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Chair

Mr. Lee Richardson

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● (1535)

[*English*]

The Chair (Mr. Lee Richardson (Calgary Centre, CPC)): We are starting a bit late today, and let's say that, for reasons of weather, we're going to try to wrap up a little earlier today as well. We're aiming for five o'clock, so I'd like to get started.

Our witnesses today are Jim Vollmershausen, director general of the Mackenzie River Basin Board; Mary Griffiths, from the Pembina Institute; and Margaret McCuaig-Johnston, assistant deputy minister for the energy technology and programs sector within the Department of Natural Resources; along with Dr. Kim Kasperski.

I understand that you've been speaking with the clerk, that you have a speaking order, and that three of you will be speaking. Is that right?

A voice: Yes.

The Chair: With that, we'll just begin and ask you to give us some background for perhaps ten minutes each, and then we'll go into questions.

Jim, are you going to begin?

Mr. Jim Vollmershausen (Chair, Board Member, Mackenzie River Basin Board): Good afternoon, and thanks for having us today.

My name is Jim Vollmershausen. My day job is with Environment Canada, with which I'm a director general in Edmonton. But today I'm here speaking as the chairman of the Mackenzie River Basin Board, and certainly the focus of what I have to say will be on the work of that board.

Initially, I'd like to first share with you a bit of information regarding the size and complexity of the Mackenzie River Basin. It has cultural, political, geographic, and environmental characteristics that are unique and significant by world standards.

It's a big basin. It's huge. At a staggering 1.8 million square kilometres, it's about one-sixth the size of our country.

It has only a small population of about 360,000 people. Even though it does include Fort McMurray, it still has only 360,000 people. But everybody who lives in the basin depends in some way on the rivers and the lakes and the waterways and the three world-class deltas that are in the basin. The population is very diverse in lifestyle and heritage. Aboriginal people living in the basin speak eleven different languages, which is a good example of that diversity.

Another characteristic of this basin that's a bit different from other big river basins in the world is development. The reason we're here today, of course, is that the development is in the extreme upstream portions of the basin, whereas in most big rivers, the development and the big populations are at the very downstream end, at the river mouths and so on. So it makes for a different dynamic, for sure, in the Mackenzie.

The Mackenzie River Basin Board was created in 1997, with the signing of a transboundary waters master agreement between the Government of Canada and the Governments of Saskatchewan, Alberta, British Columbia, Yukon, and the Northwest Territories. These are the governments with jurisdiction to manage water and the environment in the basin, and their members on the board, both government and aboriginal or both, are who I'm representing today.

The agreement establishes common principles for the cooperative management of the aquatic ecosystem of the basin. There are five principles, and they are as follows:

> 1. Managing the Water Resources in a manner consistent with the maintenance of the Ecological Integrity of the Aquatic Ecosystem;
>
> 2. Managing the use of the Water Resources in a sustainable manner for present and future generations;
>
> 3. The right of each to use or manage the use of the Water Resources within its jurisdiction provided such use does not unreasonably harm the Ecological Integrity of the Aquatic Ecosystem in any other jurisdiction;
>
> 4. Providing for early and effective consultation, notification and sharing of information on developments and activities that might affect the Ecological Integrity of the Aquatic Ecosystem in another jurisdiction; and
>
> 5. Resolving issues in a cooperative and harmonious manner.

The agreement established the Mackenzie River Basin Board to guide adherence to those principles. It has developed a strategic plan and has published its first report, “Mackenzie River Basin Board's State of the Aquatic Ecosystem Report 2003”. I can arrange to have copies of that document made available to you if you would like.

Of particular interest to this committee will be the “State of the Aquatic Ecosystem Report” that contains a chapter dedicated to the Athabasca sub-basin, in which the northern Alberta oil sands are located. The report notes that the growth and expansion of the oil sands industry has and will certainly continue to have an impact on the regional environment. Large-scale water use for processing or deep well injection land disturbance from the large mining operations; potential water contamination from tailings ponds; and air pollution in the form of acidifying emissions, particulate matter, sulphur, and greenhouse gases, are concerns that have been raised.

These concerns are echoed in the provincial-regional sustainable development strategy, or RSDS, for the oil sands area and the Cumulative Environmental Management Association, or CEMA, has identified surface water quality as a potential environmental concern. CEMA is a consensus-driven organization that is multi-stakeholder, with industry, environmental group, aboriginal, Métis, first nations, municipal, federal, and provincial representation. It's a very broad group, and it has been charged with trying to manage the cumulative environmental affects in the oil sands area. It has identified surface water quality as a potential environmental concern. The RSDS, the provincial strategy, contains a blueprint for action to address the issue, and CEMA is developing environmental objectives and management recommendations for surface water quality.

● (1540)

I'd like to stress that the board is not a regulatory or licensing board. We don't hold hearings or grant permits or anything like that. It has no legal or policy basis to regulate resource use in any of the jurisdictions. However, the board can influence regulatory decisions made in the various jurisdictions in a number of ways. We can provide factual material, such as the "State of the Aquatic Ecosystem Report", to inform development decisions. We can participate in and influence pre- or post-regulatory processes, such as planning regional or cumulative environmental impact assessment processes or ministerial reviews of sensitive decisions. We can appear as a "friend of the tribunal" in federal, provincial, or territorial public hearings to advocate for the principles endorsed in the master agreement.

Of some importance, the master agreement also mandates the development of bilateral agreements between neighbouring jurisdictions that are intended in fact to provide the cornerstone for sound aquatic ecosystem management within the basin. So far, we have one between the NWT and the Yukon Territories—they've completed an agreement—but the board encourages, certainly, other member jurisdictions to follow suit.

Using that "State of the Aquatic Ecosystem Report" is a starting point. It's a valuable aid to helping them define what will be sent across provincial and territorial boundaries. In the context of the oil sands area of the basin, the two bilateral agreements between B.C. and Alberta and between Alberta and the NWT are clear priorities, and work is certainly under way now to conclude them.

It is important to note that the board regularly discusses a number of pressures within the basin and has heard presentations on such issues as potential climate change impacts, the Mackenzie gas pipeline and its associated exploration and production activities, the impacts on flows of the operation of the Bennett Dam, as well as the potential oil sands impacts. These are all referenced in the "State of the Aquatic Ecosystem Report" and will almost certainly be the subject of future reports. In addition, they are important starting points for the negotiation of our bilateral agreements.

Finally, of course, the board has opportunities to hear from jurisdictions about progress regarding these issues, and others for that matter, at its regular meetings.

That's basically what I wanted to share with you today about the Mackenzie River Basin Board, and I thank you for the opportunity.

● (1545)

The Chair: Thank you.

Before we continue, I think the committee would be very interested in the "State of the Aquatic Ecosystem Report" prior to our visit to the oil sands. We are beginning a recess tomorrow, so in terms of logistics, is that report available in both languages?

Mr. Jim Vollmershausen: I believe it is.

The Chair: Either way, would it be available in electronic form?

Mr. Jim Vollmershausen: Yes, it is. I can get it to the clerk post-haste tomorrow.

The Chair: If we can, it would be much easier to get it in electronic form. I can have it distributed to the committee prior to them departing for Fort McMurray.

Mr. Jim Vollmershausen: Sure. Absolutely.

The Chair: Thanks very much, Jim.

Mr. Jim Vollmershausen: No problem.

The Chair: We'll proceed with Mary Griffiths from the Pembina Institute.

Ms. Mary Griffiths (Senior Policy Analyst, Pembina Institute): Thank you very much, Mr. Chairman. I'm very pleased, members of the committee, to have an opportunity to be here today on behalf of the Pembina Institute.

I'm a senior policy analyst with the institute, and last week you had the opportunity to hear my colleague Dan Woynillowicz talking about some of the issues. He would have told you that the Pembina Institute is a non-profit, non-governmental organization, so I won't need to tell you more about the Pembina Institute.

What I would like to say is that we had hoped that Amy Taylor, who is director of ecological fiscal reform, could also have been here today as she was invited, but she had a prior commitment, and both our invitations came rather late.

The three of us together, Dan, Amy, and I, worked on a report *Troubled Waters, Troubling Trends*, which the Pembina Institute published this year. I believe you have already received the summary of the report, and it has been translated for you. I will refer to this as I'm talking.

I would first like to mention something about the oil sands mining, which is the most conspicuous aspect of the oil sands activities and which has a major impact on rivers and wetlands. The wetlands must be drained before the overlying deposits are removed to expose the bitumen. In addition, the basal aquifer, which is the water layer underlying the bitumen, also has to be drained so the mines don't flood. That can cause considerable drawdown of waters and also of wetlands.

Bitumen itself forms only about 10% to 12% of the total amount of material that is mined, and extracting it requires huge volumes of water. Even with water recycling, it still takes between two and four and a half barrels of water to produce a barrel of synthetic crude oil. The majority—two-thirds in fact—of all the withdrawals from the Athabasca River are for oil sands mining, as you can see on the graph on page 3 of your brochure. So the Athabasca River is incredibly important in supplying water for the oil sands.

Existing projects have already been allocated as much water as the city of Calgary, and you can see that in the left-hand bar in the graph on page 4. Calgary, of course, is a city with a population of about a million, so already the existing three or four projects are using as much water as is used within the city of Calgary. If we take the existing and approved projects, as shown by the second bar in the graph on page 4, we see that they've been allocated roughly twice as much as has been allocated already. To expand—for all the planned projects as well as the existing ones—would mean using as much water as the city of Toronto does. That's for just the oil sands mining operations. That gives you an idea of the volume of water that is used or is required.

Less than 10% of this water returns to the Athabasca River. I think that's rather different from what happens to water used for municipal purposes. There are major concerns. Is there sufficient water in the river to meet the instream flow needs to keep the river ecosystem healthy, especially as the flows are very low in winter and also highly variable from year to year?

The Cumulative Environmental Management Association, CEMA, which you've already heard about, has unfortunately failed to determine what the instream flow needs levels are, and it was left to Alberta Environment to establish an interim framework for the instream flow needs and water management on the lower part of the Athabasca River. This happened because the Energy and Utilities Board recommended in a decision that it was so important to have these instream flow needs that if CEMA couldn't come up with a figure after five years, by January of 2006, the duty would fall to Alberta Environment.

The interim framework that Alberta Environment proposed set a series of flow-rate thresholds, potential environmental impacts, and required management action, but this framework has not yet been implemented. It has undergone several drafts, and Fisheries and Oceans Canada is now partnered with Alberta Environment to work on it. Still, the most recent draft, of July 10, is unsatisfactory as far as the aboriginal and environmental communities are concerned because it would still allow withdrawals from the river, even during a red alert when there would be significant risk of impacts to the river.

So as a result, there is currently no management framework in place, and in the meantime, new projects are going ahead, or there are hearings for them, as is the case for Imperial's coal mine. They want new water licences, and it looks as though new decisions will be made about allocating water, yet we still don't have a sound water management framework in place.

● (1550)

Upon leaving the oil sands area, the Athabasca River flows along the eastern edge of Wood Buffalo National Park and into the Peace-Athabasca Delta. This delta is the largest boreal delta in the world, and one of the most important waterfowl staging and nesting areas in North America.

Oil sands mining operations have been listed as one of the threats to the integrity of the Peace-Athabasca Delta because of the volumes of water withdrawn from the Athabasca. The delta has already been hugely impacted by the Bennett Dam in B.C., which has affected changes in the flow of the Peace River. More research is needed to determine how the oil sands activities actually impact on the ecosystem and also on the aboriginal fishing in the delta.

As I've said, only a small portion of the water used from the Athabasca River goes back. Most of it ends up in tailings ponds. The National Energy Board has said that tailings management is daunting, because once the bitumen is separated, a lot of that water is contaminated with the sand and the residual bitumen. These residuals are, with the water, called tailings, and they're sent to tailings ponds. But it's a misnomer to call them tailings ponds. The diked area holding the tailings already covers 50 square kilometres, so these are hardly ponds.

As well, the water in these ponds is actually contaminated with various pollutants from the bitumen, with such things as naphthenic acids, which make the water toxic to fish and birds. Birds have to be prevented from alighting on these tailings ponds. We just have to hope that the water from the tailings ponds doesn't leach into groundwater or the soil.

So far, although there have been experiments with new processes to develop better forms of tailings with less water in them—so-called consolidated tailings, in which the sand and the fine tailings stay together—there still has not been completely satisfactory reclamation processes that avoid large volumes of these fine tailings that have to go to tailings ponds. For example, so far, with the experiments with consolidated tailings, only about 10 hectares have actually been reclaimed to a grass vegetation, not at all like the native boreal forest and peat wetlands.

As far as the mines are concerned, some of the larger areas have been reclaimed, but no reclamation certificate has been issued for any of the areas so far.

Companies are working on new technologies to try to reduce the volume of water used in bitumen mining. There are new processes to develop consolidated tailings, and the bitumen process is a dry tailings process. However, experts say that there probably won't be major breakthroughs or alternatives to water-based bitumen extraction before the year 2030.

The bitumen operations for mining get the most attention, but in fact, as you'll see from the map on the front page of the *Troubled Waters* brochure, the bitumen deposits underlie about one-fifth of Alberta. This means that 93% of the bitumen is actually too deep to mine and has to be extracted in situ by drilling wells through the overlaying deposits and into the bitumen.

At the present time, about one-third of Alberta's bitumen is actually recovered through in situ operations. As I say, it doesn't get the public eye, but it is very significant. Again, it uses a lot of water to generate the steam that is injected into the bitumen to warm and soften it so that the bitumen can be pumped to the surface.

Although the in situ operations use less water than the mining operations on a per barrel basis, only about one-fifth of that is surface water. Two-fifths come from deep saline groundwater, and nearly two-fifths come from surface or shallow groundwater—fresh groundwater, in other words—which in Alberta is defined as water with less than 4,000 milligrams a litre of total dissolved solids.

I am particularly concerned about the impact of the in situ operations on the shallow groundwater. Geologists are still learning about groundwater resources in northern Alberta. Alberta Environment itself certainly doesn't have enough monitoring wells in the area. There is insufficient baseline data to be able to analyze what the long-term impacts are of a drawdown of aquifers.

Certainly while a project is operating and drawing on a shallow aquifer, it may be lowering the level of the water for 30 or 40 years. It could take decades after operations cease before the water level re-establishes. Since a lot of the wetlands will have been reduced, one wonders if the level actually will re-establish. With climate change, the rate of recharge may be less in the future than it has been in the past.

● (1555)

When saline water is used to generate the steam, it's not the end of the problems, because one still has to treat the water, both for recycling and also for the waste products from recycling. Also, when it's saline water, the waste products then have to be disposed of, often in landfills, which then have to be monitored, and the leachate has to be pumped out because of the brine in the residual material that goes to their landfill.

Although in situ operations use less water than mining, there are still a lot of different concerns, especially as the area impact will be much greater. Efforts are again under way to reduce the use of water, but it has been increasing very rapidly so far, as you can see from the top graph on page 4 of the brochure. Pilot projects to reduce the use of water include using a mixture of solvents and steam. There's also a new project called toe-to-heel air injection, which burns some bitumen in situ to warm the oil and then uses the heat from the residual burning of the bitumen to warm up further bitumen, which then melts, but it's too early to say if these techniques will be successful.

In the meantime, new projects that will probably last 30 or 40 years are being approved. These projects are again being allocated water. Last week my colleague Dan told you about the very rapid growth in the oil sands. Our concern is what can be done to reduce the use of water per barrel, because given the expected growth from about a billion barrels a day to perhaps five or six billion by 2030, it's incredibly important to reduce the amount of water required per barrel of synthetic crude oil.

We have made various recommendations for reducing the use of water or for encouraging industries to reduce the use of water. Some of them are on page 2 of the brochure. I'd like to mention one, which was the implementation of user fees for the fresh water for oil recovery that does not flow back into the watershed. We would suggest that this would not be a tax, but would be money going into a dedicated water management fund that could be used to improve knowledge on our groundwater, to improve the knowledge of our rivers and the management of the water resource, and to finance research for other methods to reduce oil recovery.

We believe that good management requires good information on both surface water and groundwater quality and quantity. Alberta certainly needs a comprehensive groundwater monitoring system and database in order to develop watershed budgets. The long-term water balance in each basin and sub-basin, including the sustainable yield from aquifers, should form the basis of future watershed planning and water allocations.

In our *Troubled Waters, Troubling Trends* report we said effective water management requires a comprehensive policy framework that's based on solid data and scientific information and provides adequate protection for ecosystems. We hope the federal government will play an effective role in reducing the impacts of the oil sands operation on the environment in the areas where it has jurisdiction.

● (1600)

The Chair: Thank you, Ms. Griffiths.

Ms. McCuaig-Johnston, are you going to give the point of view of your department?

Thank you.

Mrs. Margaret McCuaig-Johnston (Assistant Deputy Minister, Energy Technology and Programs Sector, Department of Natural Resources): Thank you very much, Mr. Chair.

I'm very pleased to be here today to brief the committee on the challenges and opportunities of technology development related to water in the oil sands. I believe you have a copy of the deck that's been made available to you by the clerk. I'll speak to that this afternoon with my colleague, Dr. Kim Kasperski, who is here from our NRCan lab at Devon, Alberta, where she is the team leader of the water management group. In addition to being expert on these issues, she was recently asked by the industry to chair their committee on research and development on water in the oil sands, so she is a real expert.

We'll be focusing on R and D matters today. Any questions on policy on the oil sands we would have to refer to the relevant ministers; also, any questions on the Clean Air Act and how it might affect the oil sands would be best dealt with I think by the policy leads at Environment Canada. Within those constraints we're happy to provide as much information as we can.

There are three laboratories undertaking energy research in NRCan. They are the CANMET Energy Technology Centres in Ottawa, Varennes, and Devon, which is near Edmonton. In fact, next year energy research at NRCan will be celebrating 100 years of service to Canadians.

[*Translation*]

In the Advance Separation Technologies Laboratory, or AST, of CETC-Devon, there are about 16 scientists and engineers with a support staff of 23 technologists.

This lab focusses both on fundamental research and developing technologies to reduce the environmental impact of oil sands development. This includes tailings treatment, water management, bitumen extraction and froth treatment: everything from after the ore is mined to when the bitumen is sent to the upgrader.

The other group at Devon is the National Centre for Upgrading Technology which focusses, as the name suggests, on upgrading the bitumen to synthetic crude oil and the production of fuels. It has a scientific staff of 53.

[*English*]

Slide 3 of the deck shows that our lab in Devon has focused in particular on issues surrounding surface mine oil sands. The lab plays several roles in this regard. First, the scientists help industry to understand how tailings management and water chemistry affect oil sands development and reclamation. Second, we provide expertise to develop new technologies to reduce the effect of oil sands development on water resources. Third, we evaluate new oil sands developments during the environmental assessment process. In all these roles, the scientists are helping to improve the environmental management of an important energy resource, and in that we share the same objective that Mary Griffiths just spoke about, to reduce the use of water per barrel of oil produced.

I'm moving now to slide 4. I understand that you'll soon be visiting the oil sands, so these photos may show some of the sites that you're going to see. As you can tell, the tailings ponds, reflected in the photos on slide 4, are the liquid left over from the oil sand separation process and are a very significant feature of the landscape. Water management and tailings pond management are therefore a very important feature of environmental, scientific, and industrial research and development. The left-hand picture is the original Syncrude mine site. The original tailings pond, Mildred Lake, is in the top centre of the photo. An additional pond is the southwest sand storage, seen to the bottom left of the photo. The right-hand picture is a small section of the Suncor site, showing pond 1 on the right-hand side of the river. This was originally meant to hold all the tailings, but the tailings properties forced them to build more and bigger ponds, as Mary mentioned.

The problem is that while the sand in the waste stream settles rapidly when it's dumped into the pond, the clay stays suspended, and over about three years it forms a thin sludge called mature fine tails, which is why they're called tailings ponds. This is about the consistency of ketchup, and it doesn't settle any further. The water in these ponds is much saltier than river water, and it is toxic, due to the presence of naphthenic acids, although this toxicity does disappear with time, as natural bacteria break down the naphthenic acid molecules, usually over one or two years.

In addition to the tailings ponds of these surface mining companies, there is now Shell/Albian, which is in operation; CNRL, which is being built; Synenco; Deer Creek; Imperial Oil; and PetroCanada. All are in the planning stages, and there are expansions at the existing sites.

On slide 5 you can see that tailings ponds are proliferating and are covering oil sands deposits. This satellite picture shows the Syncrude Aurora and Shell/Albian sites to the north and the Syncrude and the Suncor sites to the south. The tailings ponds can be seen clearly, and you can understand from this photo that water is a significant issue in the oil sands, directly related to the number, location, and quality of tailings ponds. Our CETC-Devon scientists are now working with Suncor to develop methods so that by 2010, pond 1, which you saw in the photo, can be capped and reclaimed. That will be a very significant achievement for the oil sands.

On slide 6 the diagram shows how water is recycled in a surface mining oil sands operation. The recycle rate—and this, I know, has been a matter of some question at the committee—varies between 50% and 80%. This particular diagram shows that it's 74%. This also illustrates a very important point in that everything is inextricably linked. Changing one part of the process—for example, adding a new chemical to the tailings stream—will affect every other part of the process, including bitumen extraction efficiency. In situ operations are a different story. They also recycle water, but they can get back about 90% of the water they pump as steam into the formation, and even more, if there happens to be water in the formations as well as the bitumen. If they treat the recovered water, as some operations do, to create dry waste salts and cleaner water to make steam, they can recycle 90%. However, some of the operations only treat the water to a point that produces sludge or a brine stream, which is disposed of. So the recycle rate varies between 60% and 70% in those cases because of the water lost in the waste streams.

● (1605)

On slide 7, the two main issues regarding water and oil sands are the amount of the water used and the quality of the water used. With increasing development, there is an increasing demand on the Athabasca River to supply the water needs of the surface mining operations. How much water is needed by an operation is determined by how much is used in the extraction process by the operation and how much can be recovered from the tailings.

The quality of the water is important, because the wrong chemistry can reduce bitumen extraction efficiency, resulting in bitumen being sent as waste to the ponds. The water quality also affects how the minerals settle in the tailings ponds and, ultimately, affects reclamation, because the salinity of the water left in the settled solids affects, for example, the growth of plants.

On slide 8,

[*Translation*]

there has been a significant program on tailings research at Devon for about 15 years. Water has always been a part of this because of the inextricable link between tailings properties and water chemistry and use.

Our research has focussed mainly on the following aspects: increasing water recovery, understanding tailings properties and behaviour and using computer modeling to predict process water chemistry.

In the last few years, we have expanded the research in the water area to include new developments for better re-use and discharge of water, as well as understanding what happens to chemicals in oil sands process water.

● (1610)

[*English*]

Per slide 9, we have always worked through methods of collaboration. For example, the Fine Tails Fundamental Consortium was a five-year joint effort by industry, universities, and federal and provincial labs to develop a way to deal with the massive problem of accumulating oil sands fine tailings. These are small particle, clay suspension tailings. The total effort from all sectors was about $3.8 million per year. Out of this project came the consolidated tailings treatment method. This is really important research, providing the model for the current oil sands research network, called the Canadian Oil Sands Network for Research and Development, or CONRAD, involving industry, government, and universities.

Regarding slide 10, the Oil Sands Tailings Research Facility, a $2.5 million facility, was built at CETC-Devon in 2004 under the auspices of the University of Alberta to undertake pilot projects on tailings treatment methods. We work closely with the University of Alberta: some of our scientists are adjunct professors there, and post-graduate students work at our lab. We also work closely with scientists and engineers from the companies, because pre-competitive research such as this can be used by every company to the benefit of all of them.

Slide 11 shows an important tailings treatment that CETC-Devon had a leadership role in developing, called consolidated tailings. It mixes fresh sand and oil sludge, and it adds waste gypsum from the flue gas scrubbers on site, to create a mixture in which the sand and clay settle together quickly to a solid surface. The picture in the upper middle is of consolidated tailings made with gypsum, and it shows two CETC-Devon scientists standing on top of their work; so you can see it really is solid. The one on the right is of consolidated tailings made with carbon dioxide. The gypsum consolidated tailings process is being used at Suncor, and its pond is shown on the bottom right. In fact, due to the pioneering work at CETC-Devon, all new operators now include some form of thickening to reduce pond sizes. This solidifying process reduces the amount of water tied up in the tailings and therefore increases the free water available. About 15% of the total tailings produced has been consolidated tailings, showing there's still a long way to go and there's a lot more we can do in this area. But still, it has reduced the projected fine tailings inventory by about 10%, or 55 to 75 million cubic metres. That's a lot.

At CETC-Devon, research in this area has been an ongoing effort, which has included in-house and joint industry cost-recovery projects, ranging from fundamental studies of tailings properties and what affects them, to pilot demonstrations of tailings treatments. The latest development is the use of carbon dioxide to make consolidated tailings. In fact, this has led Canadian Natural Resources Limited, or CNRL, as it's also known, to adopt this treatment method for their new Horizon oil sands mine.

Slide 12 shows that CETC-Devon has an extensive research program into fundamental science affecting all aspects of oil sands operations. For example, it's important to understand the properties of clay when considering new tailings treatments. Our scientists were also commissioned to write a comprehensive review of extraction and water chemistry, which is now widely used in the industry. Our scientists—Kim and her team—have also constructed a database of water treatment methods, focusing on emerging technologies relevant to the oil sands industry. They will use this database to focus an in-house research program on promising treatment methods.

Slide 13,

● (1615)

[*Translation*]

shows that it is important to understand what happens to chemicals in oil sands process water. A new program aims to model what determines where molecules such as organic solvents or toxic naphthenic acids end up: in the water, the solids or the air.

We want to be able to answer such questions as: “If the operator changes the pH of their process, what will that do to the toxicity of the water?“

From the answers, we can address environmental solutions.

[*English*]

In conclusion, there is slide 14. As you are well aware from your study of water in the oil sands, the issues are complex, due to the interrelationship of all aspects of oil sands operations. Changing one part of the process can have consequences at any other point, from production through reclamation.

Our NRCan lab at Devon is working together with the scientists and engineers in the companies and universities to understand the problems and find solutions to the challenges. Working together in pre-competitive research such as this allows knowledge to be used by all the companies in the oil sands, as well as by the regulators, for the protection of the environment.

Thank you very much.

We'd be happy to respond to any questions you may have.

The Chair: Thank you. That is fascinating.

He's chomping at the bit over here, so I'm going to let Mr. Cullen begin. He's been asking these question, without much luck, for some time now. I hope today he's going to get the answers he's looking for.

Mr. Cullen.

Hon. Roy Cullen (Etobicoke North, Lib.): I'm not going to hold my breath, but thank you.

Thank you to all the witnesses for coming here today.

We're talking today just about water and some of the environmental challenges. The thing that I find totally amazing on the question of the oil sands, let alone natural gas, and CO_2, is that everyone recognizes there's a problem, but I don't see much in the way of action.

I appreciate that the Pembina Institute is a think tank. The Mackenzie River Basin Board was very clear that it's not a regulator, etc. But the one thing I find surprising is that no one seems to want to touch it. It gets into this area of not wanting a national energy policy type of backlash or not wanting to be seen as anti-Alberta.

But the bitumen will be there forever. The pressures on the costs now are horrendous. There is probably going to be $50 oil for a long time as well. Why can't the federal government sit down with the province and the stakeholders and work out a plan where we can have some measured pace to this, maybe save money in terms of the costs, deal with the social problems, and then work towards the environmental solutions?

We heard again today that the breakthrough technologies on water will be 2030. Well, the last time I checked, the production out of the oil sands is going to quadruple by 2015. We have no water management framework. Why would we, collectively, as a society—forget the jurisdiction for a moment—allow these projects to proceed and expand and quadruple when we don't know the impacts on the water? Who is asleep at the switch? Is this a matter that the province should be regulating or the federal government. What's going on here?

Maybe we could start with you, Ms. Griffiths.

Ms. Mary Griffiths: I would love to respond to that.

I would like to say hear, hear! It's great to hear somebody asking these questions.

With respect to Alberta, you had a presentation last week from the Canadian Association of Petroleum Producers. They're very influential in deciding what happens within Alberta. I think there is a very important role for the federal government, within its mandate—without it being a national energy policy or anything like that—to actually do a lot more, not only on research, as we've heard about today with what's happening in the labs, but also on groundwater. What is happening to our groundwater? We just don't know nearly enough about that. The Alberta environment ministry has a poor record there. They would agree that not enough money has been spent on monitoring groundwater.

I think the federal government can have a better role within CEMA, the Cumulative Environmental Management Association. More money is needed to work through CEMA, but it needs someone to drive that. Although I'm not personally involved in CEMA, from what my colleagues have said, I feel there could be much more initiative taken there. I don't know about the internal politics of CEMA, but there is an opportunity here.

There's also an opportunity with environmental impact assessments, through the Canadian Environmental Assessment Agency. At the moment, a lot of it is discretionary. Sometimes the Department of Fisheries and Oceans will not take such a powerful opportunity as they might, because of the discretion. I think there's been a reluctance by the federal government to get too involved.

But I think it's time for a change, and I would certainly like to encourage that.

● (1620)

Hon. Roy Cullen: Just on that point, I know there are jurisdictional issues and a sense of passing the buck on this project. It's unbelievable. But how as a society do we allow the use of this water at this rate and this pace?

You said that 10% of the water is returned to the river; the numbers bounce around a little bit. We heard at the very minimum that there's a timing issue. Even if you're able to recover from the tailings ponds, it could be futuristic. And even then, you're not going to recover it all. In the meantime, we're expanding the projects in the oil sands. How can we as a society allow this to happen without a water management framework or an environmental approval? Who would actually do that, and why haven't they done it...to insist on that?

Ms. Mary Griffiths: The Energy and Utilities Board recognized, when they were doing some of the hearings back in 2004, the essential nature of this water management framework. They realized that CEMA was being rather slow in doing it and said that if CEMA didn't come up with this management framework by the end of 2005, then the task had to be taken over by Alberta Environment and the federal government. Alberta Environment came up with an interim proposal in January of 2006, and subsequently the DFO got involved.

Again, there seems to be a lot of industry "influence", shall we say, and wanting to have as little change of the status quo as possible so that there would still be allowance for water to be diverted, even under a red alert system in the proposed draft management framework. This is why not only the Pembina Institute but also some of the aboriginal communities don't find this proposed framework acceptable.

So that's why it's reached a stalemate. It's just not acceptable. In fact, the Mikisew Cree have actually withdrawn from CEMA because they're so disappointed that it's not protecting the aboriginal interests with respect to traditional fishing and also commercial fishing.

Hon. Roy Cullen: Is that it, Mr. Chair?

The Chair: Yes.

We've just heard from one of the witnesses in terms of a response, but let's try to keep to seven minutes in the opening round and five throughout.

Again, I do want to say that certainly Ms. Griffiths can answer to anything she wants, but when it comes to departmental officials, if you're asking for policy advice and policy direction, Mr. Cullen, that's our job. I mean, that is why we're having this study, so that we can recommend policy to the government. The purpose of the witnesses in this hearing is to get information for us to base those questions on the policy.

I think you got a very good answer to your question. I just don't want to put particularly departmental officials on the spot to have to respond in terms of policy answers. They're here to provide technical information. I think they've done a very good job of that. And there's lots more room for questions, too, because there was considerable difference amongst the witnesses, even, in some of the data they provided.

So if we want to nail down technical areas, and differences of opinion on technical questions, I suggest that those kinds of questions would be helpful to the committee. It's our job as committee members to make policy recommendations; it's not particularly the job of government officials.

Hon. Roy Cullen: Certainly I hope we'll be doing that, Mr. Chair. I'm just trying to understand the context behind why—

The Chair: No, it's been very helpful in this case, I don't doubt that.

Hon. Roy Cullen: Actually, I would have liked to ask Ms. McCuaig a number of questions, because there's a lot of good stuff going on. We just don't have the time here.

The Chair: You will get a chance in the next round.

Madame DeBellefeuille.

● (1625)

[*Translation*]

Mrs. Claude DeBellefeuille (Beauharnois—Salaberry, BQ): Thank you, Mr. Chairman.

The Chairman was underscoring the diversity of opinions of our guests. What we have had here is what we call rich presentations that allow us to reflect upon issues along with you.

My question is for Ms. McCuaig-Johnston or Ms. Griffiths. I am a newly elected MP, so I am somewhat confused.

Could you identify clearly for me who has the power and authority to intervene in the implementation of the recommendations put forward by the Pembina Institute, in other words the establishment of a wetlands policy, etc.? Who has the ultimate authority to make decisions and take action with regard to water? Is it the province of Alberta or the federal government?

Ms. McCuaig-Johnston might enlighten me, on behalf of the government.

Mrs. Margaret McCuaig-Johnston: A few weeks ago, a colleague within the department, Mr. Howard Brown, came here to discuss this matter. He followed up by providing a document detailing the responsibilities of the federal government as well as those of the provinces. I would simply say that I today discussed the research and development responsibilities of our department.

Furthermore, there are colleagues within the department who oversee

[*English*]

groundwater, the Geological Survey of Canada. I would be happy to provide information to the committee as to the mapping they are doing of the groundwater and the additional information they provide to regulators, who then base their decisions on it.

[*Translation*]

Mrs. Claude DeBellefeuille: Forgive me for interrupting you, but this was simply a question of clarification. I simply thought that you could tell me whether, yes or no, the implementation of the Pembina Institute's recommendations falls under federal or provincial jurisdiction.

Mr. Wollmershausen, what is your opinion of the Pembina Institute's recommendations to the effect that the oil industry should have to pay for its use of fresh water? Did your board look into this matter?

[*English*]

Mr. Jim Vollmershausen: The board has not dealt with that particular question, no; we have not. On the general question you're asking about who decides what, at the Mackenzie River Basin Board we're certainly very aware that in Alberta a number of decisions are made by the province. The Alberta Energy and Utilities Board has a major decision-making role to play.

On the federal side, there are permits and licences that are required, and they become part of the overall permitting process around each project. They tend to get dealt with as part of the environmental assessment processes, which are normally joint processes, federal and provincial together.

Ultimately, final decisions are rendered by a federal minister and a provincial minister. They deal with their requisite stuff.

[*Translation*]

Mrs. Claude DeBellefeuille: Your board does not have an opinion on this matter. That is what I understand.

[*English*]

Mr. Jim Vollmershausen: Not on that particular.... We haven't dealt with them, no.

Mr. Alan Tonks (York South—Weston, Lib.): Madame DeBellefeuille, you have two and a half minutes.

[*Translation*]

Mrs. Claude DeBellefeuille: Very well.

You must be aware, Ms. McCuaig-Johnston, that I am passionate about science and technology. I am the member on this Committee who asks the most questions about science and technology.

I received a report from your department that gives the amounts of money that Natural Resources Canada devotes to science and technology. I looked at various tables. I have data for 2004-05 and I would like to take advantage of your presence here for you to help me understand this table. It is divided up as follows: “Energy“, “Minerals and Metals“, “Earth Sciences“, “Forests“, “Administration“, and there is a grand total of $366,000,730 devoted to research and technology. It says in the “Energy“ section that $174,201,000 have been devoted to the energy sector.

I would like you to tell me if the energy sector comprises all energy sources, in other words oil, gas, wind, biomass and solar? Is all of that included in the column entitled “Energy“?

● (1630)

[*English*]

Mrs. Margaret McCuaig-Johnston: Energy in this case includes energy efficiency, industry, and buildings. It includes fossil fuels, renewable energy, hydrogen, and fuel cells. Those are the broad categories; then there's a tiny bit in additional areas.

[*Translation*]

Mrs. Claude DeBellefeuille: Is it easy for you to identify, within the “Energy“ section, the percentage of these amounts devoted to non renewable and renewable energies? Would it be easy for you to do this?

[*English*]

Mrs. Margaret McCuaig-Johnston: Renewable energy is $20 million this past year and fossil fuel is $47.8 million. That includes the research we're doing in the oil sands to reduce the use of water in the oil sands. Then hydrogen and fuel cells is $12 million. Energy efficiency is $29.2 million.

[*Translation*]

Mrs. Claude DeBellefeuille: Thank you very much.

[*English*]

The Chair: Merci, madame.

Ms. Bell.

Ms. Catherine Bell (Vancouver Island North, NDP): I'd like to thank the witnesses for their presentation.

I have questions for each of you with respect to recommendations.

Mr. Vollmershausen, the Mackenzie River Basin Board can do studies, but can it also make recommendations?

Mr. Jim Vollmershausen: Yes, it can.

When you see the “State of the Aquatic Ecosystem Report”, for example, you'll notice right at the front of it a number of observations and suggestions about work that needs to be done. One of the ways we can try to influence decision-making is by making those kinds of observations and suggestions.

Ms. Catherine Bell: I'll wait until I read the report to get the rest of it. Thank you.

Ms. Griffiths, you talked about the impacts of the heavy use of water on the surrounding area, on communities, and on first nations. I'm wondering if you could elaborate a little more on that and what the impacts have been with regard to rivers, communities, and especially first nations, with regard to fishing and that sort of thing.

Ms. Mary Griffiths: I understand Pat Marcel is coming next week. He's an elder with one of the first nations, and that's why I didn't deal with that in detail. I felt it would be much better for him to talk about it first-hand.

I know they are very disappointed that there's not yet any instream flow management, because of the concern about the impacts on the fish. Also, I know that from their perspective more research is needed on the fish tainting problem, because to a large extent the bitumen is responsible for the fish tainting effect, and it actually causes health problems. I know they would like more research done on that, as well as on the Peace-Athabasca Delta, as I mentioned in my presentation.

Ms. Catherine Bell: I know that the institute has called for a moratorium on future development, or called for it to slow down. How long do you think it would take until the land can be reclaimed? There's really no approved reclamation by the Alberta government, but how long might that take? Do you have any idea?

● (1635)

Ms. Mary Griffiths: I don't know how long it's going to take Alberta Environment to give approval for the reclamation. I mentioned the ten acres of consolidated tailings, but I think about 9% of the mining area from Suncor and probably about 20% of the mining area from Syncrude have been reclaimed. They are trying to reclaim the land as they go along, but of course it's usually a 20-year lag before they can start reclaiming from one particular area.

With all the new projects coming on, we've asked for a halt, at least while we get something in place. We have not specified a time, but I think even those involved in the industry in Alberta realize that the pace of change has been so rapid it's had incredible impacts on the whole economy everywhere you go. In Alberta it's hard to get the people to do the work, and it's having repercussions throughout the whole of the province from a social point of view.

We've not actually set a time limit on that. We don't plan to be disruptive, but we feel it is time to do some catching up with the existing projects and go ahead in a staged manner, rather than everything happening at once. We've actually had one or two companies now say maybe they'll delay a project, as it's going to cost them so much because of the shortages of labour. It may come about to some extent through the industry itself, but on the other hand, it's better to have it required, so that it's a staged development and you get people to work together so that nobody misses out, but we at least do things in a more responsible, measured manner.

Ms. Catherine Bell: Thank you.

Ms. McCuaig-Johnston, you talked a lot about the research and development. I found it very interesting. In terms of research and development, are you ahead of the industry or are you trying to catch up ?

Mrs. Margaret McCuaig-Johnston: I would say we work closely with them, but we have an ability to look out a few years beyond and look at the longer-term research.

I would ask Kim Kasperski to respond to that because she leads the committee on water and the oil sands and is plugged in well with the research the industry is doing.

Dr. Kim Kasperski (Research Scientist, CANMET Energy Technology Centre (CETC) - Devon, Department of Natural Resources): We do, as my ADM has mentioned, work closely with industry, so we are current with our existing technologies. But what we are trying to do is push the envelope, so we are trying to develop, for example, much more aggressive tailings treatments at our laboratories so we can then say to the producers that this is a way to do it, this is what it would cost you, and this is the effect on the water chemistry, and how about it?

So we are trying to stay ahead of the industry in those terms.

Ms. Catherine Bell: I just have one question about the tailings. What do you do with the clay?

Dr. Kim Kasperski: We're talking about the mature fine tailings. One of the things that has to be addressed by the industry is dealing with the stored, accumulated volumes. So in this consolidated treatment process, they dredge it up and pump it to big mixing chambers where they mix it with the fresh sand. And as those solids settle, they settle together. The clay particles are in the interstices of the sand—in between the sand grains—so the whole thing settles as a mass. That's where the clay ends up, mixed with the sand until it forms a solid surface. The water rises to the top, it's pumped off, and you're left with a solid surface. That's what they do with the clay.

Does that answer your question?

Mr. Alan Tonks: Is it inert?

Dr. Kim Kasperski: Is it inert? Yes. These are like koalinite, which is the stuff that coats paper. These are just ordinary clays and montmorillonite—well, there are traces of that. It's inert, just like anything you'll find in your soil in your garden. The things that may not be inert are the soluble particles in the water, which is still in the pores of that mixture—the organic compounds, the salts, and so on.

Ms. Catherine Bell: But are there toxins left in that?

Dr. Kim Kasperski: That's what I was referring to, the stuff that's left in the water, like naphthenic acids, the salts, and so on. It's actually quite—

Ms. Catherine Bell: It is quite toxic.

Dr. Kim Kasperski: It's acutely toxic, yes. It does decrease over time. Also, the high salinity has issues with respect to plant growth.

● (1640)

Ms. Catherine Bell: For how long? You said it's toxic and will reduce over time. How long will it be?

Dr. Kim Kasperski: In studies that were done maybe ten years or so ago, they were trying out these natural wetlands to see how they would reduce toxicity. Within months there was a significant reduction. So they estimate—project—maybe a year or two, but that's as long as you don't have any fresh input of new tailings, which would keep the toxicity up.

But one thing that will not disappear is the salinity. Unless you treat the water, it will stay there.

Ms. Catherine Bell: Do I have any more time?

The Chair: You're three minutes over your time.

That's very good. It's exactly the kind of thing that I think the committee is looking for.

In anticipation of our visit, Ms. Griffiths was mentioning that we would be hearing from some of the native bands in the area. We have Pat Martel coming before the committee in two weeks to discuss the impact on some of the native communities around the sites.

In addition to that, I think this meeting today has probably, more so than ever, stimulated an interest in visiting and actually seeing these ponds and their reclamation, or not, with our own eyes. So I think that will be very effective.

Thank you for those answers.

I'm going to move now to Mr. Harris.

Mr. Richard Harris (Cariboo—Prince George, CPC): Thank you, Mr. Chairman.

Welcome, ladies and gentlemen. I appreciate you being here.

I have a number of questions. I'll try to make them short, and we'll try to complement with short answers if we can, although we probably could use more time.

This appears to be a very serious issue we're talking about today, and an issue that is crying out for solutions. This is the first time I think that you folks have been to this committee on this issue.

How long has this been perceived as a problem? Just quickly, how many years have we been aware of this problem?

Mrs. Margaret McCuaig-Johnston: Dr. Kasperski could perhaps answer that question for you.

Dr. Kim Kasperski: Soon after Suncor started is when they perceived that there would be a tailings problem. It was when their ponds started. But the cumulative effects have just been since five years ago, when all these other operators put in plans to develop surface mine operations.

Mr. Richard Harris: When did Suncor start up? How many years ago?

Dr. Kim Kasperski: In 1967.

Mr. Richard Harris: Oh, 1967, okay.

Dr. Kim Kasperski: Yes, centennial year.

Mr. Richard Harris: All right. I'm trying to get an idea of how long this has been going on, so I can go to the next question.

Ms. Mary Griffiths: Back in 1995, when the provincial government gave royalty breaks, it was thought that we might have one million barrels by 2015. We had a million barrels in 2004, so I think the whole problem grew much faster than they had anticipated.

Mr. Richard Harris: I guess that leads to my next question, since their considering it appears to have been around for some years.

How many times have you appeared before the Standing Committee on Natural Resources on this issue, as you are today?

Mr. Jim Vollmershausen: Going by that, no.

Mr. Richard Harris: Never? Ms. Griffiths, never?

Dr. Mary Griffiths: No.

Mrs. Margaret McCuaig-Johnston: I haven't appeared before, but our director general, Hassan Hamza, was here several weeks ago speaking about oil sands challenges.

Mr. Richard Harris: In spite of the fact that the issue has been around for so many years, this is the first time we're talking about it at a committee at the federal level?

Ms. Mary Griffiths: To my knowledge, yes.

Mr. Richard Harris: Okay. That's all I wanted to know.

Looking at your submission, Ms. Griffiths, and on one of your pages you have some recommendations. You say putting a user fee on the water used by the oil industry could fund research into new technologies, improve water management, etc. Good suggestions. Then I look at the deck from Natural Resources Canada and I see that what they do is provide scientific understanding into tailings management, water chemistry, provide expertise in the development of new technologies to reduce the effect of oil sands development. Basically, what they're doing is what you're saying you ought to do. Is it that you don't think they're doing a good job and you can do it much better?

Ms. Mary Griffiths: No, no, no, it's not a question that the Pembina Institute is doing it; it's a question of more research. I think what they're doing is excellent, but I think they'd probably be the first to agree that we could do even more with more resources.

Also, there's one thing about doing sort of lab work and researching new technologies, and I think they've come a long way with the consolidated tailings. But from the aspect of groundwater, for example, which is going to impact a huge area, over 100,000 square kilometres, an area bigger than the area of Florida, where they've got the in-situ bitumen...we don't understand our groundwater. Alberta, for example, has one monitoring well, on average, for every 3,000 square kilometres. We need a lot more information about groundwater.

The federal government has been doing a good job on studying one of our aquifers in Alberta, the Paskapoo aquifer. I think it would be great if the federal government also helped us out in learning a lot more and speeding up our knowledge, before we get so many cumulative impacts that we don't even have a baseline against which to measure the changes.

● (1645)

Mr. Richard Harris: You talked about putting fees on the water usage, of course, and increasing scientific research. Given the cost of extracting a barrel of oil from the tar sands today—I'm sure you must have done some studies; by implementing all of the things you're suggesting here, there would be a cost to it. How much of a cost do you think would be added on a per barrel cost basis if what you're recommending were carried out to its fullest extent? What would that raise the cost of extraction to?

Ms. Mary Griffiths: We have not actually done that equation. We don't have the resources to go into such depth to do an accurate... well, we've done it with greenhouse gas emissions, and the amount would be a dollar or so. It varies according to what systems you use. We have not done it with water. It was a question of having a financial levy that would be used productively.

For the moment, with the price of oil being what it is, we know there's a very large margin there. Companies at the moment find it more economic simply to reinvest in producing more oil. They get a better return on their money than they do reinvesting in water conservation. I've heard that said by companies.

Mr. Richard Harris: Okay. I want to move quickly because I think I'm running out of time.

There appears to be a jurisdictional conflict here, where the federal government, I'm sure with the blessing of the Province of Alberta, is invited and helps to do scientific studies and research into environmental issues on a wide scale. When we get to the point at which the federal government's natural resources studies call for the infusion of a lot of provincial money to actually do the projects that the study has identified, the province actually has to say, “Oh, yes, we agree we'll spend the money.” That's where the rubber hits the road. We can do a lot of research, but is there a commitment from the province, or will there be a problem to actually spend the money to carry out the recommendations of the scientific research results?

Maybe Ms. McGuaig-Johnston can answer that.

Mrs. Margaret McCuaig-Johnston: I'm afraid I can't speak to provincial policies in this regard. We do work very closely with provincial research organizations, the Alberta Energy Research Institute and the Alberta Research Council, but I can't speak to provincial policies and priorities.

Mr. Richard Harris: What I'm saying is let's say we put a lot more money into research on ways to improve the environmental effects of the oil sands and we gave some great results and recommendations to the provinces, and they said, no, from an economic point of view, we feel it would impact the cost of extracting too much, it would cause a downturn in the development, and our economy can't afford that. Where do we go from there?

Ms. Mary Griffiths: I think when individual projects are reviewed—and this is how progress is made—we have the federal government sitting usually on a joint review panel, and it's possible then to say these are conditions that you should write into that application going ahead. And if we have both the federal and the provincial government having more knowledge about what those impacts will be, now we can have two companies operating in the same area. They both can provide their environmental impact assessment, but they don't always realize what the overlapping impacts will be over those two operations within the same area.

With more knowledge we will be better able to anticipate the problems.

Mr. Richard Harris: Can I just have one more question, one little one?

The Chair: You can get on the next round. Sorry. You did go a little bit over that time, for a change.

I should also mention that we were going to hear from one of our Alberta ministers in Fort McMurray, the Honourable Greg Melchin, the Minister of Energy, who had inquired about joining us briefly in Fort McMurray. He is now unable to do that, but we have had some discussions, and I think it might be appropriate to ask a representative of the Alberta government to come down and respond to some of these questions. So we'll perhaps do that after the break.

I will go now to Mr. Telegdi.

● (1650)

Hon. Andrew Telegdi (Kitchener—Waterloo, Lib.): Thank you very much, Mr. Chair.

In terms of the tailings ponds, what kind of groundwater protection strategies are put in place in terms of what is below the ground for the tailings ponds?

Dr. Kim Kasperski: I can speak to that just a little bit. What I know is they build ditches around the ponds, so any drainage through the ponds is collected in the ditches and then it's just pumped back into the ponds. Obviously anything deeper than those ditches could potentially escape, so I don't know what measures they do have to look at any deeper drainage than that.

I don't know if Ms. Griffiths knows more.

Ms. Mary Griffiths: There is a concern, certainly, that there could be some leaching from the ponds, and one concern that they're discovering is there are a lot of buried channels, and they're still learning the location of the buried channels. They are sometimes only about a kilometre wide and up to 180 metres deep, and on the Alberta geological survey...I saw a map one year, and then the next year another map, and there were a lot more of these channels on the map. Because they are small, they are not always picked up by the routine surveying, and companies, when they come to do their operations, obviously survey at a much higher density, and they're actually telling the government where some of these channels are.

Of course, if it should be that there's a tailings pond built over one of these channels, and it's only fairly recently that they've discovered these, then there could be a real problem. I know that in Suncor's latest application they did a lot of work to identify within their project area whether there were any of these buried channels that they didn't know about, but this is something that is a concern, and hopefully there are none of these buried channels under any of the existing tailings ponds. There are not, to my knowledge, but I did hear that one SAGD operation has found unexpectedly that there was a buried channel within part of their lease area.

Hon. Andrew Telegdi: Is there any testing of the deep aquifers under the ponds?

Ms. Mary Griffiths: They do have some monitoring, but I don't know how much.

Mrs. Margaret McCuaig-Johnston: The Geological Survey of Canada has started an extensive research and mapping of this whole area of the northern part of Alberta as a way of understanding what is going on with the aquifers and the groundwater, and certainly we would be in a position to give you some background information or some technical information that might help you in your work in that area.

Hon. Andrew Telegdi: My concern would be that most of the fresh water that we have on the planet is in groundwater. It's not in lakes and it's not in rivers and it's not in the ice caps. It's right in the ground. Once you contaminate an aquifer, it becomes virtually impossible to clean it up.

It would seem to me that we should be testing the aquifers. And if it is the case that this aquifer has been contaminated, then it can be kissed off, because there's going to be no rehabilitation for many centuries. But at the very least, use that water, and be very careful before you do any tailings ponds that don't take into account what the aquifers are doing and what activity is there. It staggers the mind.

I come from the Waterloo region, and we're very much dependent on groundwater there. I know that if you contaminate a deep aquifer, that's it, there's no rehabilitation for it.

Can we have some kind of testing in terms of monitoring what's happening there now? We'd want to know it for the sake of science anyway.

Ms. Mary Griffiths: It's not just the contamination; it's also the volume of water.

The mining area is one area, but the area that is going to be impacted by the in situ, where they're actually going to be drawing down the aquifers.... And then of course you can get other waters flowing in, which may have a different purity, and also water flowing downwards into the areas from which the bitumen has been taken out. The actual water table will flow, and then other substances can flow in.

So it's not just a question in the tailings area; it's a question—which is a major concern to me—over the whole area where the bitumen is being developed.

● (1655)

The Chair: Dr. Kasperski, did you have something to add?

Dr. Kim Kasperski: I was just going to say that it is a provincial jurisdiction, although, as Ms. McCuaig-Johnston said, the Geological Survey of Canada is helping. But it is provincial jurisdiction to monitor and control the groundwater.

Mrs. Margaret McCuaig-Johnston: We provide technical information to them—to a number of regulators, in fact—on the mapping and what's there, and then it's up to them to decide what measures they want to take for controls or regulations in that connection.

It may be something you would raise with the Alberta government people you'll be meeting on your trip out there.

The Chair: Yes, thank you. And it may be something we might want to recommend in this report. I appreciate that.

Thank you.

Mr. Ouellet.

[*Translation*]

Mr. Christian Ouellet (Brome—Missisquoi, BQ): Thank you, Mr. Chairman. I am all the more pleased that this time I will be able to ask a question that has been on the tip of my tongue for weeks.

My question is for Dr. Kasperski.

Ms. McCuaig-Johnston at one point mentioned that there are naphthenic acids. I took a chemistry course at McGill University, but that was back in 1954. I therefore do not remember what theses acids are.

I would therefore like you to explain to me what they are, from a technical point of view, but in a language that I can understand. Are there heavy metals involved? Are there hazardous materials? What chemical compound are we talking about?

You stated earlier in your presentation that these compounds are not dangerous and that they could be spread over land, for example in gardens. But you must be aware that there are mixes of earth derived from composting and which are dangerous. These compounds could therefore contain harmful substances. What is dangerous in their composition?

[*English*]

Dr. Kim Kasperski: What I said was with respect to the types of clays in these systems. They're just ordinary clays. The naphthenic acids themselves—if you remember from that course—are hydrocarbons. The elements in them are hydrogen, carbon, and oxygen. They are big molecules. There are about a thousand different molecules that actually make up this group. Some of them are toxic; some of them are not.

When the natural bacteria chew on them, they break up these molecules into harmless, non-toxic compounds. So there are no elements in the naphthenic acids themselves that will be left over to cause further effects. They're just simple carbon, hydrogen, and nitrogen, but they're put together in such a way that some of them are toxic. When they break down, it's just carbon, hydrogen, and oxygen left over.

[*Translation*]

Mr. Christian Ouellet: Ten percent of the water is discharged. Does this water contain toxic substances?

[*English*]

Dr. Kim Kasperski: As far as I know, the only water that is discharged is potable water that comes from the river and is used on-site for drinking water and so on, and it is then treated like any sanitary sewage, which is then sent back to the river. That's what's called not process-affected; it hasn't been touched by the tar sands. Any process-affected water is not discharged.

There is other river water, for example, that might have gone through a heat exchanger, did not touch any tar sands, and could be discharged. As long as it hasn't been in contact with the oil sands, it is discharged. It's just the river water.

In the case of potable water or sanitary sewage, it would be treated the same way water in any other sewage plant would be before going back to the river.

[*Translation*]

Mr. Christian Ouellet: I will use the question asked earlier by Mr. Telegdi as a starting point: are there things that can wind up in the water table? What could be dangerous and what could wind up in the water table?

[*English*]

Dr. Kim Kasperski: Anything that is soluble in the water can travel with the water, so you're talking about any kind of dissolved inorganic salts, sodium chloride, iron, aluminum, or anything that will stay in the water. That also includes organic compounds like the naphthenic acids, which are soluble. So anything that can flow with water can potentially end up in groundwater. As long as it's soluble in the water, it will stay with the water.

As Ms. Griffiths also alluded, when these waters mix in the ground with different chemistries, reactions can occur. So at that point, some things may fall out of the water and stay in the reservoir. As long as it's soluble in the water, it will go where the water goes.

● (1700)

[*Translation*]

Mr. Christian Ouellet: You who do research, could you tell us if it would be possible to build leakproof ponds, as is done in landfill sites to retain the water with very thick and very water-tight seals, so as to prevent toxic substances from escaping?

[*English*]

Dr. Kim Kasperski: The civil engineers who design these ponds do flow studies of the ponds to try to monitor how much will actually flow out of the ponds, through the bottom, let's say.

This is not my area of expertise, but the numbers I have seen for what they call the water conductivity are very low in these ponds. Because of the clay makeup, the water does not flow readily through these systems, so they have a very low permeability.

This is more the realm of the engineers. When they build these ponds, they determine the water conductivity of these systems. I don't know the units, but they come up with numbers that show a certain flow rate, and then they can say whether there's a leaky pond or not. They try to design these ponds with very low water conductivity.

[*Translation*]

Mr. Christian Ouellet: Even then, is there not still some risk? Some element of risk remains. How do you go about assessing the risk of contaminating the water table?

[*English*]

Dr. Kim Kasperski: Here we're getting way out of my area of expertise, so I could only offer an opinion on that. It wouldn't be a really scientific answer.

[*Translation*]

Mr. Christian Ouellet: Perhaps Ms. Griffiths has an opinion on this. Are you familiar with this?

[*English*]

Ms. Mary Griffiths: Yes, I am, but I'm not an expert on this, and I would not give an answer. Sorry.

[*Translation*]

Mr. Christian Ouellet: We will have to call upon an expert.

We are moving ahead, we are moving ahead.

[*English*]

The Chair: It's a very good question, and it's certainly one that we would like to have answered, because it is a serious concern. I think we labour under the opinion or the view that there is no leakage at this point. As Ms. Griffiths said, however, that's not beyond the realm of possibility. So it's a question you should ask in Fort McMurray when you're there. I hope you get the answer, because I'm interested in it as well.

Hon. Andrew Telegdi: Just on that, for your information, you might get some people in from the groundwater research institute at the University of Waterloo. It's a centre of excellence, and they can give you all sorts of information on groundwater effects.

The Chair: Thank you. If they couldn't appear as witnesses, perhaps we could ask them for an opinion.

We are going to try to wrap up, but we have two more to hear from. I'm going to ask Mr. Allen to proceed.

Mr. Mike Allen (Tobique—Mactaquac, CPC): Thank you, Mr. Chair. Thanks, everybody, for being here today.

I have three or four questions, and they should be relatively quick. The answers might not be that quick.

I don't think I'll go swimming now when I go up there, although I'm not sure if it's after one year or two years. I'll have to wait and see.

The first question concerns the usage of the water, and I have some ranges here. The upper range seems pretty consistent at 4.5 barrels; the lower range, two barrels to three barrels, seems a little bit different. What are the key drivers making that variable for the usage of the water?

Dr. Kim Kasperski: If you want, I can respond to that.

A key driver is the nature of the ore itself, because the ore grade varies tremendously, for example, with respect to the clay content. If you have higher clay ore, which is poorer quality ore, you need more water. Also, the tailings are worse for that ore. You get less water back. One of the main drivers is the ore itself as to why you have such a wide range in water usage. Also, the individual producers have slightly different processes in how they deal with the tailings, such as whether they have thickeners, for example. Again, that will cause variations in the amount of water used or lost per barrel of oil produced.

Mr. Mike Allen: My next question is with respect to the toxicity. Let's say this does break down. Your best guess is it breaks down after one or two years. What are the other dangers that this possesses after that time, after that one to two years of the toxicity breakdown?

● (1705)

Dr. Kim Kasperski: I can kick that off. Again, I'm just going by what I've read on the subject.

There are issues about what they call chronic toxicity. There's acute toxicity, which means it will kill something right away, and then there's chronic toxicity, which means the effects would build up. There are studies being done to address that issue. There's also the issue of the salinity itself. Having such high salts in the water affects what it can be used for. There are also studies looking at certain organic contaminants other than the naphthenic acids. Those are the issues around the toxicity of the water.

Ms. Mary Griffiths: All I'd add is with respect to the fish. We know that there is fish tainting, and we don't know quite how that's associated with the bitumen, I understand, but I don't have any scientific results on that.

Mr. Mike Allen: This is my last question. I've been involved in environmental impact assessments before, for power stations and things like that. I'm familiar with when they build these holding.... They put impermeable liners in them. Is that something that is even reasonable for us to move towards—impermeable liners? If not, with these ditches that could potentially leach, has some other thought been given of ways to control that so we don't get leaching into the groundwater?

Dr. Kim Kasperski: This would be an opinion. There's the issue of the sheer scale, when you're talking ponds that are two or three square kilometres. They are really small lakes. I don't know. You'd have to ask an engineer about the practicability of lining such a big hole in the ground with impermeable membranes. I really can't respond to that.

Mr. Mike Allen: Thank you, Mr. Chair.

The Chair: In the interest of time, I'm going to go to Mr. Paradis.

[*Translation*]

Mr. Christian Paradis (Mégantic—L'Érable, CPC): Mr. Chairman, I would like to share my time with my colleague.

Do you see any opportunity to stop using fresh water by using water of a lesser quality, for example, waste water that would not be harmful to the environment or saline water, as you were saying? Would that be possible?

[*English*]

Dr. Kim Kasperski: Are you referring to in-surface mining operations?

[*Translation*]

Mr. Christian Paradis: Yes, exactly.

[*English*]

Dr. Kim Kasperski: The problem with that is they could use it, but they would have to treat it first before they could use it, because the chemistry of the water affects bitumen recovery. For example, if the ions get too high or it becomes too salty, bitumen recovery goes down, so a lot of the resource is lost to the waste stream. If they were told to use more brackish water, they would have to treat it first to remove certain salts especially and also to reduce the salinity, depending on what the degree of salinity is. It just cannot be used as is.

[*Translation*]

Mr. Christian Paradis: Thank you.

[*English*]

Ms. Mary Griffiths: Also, I don't know if there would be the volume of saline water available. It has to be drawn from deep down under the earth. When one looks at the huge volumes that are drawn from the Athabasca River, to obtain comparable volumes over such long periods of time from deep saline aquifers.... They are recharged very slowly. I know that in the Cold Lake area for the in situ operations it's been worked out that there may just be about enough saline water in the aquifer they are using for the three companies that are operating in that area, and they use much less water than is used for the mining. After about 50 years, that deep saline aquifer will probably be exhausted, and then it will take a very long time to recharge because it's so deep. Even the deep saline aquifers are not an inexhaustible supply of water.

[*Translation*]

Mr. Christian Paradis: I thank you.

[*English*]

The Chair: Thank you.

We have time for one more, and then we have a point of order, I think, from Madame DeBellefeuille.

Did you want to go ahead?

[*Translation*]

Mrs. Claude DeBellefeuille: Do you want me to make my point in front of the witnesses?

[*English*]

The Chair: No, I understood you had a point of order. You wanted to ask for the tabling of documents?

[*Translation*]

Mrs. Claude DeBellefeuille: Ms. McCuaig-Johnston provided me with numbers in answer to a question I asked, and I wanted to know if the deputy minister and the parliamentary secretary might provide a written follow-up, in order for me to add this information to the file. I do not know if the numbers the witness gave me were for 2005-06 or for the year 2004-05. It is however important to me, in order to gain a better understanding of this file, that things be more precise. I would therefore very much like to be provided with a written document from the deputy minister.

Would that be possible, Mr. Chairman?

● (1710)

[*English*]

The Chair: Okay. I think that's clear. If you need clarification, the clerk has the request. So we will get that information to you.

To wrap up, Mr. Tonks, for five minutes.

Mr. Alan Tonks: Thank you, Mr. Chairman.

Thank you for being here.

I'm not sure I'm going to be able to ask the right questions, so just bear with me. I think the committee is attempting to understand two parallel parts of the process. We have the cumulative process that is going on, which has resulted in concerns being raised by the Pembina Institute and others with respect to tailings; groundwater, shallow and deep; and the entire ecosystem, if you will. We have a process that is cumulative in terms of identifying the degree of those effects on the environment. On the other hand, while you have the cumulative analysis, you also have another regulatory regime that is an ongoing approach, which has been described as environmental assessment. You have a joint review panel that looks at it application by application. You also have CONRAD, which is looking at a consolidated tailings development scheme, if you will. And you also have new technologies coming in that deal with cumulative problems. But we fear they're not being implemented quickly enough; Pembina says they won't be implemented until 2050.

I guess the question I would like to posit on behalf of the committee is, where are the crossovers? When we had the National Energy Board, the question was, what regulatory regime or levers do you have to intervene with respect to getting particular action? So you have a cumulative regulatory process, out of which, obviously, there are certain recommendations that will come out, for example, perhaps in a bilateral agreement. Where is the crossover where that information is then fed into the environmental assessment, which determines whether there is going to be a precautionary process that will then click in? That's what the public wants to know, and that's what we're charged with in this committee. That's why we're going up to have a look at what's going on up there. But I think the committee would also like to have a sense of what that comprehensive regulatory framework is, both cumulative and ongoing.

I know that's a long way to go to get an answer.

Mr. Vollmershausen, is there perhaps any sort of ORP chart that shows how those crossovers happen, if they do, and if they don't, who's going to recommend they should be?

Mr. Jim Vollmershausen: I'll take a small stab at it. With reference to the bilateral agreement notion that you mentioned, and that's the bilateral agreement associated with the Mackenzie River Basin Board, how that would work.... For example, the one that would be of most concern to the oil sands area would be the Alberta-NWT bilateral agreement, where they would worry about what's crossing the Alberta-NWT border and the Slave River. They would worry about volumes and water quality, and there are probably various categories within those two main subjects. They would reach an agreement on that. The NWT is very interested in what they receive, so there would be some pretty serious negotiations to determine volumes and water quality.

Once that's done, Alberta's responsibility would be to make sure it manages the water within its jurisdiction while it's there to meet whatever those targets and criteria are. It's not unlike another board, the Prairie Provinces Water Board, where 50% of the flow of eastward-flowing streams out of Alberta has to be passed to Saskatchewan. It's monitored very carefully and worried about a lot, but it's the same principle exactly, and the jurisdictions take that very seriously. So that would be one mechanism that would certainly become part of the org chart you're talking about.

Another part of it, and Mary referred to it as a bit problematic, is the regional sustainable development strategy that Alberta put in around the oil sands area. It was to do with a Suncor project back in the late nineties; I forget the exact date. The Cumulative Environmental Management Association is designed to take that and run with it and make things happen, but it's devoted to cumulative effects. That's what it's called. That's why it's there.

I don't remember the exact number. I know when the RSDS was put in place, the existing and planned project value was in the $20 billion range, and not very many years after that it was up in the $80 billion or $90 billion range. That's the pace issue Mary refers to. The problem CEMA is having is coping in a multi-sectoral, multi-stakeholder, consensus-driven mechanism.

Many committees know it's a demanding process to try to reach consensus on anything, and with a lot of players around the table and the pace of development, they're simply having trouble keeping up.

Pembina's references to doing something to instill energy and resources and so on into that process, to upgrade their ability to work, is important to Pembina, and they make that clear whenever they have an opportunity. That would be another part of it.

● (1715)

Mr. Alan Tonks: Who invokes the precautionary principle? In a joint panel, when do the alarm bells go off and they base the analysis we have...? These are terms and conditions for the environmental assessment to be approved. They may involve technology. They may involve a chronological order of development, a pace, a rhythm, a number of things. When does that happen?

Mr. Jim Vollmershausen: At that stage, it happens project by project at the moment. With both decision-makers as part of that joint process, be it provincial or federal, when they're ready to render a decision on that project, those kinds of insights and recommendations that have emerged from a lot of scientific and very good work of a lot of people...that's where it would occur in terms of “yes, under these conditions, with these caveats”.

Ms. Mary Griffiths: That's where the federal government still does have a role, and maybe it could exercise that role with more enthusiasm than has been apparent in the past.

One small example is that even though we don't yet have an instream flow needs water management framework, it could be that at the next hearing, somebody should say, right, well, we're not going to be able to allocate more water from the river, and maybe the company should only go ahead if it makes provisions for off-site storage, so that they have resources for when the river.... That's something that could be put into a specific project approval.

Mr. Alan Tonks: Thank you, Mr. Chairman.

The Chair: Thank you, Mr. Tonks.

And thank you to our witnesses today. It was an excellent meeting, and I very much appreciate your preparation and also how you responded to the questions.

With that, we are going to adjourn until 6:30 a.m. on November 20 in Calgary. I look forward to seeing you all bright and early on our way to Fort McMurray.

Thank you again, and *bonne fin de semaine*.

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