# CAL SIKSTROM

**Date and place of birth (if available):**

**Date and place of interview:** Cold Lake Oil & Gas Galleries at the Cold Lake Museum

**Name of interviewer:** Peter McKenzie-Brown

**Name of videographer:** Peter Tombrowski

**Full names (spelled out) of all others present:** N/A

**Consent form signed:** Yes

**Transcript reviewed by subject:**

Initials of Interviewer: PMB

Last name of subject: SIKSTROM

PMB: We're in Cold Lake still. This is the first part of a two part interview with Cal Sikstrom. We're probably going to break this up very quickly when our next interviewee comes up. Cal has been with... well, I will let him tell us about his story. His speciality for this project is environmental work and he is going to be telling us a little bit about that. But, I wonder Cal, if you could just begin by telling us about your career and how it developed.

SIKSTROM: Yes, certainly. I graduated from the University of Calgary in 1974 with a bachelor of science in zoology. But, I specialized in ichthyology and a...

PMB: And, ichthyology, that's the study of fish?

SIKSTROM: That's correct. I love fish, to them I'm true but my wife tried to change my point of view. But, the first thing I did after university was I started working in environmental consulting. In fact, one of my first jobs was on Syncrude with Aquatic Environments Limited looking at the stream diversion for the Syncrude project which was the very first development in that area, one was first, GCOS was first. But then, I worked in environmental consulting for about four or five years.

PMB: What firm were you with?

SIKSTROM: I was with Envirocon Limited, Beak Environmental Consultants and Aquatic Environments Limited.

PMB: What was the second one?

SIKSTROM: Beak Environmental. I worked in various oil and gas projects in western Canada. Other types of projects, dams, dam developments, causeway developments in Saskatchewan, but primarily I worked on oil and gas pipeline projects for the Alaska Highway Gas Pipeline. They went from the boarders of Saskatchewan across Alberta into the Yukon. So, I worked on the Alaska Highway Pipeline. But, I got a call from Imperial Oil in '79 and they asked me to come and work on the Norman Wells project as their environmental person. And, I worked on that project until 1985 when the project started full production. So, it was the first northern oil for southern markets in 1985, kind of a landmark, because it came after the Berger Decision 1977 to postpone development up there for ten years. But, Imperial Oil pursued a smaller project called the Norman Wells project and it brought the oil out to Rainbow Lake. So, that was good. And, following that I worked in projects and production operations as an environmental advisor, environmental specialist until 1996 when they offered me to come up to Cold Lake operations as their environmental team leader.

PMB: Now, before we leave this piece of the story, would you mind giving me just a brief history of the Norman Wells project, because it's quite an old project, isn't it?

SIKSTROM: Well, the field is very old. The field is from 1919-1920, when it was drilled by Theodore Link. And, there were four wells until about 1937 and then the expansion occurred a little bit. They put a refinery up there and they called it a Tea Kettle. Then World War II occurred and Canol, the Canadian Northern Oil Line, some people say. The other people say, Canadian-American Northern Oil Line. It was developed to cross the Mackenzie Mountains to the Yukon and to a refinery in Whitehorse and that was a great white elephant for the American government, but they did succeed in putting a four inch pipeline across and today there is the Canadian Heritage Trail, Canol Trail, which is a heritage trail now. Primarily because it marks a historic route and also because, many of the artifacts have been left behind. It's an absolutely beautiful area to cross because it crosses the Mackenzie Mountains. There are many stories about that but...

PMB: The refinery was built during the War, eventually ended up in Alberta, didn't it?

SIKSTROM: Yes, part of the refinery that was built in Whitehorse ended up in the Strathcona Refinery here in Edmonton. The refinery that was built at Norman Wells was dismantled, I can't remember the year, about ten years ago and ultimately the site was restored, because we did have a refinery in Norman Wells as well. So, now it's the production center of the central processing facility and the nearly thousand foot long pipeline to...

PMB: And, the project that you were involved in in the 1980s was to build a pipeline from that field up in the far north down to Alberta?

SIKSTROM: Not just a pipeline, it was a two phase project. One was the pipeline, primarily led by Interprovincial Pipeline Limited now Enbridge. But, the other was to expand the oil field production by drilling I think it was 200 wells to increase production to about 25,000 barrels per day from 3,000 barrels per day. And, that involved developing a central processing facility. And building, uniquely,

six islands in the river out of rock, sand and core, the sand core surrounded by a rock horseshoe and there are six of them in the Mackenzie River, and they are production platforms for drilling and for production because the pipelines come under the river. So, obviously it was a very... it's still unique in the world as far as I know and no one has ever done that. There were lots of hydraulic impact concerns about what these islands would do to the river and so far, the modelling has been pretty much spot on in what would happen.

PMB: Now, take us back to that time when you came to Cold Lake.

SIKSTROM: So, I was actually looking to try and get assigned overseas and my preference was a project in Russia called Sakhalin. And, at the time, they were...

PMB: Sakhalin Island...

SIKSTROM: It is in the Far East. So, I was looking for a nomination to go there but that didn't work out and after working in Cold Lake from 1996 to 2004 I was offered a position in Sakhalin Island. And, I went over to Sakhalin for five years, came back and retired after 30 years with Imperial Oil. And now, I've got a cabin or a dacha out here at Murray Lake which I am enjoying a lot; but in those eight years that I worked here at Cold Lake operations...

PMB: That was the period '96 to 2004.

SIKSTROM: 2004. December, 2004. I became interested in this museum that you see around us. I was on the board of directors for oil and gas. I always had an interest in history and I took a greater interest in the Cold Lake operations history when I became involved in this particular museum. And, in 2000, I actually saw that we were losing the knowledge of some of the people that were here from 1960s and I actually proposed to the school and to the Petroleum History Society that we should establish a Phase 3 to look at oil sands history, be it that the first couple phases focused on other production methods and not the oil sands. And, especially the oil sands in the in-situ side of things, which is what Cold Lake is. It is in-situ oil production. It is not the mining that you see in the Fort McMurray area, although you are starting to see steam-assisted-gravity-drainage in the Fort McMurray area now. It's not all mining. But, certainly, there's a large history established here. It's one of the first production developments for in-situ oil sands and it happened right here in Cold Lake.

PMB: That's right, I'd completely forgotten that. You were the person who kept nagging the Petroleum History Society to do an Oil Sands Oral History Project. And, it came up at three or four board meetings. And, then I said, "Oh, that's an awfully good idea. Maybe I'll take that on as my little contribution." That was about four years ago.

SIKSTROM: Yeah, yeah.

PMB: I'd forgotten that. That's right, you were the guy. Thank you.

SIKSTROM: Well, I also worked David Finch because I sought help and advice from David. I said, "David, I need to understand how to do oral history. There's an opportunity here to work with the school. There's a school partnership between Imperial Oil and the school." Chris Holoboff was instrumental at that time. But, the barrier was the money. At the time I proposed it in 2000, because I'd put out, okay, here's the methodology, here's my presentation but here's how much money it costs. And, you would have to get support from Imperial Oil for some funds; the school doesn't have very much money. It just didn't happen and then I left and this museum got constructed and with the help of some very good people. It's still under development but it is here and it's a start.

PMB: But then, in the end when we were raising money for the Oil Sands Oral History Project, I don't know what the exact number is but I think we raised close to $200,000.00.

SIKSTROM: And, Imperial Oil contributed $15,000.00.

PMB: Imperial contributed $30,000.00.

SIKSTROM: $30,000.00.

PMB: $15,000.00 over each of two years, absolutely it did.

SIKSTROM: Yeah.

PMB: The only companies that contributed that much money were... well, Suncor contributed more $45,000.00 and Syncrude contributed the same amount. So, you were the three top contributors. Plus, the Province of Alberta contributed about $30,000.00 or $40,000.00 I think.

SIKSTROM: Well, Cold Lake operations are the major producer here. There are other, smaller developments, still significant. But, Cold Lake being first I think Imperial's proud of that and certainly they've got a long-standing interest in establishing things with a community like this museum or like the Energy Centre.

PMB: So, that kind of brings us up to date on how the Oil Sands Oral History Project really began. So, congratulations and thanks again. But, now for the period that you were working in Cold Lake, can you tell me about what your work was? You're still an environmentalist?

SIKSTROM: So, I led a small environmental team who were organized into disciplines and to plant areas, because we had several plants. We have air, land, water. We have socio-economic which was done by somebody else, but it kind of ties to the environment as well. And, through working here for eight years I learned a lot about the operation through discussing things with people. I also, I was an environmental auditor with the company for two and a half years prior to coming to Cold Lake. And, I was involved in environmental audits in Cold Lake. So, that gives you a little bit of historical perspective because you've got to go back and pull out on information on this oil spill or that incident. Or, this site is cleared, I think there was a discussion about the May Ethyl plants, the site was cleared in such and such a year, what are you doing to do about, how are you going to clean it

up, what's the condition of the soil. So, you do learn a little bit about the historical background just through doing that sort of environmental work and also, my interest in knowing what's happened. I was still fortunate to work with people who had worked here in the 60s and 70s who could tell amusing stories about things that had happened. Then, not just amusing stories but important stories about some of the development as well, but they are better to tell their own story than I am because I've got it second hand.

PMB: Can you tell us a little bit about the development of environmentalism and environmental audits and environmental regulation, internal as well as external? And, how it affected the oil industry in general, oil sands in particular?

SIKSTROM: My first experience with regulations was federal. Primarily federal, because it involved the Normal Wells project in the Northwest Territories. Thereafter, I was involved with smaller projects in Alberta with Imperial that involved the Energy Resources Conservation Board and Alberta Environment in various guises. And, I guess the general trend was for increasing regulation. I think now the trend now is try to streamline the regulations because, for Norman Wells I had 370 approvals I obtained personally for that project.

PMB: For Norman Wells, you personally had to obtain how many approvals?

SIKSTROM: I was involved in about 370 approvals.

PMB: 370.

SIKSTROM: Mm-hm. So, that's a challenge. And, with Alberta Environment some of the projects I worked with and with the Energy Resources Conservation Board were a similar challenge. But, they were smaller projects until I came to Cold Lake operations and then we encountered a couple phased expansions which provided an insight into the intervener process. The Energy Resources Conservation Board, public hearings, having to work with the interveners, the development of other tools to deal with environmental issues and concerns. So, for example, the Energy Resources and Conservation Board went into something called Synergy. The idea being that, if you cooperate with the landholders and the people with interest, you can work out a lot of these things in advance and we did that. Part of the...

PMB: Give me an example of how that would work?

SIKSTROM: An example of how that would work is we went through a project here called the Mahkeses.

PMB: What was it called?

SIKSTROM: Mahkeses and this stood for Little Fox and this was a major expansion of Cold Lake operations. In fact, well that and the other expansion is one of the reasons I couldn't go until I'd been here eight, nine years. But anyway, the expansion caused considerable concern by some

citizens. And, the Synergy process involved us in trying to work out those concerns with them. And, an organization called the Murray Lake Land Air and Watershed Society was started by Dan Sibbard. We had other interveners. We had the Stop and Tell a Politician societies led by Sally Alston. We had individual interveners and we had to work with them. And through the public hearing process, one of the recommendations that occurred is that there should be a mechanism to hear those concerns and deal with them. And, it caused the Lake Land Community Association, LLICA to be formed. That was one of the recommendations we as Imperial Oil had to adhere to, to begin on the Mahkeses project, the expansion. It was established and it gave... various committees were set up, committees to deal with new development, committees to deal with problems and they're still active. They've got their offices in Bonnyville. We were represented, Imperial Oil was and other companies were too, CNRL, Alberta Energy Company and people who had interests, like the Stop and Tell a Politician Society or the Royal? Rob? Parmaroskis? And, it was a forum for them to work it out. And, the ERCB supported it, they attended the meetings, they encouraged you to synergize to work things out. So, I think that's an example of the evolution where you can work together to try and...

PMB: And, this compares to the old model of going to a hearing and the members of board hear people's complaints and the companies' responses and they ultimately make a judgement. And, they are effectively saying, we want to do as little of that as possible?

SIKSTROM: Yeah.

PMB: You guys work it out?

SIKSTROM: We want to avoid controversies where they are not necessary. There are maybe things that are no workable. But, then you can take them to the regulator and they can arbitrate it. Another example of regulation is, and what led to mediation, was the environmental protection order for Imperial Order. It's one of the first environmental protection orders issued by Alberta Environment for a large lease of oily material to the ground from the blowout that we had.

PMB: This was the Pad T?

SIKSTROM: T-Pad.

PMB: Or, T-Pad; T-Pad blowout.

SIKSTROM: So, it's another example where we had this blowout, we had obviously a problem to deal with. We dealt with it. We took many, many years to clean it up. But, there were I think seven orders that we had to meet. And, we worked to do that. In one case, we had to go to mediation with one of the parties involved and it involved a mediator from Alberta, representing Alberta, not representing Alberta but representing mediation but she was from the University of Alberta. I think, Dr. Ann Naeth. But, it was another mechanism set up in the government. This seems to be an issue that can't be resolved so let's bring in additional resource and see if we can fix that up. And, one party were able to do that, the other party we agreed to disagree and a decision was made by the mediator...

PMB: And, the mediator was the ERCB?

SIKSTROM: No, it's an independent mediator based out of the University of Alberta.

PMB: Oh, this is the lady's name you gave me?

SIKSTROM: Yeah, Dr. Ann Naeth. I think they were independent. It's a board I believe, mediation board. I can't remember the exact name. But, it's just another example of where you evolve to a point where you can work things out or you cannot but there's a mechanism to resolve it, right. Not everybody's happy if you get to the point where that person makes the decision for you, but if you work it out and agree amongst yourselves than you save yourselves a lot of trouble. And, you might save an intervention into a public hearing, right.

PMB: I'm trying to understand where that's going to take us. Is this still evolving? Or, have a lot of those issues, or those solutions been put into effect for a long time?

SIKSTROM: Well, I kind of lost track in the last few years of what's happened to the ERCB, the Synergy Initiative.

PMB: Because, you were out of the country?

SIKSTROM: That's right. I mean, they had workshops, there were seminars, there were coaches that would bring people together and you would try and learn from these experiences and get trained, take some training to mediate and communicate and cooperate.

PMB: Now, can you tell me a little bit more about the T-Pad episode? I asked Mark Ruschkowsky about it yesterday and he told me a little bit about what happened. But, he said that in the end they had to create a report. I think he said took up 17 full binders and submit it to the ERCB as an explanation of what had happened, what they learned from it, how they were going to avoid that kind of problem.

SIKSTROM: Yeah. So, what I will say is that it had all the regulatory affects specifically on Cold Lake operations that it had on many other operators. But, I will also say that it had on effect on other operators in that they had to take best practices that we established after the event, into their own operation so there wouldn't be a similar event elsewhere. We copy technologies, we learn from each other and the event actually occurred before I got here. But, I was involved in resolving the environmental protection order and in cleaning up through reclamation the actual even which was a large volume of clay lowly contaminated with hydro-carbons up to ten percent, in some cases, but in a big area.

The effect that it had on Cold Lake operation was through the ERCB because they had jurisdiction over the underground things, the pipe, the steel, the valve connections, the pressures that you operate under; these very technical matters which Mark Ruschkowsky was better able to speak to you than I was because I was involved with the environmental. But, that was the ERCB's evolution

because any failure we had after that could potentially be one of those, that was the opinion of the ERCB and we had to, through research and extensive efforts, find new ways to join the underground pipe. I don't know if Mark talked about this, but the strain of turning it cyclically from 300 degrees centigrade to 80 degrees centigrade causes a lengthening and the threading between the pipes is one of the weak points. It's also sulphur issues, very technical, research spent a long, long time...

PMB: He said there was a lot of caustic and...

SIKSTROM: Cracking; cost of cracking and things like that. So, it caused the ERCB to look at that with very fine eyes. Alberta Environment looked at our effects on the environment with very fine eyes because we contaminated some groundwater. As the fluid came up through the formations, it went into some of the layer-cake groundwater formations, the top of them, pardon me. So, we had to enter into reclamation.

PMB: So, potentially this could affect people's drinking water?

SIKSTROM: If add enough years and if they were close enough, yes. So, we had major remediation programs with Alberta Environment. And, we worked very closely with the contaminated sites branch. And, again, it caused more regulation, more over-sights and a deeper appreciation for what we do because we had to establish remediation programs where we pumped water out that was contaminated and did for years and years in some cases. But ultimately, you want to be successful. In many cases we were and others we're probably still doing some work. But...

PMB: One of the things that I talked about with Mark yesterday was the idea of how best practices were adopted and just became part of the DNA of the corporate culture at Imperial. And, in his case, he was talking specifically about a construction and maintenance best practices. I wonder whether you could talk about how environmental best practices developed.

SIKSTROM: We didn't proceed in the same way.

PMB: I'm sorry, did or did not?

SIKSTROM: Did not, because safety is number one, environment is number two and we had to ensure the safety of staff and employee through best practices, I guess. We also had something called best practices, I guess. We also had something called operations technical, technical excellence project, which again examined our over six month effort. It examined what we're doing from a technical perspective and saying, "Well, can we do it better? What have done wrong in the past? Can we learn from that? And then, can we establish a best practice?" I think it was a world-wide push for Exxon as well. A lot of these things had been exported around the world as the best way to drill groundwater well, or the best way to drill a horizontal well, or the best way to remediate a well. These things happened, what I just said they are kind of environmental but they're not in their own little environmental booklet. We don't have... You can nominate an environmental best practice and it can get into that book but it's not on its own, by itself as an environmental book.

PMB: Well, let me ask you this. What about the protection of wildlife habitat? Do you not have any guidelines about protection of habitat?

SIKSTROM: Yeah. And, I guess... in fact, your point about regulation. The key tools for regulation here is through licencing, Alberta Environment Licencing and the ERCB scheme approval. Terms and conditions are attached to those approvals. Again, the ERCB is primarily, you know, the technical aspects. Alberta Environment is primarily environmental issues. And in those terms and conditions, you can have terms and conditions related to how high the pipe has to be so you can protect deer and moose that have to cross under it. So, they don't have to cross over them. You can have terms and conditions that relate to Canada's toads, because toads are considered to be an indicator species and perhaps endangered. Wild flowers and every aspect of the environment that you can think of is pretty much covered in these Alberta Environment Licences. And, I obtain several renewals of Alberta Environment licences while I was here. And, it was intensive effort because you have to work with the regulator.

You have to agree on the usefulness of the mediation or the amelioration measure. The mitigation measure, is it going to be effective, is going to be cost effective. Mitigation is to make things less worse, amelioration is to make things better. So, that's the difference in the terms. We commonly use those two terms. So, what would be an example, amelioration, you might take a pond that was excavated to take clay for a reclamation effort. And, you may make it into a duck pond. You may put artificial nesting boxes in it to increase duck production. That would be, an example of amelioration. Mitigation is more focused on preventing things from happening.

PMB: Less CO2 emissions; reduce CO2 and things. I think it's time for us to continue this in a little bit. Thank you very much.

SIKSTROM: Okay.

**[END OF 1ST RECORDING]**

**[START OF 2ND RECORDING]**

PMB: This is the second part of my interview with Cal Sikstrom. And, when we left this conversation Cal, we were talking about the use of a licence to operate as essentially best practice. So, you're not getting any... much leeway on what you can do. For example, in habitat protection. Would you continue that discussion because I think you were getting to important stuff there.

SIKSTROM: Yeah, I was talking about terms and conditions which are commonly applied to some of these approvals and they can lead to mitigation actions. They can lead to remediation, things that you do to make the environment better. They can also lead to prohibitive actions, just things that you are not allowed to do. Penalties for not obeying the terms and conditions which say, this is the water quality that you need to have in your groundwater before you have to do a remediation effort. And, the terms and conditions are usually quite extensive. They were when I was here renewing the licencing. I expect they still are. They involve all facets of the environment from either your air,

maybe, you mentioned effluents earlier on. But, the air emissions, yes there limits on particulates of SO2 and NOX and all of that. But, backing all this up is the monitoring that you do to ensure that you're meeting the standards that are required of you for air, land, water. So, without your monitoring and your declarations to the government on a regular basis through your reporting, you don't have the complete system. But, the monitoring completes that system because you are telling the public and the government, how are you doing? And, I mentioned LICA previously, maybe an example of that is during the process of the development, of the Lakeland Industry Community Association, they set up the monitoring program to assure the air quality was of such and such a nature. So, they've set up these monitoring stations at various locations and now you can sign in on the website and see what the sulphur dioxide level is at any particular station at any time. The wind direction, the hydrogen sulphide...

PMB: Who established these monitoring sites?

SIKSTROM: Well, Imperial Oil established them in cooperation with the Lakeland Industry and Community Association. And, it's a regional monitoring system to help assure the public and to forewarn the public if something happens. If you had some unfortunate release, you would be able to inform or warn the public but that's not happened. But, it's through the monitoring that you gain reassurance that things are being done properly. Likewise with groundwater, the business of moving things around in Cold Lake is often called a water moving project, not an oil project, right.

PMB: Called a what?

SIKSTROM: Water moving project because we used to use a lot more water than we do now, but it gets like 3.3 barrels of water per barrel of oil per day now; which was a big improvement over the decades since we heard about the Leming Pilot and the other pilots.

PMB: And, how much water was it per barrel at Leming?

SIKSTROM: Oh, I think it was ten, something like ten. We heard about some recycling efforts that were done in the 70s with the Leming plant. Those were all experiments to try and improve the process. I mentioned the groundwater monitoring. It's a big business here because I think we've probably got, in Cold Lake, one of the largest groundwater networks in the world. It's a regional groundwater monitor network. When I left there were about 500 groundwater wells and there's more than that now since I came back. It's a very large monitoring effort to keep track of all the data and to assess and to analyze it. But, it's been done and it's been reported to Alberta Environment and something that's happening to the groundwater our monitoring program will tell us. And, if something bad is happening to the groundwater, such as an oil spill or a contamination situation due to a pipeline leak or something, then you have the ability to detect it and take early action to correct the problem.

I'll just say something here about, something that came out of our environmental protection order. Because, we put steam into the ground and because the pipes go through groundwater lenses there's the potential for local heating of the groundwater from the pipes. Well, this became a big issue in the

Mahkeses expansion project because... And, this is an example of I think a successful monitoring effort. We discovered arsenic in our regional groundwater monitoring system. And, in some of those wells, those are off-site. Those are public resident's wells which are located at different places not on our operation but away from it. Through our monitoring program we identified arsenic concentrations that exceeded world health standards at the time. Since then, they've been dropped down to ten parts per billion.

PMB: Now, were these arsenic... was it there because of Cold Lake operations?

SIKSTROM: Well, this is the point of the monitoring is that through investigation of the occurrence of arsenic in the area. Now, this was an extensive investigation, perhaps two years it took us. I was a [?] through the report to the government with Comex Environmental Consulting and John Pinel, who was the primary researcher. And of course, we had the help of our research department to investigate the occurrence of arsenic and could it be due to this presence of the heat in the system. I think now, you will see it as a standard term and condition of oil sands approvals, in-situ or otherwise. That you have to measure arsenic and assess what's the potential for arsenic to be mobilized, by the heat from your steam operation and the movement of this arsenic through ground water to whatever receptors there are.

PMB: So, in other words, it wasn't that you were using arsenic in any way as part of the process.

SIKSTROM: No.

PMB: But, the heat was mobilizing arsenic that was already in the ground and it was concentrating in the water?

SIKSTROM: And, it was moving it off and they've got one of the worlds, I'd say, most extensive field experiments going on right now. That's been going on for years. Where they've taken pads, a virgin pad that has not been steamed, a pad that has been steamed and they're examining the movement of water away from these pads and the temperature conditions. And, the research department are doing this and they would be better able to comment on this. The basic conclusion after the initial results is that, yes arsenic is mobilized but it reduces very quickly as it moves away from the well. It also reabsorbs once the temperature goes back to normal. So, that's some reassurance that this isn't a serious environmental effect on the public.

But, the second part of the story is, that I mentioned, that we found arsenic concentrations above guidelines in some resident's wells. And, because they were above world health standards and guidelines for Canada which were equivalent to them we informed the residents and then a serious investigation occurred through Alberta Environment. And, through others' research departments and that, to determine the cause. And, the conclusion of that was that it was due to natural movement of arsenic from sediments underlying the major groundwater aquifer zones. And, where they over top of shale, you had a greater concentration of arsenic. And that, roughly ten percent of the groundwater wells located outside of the area had nothing to do with our operation, had arsenic

above guidelines. Which, obviously, affects the public and there were concerns because some people were drinking the water for their entire lifetimes, right.

PMB: So, it had nothing to do with Imperial?

SIKSTROM: Yeah, that's right.

PMB: This monitoring system basically made life better or safer for people that were unknowingly affected.

SIKSTROM: Well, once the government became aware of the health standards, people had to be informed, they had to be investigated as to why it was occurring. People could take actions to filter their water or not, remove the arsenic through certain means. Or, not drink it. So, they had a choice. And, by the way, Alberta Environment started studying this area for arsenic. And, this isn't the only location where naturally occurring arsenic is occurring. Thermal regions on the West Coast where you've got volcanic action have had this, so the Shell Peninsula. The health authorities there took very distinct action to protect the folks there from the arsenic. It's marginally higher than the world health standard, but the health standard has been moved to ten parts per billion because of various investigations of the effects of this in Bhopal, India and elsewhere. And, it's there in Bhopal for different reasons entirely than here. But, it's one example where monitoring actually resulted in identification of a real issue.

And, if the monitoring hadn't been there we wouldn't have caught onto it until much later, I think. And, we did the right thing. The public was notified. The government did the right thing by taking action. They took a lot of criticism for slow action, if you look at Hansard and some of the Alberta Government records you will see that they took some criticism for their actions. But, they eventually did. But, it's an example of monitoring. They succeeded. And, there are many examples, groundwater remediation. And, the lesser known examples are things that we do for birds, mammals and rare plants. And, I mentioned the toads previously. Some people chuckle when we say that we're monitoring Canada toads, but no, it's a real ecological issue. It's a real concern and we do it here. There's a very extensive monitoring program.

PMB: You said and you kind of glossed over it, but I thought it was a really neat thing. You talked about a model of, okay here you have a licence and you have the requirements within that licence. But, that's irrelevant unless you have a monitoring system which makes information simultaneously available to the government and to anyone in the public who wants to... or is interested and concerned. Can you talk a little bit more about that model?

SIKSTROM: Well, I think it's a model of the efficiency, because the government could do light monitoring for us and they could force it upon us. I think in some jurisdictions in the world the government takes it upon themselves to come on but they've made us responsible. And, as the person responsible it's put upon us to bear the costs of doing that monitoring. And, I'm not going to say how much it costs to you now for Imperial Oil. But, it's substantial. It's substantial to monitor these facets of the environment. And, I just think it's the right model. You make... we're the people

getting the oil out of the ground. We're the people responsible for whatever happens when we get it out and we are the ones that should be monitoring it, with the oversight of the government who get the results that we provide. And, that seems like a good model.

PMB: Now, how often does the company need to report this information? Is it daily? Is it weekly? Is it monthly? If there is an infraction, what do they need to do?

SIKSTROM: Reporting is variable. In some cases it is annual reporting and in some cases it is semi-annual. And, in some cases it is quarterly. I can't recall off-hand any monthly examples. But, yes if there are standards that are not being met but you're in your licenced you could be fined or charged for them. The most serious penalty would be shut-down of your facilities if there was an environmental protection order by the ministry who was convinced that there was imminent danger to the public or to the environment. He could make that decision. But, that's a rare decision in Alberta for that sort of thing to happen.

PMB: Now, I know that at Syncrude and the other oil sands project that were in Fort McMurray. If there is an infraction of the rules or the licence, they have to report that immediately to the province. Same issue here?

SIKSTROM: It's a very interesting question. It's called self-disclosure of non-compliance. And, Imperial Oil's policy when I was here was, we will disclose if we've been... if they've missed a limit, we will disclose it. Also, it applies to oil spills as well. If you do not declare that there has been an oil spill or for the potential for a spill then that's potentially an offense. You can be charged for that offense. But, if you report it and you report the potential of a spill, then you are okay. Because, it's not illegal to have an accident, it's illegal to avoid reporting it or to ignore the event and to delay reporting. So, the government actually says in the case of spill reporting is it is immediate. Then they define immediate as something as soon as reasonably possible. That's the old definition I saw and I think it still stands.

So, it's an interesting question because there are other places in the world where self-disclosure is not... that's the government's job. Why would we tell the government that we've exceeded these limits when we're handing them the report. Let's hand them the report, yes there's data in there that in case we missed a refinery effluent limit, but it's their job to find this out. That's not what we do here at Imperial Oil. We have a policy for self-disclosure.

PMB: Now, is that a company, I'll say for example. A company X might say, "Well, we don't self-disclose. We'll just give them a report."

SIKSTROM: Yes. I haven't seen a spill report and guidelines... Imperial Oil has a report or they had a report that said, "These are our spill reporting guidelines." It's actually based on Exxon's guidelines. And, it's very specific, certain limits if they're missed this is the action you take and this is who you report it to. So, you have that here. And, there are other places where I don't think they have it. Now, I don't know who they are but... Well, I've seen it overseas where this has been a different issue where it has been thought to be the government's responsibility.

PMB: Well, on the train of water and air emissions and effluents and those kinds of things, it can be pretty easily done with just some measuring tools. You've got instruments which will say, this is the volume of this contaminate in this water and the air or however you do that. Groundwater measurement...

SIKSTROM: Well, you say that it can be done quite easily with measuring tools but some of these tools are quite expensive. If you take an air monitoring trailer and say you have four of them on-site, they used to be in the order of a hundred thousand a trailer, something like that. So, when you add all of that up the infrastructure of the groundwater wells. Say, I said 500 groundwater monitoring wells. You add up the trailers. You add up the monitoring efforts that are done by indepenedent consultants to look at the toads, to look at the moose, to look at the rare plants, to look at the deer, the ducks. It's a substantial cost. Easily done, easy tools, I'd say the tools are there but it's a concerted effort.

PMB: So, I'm assuming that you're doing the correct amount. But, I think a friend of mine and I won't tell you his name. I think he told me that Imperial's annual budget for this kind of thing is about a hundred million dollars.

SIKSTROM: Over Imperial Oil Limited.

PMB: Imperial Oil Limited, across the country, yeah.

SIKSTROM: Mm-hmm. Yeah.

PMB: So, it's not a small amount of money. It's a big hunk of cash. But, what I was actually getting at is that you get away from the tools, the metres that measure the emissions and so on. I was wondering about the toad measurement and monitoring at that level, the level of wildlife. The kinds of birds and nesting, the changes in nesting behaviour and migration patterns, how do you do that? The fish, the fish in Cold Lake, how do you measure those kinds of things?

SIKSTROM: As I'm recalling the last place I had to deal with here. Part of the monitoring as you get a new licence is you have a schedule. And, we built the schedule to... we've got some computer tools to try and keep us on schedule and to try and report the information to a data system. But, for the first few years there are variable schedules. So, for example, they might say, "You will monitor reclamation on newly disturbed areas, every year for the first three years and then thereafter, it will be five years." So, they can alter the schedule based on the results that you get early on and you may get relief. Same thing with toads, once every five years you'll monitor the toads and based on the results, the government may say, "Well, that's sufficient a frequency, but maybe we've seen a decline in toads, maybe we need to decrease the frequency."

And, what you do is you have your biologists, I'm a biologist. You go out and you do these surveys to meet the requirement. It might be, "How many toads are in this particular area?" And, reclamation is creating plots and counting the density of vegetation. If it's crossing pipelines with the deer and moose, they do track surveys in the winter. And, they go out and look to see where there

are moose crossing, are they successful in crossing and based on that, you could modify the crossing areas on the pipeline if there is an undue interference on the animals' movements. Because, these pipelines here are largely above ground, so they're difficult to walk across and some of them may be hot. Owl monitoring, which is... I know you like birds. You do those surveys in March because that's when they're nesting. And, biologists will do transects and then they will triangulate to the sounds of the owls based on the responses to the recorded sounds that they make. So, these are all monitoring techniques that all biologists use in environmental monitoring programs. Whether it be the plants, birds, fish, moose and deer.

PMB: Anyway, it is to some extent these exact same rules apply to whatever business you are conducting in Alberta. So, if you're a mine, if you're a conventional oil field, if you're a gas field, whatever. The rules are essentially or the requirements are the same for the same behaviour. But, with oil sands projects, I'm guessing that they're more stringent basically because of the size and the impact of the projects, correct?

SIKSTROM: Well, when you say rules.

PMB: Or, the requirements.

SIKSTROM: The requirements... The rules may be the same across Alberta for SO2 and for the protection of certain facets of the environment. But, they've been modified differently in the licences based on the discretion of biologists and scientists who are working with that licence. And, knowing the history of the person or the group that are re...

PMB: ...with Alberta Environment.

SIKSTROM: And, the ERCB as well. They have some discretion to increase the frequency or decrease the frequency based on the performance of the company that they're working with, right. So, I've seen that, I've seen discretion used in that and it becomes a... In many cases, there are tremendous people at Alberta Environment that you may work with on... I'm trying to think of an example. We had something called, pre-disturbance assessments. In other words, before you can go and clear this area, you have to go in and you have to assess the quality of that area before you go in and clear it. And, the reason is, you're required at the end of the day to put that area back to an equivalent land condition. If you don't know what the condition it was in when you started, then 20 years from now or 10 years from now when you go to reclaim it and ask permission from the government to take it off the books, you have to prove that it met the condition of its original state.

They can write terms and conditions onto your approval of what is required to disturb that area, measure it, take photographs of it, upside, backwards from the area. They can put in standards as to how much topsoil you remove and all of that so that you can get this thing reclaimed. You can work with the government and we did to develop guidelines that are applied. Or, Bob and I worked with the government, with a particular person over there and we established the first set of guidelines with pre-disturbance assessment. Primarily based on Cold Lake, but now applied across Alberta. They have to be reasonable. They have to meet construction standards. You can't tell the grader to

clear soil to a depth of two centimetres that the grader is incapable of distinguishing that from that. So, they have to be reasonable terms and conditions and my learning was that you can work with the government to develop reasonable terms and conditions if you've got the patience and the willingness to do that. So, we've done that in the past and I think people are still continuing to do it. There was someone who replaced me as environmental team leader. I've only known her briefly but I think she's probably doing a good job and doing the same thing that I was doing.

PMB: I had a discussion with you for something I was doing a few weeks ago, with a number of the old PhD's in ecology or some related field. And, it was about this topic. The topic of reclamation and one of the ideas that we were discussing was that it's going to take hundreds of years, maybe to restore the mines around Fort McMurray. But, one way that you can off-set that environmental damage is by increasing the extent of the Boreal Forest in northwestern Alberta. So, in Shell's case for example, they have bought some land which is right on the Boreal Forest, it was used for farming. They bought it from an old couple who were retiring and they basically they've turned it over to the Alberta, I forget the name of the environmental trust I think it's called; Ecological Trust, and they are returning it to forest. They are saying this is a partial off-set to the damage that their activity is doing around Fort McMurray.

SIKSTROM: Kind of the set-aside concept.

PMB: Well, you're thinking about that right?

SIKSTROM: Well, that in the case of the northern oil sands, the mining, I think that waiting a hundred years to try and off-set your reclamation efforts is maybe a little too long. I think we have a better situation here in the in-situ developments because you can reclaim the surfaces much more quickly. You can store top-soil and put it back over the area once you...

PMB: Sorry, one of the arguments that I heard from one of these different people, the extreme was saying, "Look, you can start to..." But, the Shell guy is saying, "Look, we started to restore the mine almost immediately as soon as we mined it out and we start to restore it." But, the most extreme of these environmentalists, "Yes, that's true but you don't have true Boreal Forest for at least decades and maybe over a hundred years." So, that was the argument. It was not that we're going to wait for a hundred years to start to reclaim.

SIKSTROM: Well, this argument comes forward from various sides of what equivalent land capability is. Is it equivalent to supporting vegetation, or is it equivalent of supporting the exact vegetation that was there previously and that is going to continue to be a debate. In the case here, in-situ in the Cold Lake area, the same concept of progressive reclamation was put into place. So, when I left here we were over 55% of the areas that we had disturbed were under reclamation. Now, the criticism from other people as well, they haven't been fully reclaimed and they are not turned back to the Alberta Government and that was true. But, we fully expect with reclamation going on in those areas that they will be turned back. The spruce trees may only be this big this year, but ten years from now they'll be much, much bigger and things look good for them. So, 55% I think that's

pretty good. If you disturb ten acres and you start reclamation of ten acres in the same year, then you're on the right track. You may not satisfy every group that you're doing it fast enough, but I'm not sure...

PMB: So, this idea of doing the off-sets is a good idea?

SIKSTROM: I think so.

PMB: Which is what you're suggesting?

SIKSTROM: Yeah.

PMB: So, continuing this. The notion of having land off-sets in the Boreal Forest is not a bad one at all.

SIKSTROM: That's right and I think I gave a mini-example of that earlier on when I said, you have a Borrow Pit and you've taken the clay out. It's a process of taking clay or maybe gravel to use in other construction efforts, maybe a berm, maybe a roadway. But, it's common practice to remove soil from certain areas and then we have the question of, "Do you put it back to what it was? Or, do you make into something different?" And, this is where you take the term amelioration because with the permission of Alberta Environment and perhaps some others, you can turn it back to something different. And, it's an off-set. You've created a duck pond in the Boreal Forest where social forces are saying, "We need more ducks."

Ducks Unlimited are very involved in trying to protect the duck population in the Boreal Forest. They say it's one of the greatest duck factories in North America. People consider the prairies their duck factory, but in reality a lot of the Boreal Forest is duck heaven. So, if you have some concern or issue for the public policy point of view, you as the government can decide it's more important instead of making this a pine, then a spruce, then a fir forest, let's make this into a duck pond. And, that's perfectly fine as long as society knows that and it has some input into that policy and understands it.

PMB: One of the issues, of course, in the mineable oil sands is that when you extract the bitumen...

SIKSTROM: You're bringing up duck ponds, aren't you?

PMB: You have more sand. The sand that you have left is great than the amount of ore that you took out of the mine. So, I think the sand expands by 1.6%.

SIKSTROM: It's called bulking.

PMB: 1/6th times... it's called what?

SIKSTROM: Bulking.

PMB: So, it bulks up. So, then the problem becomes when you're reclaiming that mine. You're actually putting more material into it, in volume terms, than you took out. And so, if for example, that mine part of it was at a true wetland, you can't really... or can you really restore that wetland? The best you could probably do, according to these interviews that I've had, the best you can probably do is make a pond, a duck pond or something there. You can't return them to the kind of wetland that it originally was. You're more likely to have hills because you have more material.

SIKSTROM: Well, these are realities that public policy makers and Alberta Environment biologists and ERCB engineers need to work out and the new policy debate will help solve that. I mean there are examples; I'll give you a different one than Syncrude. I worked on the Kananaskis Golf Course. There's a stream. And, the issue there was they're going to make a golf course and there was a stream that flows to the Kananaskis River and it had a spawning population of Brook Trout. Now, the golf course is going to cause a re-routing of that stream, a diversion. And, what are you going to do about the stream and the Brook Trout. Well, the policy makers can say, "First of all, Brook Trout weren't natural to the Kananaskis River, they were introduced. So, they were an introduced species." So, on that side of the ledger you say, "Well, maybe it's not such a big deal." If they are Dolly Varden not Brook Trout you might have a bigger concern about it.

So, there's two species that you may have a different solution depending on what your policies are. If you don't like invasive species, you want to get rid of all the brown trout from the Bow River they might have a different policy. And, in the case of the Kananaskis Golf Course, I don't know what the reclamation plan is but I doubt that it's going to be to restore the stream of the Brook Trout spawning site. The Syncrude site, which I was on in 1975, the stream diversion that went right through the site, they'll probably never restore that stream but you'll have some other sort of equivalent land capability. And, that's where the debate comes in. Is it equivalent or isn't it. Perhaps, if you're a First Nations, this will never be acceptable. Perhaps, for a particular environmental group it will never be acceptable. They need a public policy debate to say what is acceptable on that. And, that's what's going on, I think.

PMB: These are policies that the public can be involved in by this model that you're talking about, because they know about the emissions and they know about how it... because of public disclosure they know about how many Canada toads are alive and so on. They can enter into public hearings form the board or the ERCB or Alberta Environment. And, they can actually participate in those discussions.

SIKSTROM: There's another forum as well. And, I'm not sure where this issue is right now because it was being reviewed as integrated land use planning. And, in certain areas the idea was to break down our planning to look at certain areas like Lakeland. And, integrated means, let's look at all of the facets. Let's look at farming. Let's look at what are the qualities that we want to highlight and give value to in this area. Murray Lake where we're at today, all-terrain vehicles are allowed into the forests that are present. And, that's all through this integrated land with framework. Now, it's taken a lot of criticism from anglers and others as well, for permitting too much. Other people are saying, it's permitting too little. In the Waiparous Creek area, that's an area used heavily by 4x4 vehicles. It

was set aside for that purpose because the government sees that there's a need to have an outlet for this activity but in certain places it should not be allowed because of its... If you were in the sand hills, you would not allow it in the sand hills. I wouldn't from a biologist's point of view. But, that all has to be taken into account. And, one of the other frameworks is this integrated land use planning, which has and has not worked very well. I've read some recent criticism of it. I haven't followed the issue too closely in the last little while. But, it's another mechanism. I talked about synergy. Integrated the land use plan is another mechanism where you can balance the needs and the desires of the various users in a particular area. It's happened here. They've rewritten plans in the past, they'll rewrite them in the future. Based on that rewriting, you'll see changes of status quo.

PMB: Question, is there anything else that we want to talk about in terms of oil sands and the environment and regulation and the model that you've just described?

SIKSTROM: I think the other aspect would be that oil sands are not a single company activity. That there are multiple companies, Cold Lake operations which we've emphasised here was one of the pioneer companies but there have been others. Some forgotten, some still remembered. I think the World Energy Company is on the board over here. I didn't hear about World Energy Company until I came here and I saw its faint outline on a building in Bonnyville. Where they used to have the sign World Energy Company, I said, "When were they here?"

PMB: Who were they?

SIKSTROM: And, who were they? What did they do? Why did they leave? What did they do when they were here? And, I still don't know the answer to that. So, from a history perspective, I think there's this other aspect. We've got many companies that have morphed into other companies. GCOS became Suncor. We have a project over here it's called Husky. It's now called the Tucker Lake Project. We had Black Rock Ventures. They were purchased and bought out by another company to become a bigger company. So, one of the historic of legacies of a company like Imperial Oil is to break ground and in some cases, encourage other developers. There are people... there's a company in Black Rock who is right on the border of our lease. They're there for a reason. They're there because Imperial Oil helped develop this resource in the 60s and the 70s through to 80s and the 90s and Black Rock came in the 90s, taking advantage of 40 years of history and technology. And, they're using SAGD. Tucker Lake is using SAGD as well. And, now...

PMB: And then, the irony there is that Imperial's experience is that SAGD does not work well in the Cold Lake deposit.

SIKSTROM: Yeah, we chose cyclic steam stimulation and I think primarily because of the faeces in the cores showed that they were clay layers which affected vertical drainage. And, our research scientists' view was our cyclic steam stimulation was the most efficient. Other people have different views.

PMB: Black Rock apparently was happy using SAGD. Maybe it's not efficient or whatever.

SIKSTROM: The researchers will have to tell you that story because you may only get... you may get an increased rate of production for a shorter period of time which amounts to less total production. And, Cold Lake and Imperial Oil has a notoriously long-term vision. Short-term is leading on Exxon, in Imperials wake. They look to the future in a long-term way. So, I think Imperial Oil's legacy is evident here in Cold Lake. Syncrude and some of the pioneers, GCOS in the oil sands area, there legacy is apparent there in all of the activity there. You mentioned JCOS, Japanese Canadian Oil Sands. I think they've been there since the 60s or something or 70s?

PMB: It was certainly the 70s.

SIKSTROM: They've got a very small plant that's operable and they've got bigger plants and a longer-term view.

PMB: What an interesting vision that a Japanese company would come in here, in those days and nobody was really much interested in the oil sands and say, "Well, we're going to make a go of it." And, they did. They have a small project. I think it's called the Hanging Cliff?

SIKSTROM: Hanging Stone.

PMB: Hanging Stone project.

SIKSTROM: And, you know, you mentioned a hundred years. Our life spans are generally shorter than that. Therefore, we get concerned about a hundred years being beyond our lifespan. But, I think with the Normal Wells Oil Field. 1911 was when the Native Karkasee went to the mouth of Bosworth Creek and he pulled an oil sample for Bosworth and Bosworth sent it off to get it analyzed. He sent it to Pennsylvania and he said, "This is light oil." That was in 1911. 2012, at Norman Wells the oil field that developed from that, a hundred years later going on a hundred and one, they're still producing 18,000 barrels a day for Norman Wells. That's over a hundred year period. So, I guess the Bosworth example says that it's not a short-term thing. It doesn't have to be a short-term thing. Sometimes it does, if you think about some of the boom and bust in California and Texas where they came in and some of the formations were ruined; some of the gas reserves were lost so they lost the drive and that's the Energy Resources Conservation Board came into effect here, to try and conserve our resources for the longer term.

You don't want a rapacious company coming in, taking everything away in a short time and not contributing to society or royalties to the government in a major way. So, I think that's the... the longer-term view is sometimes difficult to accept. But, if you're around long enough like you and I, we see oil fields that operate for a hundred years. Syncrude, the oil sands that you see up there, I've already seen since '75 Syncrude come into operation and it's not going anywhere soon. It's still there and will be for many, many, many more years. So, we have time. But, we do need to be diligent in our oversight of what's going on in these operations, same there are the true ones. But, I think the framework, the government framework is there to do that and we are.

PMB: A couple of minutes ago you said an example of Bosworth, and you mentioned an Indian or an aboriginal...

SIKSTROM: Karkasee.

PMB: And this was in nineteen...

SIKSTROM: Eleven.

PMB: Eleven.

SIKSTROM: So, they sent... Bosworth was brought in, here was this Turner Valley thing going on and Bosworth was brought in to examine that but he was also sent up to... J. K. Cornwall, I think was the leader of this... Sent him up to Norman Wells and said, "Hey, go sample that oil. We want a sample." And...

PMB: And, he went up in nineteen... I think he left in 1913 and when he came back the world was at war. The First World War broke out while he was up there.

SIKSTROM: Well, Bosworth? Bosworth from 1914?

PMB: 1914, yeah. He came down I think in October. He went up in, I forget, in the spring and when he came back in September/October the world was at war. What a...

SIKSTROM: Yeah, but he had a creek named after him, Bosworth Creek.

PMB: So, that's got to be worth something.

SIKSTROM: Yeah. Well, it's interesting that he went up there.

PMB: It's an amazing piece of history, absolutely.

SIKSTROM: Yeah.

PMB: Absolutely, it is.

SIKSTROM: I've tried to recreate those oil seeps to see how much oil they collected. How much... Ted Lake went in and he tried to collect and measure how much was coming into the pits so that he could determine how much was going in to the Mackenzie River, because you could see it in the spring and you could see bubbles coming up in the Mackenzie River, of oil at the dock and that. So, how much is it, right? But, what Ted Lake did is he created squares and he put jars over top of them and collected hydrocarbons and came up with a small volume and it's in the order of 300 barrels a day or something. But, we actually did try to measure that and get some idea. But, again, our refinery

effluent in Normal Wells, there comes into your question about what are your limits. There are certain standards there as well. You just have to meet them that is all. Yeah, I'm getting off topic.

PMB: Anything else on this general topic because I'm almost ready to wrap it. I want to hit you with one last question before I go. Anything you want to say?

SIKSTROM: I think I just said it a minute or so ago. I think that we've got the framework. I think that we're always able to improve the framework but it's there to protect us and we as the public need to participate in the various four that available. Whether it is synergy, or integrated planning, it depends on the participation of people like some of our local residents and groups like LICA and the Murray Lake Land and Water Society. They do a great public service.

PMB: So, you've kind of answered the question, I think, that I want to ask you. You've been a professional environmentalist all your working life. You have this scientific background. But, you're also aware of all the environmental concerns that people have. Clearly, the arctic ice sheets are melting. There's just no doubt about that now. That's probably also happening... There are carbon emissions that are going into the atmosphere. They're not getting less, they're getting more and more every year. Something like, I think I've heard that in the last 60 years, 80% of the all the edible fish, in terms of volume, that the seas have been depleted of 80% of the edible fish. And, so on. So, you know all of that stuff much better than I do. Are you optimistic about the world's future?

SIKSTROM: Years ago I read a book called, Environmental Growth Economic... no, Economic Growth Environmental Decay. And, this was many years ago. It was a book that was arguing that if you leave it market forces, you will inevitably get this. And, they gave the example of the whales. Economics drove them to near extinction. And, it wasn't a self-regulating mechanism. The market didn't work. It just...

PMB: It was dumb luck. Oil happened to be discovered before they went extinct.

SIKSTROM: They'd have gone extinct in many cases. And, that's a big danger. You have to watch for that. I don't know exactly how we can deal with that. You mentioned the fish. This is another example with the tune, the blue fin tuna. Unless there is some regulation, which goes above the economics of it, the public have to interfere through government regulation or through a different mechanism, like saving yourself from yourself. And, you just need to have that oversight. I don't know if it has any bearing to deregulations of banks and the terrible economic times that we've had because total deregulation is bad. I think in that you lose control of some of these things that society values so highly. If you just wanted to be rapacious and harvest the Earth as fast as you could or as well as you could and maximize your economic benefit than many of the animals that we value would be gone. And many of the ones that I've talked to you about on Sakhalin Island. Japan continues fishing whales. These are examples where perhaps external interference is necessary. International World Whaling Union, right.

PMB: Well, China's the best example. It is the next world super power. There seems to be very little concern about...especially other people's environments. Burma was a great example. The Chinese...

When we were living there, we went to Burma and the Chines were coming in and they would... well Cambodia, same place. The Chinese would come in and they'd clear-cut the trees and people's villages would be stuck in the middle of a barren forest with all the trees cut down. And, it was the Chinese who were doing that and guess where those trees were going. And, doki trees grow fast there but they don't grow fast enough to... for those people to have a place to really live and hunt and farm anymore. They're environment is destroyed. So, the Chinese is like a classic example, growing at a huge rate and with at least... especially for other people's countries, no concern about the environment.

SIKSTROM: There's the World Health Organization and there are World Standards and they are supposed to be applied around the world. And, my observation is that they're not. And, only the concerted interest of other groups and other governments will force some of those other governments to adhere to those standards. And, some of that applies to companies in the Amazon or some African countries, Chad, etc. Some of the countries try their darnedest to meet those standards but the circumstances of the countries just don't allow it.

PMB: Yeah and there are a lot of countries that don't really care.

SIKSTROM: I think there are some.

PMB: Mostly the western countries do. Enough said. Well, I think we've had a good chat, last word over to you.

SIKSTROM: Thank you very much for using the museum. I think it's a good backdrop. I hope the museum continues to improve and thank you.

PMB: Thank you for your time and thank you for your knowledge.

SIKSTROM: Thank you.

**[END OF INTERVIEW]**