House of Commons
CANADA

Standing Committee on Environment and Sustainable Development

ENVI • NUMBER 038 • 2nd SESSION • 39th PARLIAMENT

EVIDENCE

Monday, June 16, 2008

Chair

Mr. Bob Mills

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● (1530)

[*English*]

The Chair (Mr. Bob Mills (Red Deer, CPC)): I call the meeting to order.

For members' information, we've had a request regarding testimony that was given on May 28 in answer to a question. Mr. Sylvester, in answer to Mr. Lussier's question, inadvertently said that an environmental assessment had been completed on the Joslyn North mine project. That is incorrect. It has been tabled but it has not been completed. So he has requested that we change the wording in our records.

Mr. Lussier, you are aware of what happened there. I need a motion that we fix the reference that was made by Mr. Sylvester.

[*Translation*]

Mr. Marcel Lussier (Brossard—La Prairie, BQ): Mr. Chairman, I would like to make the following motion with a view to correcting the record regarding Mr. Sylvester's error.

[*English*]

The Chair: Thank you very much.

(Motion agreed to)

The Chair: We have two sessions today, from 3:30 to 4:30, and from 4:30 to 5:30. Our witnesses from Calgary are on the line listening to this first session, so they will be able to respond in the second half.

Because this is to be oil sands 101, an introduction, I remind members to take a look at the oil sands report that was done by the Standing Committee on Natural Resources in March 2007. There's a lot of pretty interesting testimony and information there that you should check out.

For our witnesses, I'd like to welcome you. Because the House is about to rise for the summer, this will be an opportunity for us to get our feet wet, so to speak, and get as much information as we can regarding this topic, on which we will go further in the fall. I would ask you to keep that in mind in your presentations, and the relation between water and oil sands, but more specifically just the general topic of oil sands and development in that area.

In this first hour, rather than going for ten minutes, I will not time you. I'll let you have the floor to give us as much information as you can.

If a question arises and you just can't wait, members, please raise your hands and I'll try to entertain it that way in this first hour. We'll see how that works. If it doesn't, we'll revert back to whatever time we have left. But because this is designed, as Mr. Scarpaleggia asked, to give us information, that's what we'll emphasize in this first hour.

You can begin, Mr. Stringer. Welcome. Go for it.

[*Translation*]

Mr. Kevin Stringer (Director General, Petroleum Resources Branch, Department of Natural Resources): Thank you, Mr. Chairman.

[*English*]

My name is Kevin Stringer and I'm the director general of the petroleum resources branch with NRCan. I have with me today Dr. Hassan Hamza, who is the director general of the CANMET Energy Technology Centre in Devon, just outside of Edmonton. Also with me is Kevin Cliffe, who is a director in the petroleum resources branch with the oil division.

● (1535)

[*Translation*]

I would like to make a brief presentation on the oil sands.

[*English*]

As you begin your study, which we look forward to reviewing once it's done, we really appreciate the opportunity to start with a bit of an overview about what the oil sands is all about, and some of the broad issues that the Government of Canada and Canadians generally are facing with respect to the oil sands.

Slide two is an overview of what we'd like to go through. We will talk about what oil sands are. This is a fairly complex issue, and Dr. Hamza will be able to speak to any questions you may have in that regard. I'll also talk about the history of the oil sands. It has become a major issue in Canada very quickly.

We want to speak to the economic opportunity that oil sands present for Canadians, and some of the economic and social challenges we're facing around the oil sands opportunities.

I'll speak about some of the environmental concerns and issues that have arisen in the areas of air, land, and water, and how we're addressing those in different areas. The provinces own and manage the resource, but the federal government has an important role, and we work with the provinces in that regard.

Then I'll speak about the way ahead, and give you some of our thoughts about moving ahead on this very important issue.

Now to slide three.

[*Translation*]

The oil sands are primarily located in north-eastern Alberta. However, there are significant oil deposits in Saskatchewan as well.

[*English*]

This really is mostly, but certainly not exclusively, an Alberta resource. There are significant pieces across the Saskatchewan border. But it is a significant area: 178 billion barrels of oil reserves in Canada, of which 173 billion or 174 billion is oil sands. So it is a major part of Canada's reserves. It's over 40% of Canadian production in terms of oil right now, meeting about 6% of North America's oil needs.

If you look at the different areas, we have the Athabasca area, we have the Lloydminster area and Cold Lake area, and then we have the Peace River area. Taken together, it's about twice the size of New Brunswick, which gives you a general sense of the area where we believe there are oil sands and currently there is some production.

Slide four sets out what oil sands are, and the following two or three slides are fairly scientific. Oil sands are a mixture of wet clay, sand, heavy metals, and bitumen. Bitumen is the heaviest and thickest form of petroleum and is made up of large hydrocarbon molecules. Compared to what is often called “conventional” crude oil, it has higher density, higher viscosity and thickness, higher metal concentrations, and a higher carbon-to-hydrogen ratio. All of this makes it a challenge from an environmental perspective as well as, in many cases, an economic perspective in terms of extracting the resource. Oil sands are usually mined or produced by in situ processes that heat the oil so that it will flow—and I will speak to that in a moment.

As indicated in slide five, crude bitumen is a thick, sticky form of crude oil, sometimes referred to as “extra-heavy” crude oil. While bitumen properties vary widely, it's in a near-solid state at room temperature, somewhere between molasses and a puck. Bitumen crude must be diluted with some lighter viscosity product, referred to as a “diluent”, in order to be transported in the pipelines. Basically, it's done by adding heat, by injecting solvents, or by in situ combustion or chemical conversion of the bitumen in reservoir.

As illustrated in slide six, there are two general approaches with respect to oil sands in terms of getting it to market: mining, and in situ development.

If it's close to the surface—that's generally 75 metres or less—it's generally mined. Shallow-depth deposits are recovered using open-pit mining, surface mining. Surface mining requires the removal of layers of muskeg, surface vegetation, and tree cover. This is where you've seen the pictures—or maybe you've been there—with the giant trucks, the giant shovels, etc. That's the mining process. It's less than 75 metres in the Athabasca area only, so not in the Peace River area, and not in the Cold Lake area. It's about 20% of the reserves, so it's a small percentage of the reserves of oil sands, but it's a very large percentage of where the extraction has happened so far. Two-thirds, or 67%, of cumulative production to date is mining, because it's easier to get at than the stuff that's deeper.

The stuff that's deeper is done in situ. That's basically where it's too deep to support economic surface mining. In-place wells are drilled into the oil sands zone, and special recovery techniques are applied to separate the bitumen from the sand, in place, and bring the bitumen to the surface through the wells. That's where it's deeper than 75 metres. In fact, it's easier the deeper you go. While 80% of the oil sands is likely to be dealt with in situ, so far only about 33% has been dealt with in that manner.

The environmental footprint with the in situ approach is significantly less than with mining, for obvious reasons. You just have wells. You have seismic issues and some other issues to deal with, but it is a whole different set of issues.

● (1540)

About two-thirds of the processed bitumen is currently being upgraded to synthetic crude oil before being shipped to refineries. Synthetic crude oil is a mixture of hydrocarbon similar to light crude oil, and upgraders are basically refineries that convert bitumen to synthetic crude oil, which is comparable, as I said, to high-quality light sweet conventional crude oil. It's an expensive technique, but it's what the market is looking for. All current mining operations also upgrade the bitumen to synthetic crude oil. In situ operations produce a heavier crude that needs to be diluted so it can be pipelined to refiners.

Slide eight is a bit about the history. This slide starts in 1967, but really it's 1915. In 1915, Sidney Ells, a federal engineer, demonstrated possible commercial use of oil sands for road paving in Edmonton and Ottawa. The early 1900s marked the beginning of looking at its commercial use. In terms of actual commercial efforts, it was really 1936 when Athabasca Oils Ltd. used hot water and solvents to extract the bitumen. That process was used until shortly after World War II.

It really got going in 1967 with the world's first oil sands mine that was started by Great Canadian Oil Sands, now known as Suncor. The Syncrude mine, which is the largest in the world, followed in 1978 and they have been the leaders from day one. In situ projects began in 1979 when Shell began its Peace River pilot that led to commercial operations in 1986. In 1985 in Cold Lake, Imperial Oil also began in situ production. Currently, about 35 major oil companies are active in oil sands and about 70 major projects are under way or under consideration across the oil sands area.

Oil sands are a huge opportunity. The chart in slide nine shows that conventional traditional oil fields in western Canada in particular are declining and are projected to decline over the next number of years as those fields become depleted. As new technology comes along you can get more out of the ground, but that's the current projection. The belief is that the oil sands will or can more than make up for this depletion. As we move toward wind and alternative energies and as we move toward efficiencies, fossil fuels will continue to be a dominant energy source for North America for the foreseeable future, according to the IEA, NEB, and those folks who look at this stuff. The numbers really are quite substantial.

Today about 1.2 million barrels per day of production is coming out of the oil sands, and it's forecasted to increase substantially, to 3.3 million barrels per day by 2020, according to the NEB. At that time it will be approximately 80% of total Canadian production. Right now it's around 50%. To put that into perspective, about 380,000 barrels per day are coming out of offshore Newfoundland. That's a significant number, but in terms of reserves and the percentage of the numbers coming out of the oil sands, it really is that much larger.

Slide ten shows where Canada is with respect to the rest of the world and in particular shows the top ten world oil producers right now. If we get anywhere in the range as projected by the NEB of three million barrels per day, 3.3 million barrels by 2020, and 2.8 million barrels by 2015, the expectation is that Canada would go from its current seventh to fourth in the world in terms of ongoing production, after Russia, Saudi Arabia, and the U.S.

As I said earlier, proven oil reserves in Canada are in the neighbourhood of 178 billion barrels. Of that, about 173 billion or 174 billion barrels are in the oil sands. It really is an enormous amount. It puts Canada at second in the world after Saudi Arabia in terms of the amount of oil reserves. If you want to get a sense of cumulative production, with 174 billion barrels in the oil sands, cumulative production to date out of the oil sands is 5.4 billion barrels. That's how much has come out to date.

● (1545)

Estimated reserves currently under active development—in other words, in those projects that are under development now or already in operation—if they were to take all the oil they could take out, it would be around 21 billion barrels. So there is a lot more that the projects have not yet defined.

The final point on this slide is quite noteworthy. The IEA projections show that by 2030 it's expected that Canada's oil sands production will represent about a third of total OECD oil production. That is a substantial amount from Canada's oil sands production.

We talk about 178 billion barrels as proven reserves, but the sense is that there's a heck of a lot more there. Proven reserves means what is technologically possible at current prices and current technology. Down the road—where the technology has not been invented, and the price isn't anywhere near there yet—there is an enormous amount, 1.7 trillion barrels, estimated. I'm not quite sure how they get that number, as opposed to 1.6, but the sense is that it's an enormous field.

I should note as well that 80% of the remaining resource is recoverable only by in situ techniques. In other words, it's deeper. The easy stuff...and people who have done this mining would say don't say easy stuff, but the relatively easy stuff has been done and we have the more difficult in situ to continue. But again, that has less of an environmental footprint than the mining has.

In situ projects produce heavy oil, which is differently priced than light sweet crude, and these will involve reduced environmental footprints for land, water, and GHGs for the mining projects. There's a greater range of technology available for application and more of a sense of what is environmentally responsible as we go forward. There's a lot of research going on in that regard, as well.

● (1550)

[*Translation*]

There are significant socio-economic repercussions for the country as a whole.

The oil sands have generated jobs for Canadians: 120,000 direct and indirect jobs, 1,300 Aboriginal people employed directly in the industry, and $310 million in contracts.

Investments have also been substantial. Over the last 10 years, the industry has spent $47 billion on new capital projects, and between $110 billion and $125 billion in new investments are expected over the next 10 years.

[*English*]

So oil sands investment has been a major economic driver for Canada, with significant challenges around that, as well as opportunity. The next slide actually speaks to some of those economic and social challenges. I think these are fairly well known.

In addition to the environmental challenges, there's the enormous growth in an area that didn't have the population and skilled labour. Areas like Fort McMurray have grown exponentially, from 1,500 people back in the seventies to 35,000 a few years ago, to over 56,000 now, and it's expected to grow in the next few years to 80,000. It really is enormous growth for the Wood Buffalo area. So there's a skilled labour shortage in all sectors of the marketplace. This isn't unique to the oil sands, but it is particularly acute there.

Also, there is labour dislocation, with significant movement across the country to this area. So there are issues with salary benefits versus concerns over labour dislocation.

And there have been pressures on labour, manufacturing, and deliveries, which have increased initial project cost estimates. It's been an enormous issue. The cost of steel for some of the pipeline projects being undertaken has really grown, as we try, basically, to buy up all the steel in the world for some of the projects we're dealing with, both in the oil sands and the pipelines to support them.

Pipeline capacity is also a huge issue. We have the Keystone, Alberta Clipper, and Southern Lights projects that are coming on to deal with the extra capacity that's coming through the oil sands.

And there's increased pressure on local infrastructure. Housing, water, and sewer, those basic infrastructure items, are a real challenge, largely in Fort Macleod and Fort McMurray, but also in Edmonton and other areas around Alberta—and perhaps even Saskatchewan. There are some real challenges with respect to economic and social issues in these areas.

On the next slide, we get into the environmental issues. I think there's a fourth issue that we identify, which I'll start with, because it's an economic and environmental issue, and that is the use of energy. The oil sands use a lot of natural gas, which is needed elsewhere as well, so there's a fair amount of research and work going on to try to decrease that and to make it more efficient, in terms of the use of energy.

Air, water, and land are the three general areas. In terms of air, oil sands production and upgrading are more energy-intensive than the production of light oil. As a result, they create more GHG emissions. The oil sands industry currently accounts for upward of 4% of Canada's total emissions.

In terms of water, which we understand is the nature of the study you will be undertaking, there are a number of environmental concerns associated with increasing water usage in the oil sands sector. These include the potential negative impact on the aquatic ecosystem; the removal of water from the watershed, both surface and ground water; and the large tailing pond issues that are being created by the mining projects—not the in situ, but the mining projects.

In terms of land, the Athabasca oil sands deposit is situated wholly within Canada's boreal forest, with large individual mine areas. The in situ process requires no excavation and less surface area for operation, but it is associated with fragmentation, and there are new roads and seismic testing and things that are associated with traditional well sites and more conventional oil exploration.

So those are the three general areas. I'll speak to the air and water issues in a moment, but I do want to point out slide 16, on the issue of jurisdiction in terms of how we address these issues.

I pointed out at the beginning that the provinces own the resource and set the framework for oil sands development, project approvals, royalty regimes, and regulation. The federal government, however, has an important role, and we actually work closely with Alberta and Saskatchewan in managing that. We have responsibility and some engagement around the environment, habitat, and wildlife protection; around human health; and around aboriginal consultation. And we have shared responsibilities to ensure a fiscal and regulatory framework that encourages a positive investment climate in Canada and that meets environmental goals.

Some of the ways in for the federal government here include the Canadian Environmental Protection Act, the Canadian Environmental Assessment Act, the Navigable Waters Protection Act, the Fisheries Act, the Indian Lands Agreement Act. And we worked with Alberta as well on some joint documents, such as the national water framework, which DFO prepared along with the Alberta government.

● (1555)

In terms of air, in 2007 Canada set out its national plan for reducing greenhouse gas emissions and provided further detail in March of 2008. Existing facilities in oil sands—existing facilities being pre-2004—will be required to reduce emission intensity by 18% below 2006 standards by 2010, and will be required to achieve a 2% annual reduction thereafter. Newer facilities built since 2004 will have to meet a cleaner fuel standard and improve their intensity by 2% a year as well.

Additional measures apply exclusively to the oil sands and coal-fired electricity sectors, including requirement that oil sands in situ and upgraded facilities commencing production after 2011 achieve significant reductions based on carbon capture and storage standard. We're still working out exactly what carbon capture and storage standard requires, but we believe carbon capture and storage will be a major part of the solution moving forward on oil sands, but also in other areas.

I should note, however, that between 1990 and 2002, GHG intensity of production improved by 27%. There has been an absolute increase in GHG emissions because of the growth of the oil sands, the number of projects. The intensity actually has improved, and we've all set objectives, including the Alberta government setting objectives for improvements moving forward.

I'll turn to water, slide 18. In the oil sands industry, water is important. It's required for extraction and other processes like transporting slurry, separating oil from sand in the mining operations, and making steam for extraction. In oil sands surface mining, about 70% of the water is recycled, and in situ, in the deeper stuff, which is going to be the future, about 90% is being recycled. Those numbers are an improvement from where they were a number of years ago. Depending on who you talk to, it's between 30% and 45% improvement in efficiencies over the last 10 or 15 years.

The Alberta government, responsible for this, has set an objective of a further improvement by 2015. Alberta Environment, monitoring the water quality and oil sands in the region, has set that objective, and we've been working with them through DFO in particular, which has developed a plan that was released in February 2007, a water management framework for oil sands in Alberta.

The final slide is just a bit of a summary. It really is an enormous resource, a hugely important resource for Canada, for North America, and for the world. High oil prices and improving technology will likely make more of it available in a shorter period of time than folks may have thought. Our challenge is to make sure that as it is developed, it is developed in an environmentally responsible way, in a way that takes into account the economic and social challenges we spoke to and is driven by sustainable development.

Moving ahead, in our view, means partnerships: partnerships with the Alberta government and other provincial governments; partnerships internationally, where we're involved with many other countries in terms of carbon capture and storage, in terms of many aspects on the environment side; partnerships with industry; partnerships with environmental groups; partnerships with aboriginal groups, particularly the ones who live there, the Athabasca Tribal Council and others in the area.

With that, thank you very much for your patience. We have a few extra slides, which I think I'm not going to walk you through, but we'll leave them for your information.

We'll be happy to answer any questions or comments you may have. I've taken more time than I was supposed to, which I appreciate.

● (1600)

The Chair: As I say, this is a 101 course, so we appreciate your input.

I think we'll go maybe six minutes on a round. That will get us through the half-hour, unless there's a vote.

I will begin with Mr. McGuinty.

Mr. David McGuinty (Ottawa South, Lib.): I have a few quick questions. Mr. Chair, I hope we're going to have a chance to bring these witnesses back. There's just no way we can—

The Chair: Again, this was our last week. It was an attempt to get some basic information.

Mr. David McGuinty: That's in anticipation of perhaps a more detailed examination of this in the fall, I assume.

Mr. Stringer, you talked about the federal government's role in the oil sands, and you cited CEAA, CEPA, the Navigable Waters Protection Act, the Fisheries Act, and the Indian Act. Is that right? That's the federal legislation at play here?

Mr. Kevin Stringer: Yes.

Mr. David McGuinty: Can I ask you about water for a second?

It takes three to five barrels of water, primarily from the Athabasca River, per barrel of oil. You tell us we're producing 1.2 million barrels a day now, so I take it that's 3.6 to 6 million barrels of water a day. Is that right?

Mr. Kevin Stringer: That would be the math.

Mr. David McGuinty: Do we have any idea about the carrying capacity of the Athabaska River? Are you working with any metrics to indicate that this is a sustainable extraction quantity?

Mr. Kevin Stringer: I'll start, and I'll ask Dr. Hamza to continue.

I think this is largely why the water framework was prepared between DFO and the Alberta government, to look specifically at that and set some specific objectives on what is a reasonable amount. At the moment about 1% of the flow is dealt with. With the projects that we know about, there's talk about going up to 2%. And there are some specific objectives set by the Alberta government on a case-by-case basis on how much you can take.

As I say, there's been an improvement in terms of the intensity. Ninety percent of the in situ water is recycled. Seventy percent of the water for the mined product is recycled, but folks know that's not good enough and they continue to work on it.

Dr. Hamza can add to that.

Dr. Hassan Hamza (Director General, Department of Natural Resources, CANMET Energy Technology Centre (CETC) - Devon): That's true.

One more thing to add is that in the river there is high flow and low flow, and even at low flow, so far, according to the Alberta government's water management, this is a reasonable and acceptable level of draw on the river.

The Chair: Mr. Scarpaleggia.

Mr. Francis Scarpaleggia (Lac-Saint-Louis, Lib.): Thank you for being here. It's a very interesting way to begin our study.

You made it sound like the open-pit mining, which is the source of the tailing ponds, is on the way out, that it's on the downward part of the life cycle curve. Is that an accurate understanding of what you're saying? Do we still go full steam ahead, if you will, with the mining portion for quite a long time still?

● (1605)

Mr. Kevin Stringer: The answer is yes to the latter question.

I guess what I was trying to suggest is that the future is largely with the in situ. The mining will continue; the tailings ponds issue will continue to be a significant issue for a long time to come. But in terms of the proven reserves we have, 80% of it is not in mining. That said, 20% of it is a lot, and the current activities will continue for some time to come. That's why it's so important that work on the tailings ponds continues.

Dr. Hamza.

Dr. Hassan Hamza: I think this is an excellent question. We still have the legacy of what happened before, and even if we stopped today we still would have large tailings ponds to deal with. We have been working with this for a while now, and there are some technologies around that can mitigate that. It is more effective when you are dealing with new, fresh tailings, but we still have to deal with the tailings that are stored in these huge ponds.

Mr. Francis Scarpaleggia: I had the opportunity to listen to a presentation by a Mr. Randy Mikula, who gave an excellent presentation on his work on trying to salvage, basically, the tailings ponds.

Let me see if I can get this correctly. My understanding is that in terms of construction material used to build them, these ponds—one of them in particular, or I don't know if it was collectively—are larger than any dam in the world, though that may no longer be true once the Three Gorges Dam is built.

How many ponds are there at the moment?

Dr. Hassan Hamza: There are about four or five. But the size of the dams is actually a point of pride for the engineers who built them.

Mr. Francis Scarpaleggia: Do we anticipate that we'll be adding to these ponds and that we will double the number of ponds? Obviously, someone is thinking of that. If the mining portion of the development of the oil sands is going to continue, we must have a projection as to how many ponds we will add every ten years. I don't know if it works that way, per se. What are we looking at?

Dr. Hassan Hamza: It may not work this way exactly, because as new technologies come in, the number and size of the ponds will not be as big. The sooner we bring in new technologies, the better it will be for everybody.

The fallback position for approvals from the province is the technology where you have a tailings pond. But there is a stipulation that the industry must use every possible means to introduce new technology to reduce that.

Mr. Francis Scarpaleggia: Sure. And are the technologies developing quickly? I'm not an engineer, and I'm certainly not an expert on the oil sands, but one gets the sense that the oil sands technology has been around for a long time. It is not that the technology is simple, but it's not developing that quickly. Basically, the same technology is being used, maybe with some small advances. What's really making the difference is that the price of oil is going up. That is what is spurring development. It's not so much the improvement of technology to bring the price down or to mitigate the environmental effects.

We were talking before about 1915, I think. That's a hundred years ago, almost. Has the technology really developed much since 1967?

Dr. Hassan Hamza: The technology, actually, in the old sense, in the extraction of the oil sands, made major strides up to the late 1990s, before the prices of everything went down.

You could produce better oil for about $8 or $9. This is for production. Now it is close to $40, and it has nothing to do with technology. It has to do with the cost of the steel, as Mr. Stringer said, and the cost of labour, and so on.

If we go back to the tailings technology, at any time you can buy brute force. You could solve this problem today through brute force.

Mr. Francis Scarpaleggia: What does that mean?

● (1610)

The Chair: Mr. Scarpaleggia, your time is up.

We'll go to Mr. Bigras.

[*Translation*]

Mr. Bernard Bigras (Rosemont—La Petite-Patrie, BQ): Thank you very much, Mr. Chairman.

I would like to begin by thanking you for appearing before the Committee today. It is a brief, but at the same time, broad overview of the industry, and I want to thank you for that. However, there is one area that I would have liked to see you discuss further, and that is the tax system affecting the oil sands industry in Canada. You talk about—and I understand that—120,000 direct and indirect jobs that have been created, as well as 1,300 Aboriginal people directly employed by the industry.

However, I would like you to describe the Canadian tax system as it applies to the oil sands, how much that represents annually and how much it has represented for Canadians, in terms of various taxes, over the last 10 years? Can you give us some general indications in that regard?

Mr. Kevin Stringer: We can certainly provide the Committee with an accurate picture of the current situation.

[*English*]

What I can say, as well, is that the capital cost allowance was changed—I believe it was last year in the budget—to bring it in line with capital cost allowances elsewhere. The government has indicated since 1986 that it's out of the business of providing large support for megaprojects in the oil sands. There was some involvement in early days, but there hasn't been in recent years. Certainly, in terms of the fiscal situation, we can provide you with....

[*Translation*]

We can provide more information to the Committee on this.

Mr. Bernard Bigras: However, you do recognize that there are still tax incentives available to the industry.

Mr. Kevin Stringer: We can also answer that question.

Mr. Bernard Bigras: I have a second question for you. In the Speech from the Throne in October of 2007, the Prime Minister announced his intention to develop a new water strategy. I believe the Minister of the Environment has been suggesting there could be some details provided, including very specific standards, particularly with respect with wastewater.

That is all well and good, and I know that a great deal of effort is being made to develop the industrial sector. However, were you consulted to ensure that this development would abide by a certain number of environmental standards, in terms of water quality, as well as a principle called green taxation, and that the public data obviously serve to develop this sector, but also ensure that environmental standards, particularly those relating to water quality, are observed?

Mr. Kevin Stringer: I am going to ask my colleague, Dr. Hamza, to answer your question, but I can tell you that we are working very hard in our Department, and at the Department of the Environment, on a water strategy. We know that this is very important for Canada. I also believe that the water management framework the Department of Fisheries and Oceans has developed with the Alberta government is a very important link to a strategic framework on water use in the oil sands. We are currently working on that strategic framework with the province.

● (1615)

Mr. Bernard Bigras: I have one last question for you. Mention was made of technology and developing that technology. I would like to know if the federal government has made any effort in that regard. You told us earlier—rightly so—that the industry uses a great deal of natural gas in developing the oil sands.

Has the federal government made any financial effort to develop the nuclear option for future oil sands development? Can you confirm that public funds have been used to develop the nuclear option, as a way of increasing production?

Mr. Kevin Stringer: Research has been conducted on whether nuclear energy could be used to develop the oil sands. I believe that research indicates that the technology is not yet sufficiently advanced. Nuclear energy does not produce enough steam. But, we do believe that with more research, it will be a possibility in the future.

[*English*]

Dr. Hassan Hamza: Our department is working on two fronts. One is the technical front. We're trying to develop better technologies to clean the water, recycle the water, and generally use less water in the production of oil. On the coordination front, we have committees in NRCan from different areas within the department, and we are working with the Department of Environment on a number of these issues. We are also in touch with the provincial government. We sit on many committees with the federal and provincial governments, and these issues are discussed extensively.

The Chair: Have you done any research on the Northwest Territories and run-of-river hydro potential? I understand that it's huge. It could provide all of the energy required for the oil sands if you could get it from where it's generated to where you need it. The problem would be the transmission lines. Has any work been done on this?

Mr. Kevin Cliffe (Director, Oil Division, Department of Natural Resources): That's a very good question as well. The answer to that is no, we haven't really examined that directly. As you suggest, and as you point out, it is a question of the transmission. It is a fair distance. We haven't looked at it, as I said, directly. I think that is an area that perhaps the fisheries department might have been looking at, or perhaps even the province. I'm not sure. We can check that for you.

I just wanted to respond, if I could, to the nuclear question. We have just completed the first phase of a study with Petroleum Technology Alliance Canada, taking a look at various nuclear technologies that are available within Canada and other jurisdictions that might have the potential to be used in the oil sands area. The results of the study to date indicate that, as Mr. Stringer has pointed out, it's really becoming an issue of size, proximity of the nuclear facility to the actual load—the oil sands operation—and the amount of compression that is required in order to maintain the steam pressure and steam temperature to transport the steam produced at the nuclear facility to the actual site.

Petroleum Technology Alliance Canada, along with industry, is engaging in the second phase of this study right now, which will take a look at some of the technologies that could be applied and the economics of their application.

Mr. Kevin Stringer: Can I just add to that, Mr. Chair?

I think this goes back to the question of whether technology is moving along or the price of oil is driving this. It is, indeed, both. Technology has advanced enormously in the last twenty years, as has the amount of research being done. I did say, in response to the question of whether we have looked at nuclear, that we have looked at it. I should be clear that the research was not done by the federal government.

We have seen emission intensity levels come down. We have seen use of water come down. We've seen a decrease in the cost, which has made it more economical to proceed with some of this work. So technology is moving ahead, and there's an enormous amount of technological research, much of it being done in Devon by Dr. Hamza and his group, but also all over the world. The question is whether the research and technological improvements can keep up with the growth of this resource. That's the challenge we're facing.

● (1620)

The Chair: Did you have a quick question, Mr. Lussier?

Mr. Marcel Lussier: I have three questions.

The Chair: The next two presenters will present much of the same material, so I think everybody will get a chance to ask questions. Of course, this is just our beginning.

Go ahead very quickly, and then we'll go to Mr. Jean.

[*Translation*]

Mr. Marcel Lussier: Do the investments of $125 billion mentioned on slide 13 include costs related to nuclear power plants?

[*English*]

Mr. Kevin Cliffe: No. This is just for capital for the actual plants and for sustaining capital to maintain the operations at their levels.

One of the things with oil sands is that they do not decline as you produce them. There is a flat production rate for about 40 years. The material is fairly caustic, and it does require continued investment in the facilities in order to keep them operating effectively.

[*Translation*]

Mr. Marcel Lussier: Mr. Stringer, on slide 15, you mention that the oil sands contribute 4% of greenhouse gases in Canada.

What year does that figure refer to? And, what is the projection for 2020?

[*English*]

Mr. Kevin Stringer: Okay.

[*Translation*]

I do not know exactly what the projection is for 2020. However, we did say that we are aiming for an overall reduction in emissions of about 20% for the industry as a whole.

[*English*]

We have projections for even more reductions for the oil sands. In terms of what percentage of the overall that would be, I can't tell you, but we can certainly get you that information. I'm sure there is a projection about that.

[*Translation*]

Mr. Marcel Lussier: Mr. Stringer, you talked about open pit mining, as opposed to *in situ* methods. You said a number of times that *in situ* methods are less damaging to the environment than open pit mining.

On what basis did you make that statement, two or three times, during your presentation?

Mr. Kevin Stringer: That is a good question. I can ask my colleague, Dr. Hamza, to answer that.

[*English*]

Basically, it's that the open-pit mining takes a very large area, and the effect on the land certainly is more significant. The amount of water used is more significant. Only 70% of the water is recycled, whereas with in situ, 90% is recycled. The emissions are less substantial. So the overall footprint is generally less.

That is not to say there aren't issues with the in situ situation, the in situ facilities. There are issues there. There is seismic work done, there are roads, and there are other issues we need to deal with. There's a different set of issues, but the sense is that it's less grand on the scale of what you would have to deal with.

Dr. Hassan Hamza: I'd like to add one or two quick points.

With in situ, because there is no disturbance of the land, and so on, whatever emissions there are underground are not exposed to the surface. These are advantages.

But I'd like to at least warn you against believing that in situ produces, with the same unit of energy, as much as surface mining. In the surface mine, you can produce over 90% of the bitumen. With in situ, you are producing maybe 30% of the bitumen, because of the structure of the formation, and so on.

● (1625)

[*Translation*]

Mr. Marcel Lussier: Dr. Hamza, is any data available on the effect of solvents on groundwater, or will these data only be available 20 or 30 years from now? I am referring here to contamination of the groundwater.

[*English*]

Dr. Hassan Hamza: There are studies in that area. There are some numbers that are available now. The ultimate effect is that you don't have to wait for 20 to 30 years. At least you can get projections of what could happen.

You are right; the contamination of underground water is one of the issues that should be looked at.

The Chair: Thank you.

We'll go now to Mr. Warawa, please.

Mr. Mark Warawa (Langley, CPC): Thank you. This is very interesting.

About a year ago I went up and visited my good friend, the hard-working member of Parliament for Fort McMurray—Athabasca, and had a tour of the river. I was fascinated to actually see rocks with bitumen oozing out of them right along the shore of the river. So it's there naturally too, and to now see this resource being used is very interesting.

I also saw some areas that looked as though they had been reclaimed, different from what they were originally. Of course I think the bison had been returned to that area too.

My question is on water recovery. You had mentioned that with the surface mining it's about 70%, and it's about 90% with in situ. So with the projected trend as we move more to in situ and away from surface mining, because that's where the big resources are, deeper than the 75 metres, will just that formula alone cause the amount of water that's being used to likely go down, then?

Mr. Kevin Stringer: I think the answer is that it will mean there is less water used per project, but it depends on the number of projects that are out there. But the objective is to get better than 90%. The objective is, at this point, an improvement in water usage and efficiency: the objective that the Alberta government set, and they're working with industry to achieve it, of a further 30% improvement by 2015.

Certainly you're right in terms that, per project, the situation should be better. But with the number of projects that are expected to come along, it will continue to be a significant challenge.

Mr. Mark Warawa: On the actual volume that's taken out of the river, you mentioned there are high and low volumes in the river. I think I've heard the figure of 2% of the volume, and I've heard the figure of 4%. Is that the average during the year, or a maximum of 2% or 4%? And is the population, which is estimated to be 80,000 to 100,000 people actually living in the Fort McMurray area, part of that volume of water being removed, when you say 2% to 4%?

Mr. Kevin Stringer: I believe that the 2% of the flow—which is the figure that I've seen most often, and it is true you do see different figures, 1%, 2%, or 3%—speaks to the oil sands. That's the percentage of the flow that is being used by the oil sands. My understanding is it's 1% now and the 2% is expected with projects that are foreseen in the near future.

Mr. Mark Warawa: I'd like to switch gears a bit. You said that carbon capture and storage is a very important part of future developments, actually absolute reductions in greenhouse gas emissions. Could you share with us the importance of carbon capture and storage and what part it will play? How is it going to make things different from the way we remove bitumen now and in the future? And what are the capital costs associated with it?

Mr. Kevin Stringer: Again, I'll ask Dr. Hamza to add to what I'm saying.

With regard to carbon capture and storage, one of the things our department is working on is something called a storage atlas, and it's going to point out where in Canada it's possible to store carbon dioxide. The challenge is actually capture. That's the biggest challenge. There are lots of places to store in deep-water aquifers, in old oil wells, in particular in southwestern Alberta. That's an exaggeration, because it goes right up to Edmonton, but the area south and west of Edmonton in Alberta is a particularly good area for that.

What we anticipate is that there will be pipelines from Fort McMurray. The Fort McMurray area is not one of the best areas for it, but just south and west of there it does become good. So there will probably be a pipeline that goes to those areas that would be used and sequestered throughout Alberta and Saskatchewan. Currently, the Weyburn-Midale project in Saskatchewan is one of the biggest in the world, and is looking at monitoring, looking at evaluations, and looking at how this can best be done. We do see it as an opportunity to capture the carbon dioxide and inject it deep into the ground, where it will stay secure for thousands of years.

● (1630)

Mr. Mark Warawa: I wish we had a lot more time to hear from you. As was suggested, maybe we can hear more in the future, in the fall.

In Weyburn they use the carbon dioxide they've captured, coming up from North Dakota. It's piped up. Carbon dioxide is mixed with the water and it enhances the oil recovery. You've mentioned that in situ is providing a recovery of about 30%. Will that enhance that recovery?

Mr. Kevin Stringer: That's a good question.

The great thing about carbon capture and storage is that the first opportunity is enhanced oil recovery, that it goes into depleted wells or reserves and could actually enhance the amount of oil you get out of it. You get another 10%, 20%, or 30%, and that's what they're doing in Weyburn. And they're doing it around the world; they're doing it all over the U.S. Whether that works in in situ, I have no idea.

Dr. Hamza.

Dr. Hassan Hamza: Yes, it does. What has happened in Weyburn, actually, although we are getting the carbon dioxide from North Dakota, it is an experiment to see how this works. The advantage with Weyburn is that we know the base information, and when we put the carbon dioxide in, we can see the effect of the carbon dioxide. Your objective is to store it for a long time, but you should understand that when you put carbon dioxide with the oil, some of it stays behind and some of it comes back with the oil. So it is extracted and recycled again, and, like the water, you make up the difference with this.

Mr. Mark Warawa: It also reduces the viscosity so it can flow. That's why you get enhanced oil recovery. Bitumen is quite thick, so if you now inject that along with the water, would that then reduce the viscosity and permit enhanced recovery?

Dr. Hassan Hamza: It reduces the viscosity and so on, but there are other ways actually. We'd love to talk more about that, and when we have an opportunity we'll be very happy to continue to do it.

Mr. Mark Warawa: Chair, if I have any time left I'd like to leave it to you.

The Chair: I have lots of questions as well, but our time is up for this section. I think we should move on.

I think I've heard at least three people say we want to have you back. We appreciate your information. This was intended to be base information and we'll get into the details later on.

Thank you very much.

We'll now go to our TV screens. Our next two guests are in Calgary.

Welcome to our guests in Calgary. We can see you on the screen and I trust that you can hear us okay.

A witness: Yes, we can. Thank you.

The Chair: We do have your written material as well.

I ask you to make a presentation and then we'll go to questions as soon possible with our members.

Let's begin with Mr. Chastko.

Dr. Paul Chastko (Director, International Relations Program, University of Calgary, As an Individual): Thank you, Mr. Mills. It is indeed an honour to appear before this committee today, and I hope I can say something of worth to you.

I should point out that I'm a trained historian. I earned my PhD in history from Ohio University. I am currently the director of the University of Calgary's international relations program.

My research interests have focused primarily on international diplomacy and business. In 2002 I completed my doctoral dissertation on this very subject. The title of my dissertation was “Developing Alberta's Oil Sands”, and that has since been turned into a full-length book project, published in 2004.

My book, *Developing Alberta's Oil Sands: From Karl Clark to Kyoto*, deals with the evolution of the oil sands industry. The oil sands industry began in the 1910s. We have arrived at a point 90 years later where we have a multi-billion-dollar industry. When it began, it was producing only road-top asphalt. That is a rather remarkable transformation. We now have an industry capable of producing 1.1 million, 1.2 million barrels of oil per day. By 2020 this will increase to approximately 3 million barrels per day.

There are a few themes that I developed in the writing of my book. I'll touch on these and give you some suggestions. The first is the capital-intensive nature of oil sands development. With the oil sands, we're dealing with an industry, from its origins and arguably to the present day, that resembles mining industries more than conventional oil industries.

One of the things I found in my research is that the oil sands began the 20th century as a fringe source of petroleum on the margins of the international oil industry. This is how the source was regarded by multinational oil corporations. Yet we saw a series of decisions taken by both the federal and provincial governments that now enables us to benefit from this resource. That is the second theme my book touches on—this public-private leadership. We saw it in the federal government in Sidney Ells, who researched the oil sands in the 1910s. This was carried forward by Karl Clark and the Alberta Research Council in the 1920s. It has been developing since the beginning of the first oil sands plants—from Great Canadian Oil Sands starting commercial production in 1967 to the operations of Syncrude today.

My research shows the importance of this public-private partnership in developing these resources. There has been a strong role for both the private sector and the government. Government did not play a passive role; it made enormous contributions. There is the work of Sidney Ells and the mines branch, the work of the Alberta Research Council in determining the physical properties of the oil sands deposits, research on separation methods, and the establishment of taxation royalty and regulatory frameworks that guide the industry's development today.

It was interesting for me in the last hour to hear the presentation of the members of Natural Resources Canada. I would like to point out exactly how we're dealing with an evolutionary change.

● (1635)

The process of hot water separation that you heard mentioned in the last hour involves taking the oil sands and adding water and heat. With the composition of the oil sands—clay, water, sand, and bitumen—once you add water and heat you get a separation of the oil sands. The bitumen sticks to the clay, floats to the surface, and can be skimmed off.

The process of perfecting this technology took 28 years. It took Karl Clark and the Alberta Research Council from 1920 until 1948 to demonstrate its commercial viability. So when we're talking about the oil sands, I think it's important to recognize that we have dealt for the most part with this industry's history of an evolutionary change. We have truly seen a revolutionary change with the development of in situ methods since the 1970s.

I'll wrap up these brief comments by saying that my research is now focusing on the globalization of the oil industry, and I would be pleased to answer any questions you may have that I hope I can answer on the development of the oil sands.

● (1640)

The Chair: Good. Thank you very much.

I'll now move to Ms. Killingsworth, please.

Ms. Colleen Killingsworth (President, Canadian Centre for Energy Information): Thank you, Mr. Chair.

My name is Colleen Killingsworth and I am the president of the Canadian Centre for Energy Information.

We are a non-profit, third-party energy information resource on all sources of energy across Canada. I'll just point out we are a non-advocacy group and we do rely on a rigorous stakeholder review process for all our original content.

I have a lengthy slide presentation that is put together to serve as extended background and information for you. Please don't let that intimidate you. I will only be speaking to some key highlights per slide.

As world demand for crude oil continues to grow, the oil sands deposits of northern Alberta represent one of the few reliable, long-term sources of supply. The total amount of bitumen in the ground is estimated at 1.7 trillion barrels, of which 174 billion barrels are considered recoverable reserves based on current economics and technology.

Only about 10% of Alberta bitumen resource is considered economically recoverable with current technologies, yet those reserves would be sufficient to sustain production of three million barrels per day for more than 150 years.

The next slide is a graph that shows you Canadian oil production and its projections for growth in the oil sands development and production to 2020.

The next slide shows you where Canada sits within the top five world oil reserves. The oil sands reserves are larger than the reserves of Iran, Iraq, or Russia, and are second in size only to those of Saudi Arabia.

Oil sands deposits underlie 140,800 square kilometres of Alberta, an area larger than the island of Newfoundland or the state of North Carolina. Smaller potential bitumen resources are also being evaluated in northwestern and east central Saskatchewan. Conventional heavy oil deposits in Canada are concentrated around Lloydminster on the Alberta-Saskatchewan border, but heavy oil has also been found in British Columbia, offshore Newfoundland and Labrador, and the Arctic islands.

I won't go into discussing this slide, as it has already been covered by Mr. Stringer, but it shows you the oil sands molecule and how it is developed.

According to the National Energy Board, in 2006 production from the oil sands reached 1.1 million barrels per day, surpassing the oil production of Texas and equal to about one-tenth the output of Saudi Arabia, or 1.3% of the total world crude oil supply.

Dozens of multi-billion-dollar projects are under way to expand oil sands production. The Alberta government envisions oil sands production as high as five million barrels per day by 2030. This would be equivalent to nearly one-quarter of current North American oil consumption.

The growth of the oil sands industry has had far-reaching benefits. Nearly a quarter of a million people are directly and indirectly employed by the oil sands. Studies estimate that the oil sands activity will provide $123 billion in government revenues in Canada between the years 2000 and 2025.

About 18% of Alberta's economically recoverable oil sands bitumen reserves are close enough to the surface to make mining feasible. Most of these are located in the area north of Fort McMurray.

Mining extraction techniques were initially borrowed from other open-pit mining processes and used giant draglines, bucket wheels, and conveyor belts to excavate oil sand and transport it to processing facilities. This system was costly and difficult to maintain, especially in the harsh northern climate.

In the early 1990s substantial savings were achieved by switching to power shovels, oversized trucks, and water-slurry. The switch in technology was a key step in making the oil sands industry cost-competitive with conventional oil producers.

● (1645)

The next slide is a good illustration of the oil sands mining process. Once oil sands ore is mined, it is transported by truck to a slurry system called hydro-transport, where the process of separating the bitumen from the oil sands begins. The slurry is treated with hot water in an extraction plant to recover the bitumen.

Tailings, a mixture of water, clay particles, and some bitumen, is a byproduct of the extraction process. Tailings are stored in ponds, which are later reclaimed.

Once the oil sands ore has been completely mined, the site is reclaimed to a state comparable to what existed prior to the oil sands development.

I'm going to skip over the next slide, as Mr. Stringer has covered this quite well.

The following slide illustrates the SAGD process. This is one of the in situ processes, which more recently has gained popularity and is the most common method used in new, smaller-scale projects. SAGD stands for steam-assisted gravity drainage. In this method, pairs of horizontal wells, one above the other, are drilled into an oil sands formation, with steam injected continuously into the upper well. As the steam heats the oil sands formation, the bitumen softens and drains into the lower well. Pumps then bring the bitumen to the surface.

As shown on the next slide, existing in situ projects use natural-gas-fired boilers to generate steam. Technologies have been developed to use crude bitumen as a fuel if needed for steam generation.

One technology that could reduce energy requirements is called vapour extraction, or VAPEX. In this method, pairs of parallel horizontal wells are drilled, as in SAGD. But instead of steam, natural gas liquids such as ethane, propane, or butane are injected into the upper well to act as solvents so that the bitumen or heavy oil can flow to the lower well. An industry-government conversion is currently evaluating a VAPEX pilot project, and several operators are also testing the technology on their own leases.

In situ, as the next slide says, is expected to disturb only about 10% of the surface land in the development area and utilizes about 90% less water than current mining methods.

The next slide is on upgrading. Once extracted, the bitumen can be sold directly to the market or upgraded by the oil sands operators into a variety of crude oil products. Because most oil refineries are designed to handle only conventional light and medium crude oil, bitumen requires special processing or upgrading to make marketable commodities.

The next slide is a diagram on the upgrading process. Upgrading is usually a two-stage process. In the first stage, coking, hydro-processing, or both are used to break up the molecules. Coking removes carbon, while hydro-processing adds hydrogen. In the second stage, a process called hydro-treating is used to stabilize the products and to remove impurities such as sulphur. The hydrogen used for hydro-processing and hydro-treating is manufactured from natural gas and steam.

As the next slide shows, upgrading produces various hydrocarbon products that can be blended together into custom-made crude oil equivalent or sold or used separately. The Syncrude and Suncor mining projects use some of their production to fuel the diesel engines in their trucks and other equipment at their operations. Suncor also ships diesel fuel by pipeline to Edmonton for sale on the marketplace.

The next slide deals with transporting oil sands products. Whether synthetic crude or diluted bitumen, they are transported in the same manner and in the same pipelines as conventional crude oil. The vast pipeline system extends from the producing areas in northern Alberta to refineries in eastern Canada, the U.S. midwest, and as far south as the gulf coast.

The next slide is a map of the North American crude oil pipeline system.

The next slide shows the benefits of oil sands. Oil sands developers are expected to invest about $45 billion in the oil sands during the next four years. This is in addition to the $34 billion in capital expenditures to date.

● (1650)

As a result of this growth, the number of people directly and indirectly employed by the oil sands industry is expected to total nearly a quarter of a million in just two years.

The economic opportunities extend across Canada and internationally. According to the study by the Canadian Energy Research Institute that examined the impact of the oil sands development over a 20-year period, about 56% of the employment impacts from the oil sands would occur in Alberta, 27% would be in other Canadian provinces, and 17% would occur internationally. The gross domestic product gains outside Alberta are largely due to the demand for steel, vehicles, and other equipment manufactured in other provinces and countries.

Most importantly, this serious study estimates that oil sands activity will provide $123 billion in government revenues in Canada between the years 2000 and 2025. During the same period, an additional $13.5 billion in revenues will be generated for non-Canadian governments, primarily as a result of the oil sands industry relying on international manufacturing sources.

The economic, environmental, and social challenges of the oil sands arise from the nature of the resource, its location, its vast scale, and the rapid acceleration of development since the late 1990s. The soaring demand for labour and services to support the projects, and the effects on the existing aboriginal and non-aboriginal communities, are among the social challenges.

Since the 1970s, the government and oil sands companies have established programs to train and recruit aboriginal people as employees, contractors, and suppliers, and the new projects seek aboriginal involvement where possible.

The chart on the next slide depicts employment due to the oil sands. It shows 56% of oil sands employment in Alberta, 27% in other provinces, and 17% internationally. On government revenue breakdown from the oil sands, 36% of the revenue is in Alberta. Other provinces receive 23%, and Canada as a whole receives 41%.

The National Energy Board estimates that 500 cubic feet—14 cubic metres—of natural gas are used to produce a barrel of upgraded crude oil from mining upgrading projects. About twice that much is used to produce one barrel of bitumen from in situ projects. With respect to other challenges related to energy use, introducing new technologies to improve energy efficiency is generating results. Energy used in oil sands mining and extraction has been reduced by 45% through the use of new technologies, such as hydrotransport and new low-temperature extraction processes.

On challenges related to water use, as we heard Mr. Stringer say, water recycling and the use of non-potable groundwater already has reduced the impact on freshwater resources. And new technologies may reduce the large water requirements for current oil sands production methods. Companies are also working with scientists, government authorities, and forestry companies to reduce the cumulative impacts on soil, vegetation, and wildlife.

There are cooperative programs underway between government, oil companies, and forestry companies to reduce the cumulative impacts on landscapes, forest productivity, and wildlife. These include using low-impact seismic reclamation techniques, which provide for more rapid re-vegetation; protecting caribou habitat; introducing bison to reclaimed land; and, to date, planting more than eight million trees.

Improved pollution controls, such as flue scrubbers, have reduced per-barrel emissions of sulphur oxides, nitrogen oxides, and particulates that can cause smog and acid rain effects.

With respect to greenhouse gas emissions, bitumen extraction and upgrading, as you have heard, produce more than twice as many greenhouse gas emissions per barrel compared to conventional crude oil production. However, about 80% of emissions from oil use occur at the point of final use, such as an automobile or furnace.

● (1655)

Several methods to reduce greenhouse gas emissions have been suggested. One possibility would be to inject emissions underground, known as carbon capture and storage, or carbon sequestration. Some of the carbon dioxide might be used to enhance production from conventional oil fields.

On a per-barrel basis, greenhouse gases and other emissions have already been reduced substantially since the 1990s, but the recent rapid expansion of production has made further emissions reductions a high priority for companies and government authorities.

The next slide shows the life cycle of emissions. If upgraded crude oil from oil sands were not available, additional imports would be required in North America. Some imports, such as Venezuelan heavy crude, actually have higher life cycle emissions than upgraded crude from the Canadian oil sands.

That's the end of my presentation.

The Chair: Thank you very much.

We'll go right to questions. I believe we're starting with Mr. Godfrey.

Hon. John Godfrey (Don Valley West, Lib.): Thank you, Ms. Killingsworth.

I'm curious about one thing you said fairly early on in your remarks. When you were discussing tailings ponds, you suggested—if I interpreted you correctly—that these could later be reclaimed.

My understanding is that the problem with tailings ponds is the suspended clay. After a certain point, it simply doesn't settle down any more. As somebody from the CANMET technology centre in Devon noted, the problem is that it doesn't settle further, that after about three years...although the toxicity does reduce to some degree.

Has the industry managed to find a way of reclaiming the tailings ponds, putting the water back into rivers and having people drink it?

Ms. Colleen Killingsworth: Thank you, Mr. Godfrey.

They are working on technologies to reclaim the tailings ponds. Beyond that, I will need to provide a further response in writing. As the centre for energy, we ensure that we are providing factually accurate information. I don't want to make a misleading statement, so I will follow up in writing with more of an explanation on how they are planning to reclaim the tailings ponds.

The Chair: Send that to the clerk, please. He can distribute it to everybody.

Hon. John Godfrey: This hasn't actually happened yet, is that right? We haven't actually reclaimed any tailings ponds?

I'm just asking.

Ms. Colleen Killingsworth: I know they are looking at how to do that. I can't say specifically whether they have or have not. I will follow up in writing.

Hon. John Godfrey: This is part of the challenge for us, and I think this goes to Mr. Chastko as well; we always are looking at the bigger picture. All the benefits can be seen, but at what cost? Our job as legislators—as historians as well sometimes, I think—is to try to balance out the good versus the bad here.

It seems to me, from listening to the presentation we heard from our first guest, from Natural Resources Canada, that in some ways the improvements in technology are being exceeded by increases in production. In other words, the pollution is gaining on us despite any improvements we might make in energy intensity or pollution reduction.

So we are now stuck with the problem of, for example, 50 square kilometres of Alberta being covered by tailings ponds. We don't yet have a solution, and those tailings ponds are growing. As I understand it, 20% of the entire reserves are still going to be reclaimed using mining techniques. That's a large number, as we were told by one of our earlier witnesses.

To either of our guests, but perhaps Dr. Chastko, how do we as a society balance out the costs to society of poisoning ourselves—by air pollution, by increased GHG production, by what we're doing to water and to soil—versus the great gains that are clearly being made? What will be the judgment of history on all of that, Dr. Chastko?

● (1700)

Dr. Paul Chastko: Well, Mr. Godfrey, we can always use more historians, and in this sense I prefer to quote Mark Twain, who was very fond of saying that history doesn't repeat itself, but it does rhyme.

You're quite right to point out that when oil sands development began, how much of a concern was the environment? The sad answer is, not very much. The very first oil sands companies that came into existence.... For example, when we look at Great Canadian Oil Sands, when they began production, there was no environmental impact statement done. In fact, if we take a look at when the first assessments were done on the environmental impacts of the oil sands or on oil sands development in the Fort McMurray region, they weren't completed until after there had been two oil spills in the region. So it wasn't until the 1970s that we began to see environmental protection legislation really beginning to influence the development of the oil sands.

You ask a very important question: what will the judgment of history be on the way in which we proceed today? I think part of my answer is more philosophical. In my presentation, I indicated to you that, quite literally, when oil sands development began, if we were to go back to 1950, with the provincial administration of Ernest Manning, when he began going forward with oil sands development, there was no market for Alberta's oil sands. Quite literally, you could not sell a barrel of oil sands oil to anyone in the world. It was a fringe resource existing on the margins. Then, when we take a look at when the province began the process of putting together the first proposals, two-thirds of every barrel of oil drilled in Alberta was kept in the ground. There was no market. In short, it was a leap of faith by Premier Manning and J. Howard Pew of Sun Oil.

I guess what I'm trying to drive at, Mr. Godfrey, is that we talk about leadership, and I would suggest to you that this is a tremendous opportunity, as well, for us to take a look at the environmental concerns we have today and to see—

The Chair: Dr. Chastko, Mr. Godfrey has other questions that he'd like to ask you, or Mr. McGuinty would like to ask—

Hon. John Godfrey: Sorry, Dr. Chastko, but I'm going to turn it over to Mr. McGuinty for the remaining questions. I'm sorry to interrupt.

The Chair: We're starting to run out of time here.

Mr. David McGuinty: Thanks very much, Mr. Chair.

Ms. Killingsworth, I'd just like to ask you two pointed questions.

Can you first tell us if any of the first nations and Métis people of the region have taken any equity positions whatsoever in any of these investments?

Ms. Colleen Killingsworth: I don't have that information at my fingertips. I will respond to you and the committee in writing on that.

Mr. David McGuinty: Thanks very much.

Secondly, you have a slide here that talks about government revenue from oil sands, and you break it down by percentages. Can you tell us how much money, in dollar terms, will be accruing this fiscal year to the Province of Alberta from its 36% share of the government revenues, how much money will be accruing to the Government of Canada, and how much money will be accruing in net profits to the oil companies involved?

Ms. Colleen Killingsworth: Again, I will need to respond to that question in writing. I don't have that at my fingertips.

Mr. David McGuinty: You don't have that at your fingertips. Okay. It's a really hard number to get. I put the same question to the head of CIRI just last week, and he couldn't answer it either. I'm just wondering if you can get that to us sooner than later. It's a number that just never seems to materialize in briefings about the oil sands.

In particular, if you can, could you help us understand, as Canadians, how much of the net profit from the companies operating in the oil sands is being repatriated outside this country?

● (1705)

Ms. Colleen Killingsworth: I will add that to the questions, yes.

Mr. David McGuinty: Thank you very much.

The Chair: Are you all done?

Okay, Monsieur Bigras.

[*Translation*]

Mr. Bernard Bigras: Thank you, Mr. Chairman.

I have three questions—two for Ms. Killingsworth and one for Mr. Chastko.

First of all, Ms. Killingsworth, you dispelled one myth right from the beginning of your presentation, in a way, when you said that the problem is not that the reserves are being depleted, but rather that we are not able to fully develop them. You said that we are only developing about 10% of available reserves. Personally, I have read that only 30% of the world's reserves are being developed.

Are you saying that the problem is not the reserves, but rather our capacity? That is my first question.

Second, in your opinion, is carbon sequestration and storage technology a way of increasing our capacity to develop the oil sands in Canada?

[*English*]

Ms. Colleen Killingsworth: To answer your first question, what I said was that only about 10% of Alberta bitumen resource is considered economically recoverable with current technology.

To answer your second question, I do believe carbon capture and storage, the development of that technology, is a way to reduce the greenhouse gas emissions produced during the production of the oil sands.

[*Translation*]

Mr. Bernard Bigras: I understand that the government and a number of companies are selling that technology in order to reduce greenhouse gas emissions, but would it also enable us to increase our current capacity? Could an environmental measure become a measure enabling us to increase oil sands production in Canada?

[*English*]

Ms. Colleen Killingsworth: That's a very good question. It's one I'd like to take back to my technology advisors and, again, respond to you in writing.

[*Translation*]

Mr. Bernard Bigras: My final question is addressed to Mr. Chastko, who is concerned about the oil industry, as well as globalization, as he himself mentioned when introducing himself.

I understand that under the free trade agreements between Canada and the United States, Canada has an obligation to export 66% of its production to the United States. I am wondering whether you are able to confirm that.

[*English*]

Dr. Paul Chastko: Thank you, Mr. Bigras, for your question.

I do not have the exact statistic in front of me right now, but I can confirm that the free trade agreement between Canada and the United States does contain a provision regarding the amount of energy that must be exported by Canada to the United States.

[*Translation*]

Mr. Bernard Bigras: If such an obligation exists, that means that, if we are to ensure energy security for Canada, particularly in negotiations on the Security and Prosperity Partnership, and in light of our export obligations, we will have to considerably increase our oil production from the oil sands and elsewhere, in order to ensure that we can meet our international commitments to our southern partners, as well as our commitments to Canadians, in terms of ensuring energy security. Are you able to confirm that?

● (1710)

[*English*]

Dr. Paul Chastko: I'm not sure I quite understand your question. Could you please rephrase?

[*Translation*]

Mr. Bernard Bigras: I will repeat my question. You confirmed that there is an obligation on the part of Canada to export a percentage of its energy production to the United States. The figure I have is 66%. If we want to meet our international commitments to our southern partners and ensure energy security for Canada, we will have to considerably increase domestic energy production in Canada, particularly in the oil sands.

[*English*]

Dr. Paul Chastko: I guess that the answer would be yes. In this respect, if we take a look at the overall capacity of the oil sands, in terms of what it is we're looking at with that resource, the Alberta Energy and Utilities Board.... Taking a look at the size of the reserve itself plus figuring in current rates of consumption, if the oil sands were to provide exclusively for the rest of Canada, we have enough oil, essentially, in the oil sands for the next 370 years.

At current rates of consumption, even considering all of North America, that would be enough oil to provide for all of North American oil consumption, without touching another drop, for about 47 or 50 years.

[*Translation*]

Mr. Bernard Bigras: In order to meet our international commitments to our southern partners and ensure energy security for Canada, given our limited extraction capacity, which is about 10%, based on what Ms. Killingsworth said, how many additional barrels of oil will we have to produce in the coming years?

Has any assessment been made based on our international commitments, our domestic needs and our limited production and extraction capacity? What should that represent in terms of production in the coming years?

[*English*]

Dr. Paul Chastko: I haven't seen anything yet.

Ms. Colleen Killingsworth: I can look for the response to that and provide it in writing.

The Chair: Mr. Lussier, do you have questions?

[*Translation*]

Mr. Marcel Lussier: My question is also addressed to Mr. Chastko.

Mr. Chastko, in your paper, you say that you do not believe that governments have played a passive role. Therefore, they have played a very active role in oil sands development.

Is it your understanding that governments have been doing the same thing as oil companies? Have they moved in on any area where they should not have invested? What is your opinion?

[*English*]

Dr. Paul Chastko: Mr. Lussier, I think that may be a slight error in terms of the translation. The sentence that begins in that part of the presentation begins, “I hope this is not taken to mean that the government at both the federal and provincial levels played a passive role, because they certainly did not”. In fact, I would agree with you that federal and provincial governments played a very active role, and arguably an important role in terms of development.

In this sense, what I argue, and what I've argued before, is that it is because of this partnership between the public and the private sectors that we really see the development of this industry having reached the stage it is at today.

I apologize for the error in the translation.

[*Translation*]

Mr. Marcel Lussier: That's fine.

Ms. Killingsworth, in your deck, there is a map of Alberta showing what is identified as the "Carbonate Triangle". But, I don't know what the "Carbonate Triangle" is in either French or English.

How is it that Fort McMurray and Cold Lake are outside of that triangle?

[*English*]

Ms. Colleen Killingsworth: The triangle you're referring to is the carbonate triangle, in which the bitumen is trapped in limestone rocks rather than in the sands and the stones. There's a particular geological formation in this triangle where the oil is trapped in limestone rocks, whereas the oil in the Fort McMurray area is trapped in sands or sandstones.

● (1715)

[*Translation*]

Mr. Marcel Lussier: Who defined that triangle?

[*English*]

Ms. Colleen Killingsworth: It's called the carbonate triangle.

[*Translation*]

Mr. Marcel Lussier: Who defined that triangle? Was it the Alberta Government?

[*English*]

Ms. Colleen Killingsworth: It's a geological formation, and I'd be happy to get a better geological definition on that for you.

[*Translation*]

Mr. Marcel Lussier: Ms. Killingsworth, on one page of your deck, you say that governments are anticipating oil revenues of $123 billion in the coming years.

How much money will the oil companies be making from that production? If you know what the government revenues are, you must also know what the oil company revenues are.

[*English*]

Ms. Colleen Killingsworth: I don't have that data at my fingertips, but I can provide that to you. Again, that was coming from the Canadian Energy Research Institute study, so I will get back to you on that.

The Chair: Mr. Jean.

Mr. Brian Jean (Fort McMurray—Athabasca, CPC): Thank you, Chair.

I really appreciate the opportunity today to be here, as it is my constituency. I appreciate the witnesses coming forward. I actually have lived in Fort McMurray since 1967, when there were approximately 1,500 people, so I've seen some tremendous changes.

I would like to agree with Mr. Godfrey that leadership is all about knowing, and indeed about knowing the facts and the truth, and not about fear-mongering. And I don't want you to think that I'm picking on you, as one of the witnesses, at all, but my mother is a historian from Fort McMurray, and she would feel that I wasn't doing my job if I didn't point out the first commercial application of oil sands, and that was actually back in the 17th and 18th centuries, when, as Peter Pond has identified, aboriginals used it for patching canoes. I wouldn't want to lose the opportunity to set the record straight on that. Maybe you want to change your book. I would certainly be prepared to allow my name to stand on that particular fact.

If I understand it correctly, surface mining is in essence taking a big shovel, digging into the earth, removing everything—especially the contaminants that are in it, such as crude oil, sulphur, coke, nitrogen, and calcium—taking all of those contaminants and the earth, putting them into a big bowl, in essence taking soap and hot water, removing the contaminants, putting the earth back where it was before, and reclaiming the land with bushes, trees, and shrubs.

Does that pretty much describe the surface mining opportunities in northern Alberta at this stage?

Dr. Paul Chastko: I'm sorry, who is the question to?

Mr. Brian Jean: It's to both of you, or either. I'm just trying to simplify and—

Ms. Colleen Killingsworth: Yes, I think that's a very simple summary.

Mr. Brian Jean: In a simple summary, that's how it works. In fact it's not just oil that comes out of the ground in that area; there are tremendous amounts of by-products, such as sulphur, coke, nitrogen, calcium, etc. Is that correct?

Ms. Colleen Killingsworth: Correct.

Mr. Brian Jean: I just want to point out to Mr. McGuinty that on page 20 of "The Oil Sands: Toward Sustainable Development", a report of the Standing Committee on Natural Resources, most of his questions are indeed answered. It's the March 2007 report, which was done by that committee. Most of your questions are answered on page 20.

I would like to say that one of the oil sands plants in the area I think has more patents than any other corporation in Canada. They are always looking for new technology.

To answer your question as well, currently I understand that one of the tailings ponds has gone through test projects to reclaim it, and those test projects were successful. I think Syncrude was the corporation that did that.

I'm interested in water reduction. My understanding is that the Athabasca River basin—which of course the city uses for water for their citizens, and many pulp mills use it, as well as many other cities—is seeing a reduction in the flow of the Athabasca River. My understanding of the reduction of flow is primarily as a result of the Athabasca glacier, the icefields shrinking, and less snowpack in the mountains. Is that fair to say?

Ms. Colleen Killingsworth: I apologize, I'm not an expert in that area, but I could get back to you with a more definitive answer.

Dr. Paul Chastko: I'm a historian, but I'm not entirely sure, sir.

Mr. Brian Jean: As a historian, you obviously know what it was 20 years ago and what it is today.

As well, I understand there are some further miscommunications and fear-mongering that goes on.

There are two types of water uses in the oil sands, are there not? There's water that's used for a cooling process, where they can actually put the water back into the rivers. It's not contaminated, because it was used to cool down things. Then there's the other type, which is used in the process itself. There's only one oil sands plant that is allowed to put any water back from that processing.

My understanding is that any water that contacts open oil sands has to be kept. In fact my understanding is that Syncrude recycles 100% of its water, Albian recycles 100% of its water, and CNRL recycles 100% of its water. When I say “recycles 100% of its water”, I'm talking about the water that's actually used for the oil sands process. The rest is kept in the tailings ponds.

Now that we have the technology to reclaim those tailings ponds, it appears we'll be able to put back not just 100% of the water they're using, but also the tailings ponds water. Is that correct, based on the assumption that the technology is there?And it is.

● (1720)

Ms. Colleen Killingsworth: Yes, you're correct.

Mr. Brian Jean: Thank you.

Is it not also fair to say that the oil sands companies now are only using about 60% of the water they're permitted to use under their licensing with the Alberta government?

Ms. Colleen Killingsworth: I believe that's the number I've heard, but I would need to double-check that and get back to you. Quite often they're not using the full amount allowed.

Mr. Brian Jean: Since this is a fact-finding mission, we actually have the largest oil reservoir in the world, but the technology is not there yet to get all that oil out. We have about 2.4 trillion barrels of oil, which would make us the largest reserve, in fact first over Saudi Arabia. Is that fair to say?

Ms. Colleen Killingsworth: Sorry, can you restate your figures?

Mr. Brian Jean: I've heard a lot of different figures, but my understanding is that most experts agree there are about 2.4 trillion barrels of oil but we only have the technology for about 1.7 trillion barrels today.

Ms. Colleen Killingsworth: The number I've heard is 1.7 trillion barrels, of which 174 billion barrels are considered recoverable today.

Mr. Brian Jean: As I said, the experts disagree a lot on different issues with respect to that.

Mr. Chair, I have no more questions.

The Chair: Okay. We'll go back to Mr. McGuinty.

I should point out to members, too, that this was to be an overview. In the fall, we will be bringing experts in, and you can ask specific questions to the people who will know those answers.

Mr. McGuinty.

Mr. David McGuinty: Great.

Ms. Killingsworth, when you are looking for numbers to answer the question I asked you earlier—which are not on page 20 of the report my colleague Mr. Jean referred me to, because they are extrapolated numbers—I would like to get the real numbers from 2007-08.

What revenues in fiscal 2007-08 accrued to the Alberta government and to the federal government, and what net profits accrued to either the Canadian or international oil and gas companies in 2007-08 from the oil sands? Can you get those numbers?

Ms. Colleen Killingsworth: I will endeavour to do so.

Mr. David McGuinty: Okay. They are not in the report here at all. They're not the same numbers I'm looking for.

Can I ask either of you if you know—and if you don't, maybe you can get us some information—who is liable for the tailings ponds?

This is a massive brownfield, if not a black field. To my knowledge, there is no technology known yet to clean up these sites. They are visible from space. They are 50 square kilometres. Do you know who is liable for these?

Ms. Colleen Killingsworth: I will need to get back to you with that information.

Mr. David McGuinty: Maybe you could specify, is it the citizens of Alberta, the citizens of Canada, or their governments? Is it the proponents who are there on the ground digging up the bitumen? Who is liable for these tailings ponds, and what is their projected growth from now until, say, 2021, which is the common number used in the natural resources committee report of March 2007? It's the common number used by the Canadian Energy Research Institute, and I think it's a number you might have used earlier. I don't recall. How big are these projected to get?

That would be very helpful for us.

● (1725)

Ms. Colleen Killingsworth: Mr. McGuinty, I will get you that information.

Mr. David McGuinty: Thank you.

I have another question for you. I asked the question of the witnesses earlier.

Somewhere between 3.6 million and 5 million barrels of fresh water a day are presently being used to extract 1.2 million barrels of oil. Do you have access to any metrics, any measurement, any hydrogeology to tell us whether or not the extraction levels are sustainable from the primary water sources? Has that work ever been done?

Ms. Colleen Killingsworth: I will do some research into that and get back to you.

Mr. David McGuinty: Okay.

As to my final question, you talk in the last page of your deck about being funded.... You're non-profit, of course, but who funds the Canadian Centre for Energy Information?

Ms. Colleen Killingsworth: The Canadian Centre for Energy Information is a public-private partnership. We receive funding from the federal government, from Natural Resources Canada. We do projects with Foreign Affairs Canada. We receive funding from provinces, as well as industry.

Mr. David McGuinty: What is your relative breakdown? Are you hired as a consulting research arm for governments, or do you get core funding?

Ms. Colleen Killingsworth: We have a contribution agreement with Natural Resources Canada to help us develop baseline information on Canadian energy.

Mr. David McGuinty: Can you help us understand, how much of your financial support is private and how much is public?

Ms. Colleen Killingsworth: I would estimate that about 60% to 65% is private, and the rest is public. Again, as a non-advocacy organization, we have a set of guiding principles that help direct how we develop content, and that outlines our whole stakeholder review process to make sure our information is balanced and factually accurate.

Mr. David McGuinty: Thank you so much.

The Chair: I would like to give Mr. Watson and then Mr. Lussier an opportunity here in the last couple of minutes.

Mr. Watson.

Mr. Jeff Watson (Essex, CPC): Thank you, Mr. Chair, and thank you to our witnesses for appearing here today.

I think most of us tend to focus on the impact of the oil sands as being largely to the province of Alberta. Can you outline for the committee the impacts to the province of Ontario? There's a Liberal premier who spends a lot of time criticizing oil sands development. Those of us who are in the know, perhaps including the premier himself, have an understanding of the significant economic impacts of the oil sands to the province of Ontario. Can you elaborate a little bit for the benefit of the committee?

I'll ask a second question as a follow-up to that. With a softening Ontario economy and the economic benefit from the oil sands, can you talk about the potential impacts of a proposed carbon tax on the industry in the oil sands and what that could mean?

Those are the questions.

The Chair: I'm not sure that we should be asking this question, Mr. Watson.

Mr. Jeff Watson: Perhaps. I don't know. They may not have an answer.

The Chair: This was to be an overview of the oil sands and water. I'm not sure where....

Do you have another question, Mr. Watson?

Mr. Jeff Watson: Can't they talk about the impact to the Ontario economy? I don't know if they want to take a stab at the question.

The Chair: Guests, do you care to respond?

Ms. Colleen Killingsworth: I would not have the actual economic impacts, but I know it does impact the manufacturing industries in Ontario. I could look to see if I could provide you with a more definitive answer.

The Chair: Again, if that could come to the clerk, all members here would have an opportunity to have the answers.

Thank you.

Mr. Watson, do you have another question?

Mr. Jeff Watson: No, I'll leave it at that, Mr. Chair. I think we can get some of that information out of the natural resources committee report. It takes a stab at the some of the numbers there.

● (1730)

The Chair: Sure.

Mr. Lussier.

[*Translation*]

Mr. Marcel Lussier: Mr. Chairman, I have three documents in front of me that contradict each other. First of all, I would draw your attention to page 20 of the report tabled by the Standing Committee on Natural Resources, where it states that Canadian government revenues will be $123 billion. Everyone agrees on that amount.

In the same report, it states that revenues will be cumulative between 2000 and 2020. However, in Ms. Killingsworth's deck, it states that this will occur between 2000 and 2025. Finally, in the French version of the deck, it says that the period is from 2000 to 2005. So, we have three different figures here. I would ask that those figures be corrected. Which one is correct?

[*English*]

The Chair: Do you have an answer?

Ms. Colleen Killingsworth: The figures I used were from the report of the Canadian Energy Research Institute. I can go back to that report and provide you with the source of its data.

[*Translation*]

Mr. Marcel Lussier: Thank you.

[*English*]

The Chair: Thank you very much.

I'd like to thank our guests. Certainly I think everybody sees the scope of this issue, and we'll have a lot more questions. Thank you very much for appearing.

The meeting is adjourned.

Published under the authority of the Speaker of the House of Commons

Publié en conformité de l'autorité du Président de la Chambre des communes

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