeff Watson: You tried to sidestep it.

Dr. Hassan Hamza: —intimating anything. I said that there are other technologies. There are many of them, and the industry is looking at all of them and they will select the one that would be in their best interest. This is the case with the industry all the time.

There are a lot of technologies around. There's technology that the industry participated in developing themselves and there are technologies that came from technology developers on all fronts. Applying it or not applying it is a matter for the industry to determine.

I didn't really have a cause and effect here. It was just a general statement.

The Vice-Chair (Mr. Francis Scarpaleggia): You have about 30 seconds left.

Mr. Jeff Watson: I have one question about the bead technology. We've been looking at possible applications to other spills. Is the water temperature a variable in its effectiveness? In other words, could this be used, say, in an Arctic spill?

Mr. Thomas Gradek: Definitely. It all depends on the viscosity of the oil. As you raise the temperature, viscosity decreases. For every 10 degrees, it's one order of magnitude. For instance, weathered crude is 10,000 centipoise at 20° Celsius. Bitumen is 1 million centipoise at 20° Celsius. In order to reach the same viscosity, you have to raise the temperature of the bitumen to 40° Celsius to be equivalent to that of weathered crude at 20°.

The reason the viscosity comes into play is because of the physical transportation of the soil particles onto the bead. That is relative to the viscosity. Peeling chewing gum off of a warm sidewalk versus when it's -30° has a different effect. What we're talking about is the same thing.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much. That was very interesting testimony.

That closes our day of hearings.

Mr. Justin Trudeau: On a point of order, are we not going until 5:30? That's according to the agenda. I have a couple more questions and I think we have time for another quick, full round three.

The Vice-Chair (Mr. Francis Scarpaleggia): Mr. Warawa.

Mr. Mark Warawa: Chair, you, the clerk, and I talked regarding the 5:30 that's marked down. That does not give adequate time for us to close up. The suggestion, and my agreed-upon time, was 5 o'clock. That gives us 10 minutes. I think if there maybe was, in that 10 minutes, three or four minutes for each party, that would be fine with me.

● (1650)

The Vice-Chair (Mr. Francis Scarpaleggia): Sure.

Do you want a couple of minutes? Go ahead.

Mr. Justin Trudeau: Three or four minutes would be fine, thank you.

Dr. Hamza, in your role as a scientist working with various technological propositions, you have obviously seen many submissions of similar and different natures to what Mr. Gradek is bringing forward. What are your concerns with this process per se? Where are the potential weak links in this proposal, in your professional opinion?

Dr. Hassan Hamza: This is a very critical question that, with the permission of the chairman, I don't like to answer. We look at all technologies and we have opinions about them. We actually produced reports for Mr. Gradek and others. If he's interested, he can make the reports and the conclusions of the reports available to you. You can judge for yourself.

Mr. Justin Trudeau: We're here in a situation as a number of lay people and non-scientists for the most part—with the exception of a couple of areas of expertise. We're trying to evaluate a technology. My original question of why you are here.... It seems too good to be true. It's dealing with the elimination of tailings ponds. Dr. Schindler was talking about the 10-year goal for what we have here. It deals with all sorts of energy efficiencies in a very easy way.

What I'm concerned with is.... What's that?

Mr. Blaine Calkins: It's in Montreal.

Mr. Justin Trudeau: It's in Montreal? Even better. If it moves to my riding, that would be wonderful.

The Vice-Chair (Mr. Francis Scarpaleggia): I think the question is excellent, but I take Mr. Hamza's point. I don't know to what extent we can start comparing technologies—

Mr. Justin Trudeau: Perhaps in general, then. Of all the different technologies that come forward as miracle solutions to things, what are the factors involved in which they get picked up or not? Is it just about industry policies, trying to keep it closed shop? Is it a question of money sent toward investment in capital and venture capital in these technologies?

Dr. Hassan Hamza: I'll give you a general answer. The oil sands industry deals with huge amounts of materials being moved, and they have to be moved fast in a certain way. They go mainly with technologies that can deal with huge amounts of materials. They don't want to have any kinks in the operation that would delay them. Sometimes they are very careful about what new technologies they apply. They have to fit it in with this general principle of dealing with hundreds of millions of tonnes moving in all directions. That's just my opinion.

Mr. Justin Trudeau: Mr. Gradek, how much money do you need?

Mr. Thomas Gradek: That question is a broad question. I mean, to accomplish what?

Mr. Justin Trudeau: To get the pilot project going.

Mr. Thomas Gradek: At this stage, the pilot project for both phases amounts to about $50 million.

Mr. Justin Trudeau: You don't have that money yet?

Mr. Thomas Gradek: We don't have that money yet.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you. That was a very good line of questioning.

Does anyone else have a question?

[*Translation*]

Mr. Christian Ouellet: He asked the question. I wanted to know whether it was as expensive as burying CO2 in the ground. It appears not.

[*English*]

The Vice-Chair (Mr. Francis Scarpaleggia): I think we're starting to sound a bit like that television show on CBC, *Dragons' Den*, as in, “How much money do you need?”

Some hon. members: Oh, oh!

The Chair: Madam Duncan, do you have questions?

Ms. Linda Duncan: I guess, Mr. Chair, my questions would be along a completely different line. As a point of order, I find it very peculiar that we spent almost an hour on one technology when we're not a technological review committee. We had an opportunity to look at the thousands of other technologies that, frankly, Dr. Hamza and Dr. Kasperski could speak to us about. I don't have the time to ask about those now.

I guess my question to Dr. Kasperski and Dr. Hamza is, how many technologies are in the hopper right now being looked at? Are there limitations because the researchers aren't getting funding? What would you see as the major barriers to moving forward with a more environmentally benign tar sands activity? Based on the science that you're seeing coming forward technologically, do you even think that's possible in the near future?

I'm particularly interested because, as we speak, more permit extensions and new projects are being approved. The history in Alberta is that the projects are always grandfathered. We've heard from other testimony that nothing is going to be done about the existing projects and the ones that are approved.

My question is, what chance is there, really, that we're going to see new technologies or approaches genuinely applied in the near future that are actually going to make this industry have less impact?

● (1655)

Dr. Hassan Hamza: This is a very good question, actually.

I am very optimistic with what we see around. The technology that we are investigating now will be in the very near future. There's also a change in the pace of the industry in trying to experiment with us in many cases with these new technologies. So I think it is very close.

Actually, what came out later was directive 74 of the Alberta government, which really focuses on capturing fines from the new operations, keeping it in separate ponds, and having it at a certain level of compactness, where you can work on it, for example, in a very short time. All of this is coming together. I believe that in a very short time—I would say in the immediate to medium-term future—we are going to have a very good resolution.

Ms. Linda Duncan: Dr. Hamza, we had wanted Alberta Environment to testify, and they turned down our invitation. I guess I have an immediate question.

My understanding is that Alberta Environment is now going to require more return of water to the river. If the technologies are not yet proven to actually safely do that, how are the industries going to deliver on that new directive?

Dr. Kim Kasperski: I haven't heard of any requirement. There's no return of water to the river right now. For the in situ operations, there's a new directive on increasing recycled water, but there's no mention of return of water to the river. As far as surface mining goes, I have not heard of any directive. I don't know the reference that you mentioned.

Ms. Linda Duncan: So I may have misunderstood. It was my understanding that because there are so many concerns about the falling level of the Athabasca, the government is saying that it's time to move forward and get some of this water back to the river.

But as far as you're aware.... You can't speak for them.

Dr. Kim Kasperski: That may be the case, but I have not heard that.

The Vice-Chair (Mr. Francis Scarpaleggia): Let's follow up on the point that you made about the Alberta government. Indeed, when news of our study surfaced or resurfaced about a month ago, I think it was the deputy premier—and maybe even the energy minister or environment minister, I can't remember—who said that they were looking forward to telling their story. They had a good news story to tell, yet something must have happened in the interim and they decided it was better not to testify. It would have been good to hear from them.

That is just for the record.

Mr. Calkins.

Mr. Blaine Calkins: I do have one quick question.

The Vice-Chair (Mr. Francis Scarpaleggia): Go ahead.

Mr. Blaine Calkins: The slide, Mr. Gradek, on page 8 in your presentation, shows 180 kilograms of Ti_{02}.... What is that?

Mr. Thomas Gradek: Titanium dioxide, aluminum dioxide, and zirconium dioxide.

From the study undertaken by the Alberta government, those are co-products that exist in the oil sands deposits, and they get concentrated up into the fine tailings streams. They are oliophilic, so they adhere to the bitumen coating on the bead. So when we do the bead wash, they settle out.

Mr. Blaine Calkins: My question to you, then, before this gets to be too good to be true.... Dr. Schindler testified here today about the presence of not only these compounds but also the presence of things like cadmium, arsenic, and other heavy metals that naturally occur. Where would those particular metals be? Would they be in the water? Do they come off as a by-product as well, but you just didn't show them on the slide?

Could you give us some indication of how pure, how clean, the water is after they're separated from the bead?

● (1700)

Mr. Thomas Gradek: Some of the heavy metals that you mentioned stay in the primary tails. They don't get drawn with the bitumen froth, because they're not oliophilic. So they remain there and the concentration is not increased whatsoever. They go back into the sand volume.

Mr. Blaine Calkins: To the dry stackable tailings, or whatever the end product—

Mr. Thomas Gradek: The dike embankment construction, and so on.

Mr. Blaine Calkins: Okay.

My last question is this. When it comes to the overall process that you've proposed on this slide, could you provide the committee with any knowledge that you have about the carbon footprint of your technology? We have to have 80°C at the end of the pipe. We have some processes here where we heat up the bitumen wash and so on. Could you provide the committee with...?

Mr. Thomas Gradek: The carbon footprint?

The carbon intensity of a barrel of bitumen that will be extracted and generated from this process on a commercial scale is anticipated to be minus 828 megajoules per barrel, which is a net negative carbon intensity. It's the greenest fuel on this planet. It's not dirty oil. It's the cleanest oil.

The Vice-Chair (Mr. Francis Scarpaleggia): Thank you very much to all of you for your appearance. I think we've learned a lot on the technological side, to add to everything else.

I would like to tell members that the clerk has advised me that the bus is parked in front of Starbucks. We're off to the airport now, and we look forward to a good day of hearings in Calgary tomorrow.

Thank you very much. The meeting is adjourned.