

---

## EDDY ISAACS

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

**Date and place of interview:** July 7, 2011

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

**Name of videographer:**

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

**Consent form signed:** Yes

Initials of Interviewer: PMB

Last name of subject: ISAACS

---

ISAACS: Start again?

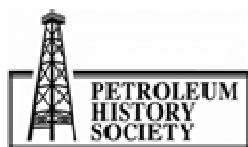
PMB: I'm really sorry; I don't know what went wrong there. Okay, so you came to Alberta in 2000 and...

ISAACS: Actually, 1969.

PMB: Sorry, 1969.

ISAACS: 1969 to do a graduate degree at the University of Alberta in Edmonton and in 1974 I graduated with a Doctorate Degree, and then went to work as a research associate in the chemical engineering department. That's a story in itself, which I won't bore you with the details, but that got me in the engineering realm as opposed to the chemistry realm, so I kind of tried to combine the two. I also spent a year at the Technion, the Israel Institute of Technology, and that was actually in medicinal chemistry, came back to Alberta and started to work with Don Flock, who was a professor of petroleum engineering. I only stayed with him for four months and at that point I started to work at the Alberta Research Council. I was hired by the Alberta Research Council, as I would say one of the first few scientists to work on oil sands and this was because AOSTRA considered the Alberta Research Council as its technology arm and was setting up an oil sands group and I was essentially hired to part of that group.

PMB: What year was that?



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: That was in 1978.

PMB: '78. Now AOSTRA had actually been formed in 1975.

ISAACS: Correct. So I think they were actually in June, '74 but it took a year or two to put things together and they started to, I guess, spread as to who would do what. And AOSTRA made a decision very early on that they themselves would not do any research, they wouldn't have any labs. The preferred lab, at that time, was the Alberta Research Council. They also set up programs at universities for example. So actually, I actually worked on an AOSTRA program at the University of Alberta when I started with Don Flock, that was the four-month – but they also set up a program at the Alberta Research Council which was really an extension of work that the Alberta Research Council had been doing all along in oil sands, some research work that they were doing for companies.

PMB: You know, I'm a bit confused here. At what point did you leave the university and at what point did you actually join Alberta Research Council?

ISAACS: So I left the universities in 1978.

PMB: And at that time you had your PhD?

ISAACS: Yes I had my PhD and about three years of research associate-ship, both at the University of Alberta and at Technion, so I'd done about three years post-Ph.D. before I joined the Alberta Research Council and I joined the...

PMB: So you had very highly technical skills at that time?

ISAACS: Correct.

PMB: The chemical studies that you did were in what?

ISAACS: They were gas processing, so gas sweetening, so they were more in the thermodynamics area and also with Don Flock we worked on a lot of oil and gas interfacial, what we call interfacial phenomena.

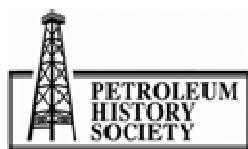
PMB: F-L-O-C-K?

ISAACS: Interfacial?

PMB: Oh no sorry, Don Flock. F-L-O-C-K?

ISAACS: F-L-O-C-K, yes.

PMB: And he was a professor?



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: He was a very famous professor of petroleum engineering in Alberta.

PMB: Okay.

ISAACS: He has since passed away, but you know, at that time he was...he had several programs that...

PMB: So by this time you were highly skilled, your credentials were quite impressive and then the Alberta Research Council hired you?

ISAACS: Correct. But you know, a lot of us knew very little about the oil sands, we just were starting to get our feet wet so to speak and to play around with what we at that time called alternative energy because it was an alternative energy.

PMB: Really?

ISAACS: Yeah, we called it alternative energy. Because it wasn't... there was very little commercial.... The word alternate energy, came about much later on, but we just refer to it as alternate energy because at that time, conventional oil was king in Alberta, conventional oil and gas.

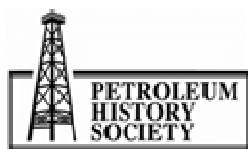
Yeah, so we started looking at the fundamental characteristics of the oil sands. I ended up with a group of people that were extremely skilled, we hired people primarily from one of the labs at McGill that were very much involved in looking at behaviours and characterizing the interfacial behaviour of crude oil and also looking at the use of surfactants, the use of... how does the oil sands structure hold together, how does it fall apart, what are the things that, you know, so looking at separation as a major component of the work that we were doing, but also flowing reservoirs. So we developed a lot of, I would say the basis for what today is used in the industry to characterize the oil sands, to look at the surfaces, to look at the forces that put the oil sands together and break them apart and make the separation occur. So a lot of work was done in that sense, so later on, of course, I started to work in a management position and they had a...

PMB: And now this was in the period 1980-'89 when you were a project leader?

ISAACS: Correct. After that period, I started to work in a management position looking after our large industry government program, this is, at that time, \$3 million, today it's about a \$5 million program with about... At that time, you know we built it from four industry members to 12 industry members and so that was a major undertaking and then from there.

PMB: Excuse me. Would you explain the project to me in a little more detail?

ISAACS: Yeah, so the program itself was really looking at the in situ recovery of bitumen from oil sands, so a lot of that program really dealt with the technologies that we have today looking at the mechanisms, looking at how you produce oil.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: So this was actually during the period when SAGD was first being tested.

ISAACS: Correct, yeah. So we had a lot of work done pre-SAGD, which was before we even had horizontal wells.

PMB: The huff and puff and cyclic steam and fire flood.

ISAACS: Correct, correct, yeah. The whole idea was to actually create a horizontal structure, what we called a communication path between two vertical wells, which effectively served as a horizontal well, so the idea was that you fractured between two wells, two vertical wells and then you build up that fracture into what we called a communication path, which was an effective horizontal well, so even at that time, even when we didn't have horizontal wells, the process that everybody was thinking about involved a creation of a artificial horizontal, high permeability channel, if you like, to allow the oil to flow.

PMB: Okay.

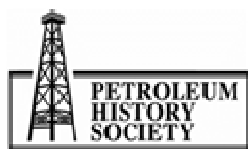
ISAACS: But you're right, after that we started to look at the mechanism of SAGD. We started to, you know, so we followed some of the work that Butler was doing and since we had a team approach to looking at the behaviour to look at some of the improvements that could be made in the process, there was a lot of work that was done in that regard. We also started to look t things like coal production, which really refers to more heavy oil, that's when oil and sand are produced together, you know, and hybrid solvent processes, the whole suite of technologies that are today, still being tested and used in the field. And also combustion, so combustion was also a program that we had. Oddly enough, even at that time, we were looking at biological processes as well, trying to determine what could do with bugs, essentially. Whether it was for conformance control, meaning that you plug zones that were no longer effective, or generating heat, so heat generating bacteria and as well bacteria that would break bonds and create an upgraded product.

PMB: Did you have any success with that?

ISAACS: No, it was started, we spent about two or three years doing some work in that area and the processes were just too slow. I mean, technically you could do it, but it was really too slow, so today, what people are trying to do is doing the same thing that we've tried to except they're trying to genetically modify the bacteria so they can do what nature does a lot faster. But ultimately the problem was that the reactions were so slow that it would take geological time before you got the answers that you need.

PMB: Okay, and moving up in your chronology...

ISAACS: So we had a very, I would say, very strong group at the Alberta Research Council that did a lot of work in the oil sands, not only the oil sands but in energy in general, so I was the head of that group. So I headed up the heavy oil and oil sands group for about a decade and after that, I moved to be the managing director of the Alberta Energy Research Institute. The Alberta Energy Research



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

Institute was established out of AOSTRA, so AOSTRA came to an end and the board of the then AOSTRA, which was really dormant, became the board of the Alberta Energy Research Institute with a broader Band-Aid to look at all of the energy of importance to Alberta. So we started to look at coal processes, petro-chemicals, renewable energy, so energy related, much broader range of project and our key realization at that time was the fact that really we had an integrated energy economy and that the waste of one part of the industry was really the feed stock of another part of the industry. Whether it was petroleum coke that could be used for steam generation heat and power, or hydrogen generation, or whether it was CO<sub>2</sub> that could be used for enhanced oil recovery that there was a much more integrated approach that was possible than had been pursued up to that point.

PMB: So this is the whole idea of industrial ecology?

ISAACS: Yes, in many ways it's the same idea.

PMB: Is that something that you originated or was that already a common idea?

ISAACS: We originated two things. One was we called the era where AOSTRA was active as the era of technology oil. We use the word technology oil because technology was critical to make the oil from the oil sands economic and competitive in world markets, so we coined the term technology oil. We coined the term the Alberta Energy Research Institutes Era as the integrated energy economy and so if you asked me who came up with that term, I would say, between our staff, myself and the board, it just evolved as a term we started to use in our conversation as we developed our strategy moving forward.

PMB: So you would argue that this historic thing make sense, that there were these two zones of history, the technology oil followed by the...

ISAACS: Integrated energy economy.

PMB: ...integrated energy economy.

ISAACS: Yes.

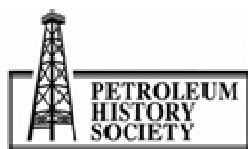
PMB: Okay, well I'd like to come back to that a little bit later on.

ISAACS: So we actually wrote a chapter in a book with the then chair of our board, Len Bolger, and I can get you a copy of that.

PMB: If you could find that, that would be great.

ISAACS: Well it's on my book shelf, somewhere.

PMB: Later on, that would be great.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: You asked me for copies and this is one that I should have sent you, but I completely forgot about it to be honest with you, until now. Yeah, so for the last ten years we were operating as the Alberta Energy Research Institute (AERI). We're now operating as Alberta Innovates Energy and Environment Solutions. Energy and Environment Solution is somewhat separated from the government, it's a separate corporation. Again, we have a board of directors, we have staff which are no longer government employees, but employees of the corporation and it's taken us about a year or two for us to do that transition. It is building on the legacy that's been established from AOSTRA to AERI, and we're trying to coin a term for this era as the era of positioning Alberta as the low carbon, clean energy and clean water economy.

PMB: Well that's great.

ISAACS: Well that's kind of the era that we think we are...

PMB: Entering.

ISAACS:...Entering, and in all of this, the critical era. If you look at what leverage all of these organizations have is the leverage of working with industry, because ultimately, it's industry that puts these technologies into play, a lot of them are going to be very risky, a lot of them are going to be very costly and so there are financial risks associated with a number of them, so I think that that's the primary reason for the government as the landowner, if you like, to make sure that the best available technologies are being used in the production.

PMB: Well, so a year ago or two, within the last couple of years you became the CEO of a government-owned corporation.

ISAACS: Correct, yeah, you're right. The sole shareholder is the Alberta Government.

PMB: How is it structured? What are the revenue sources?

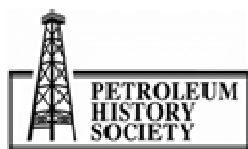
ISAACS: Our revenue is primarily from government, so we get a grant from government to do the work that we need to do, we also are fortunate that we are working, so our board, many members of our board are also members of the Climate Change and Emission Management Corporation and we act as a service provider for the Climate Change and Emission Management Corporation.

PMB: Which is another Provincial Government...?

ISAACS: Agency, yes.

PMB: Agency, or Corporation?

ISAACS: It is a corporation, it's under the Government of Canada Act, but nevertheless it is a corporation that has a grant from Alberta.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: Great. Okay, now you've kind of inter-mixed the developments we were talking about in your own...

ISAACS: Yes, sorry about that.

PMB: ...no, well, we'll have more to go back to later on, because what I would like to do, sorry I didn't explain this to you before. We will get this interview transcribed, I will have to correct the spellings, names, places and that. At the second interview, I'll be bringing a videographer here and we'll actually video it, so that we can really focus on material that we get from this interview.

ISAACS: Fair enough, and I apologize for that, keep me straight and narrow, I'll tend to deviate because there's a lot in my head about how things evolved.

PMB: How they developed, well that's great for us. You've given us a brief summary of your career, you started as technical guy, you gradually developed as a technical manager, a manager of technical people and now you're the CEO of Alberta Innovates.

ISAACS: Correct.

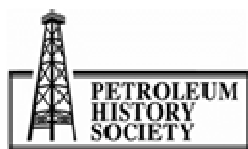
PMB: And I want to get to, in a few minutes, how did that organization develop? How did we get from AOSTRA to Alberta Innovates in 30 years or 35 years or whatever that number was? Let me ask you, when you were at McGill, had you really heard about the oil sands, or did you just learn about that here? When did you first learn about it?

ISAACS: Well, you know, I don't have a good memory when I first heard about it, but by the time that I had finished my doctorate which was in a very different area, it was in organic metallic chemistry, you know, it was possibly the time that I became aware of it, I also became aware of it because some of my colleagues who were in analytical chemistry started to work for the then Syncrude research was located on 17<sup>th</sup> street, so it's probably during my doctorate work that I became aware of it.

PMB: In Calgary or in Edmonton?

ISAACS: No it was in Edmonton then, the research center was in Edmonton. So it was, when I graduated, it was a very difficult period in many ways, because we had just gone through the Arab Oil Embargo and the economy had really taken a dive, so jobs were very difficult to find, so this was 1974-75 period, and I had a, you know, it's odd how things work, I had a post-doctoral fellowship lined up at the University of Toronto, but I had not accepted yet, I just was wanting to do that, so it very easily could have ended, I could have ended up at the University of Toronto. When one of my PhD committee members was Fred Otto, who later on became...

PMB: O-T-T-O?



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: O-T-T-O, who later on became the dean of chemical engineering at the University of Alberta and when I was delivering my thesis for him to read as part of my committee, he asked me what I was doing, and I said, well I'm probably going to take up this post-doc, and he said, have you accepted yet, and I said, no, you know, I've got lots of time, so I haven't made up my mind, I thought something else may turn up, so I kind of looked...and he says, don't accept, I've got a job for you. So that's how I stayed in Alberta.

PMB: Okay, well that's great, these strange little things that change our lives. And you've just answered the question, what led to your personal involvement in the oil sands and it's pretty much been your whole working career hasn't it?

ISAACS: Except for an interlude at the Technion was more about medicinal chemistry.

PMB: How did that contribute to your later work, if at all?

ISAACS: It actually was something, another thing that I had applied for after my doctorate, and it just came about and I thought it was a good change, so after about two years, the money was available for me to do this.

PMB: How do you spell Technion?

ISAACS: T-E-C-H-N-I-O-N.

PMB: Okay and it's located in Tel Aviv?

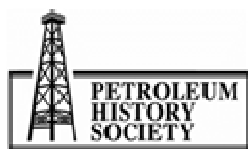
ISAACS: It's in Haifa, actually.

PMB: In Israel.

ISAACS: In Israel, yeah. So I spent about a year there, came back, by that point I was also married, so it was, you know, I guess it was a good honeymoon maybe. So we spent a year there. We came back, and I started, as I mentioned, to work in the petroleum engineering department of the University of Alberta. Again, I had a good reputation for getting things done, and so it was not very difficult to walk in and somebody just said, oh sure, we know you, we want you to work with us. And I applied to work at the Alberta Research Council because it seemed like there was a permanent job somewhere and luckily that came through as well.

PMB: Okay, what were the main achievements or highlights of your involvement with the oil sands, what would you say?

ISAACS: I would say the major achievements were developing processes that today are going to be used, so it's... You know we patented about six patents in my name, about three or four of them are more associated with the oil sands, so it's really being able to intuitively understand how to make things work, how the separation works, some of the work we've done with use of foams, surfactants



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.



were I think, still, things that the industry will pick up at some point and make use of, but ultimately it was really about a good understanding of how the oil sands had been put together by greater means, and how we can actually start to break them apart, take out the oil and it's the fundamentals of how oil sands processes work and I think was kind of the foundation of the kind of work we did.

PMB: And the work, that understanding that you developed is something that you conveyed to the oil industry in the best way you could, and helped the oil industry work with it.

ISAACS: Correct.

PMB: To what extent was it in the line of pure research?

ISAACS: Well it was all applied research. There really was very little pure research because it was all with a processing mine with trying to develop processes, whether it was with the use of surfactants, use of foams, or, you know.... So you needed that understanding before you could apply to a process. Yeah, you know, when I say I, it's really "we," we had a very good, close-knit group and although I published a number of papers, it was always because I was interacting with a lot of people that had a lot of good ideas and we worked on these ideas together, so I think that critical was the fact that we had such strong individuals in many areas and both engineers.

PMB: When I look at your resume, I see five or six pages of publications, papers that you've written over the years, so you're very, very widely published in technical journals?

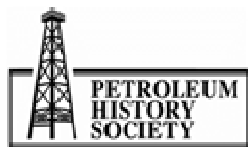
ISAACS: Yeah, yeah. So some of it is pretty good stuff, some of it is kind of repetitive, but you know, you're right, it's the understanding of what needs to be done that I think is really, was the critical, what I would say is the success. Its more the fact that we, that I could work together with a large group of people and make, you know, sort of, understand the bigger picture and how their work fitted into the overall umbrella, so that was a skill that I developed as I started to work with a lot of people, so a lot of the papers that you see here, the early years, they were more technical, the later years, they were more strategic, looking at the bigger picture.

PMB: Yeah I noticed that the last one, I think, was the role of Saskatchewan...its place in the Canadian oil sands for example.

ISAACS: Yeah, that was with a colleague when we worked together, who is now the CEO of the Saskatchewan Research Council.

PMB: What was your basic idea?

ISAACS: Well it was really his basic idea that we were going to basically. The oil sands actually doesn't stop at the border of Alberta, it actually stretches into Saskatchewan, it's just a poorer quality material, but there is a lot of potential because it still is the oil sands. The biggest issue that we have in Saskatchewan is that there isn't a cap rock. It is an exposed surface, so it's a much more difficult source. So we had a colleague also from the Alberta Research Council, all of us came actually from



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

the Alberta Research Council who did the geology and looked that the geology that was developed in Saskatchewan but he had put that together. Then Laurie Shram and I looked at what technologies could be applied to the resource given the technology, so that was the basis of the paper.

PMB: Okay, so there's potential there when all the oil sands run out in Alberta, we'll start doing it in Saskatchewan.

ISAACS: Well there is a company quest is looking at producing, they've got some leases, probably some field data, I think that electrical heating would be a technology that could be applicable to that resource.

PMB: And electrical heating, now isn't Shell doing something with that in Peace River?

ISAACS: I think they started to do that, I think it's now on kind of a hold, but you're right. The electrical heating I was thinking about was a company called ET Energy, we worked with that company and we've done some field trials, at least they've done the field trials, we support some of their work and they basically do electrical heating and inject water at the same time. So it's a water, electrical heating. The Shell electrical heating process really was designed more for oil shale in Colorado, and then imported here, but you're right, it was tested here, apparently quite successfully, but I'm not sure that it's gone beyond that right now.

PMB: Okay, now I would like to move to the area that I really wanted to focus in on today, when you and I first met. Almost a year ago, you introduced me to a little document that Clem Bowman had written, which said, you know gave a model of the history of the oil sands. I was really quite taken with it, but I wonder whether you could explain it to me now.

ISAACS: Yeah, I should have had this to refer to, basically what Clem was doing was thinking about what made the oil sands happen and his thoughts really came down to this. There were visionaries, who despite the odds, despite the barriers, despite the mountain they had to climb, made things happen and so he focused on those individuals who had the foresight to say, damn it, it's not just about economics, it's about trying to make something happen, when you know, it couldn't have happened. I think it starts with the then CEO of Sun Oil, who later on became GCOS...

PMB: Suncor, he started with Karl Clark, didn't he?

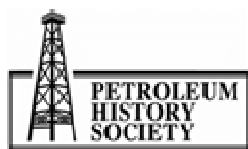
ISAACS: Yes, he did start with Karl Clark, sorry.

PMB: The first one was Karl Clark, I think there were six of them, there was Karl Clark, and then...

ISAACS: J. Howard Pew.

PMB: ...J. Howard Pew in 1967.

ISAACS: Correct.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: Then there was Peter Lougheed.

ISAACS: Peter Lougheed.

PMB: And there were three that were missing, I think?

ISAACS: No-no, he had everybody except the sixth visionary.

PMB: Oh, okay.

ISAACS: He had everyone except the...

PMB: Oh, one of them was the Premier of Alberta...

ISAACS: It was Ernest Manning.

PMB: Ernest Manning, yes.

ISAACS: Yes, he had Ernest Manning as...

PMB: It was Karl Clark, Ernest Manning, J. Howard Pew, Peter Lougheed...

ISAACS: And he had the Syncrude CEO at that time...

PMB: Oh, Frank Spragins.

ISAACS: Frank Spragins.

PMB: Frank Spragins. Okay, so those were the five guys that made it happen despite everything.

ISAACS: Right, despite...yeah.

PMB: And these were the great visionaries?

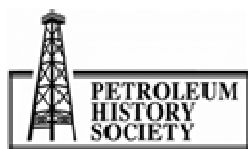
ISAACS: Correct.

PMB: And then did he not also ask the question...

ISAACS: Who is going to be the sixth one?

PMB: Who will be the next one? And what will be the obstacle of the mountain that they will have to climb.

ISAACS: ...That they would have to climb. Well it's certainly going to be the environmental issues that we have facing us, you know, so I look at the first, what close to 80 years or more was about



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

producing the oil and making it economic so we could compete in world markets, so we were economically competitive and I look at the next number of years as us competing on the environment, so we would be environmentally competitive with other energy products that are being produced commercially, so I think that that's certainly the barrier that we have to overcome....

PMB: Okay, and now within that context, the area of making the oil sands economic, they were kind of for, well first of all, I suppose Karl Clark, that's what he did, here's a technology that, well maybe it won't be economic for awhile but at least you can separate.

ISAACS: Correct. He laid the groundwork, I mean they had a pilot plant, they had Bitumount, so they did a lot of work that was just extraordinary in many ways because you didn't have the convenience of today's modern age that you could, electricity and so on and running pilots in Fort McMurray at that time, in the middle of nowhere, was a pretty difficult thing to do.

PMB: And the Bitumount Project was from the late 20s if I'm not mistaken, right up to around 1950.

ISAACS: Yeah, I think there were stages of it.

PMB: And occasionally it would burn down.

ISAACS: One burned down.

PMB: And there was a related project called Abasand, wasn't there?

ISAACS: Yes, correct, yeah, correct.

PMB: Okay, and so that was the first one, where production became possible.

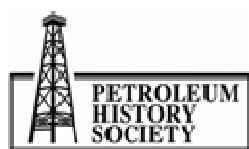
ISAACS: Right.

PMB: Now it was Ernest Manning and J. Howard Pew who made the Great Canadian Oil Sands possible to produce oil.

ISAACS: Yeah, so the way I understand the story is that they were very good friends and that Ernest Manning persuaded J. Howard Pew to take the plunge and develop the GCOS at the time as a company that would produce the oil sands, so in the end its about personal relationships, to make things happen and I think, you know, basically Ernest Manning said we'll back you up as much as we can if you take this on, Sun Oil.

PMB: And I think a little add on to that is that part of the reason they were such good friends is that they both had very strong Christian religious beliefs.

ISAACS: Correct, correct.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: And that was one of the things that drew them together as personal friends.

ISAACS: And I think that's also, if you have a strong faith in something then you say... Well, I'll end up betting on making this happen, so yes.

PMB: And then that takes us to the next two visionaries, Peter Lougheed and Frank Spragins. I've done a number of interviews about the 1975 crisis, the Syncrude crisis, when it looked as though it might collapse. It was at just at that time that Peter Lougheed, who played a role in the Winnipeg Agreement that resolved that crisis, and he was fighting with the Federal Government over who has the right to you know, basically tax...

ISAACS: Produce the....

PMB: ...produce the oil and collect the royalties, and just about the time when that was reaching fever pitch he introduced the idea of AOSTRA. Now what I'd like you to do please, if you will, is help me understand how AOSTRA and the Alberta Research Council, which goes way back, how all of that developed from that period on until today, with Alberta Innovates and specifically, what was the role of AOSTRA in this big picture?

ISAACS: Right, so it was critical, so when we had a formal recognition for Clem Bowman, he received an award from the Russians, there was an energy award that the Russians put out, it's a substantial award.

PMB: When was this?

ISAACS: Maybe two or three years ago, probably four or five years ago, but anyway....

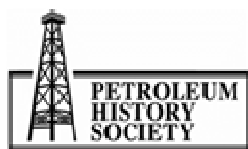
PMB: One of my colleagues, by the way, interviewed Clem Bowman just last week, and I gather it was about a five or six hour interview.

ISAACS: Okay, so well, Clem was great. We had a reception for him here at the Petroleum Club just to acknowledge the fact that he had received this award and Peter Lougheed came to that reception and what he said was really astounding because he put himself in a position, he felt that AOSTRA was important, to get AOSTRA going was so important that he himself interviewed the candidates for the job, how I don't know. I thought it was astounding because I don't see a Premier today anywhere in the country that would be interviewing somebody for a job like that but he personally interviewed, and personally hired, Clem Bowman. In other words, he approved his hiring. He also did the same thing with the Alberta Research Council, at that time he interviewed Gilles Cloutier.

PMB: How is that spelled? C-L-O-U-T-I-E-R?

ISAACS: Correct. Gilles Cloutier was...

PMB: G-I-L-L-E-S.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: Correct. So Gilles Cloutier was a Vice President of HydroQuebec and came to the Alberta Research Council, maybe six months after I started there, so probably about September of 1978.

PMB: '78?

ISAACS: Yes. I started in April of 1978, so I remember that period brightly, but so he also felt that it was really important to have this very strong technical arm of the government that would actually be doing research and development work and so he, you know, for him, the two organizations were critical. Of course Clem...

PMB: The two organizations being AOSTRA and...

ISAACS: And the Alberta Research...

PMB: ...ARC. A-R-C.

ISAACS: Correct. One was a Provincial organization that was essentially doing research and development work to support and that was the Alberta Research Council whereas AOSTRA was a funding organization primarily.

PMB: Well that's quite interesting; would you explain that a little bit?

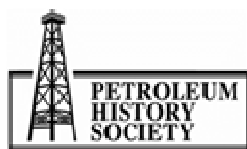
ISAACS: Yeah, so basically, AOSTRA didn't have its own labs. They essentially relied on the university labs, they relied on labs at the Alberta Research Council to do work in oil sands. They also, by and large, didn't do any of the field projects themselves, they collaborated with companies who actually operated. There was one exception and that was the Underground Test Facility, but all other projects that AOSTRA did, it was the partner that actually operated the project rather than themselves. However AOSTRA had it...

PMB: Now before you leave that, so the deal was, if I recall, that a company would say I want to do such and such a project...

ISAACS: Correct.

PMB: ...and AOSTRA would kind of review what they were proposing but wouldn't try to mess around with what they were doing, they would say, if this company is willing to put up x million dollars for this project, we'll match that money and let them do the work. Now is that largely correct?

ISAACS: Yes and no. AOSTRA also participated in steering committees and technical committees as we do as an organization, to make sure that the project put out the right, so they embedded technical staff in each of these projects to make sure that the projects were actually producing the results that were needed so somebody had to translate those results to learnings that could be applied, but also, they provided a lot of technical input into these projects so that it was a shared



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

responsibility to make sure that this project turned out to be successful, by the knowledge of the people that they put into these projects.

PMB: Now if AOSTRA put money into a project then the royalty, sorry, the patents and the technology essentially became common property, is that correct?

ISAACS: Actually, yeah. Yes. The way that AOSTRA operated is that they wanted ownership of all technology, of all projects that they funded. The excuse was that they were responsible for making that available to the public and therefore they needed the ownership and the industry got rights to use the technology worldwide, a free licence if you like, free use rights for the technology to be used and that's essentially what industry wants.

PMB: Okay now, so well let me ask you then. So if you're AOSTRA and you and I do a deal, I come up with this tremendous technology...

ISAACS: Correct.

PMB: ...which your technical people help me with, now I can use this in my project, but so can anybody else? For free or not?

ISAACS: No, they...well that was one of the, I think, weaknesses of AOSTRA is that they tried to own and have confidentiality periods of 30 years or more in many of these projects and so the information never really got out past the partner that they had doing the project. So in fact, it prevented the distribution of the information widely.

PMB: Okay, because I spoke to Vern Larson, I interviewed Vern Larson last week.

ISAACS: Right.

PMB: Who was with Imperial and he basically said that Imperial's position was "no way" would they participate in this, they wanted to own the...

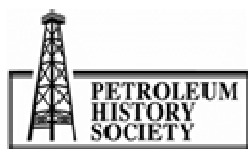
ISAACS: Yes.

PMB: And I guess my question is, I worked for Gulf at the time and I seem to feel that they did get involved with an AOSTRA project.

ISAACS: Yeah, so in that book you will see a number of projects, I think Imperial doesn't show up, but...

PMB: Yeah, okay, so there were a number of other large companies that did participate.

ISAACS: Oh yeah, there were about 20 or more projects, field pilot projects with companies and companies had every right, so companies that participated had every right to that technology, so



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

they got all the rights they needed and in some cases they had joint ownership. But primarily, so any technology that a company would bring into the partnership, if I can call it that, the company would own, because that's the background technology, but any new technology then AOSTRA wanted ownership of that technology, but in some cases they negotiated a joint ownership.

PMB: Now you describe this as one of the weaknesses of the project, AOSTRA's insistence on owning the new technologies.

ISAACS: Well not only owning but having long confidentiality periods of 30 or more years, having no provisions in these agreements to release any of the reports. We're dealing with that now because we own all of the AOSTRA reports and so on, and so if a company wants to come and get access to some of the old reports, we're talking about 25, 30 year old reports, legally, we don't have a way to provide that to them.

PMB: Yet.

ISAACS: Correct. Yeah.

PMB: But in 30 years you will?

ISAACS: Yeah, well even then, from a legal perspective and I'm only talking from a legal perspective, it is cloudy, because there were no provisions to release the information.

PMB: Oh, okay.

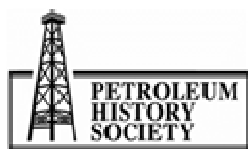
ISAACS: Without the consent, without consent. Now some of these companies do not exist anymore, other companies have bought them, so things are pretty complicated. But getting back to your original questions, I think that AOSTRA had the technical staff to try to make sure that these projects, they weren't just providing dollars, they were also providing technical competency substantive.

PMB: And they were getting the patents...all that back.

ISAACS: Correct.

PMB: I have two questions to ask you on this, first of all, as I recall, Mr. Lougheed began this process when the battles with the Federal Government were really raging, the export tax on domestic oil and all of that stuff. His position was the people of Alberta own that resource and so the people of Alberta should also be helping to develop the resource because in the end they are the beneficiaries.

ISAACS: Yeah so, you know, I really believe in that philosophy, I think that if you are the landlord, you want to get the maximum value out of those resources. It's just like having, you know, some apartments that you're letting other people have, you want them to be in the best shape, you want to



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.



get the highest value out of them, so you have to put some effort in making sure that it's clean, it's well painted, and all of these things. So I think that because government does own these resources they have a responsibility to maximize the benefit and the only way that they can do that is by being critically involved in some of the development of these resources. Now you don't have to be right in it, doing it, but you certainly should be there knowing what the technology is being used, if it's being used properly or not, if there is any way you can help make sure that these projects become successful. What you do not want to do is be in a position to walk away from technology because its, by the fact that it was not operated properly and so you want to make sure all of this is being done well.

PMB: So after about 14 years of, according to Clem Bowman, very, very successful efforts and contributions to the oil sands industry, AOSTRA was faulted. Why was that?

ISAACS: Well actually AOSTRA lasted until about 1993 as an organization, so 1974 to 1993.

PMB: Was it still providing funding?

ISAACS: Yes, yes.

PMB: Oh.

ISAACS: So it was very active until 1993. In 1993 the chairman at the time was Bill Yurko.

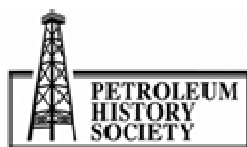
PMB: Oh yes.

ISAACS: And the Klein Government came into power and they were looking to reduce the deficit, deficit reduction was at the top of the agenda and I think at that point, AOSTRA was no longer stopping an independent Crown corporation but became part of the Department of Energy. And as part of the Department of Energy they continued at a very low level of funding some of the projects that they had started, but at that point, they had lost a lot of their technical capability and a lot of people that they had as consultants and so on, and the staffing were essentially reduced quite substantially.

PMB: Oil prices were very low, so it was hard to generate interest in the oil sands at that time.

ISAACS: Yes, I think that you know, if you talked to some people in the industry they'll tell you Suncor came very close to closing its door because it was difficult to make ends meet, so to speak. So yeah, it was a difficult time, it was a difficult time for the Province because of cuts and so the few people that were left in AOSTRA, and you know some of them are actually are still our staff here, were essentially entrusted with maintaining, you know sort of maintaining some of the critical programs that they thought were needed to be maintained with the limited funding that was available at that point.

PMB: Okay, now anything more on AOSTRA, because I'm going to take you way back in time....



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: No, we might want to back come to that. So my point is that AOSTRA did really, really well because it had some really gifted people. You know, I think Clem Bowman is a gifted individual, a leader, of course he only stayed for about five years but he set up the organization and so leadership was critical in setting up the organization. But they had a very strong technical staff, I interacted with them all the time and so whereas they learned from me, I also learned a lot from them and I think that without that, I don't think they would have been successful. They had a lot of, they went to bat several times, and struck out several times, but in the end, also hit a couple of home runs.

PMB: And the most notable one was the UTF.

ISAACS: The UTF SAGD, yeah.

PMB: Can you tell us a little bit about that?

ISAACS: Yeah, I mean I was in a room when this was discussed, they were discussing whether they wanted to do this underground mining because horizontal wells had not been invented yet and they were going to do this, drill an underground mine, primarily to test the idea of a gravity drainage process because they can drill directionally from the underground as if it was a horizontal well.

PMB: And now this was based on, and I wish I could remember who told me, this was based on somebody's trip to Russia...

ISAACS: To Russia, that's correct.

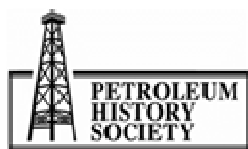
PMB: ...where the Russians were doing that, do you know the story?

ISAACS: Yes, so Maurice Carrigy, was the second man in AOSTRA.

PMB: I'm interviewing him in two weeks.

ISAACS: He's a very modest man, he'll say he had nothing to do with anything, but I really believe that he was a somebody, of course he was a geologist in this Province for a long time and worked at the Alberta Research Council before my time, but I ran into him quite a bit, and he did a lot of the geology, the early geology in the oil sands Maurice Carrigy did, but Maurice Carrigy was convinced that they needed to try to make this work. And yes, you're right, the idea did come from going to Russia, that it was possible to do this underground tunnel in the basement rock, below the sedimentary rock, the sedimentary layer, there was this rock that they could tunnel into and it would be stable and hold and so on, and they could then drill from the bottom up rather than from the bottom down, so that was the idea.

PMB: Top down.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: Top down, sorry, yeah. So that was the idea and so when they came to discuss that with the industry, everybody told them this is a foolish thing to do because it's just going to be too expensive, of course it was going to be too expensive, it was just an experiment to see whether in fact you could get gravity stable drainage to take place and so the success was proving a mechanism that became the critical mechanism. So this was this was the influence of Roger Butler, who actually worked for Imperial Oil, developed the technology and the patent when he was in Imperial Oil.

PMB: He reported to Vern Larson.

ISAACS: Correct, he did, he did.

PMB: At one point anyway.

ISAACS: And Imperial Oil tested that technology in a vertical well I believe but it was difficult to do and so they decided to stay with cyclic steam stimulation. Eventually, and the timing was beautiful, because at that the time that the UTF Project was being done, horizontal wells came into being. So if I could say that in 1978 the Holy Grail was drilling horizontally, drilling these horizontal wells. Everybody said, we're stuck with vertical wells all the time. And then when horizontal wells started to come about was about the same timing as when, what was known as the Phase A of the UTF started, so that was the coincidence, was just wonderful

PMB: Now a matter of interest. Vern Larson told me the other day, that actually in the 70s, I think it was the mid-70s Imperial did actually drill a horizontal well up at Norman Wells, so it wasn't all that new but it hadn't been applied to the oil sands yet. [**Note to reader:** In a second interview Larson had checked this information, and confirmed that Canada's first horizontal well was at Cold Lake.]

ISAACS: Yeah.

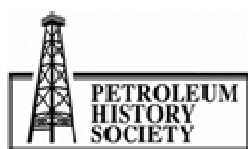
PMB: Sorry, continue your story.

ISAACS: That was in the late 1970s I think, so did Mobil at the time, Mobil Canada also had a horizontal well, I think during that period you needed to learn how to make it work as well.

PMB: Yeah. Anyway, continue with your story.

ISAACS: So yeah, so I go back to a meeting where I was present and a lot of people were in fact, not terribly excited about this and they thought it wouldn't work economically, but obviously they showed that it can work and then when horizontal wells were being drilled, the Phase B started to drill horizontal wells from the surface. Obviously it's easier to make it work from underground, but they showed that they could make that work as well.

PMB: And this was a case where AOSTRA basically struck out on its own, and did this thing by itself.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: Correct.

PMB: And it was maybe the most important development in the in situ oil sands business.

ISAACS: Correct. Yeah, I think that's where leadership comes in, is that in every other project they had industry partners doing some tests and stuff like that, pilot tests. In this project, they went alone, they acquired, from what I understand, a lease that was available from the Alberta Government, the Department of Energy, and built the road and went and drilled the underground, and operated the field for awhile until the technology was proven and then allowed industry to come in as a consortium of companies that paid into the projects so that they could prove the technology.

PMB: It's my understanding that in 1992 or 3, the project actually became profitable.

ISAACS: Yes.

PMB: Actually went through a period of profitability.

ISAACS: Okay, yeah.

PMB: I'm not 100% sure of that but I have read that.

ISAACS: Well Les Little who is next door to me could answer that question because he had, we had looked at a lot of these projects, AOSTRA had money coming to it which we collected on behalf of the Crown, even after projects came to an end, they were still being operated.

PMB: Okay, I would like to shift back to around 1918 or 17 or something, I think you were there at that time.

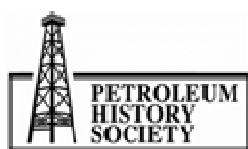
ISAACS: Yeah.

PMB: I want to talk about the origin of research; the Alberta Research Council which I think had been preceded by a federal research body. How much can you tell me about that?

ISAACS: You know I have a feeling that the Alberta Research, it was called Research Council of Alberta, it was really an outflow of the University of Alberta, and so it was essentially in the early years a part of the University. I think that they preceded, that was my understanding, the National Research Council which was established about the same time. But we can check that, I think it would be interesting to check that I think.

PMB: And has it existed all this time, or is this the same agency that became the Alberta Research Council?

ISAACS: Correct, yes, correct.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: So it really, the agency that Alberta Innovates has become originated almost 90 years ago?

ISAACS: Correct. Now that's another corporation and that's Alberta Innovates Technology Futures which is part of the Alberta Innovates family but it's a separate corporation, but you're right, the Alberta Research Council...

PMB: Okay, I'd like to get to that a little bit later on.

ISAACS: So the Alberta Research Council evolved from being, let's say a technical group within the Alberta Government. In fact, I think the patents, sorry, the University of Alberta, I think the patents, the original Clark Hot Water Patents were assigned to the University of Alberta because they were part of the University of Alberta, but then it evolved out of the University into its own separate organization, and I'm not sure at what period that was. But a lot of the work that the Alberta Research Council did, you know, after the sort of the Karl Clark era, or during the Karl Clark era was about the geology of the oil sands, so it was a huge period of geological data gathering that was done, even before we started to do some work during the AOSTRA period, so that geological period was a major, put the major foundations for, we've got a huge resource here, it's this thick here.

PMB: So a lot of it involved drilling and mapping.

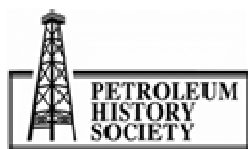
ISAACS: Its mapping, its mapping the resource. So you cannot get companies interested in sinking money into anything unless they have some data that says there's something to go after here and I think that was a critical period.

PMB: So at the end of the 1940s – well, during the Second World War – the Bitumount Project and the Abasand Project were considered important because they could provide oil as part of war effort.

ISAACS: Correct.

PMB: But then after the war, there was a real focus by the Provincial Government on developing the oil sands.

ISAACS: I think during the Lougheed, Lougheed understood that conventional oil was going to peak in Alberta, or had peaked in Alberta and was going to be declining and so effort was put.... At that time the oil was king right, we were producing a lot of conventional oil, which was the key, you know, the key income the Alberta Government had was from conventional oil. And I think conventional oil companies were concerned about the development of the oil sands at the time, and wanted to limit it because they didn't want to have something competing against what they were doing. But the realization was, is that we were going peak in conventional oil and so where was the income going to come from for the government to operate and so I think it was really driven by that.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: Now there was a period right after the Second World War, before, you know, really Leduc and those guys had really been proved.

ISAACS: Proven, yeah.

PMB: Nobody knew...

ISAACS: Right.

PMB: ...how big they were going to be. When the oil sands were under discussion, there was a lot of interest in the oil sands, a big conference as I recall, technical papers. Then there were a lot of lease sales but then the industry left. The oil sands foundered, after the light oil and the conventional oil...

ISAACS: Yeah, nobody was interested.

PMB: Nobody...except that there still were some experiments, I think Cities Service was the main one, during the 1950s.

ISAACS: Correct. So Duke Du Plessis whose office is two doors down, was actually, I believe was working for Cities Service at that time you know, yeah.

PMB: Oh yeah?

ISAACS: You may want to interview him actually.

PMB: He was active in the 50s?

ISAACS: He was.

PMB: Was he? You've got my interest, okay. Well maybe you could introduce me later on; that would be great.

ISAACS: He would be able to tell you, yeah, I'll introduce you to him.

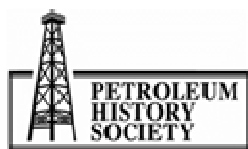
PMB: Yeah, because I just had a long conversation, a couple of long interviews with Bill Mooney.

ISAACS: Yeah.

PMB: Okay, so then the Alberta Research Council continued along...

ISAACS: Yeah, so the Alberta Research Council continued along on the, there was a lot of work on the geology but there were foundational work that was happening around heavy oil recovery, there was a group under the then David Redford. Did you ever interview David Redford?

PMB: No.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: David Redford was essentially one of the people that was running a lot of, he was a research manager at the Alberta Research Council where a lot of work was being done on oil sands, with companies like Texaco, later on, PetroCanada, with Esso, with other companies and they were done on a contractual basis and so there was a lot of analytical work that was being done, a lot of geochemical work, looking at fluid rock interactions and so on and a lot of that foundational work was done pre-AOSTRA, because there were companies that were doing some, what I would say, initial testing, so my recollection when I came to the Alberta Research Council in 1978, companies like Texaco were putting in a lot of money into the Alberta Research Council to do research on some of the their interests in the oil sands.

PMB: Now how would that work, I'm Texaco, you're the research council.

ISAACS: Yeah, they would develop a testing program so they would core, so they would have cores from the field where they had cored, they would look at, you know, so these were all primarily in situ projects, they would look at displacement with steam. There was a big test facility.

PMB: Okay what is the relationship in an example like that? What was the relationship between the Alberta Research Council and the company?

ISAACS: It was a contractual relationship, it was...

PMB: So basically I as Texaco would hire you, as ARC and...

ISAACS: To do some research.

PMB: So I would be drilling this thing, and I'd say be steaming it up and then you'd be providing me with an analysis on...

ISAACS: Yes, or we would do the steaming, we would do the steaming and do the testing and so on, under a scope of work that we've provided you. It's the same thing that we as an organization do today, we provide funding for a project that somebody else does, but we know the scope of the work, know what they were going to be doing and the testing that needs to be done.

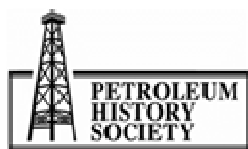
PMB: Okay now, the Alberta Research Council has had its own labs for how long, ever since the beginning? Where are the major labs now?

ISAACS: They are still in Edmonton, there is a facility here but I don't think they do a lot of energy work, most of the energy work is done out of the Millwoods Facility in Edmonton.

PMB: Okay. Sorry the one in Calgary is at the University?

ISAACS: Correct, it's the University Research Park, there's a facility there.

PMB: Okay.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: At the time that I started at the Alberta Research Council we had a beautiful facility in Clover Bar, which was just outside of the city limits and allowed for having a pilot operations so we could look at larger scale experiments which you couldn't do inside the city, so it was more of an industrial area and we had a pretty good piloting group that could put experiments together, you know, take them apart and put them together in a short period time and the facilities to be able to do that.

PMB: Now I've heard something and I've repeated it a few times, and I'm beginning to wonder whether it's true. I've heard that AOSTRA, in effect, represented the biggest research funding project in North America, outside of NASA, could that possibly make sense? The way you describe it to me I'm wondering whether that's true.

ISAACS: So yes, there were field pilots, there was the work of the Alberta Research Council, there a number of university programs that AOSTRA established, so...

PMB: And didn't AOSTRA, wasn't AOSTRA funded to the tune of \$150 million dollars or something like that?

ISAACS: Over the period, you know our estimate is that they spent something like \$780 million dollars.

PMB: \$780 million dollars?!

ISAACS: Roughly.

PMB: And most of that would have been matched by the...

ISAACS: By industry.

PMB: ...private sector, so \$1.5 billion dollars.

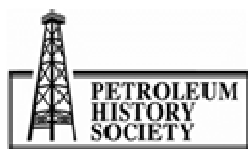
ISAACS: Yeah, you know, we think it's even larger than that, depends how you count it, industry actually put in a lot more money.

PMB: Okay, so then maybe that argument does make sense, actually does make sense.

ISAACS: So if you look at the overall, then you know, probably it was closer to \$2.5 billion dollars.

PMB: Okay, so it was a huge project. Okay, and so the Alberta Research Council continued essentially doing similar things until this century and then what happened?

ISAACS: Well the Alberta Research Council until very recently operated in exactly the same manner, providing industry with support, whether it was in tailings, in other areas, and incidentally, we also had the Federal Government with its lab in Devon Alberta, also providing similar services to



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.



industry, primarily for companies that did not have their own labs, most of the companies here in Alberta do not have their own labs to do this kind of work and even if they did, they may not have sufficient ability to carry a lot of these things simultaneously, so they...

PMB: So they were either labs for hire with staff, or labs for hire and you send your own staff?

ISAACS: No, usually it was with staff.

PMB: It was your staff, okay.

ISAACS: Now the universities did very much the same thing on a smaller scale, but nevertheless they were also for hire by industry, mostly looking at longer term programs as opposed to short term research projects, but you know, that's still going on, still many chairs that we're supporting based on sort of university projects. So you've asked me about the research council, well the research council got amalgamated with a number of other organizations, such as the Alberta Ingenuity Fund, the Technology Futures, or sorry, AIF, Nano Alberta.

PMB: Sorry, AIF is?

ISAACS: Alberta Ingenuity Fund. Nano Alberta and ICOR.

PMB: ICOR, I-C-O-R?

ISAACS: I-C-O-R, which is really an organization that was recruiting chairs for the university, in the area of information technologies.

PMB: And so ICOR stands for Information...

ISAACS: Its Circle of Research... you know.

PMB: Okay, there's some name, ICOR is basically it. And the other one you mentioned was Nano Alberta.

ISAACS: Nano Alberta, yeah.

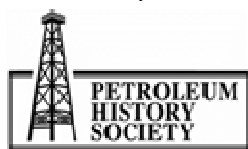
PMB: As in Nano, N-A-N-O Technology.

ISAACS: Right. So all of these organizations got amalgamated together to form one organization called AITF.

PMB: Alberta...

ISAACS: Innovates Technology Futures.

PMB: Okay, now what year roughly was this?



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: The same time that we were formed into a separate corporation, so that was 2010, January, 2010.

PMB: So only a year and a half ago?

ISAACS: Correct. So they continued to operate the labs as they did before, so you know, from that point of view, they still do contract research as they had done before.

PMB: Okay, so now we're talking about Alberta Innovates, of which you are the CEO.

ISAACS: Yes, so I'm the CEO of Alberta Innovates Energy and Environment Solutions whose predecessor is the Alberta Research Institute and before that, the Alberta Oil Sands Technology Research Authority.

PMB: Okay, so everything has kind of gradually, ultimately it just merged into what you are today, what this organization is today.

ISAACS: Correct, right.

PMB: And can you tell me what that organization is and does?

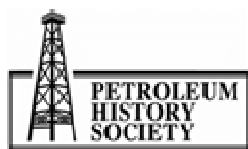
ISAACS: Yeah, so again, we're much broader than just oil sands, we have four areas of what we call our strategic areas, they are in energy technologies which covers processing, primarily oil sands, advanced recovery and processing to higher value products, it covers clean coal area of coal and carbon and unconventional gas, so those are the primary areas for energy technology. We also have renewable and emerging resources. Renewable resources, we've put our emphasis on use of municipal solid waste to fuels, so we've invested quite heavily on those types of technologies. In the emerging area of that strategic area, we're looking at underground coal gasification as we think it has potential to be the next SAGD in the sense that you can gasify coal underground, produce hydrogen, produce CO<sub>2</sub>, produce electricity and so on and power, so instead of gasifying above ground, you're doing it underground. I think that has a lot of potential.

PMB: It has a lot of environmental potential.

ISAACS: It is a lot, so this is deep coal that is deeply buried and yeah, it has, because it's deeply buried...you are...

PMB: It's not economic to get out.

ISAACS: It's not economic to get out in a surface way, but you can gasify it, and because its deep as well, you don't have the environmental problems that you would have above ground, you also get a very 100% concentrated strain of CO<sub>2</sub> which you can use for enhanced oil recovery or sequestration, so its overall, if the technology works it would be a cheap way of getting the resource in the form of a converting into a form of a gas that can be used.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: So would this be natural gas, or...

ISAACS: Well natural gas is part of it, so there would be a lot natural gas that would be produced, but also a syngas consisting of carbon monoxide and hydrogen. And we could convert that to hydrogen gas for upgrading, for instance.

PMB: Would this produce any kind of higher petrochemicals, or liquids or...

ISAACS: You, you could convert the syngas into a higher...you can go all the way to gasoline.

PMB: syn is S-Y-N, right?

ISAACS: Yeah, syn, S-Y-N.

PMB: As in synthetic.

ISAACS: Synthetic gas, it's what used to be called the town gas, and used in the UK for instance.

PMB: In the mid-1800s.

ISAACS: Correct, yeah. So you produce that, but you can convert that all the way to gasoline and do all of that. Unfortunately it's expensive to do that when you have cheap natural gas, the prices of natural gas, but it's potentially competitive at today's natural gas prices.

PMB: Is it?

ISAACS: It could be competitive yeah; we think it could be so.

PMB: Have we covered all of the, your four...

ISAACS: No, those are two areas. So the other two areas are environmental technologies, most of the focus there is on tailings, and on carbon capture and storage, those are the key focuses.

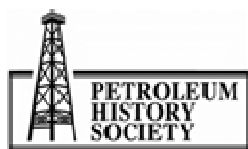
PMB: So are you involved with the sequestration projects that are going on up in northern Alberta?

ISAACS: Yes. So in two of these projects, one is actually the underground coal gasification and the other one is the Shell project, we actually funded the piloting work that Shell has been doing, up to now is doing, and also the underground coal gasification project that Swan Hill Synfuel is doing.

PMB: And how much money have you put into that so far?

ISAACS: About \$8 million dollars in each of these projects, so.

PMB: Okay, so the actual construction and the funding available for it was around \$2 billion dollars wasn't it?



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: Correct, but that part of the funding has not yet been released, because really these projects are still at the engineering design phase, but what we supported before the \$2 billion dollars was announced is projects to look at piloting some of this, so with Shell we're looking at, the project is still going on, we're looking at delineating the zone where CO<sub>2</sub> would be injected and making sure that you can do that in a cost effective way, so it really depends on the volumes of CO<sub>2</sub> that you can inject.

PMB: Now these are the environmental technologies here, or are we talking about two things, environmental technologies (a), and then (b) carbon sequestration?

ISAACS: Yeah, so I'm just giving you our main programs, we'll do other things, but mainly we're focused in the environmental technologies on tailings and sequestration, carbon capture and sequestration. The last program is on water resources and that is really looking at the water resources that we have available to us, in Alberta, from a people perspective, municipalities and so on for recreation and nature, what's available, what's the ground water like, and so on.

PMB: And now, how does... To me there's a bit of a disconnect, and help me understand this, how this fits in with your other suite of technologies, is this because so much water is consumed with oil sands development and underground or...

ISAACS: Yeah, it is a little bit of a disconnect. It's an organization that joined us as a result of the creation of Energy and Environment Solutions as an organization, as a corporation. It was the former Alberta Water Research Institute and their mandate was really to look at water as it relates, not just to energy, but also to agriculture and to forestry and whatever, in the Province. You know I personally believe that water and energy are going to be the critical things that we have to worry about in the next century, in this century coming up.

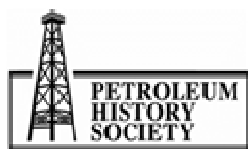
PMB: Well I would mention that small fact to the people who are buying homes in Phoenix, for example. Well, we're real close to where my mind is just going to turn to mush, but at the very beginning, and I can't remember whether I got it recorded on this or not, but you talked about three areas of oil sands development beginning with the...and I wonder if you would recapitulate for me?

ISAACS: Yeah, so I think the last 60 or 70 years have really been about trying to make, the era of trying to make, oh I see what you mean, going back to technology oil.

PMB: Yeah, exactly yeah.

ISAACS: So as I mentioned the strategic driver for AOSTRA was the fact that conventional oil was going to be on the decline and that the oil sands were not competitive and so AOSTRA's work was to try to make the oil sands competitive in world markets, so the fact that they succeeded, at least to the degree of having a technology that could be used for in situ recovery of the oil sands.

PMB: This being SAGD.



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: SAGD technology, we coined the term technology oil for that era, because technology was critical in making that possible. When the Alberta Energy Research Institute was established out of AOSTRA, or what remained of AOSTRA, we started to look at all of energy of importance to Alberta, so kind of looking at broader than just the oil sands and we quickly realized that when you start to look at, you know, what you do with all of these resources, and we've got lots of them, we were just talking about coal and deeply buried coal, and oil and gas and unconventional gas, and so on, and you can even look at CO<sub>2</sub> as being a resources, and of course we want to get to a higher value product, so the off gasses from oil sands are being used by the petrochemical industry to produce petrochemical feedstock, so we, so during that period, we coined the term, the integrated energy economy because we really felt that the economy was going to be, there was going to be a greater integration and companies that were called Suncor Oil became Suncor Energy, because they were looking at much greater integration as well, and not only that, but companies like Suncor are also in renewable energy and so this was prior to the era where they started thinking about producing ethanol, or being owners of wind power, we started to look at how do we best integrate the waste product of one part of the industry to be the feedstock of the other part of the industry, and whether its petroleum coke, whether its use of CO<sub>2</sub>, whether there were by-products, we even had a workshop on zero waste oil sands development where you can...

PMB: I was there.

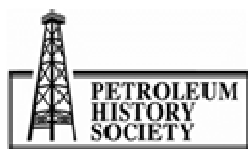
ISAACS: Yeah, that's where we met.

PMB: That's where we met, right.

ISAACS: Correct. Because in the end, I think, that was really attractive, so again, we coined the term the Integrated Energy Economy, I think we were probably a little bit behind because we should have said Integrated Energy and Related Environment Economy, because it really also involved the environment as well, as one piece. And then the third era, that I see us working through, the Albert Innovates, Energy and Environment Solutions is the era of making Alberta, positioning Alberta as a world leader in low carbon, clean energy and clean water economy.

PMB: Now where are we in that phase or stage of development now?

ISAACS: So one of the, I think, critical success stories that we had in the last three or four years, was the fact that we started looking at the lifecycle analysis of oil sands in comparison to other crudes entering the U.S. refineries, both domestic and imported U.S. crudes and we found that we're within a 10% of the average crude. What that meant is that we're not far away, and that we could, if we focused on energy efficiency, if we focused on carbon capture and storage, if we focused on next wave of oil sands production, if we focused on a better integration with renewable energy, including geo-thermal and so on, we could easily get to where conventional crudes are today. On average, it's still going to be an average, it's going to take awhile, because these things don't come into the marketplace right away, but there are, there is I think good potential, now that we've benchmarked ourselves, it's much easier to see where you're going as opposed...



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

PMB: Is this based on a concept like what are called the Princeton Wedges?

ISAACS: Yes, I know the Princeton Wedges well, you mean the reductions?

PMB: That's right.

ISAACS: Well it's based on deciding, you know, so companies have to decide whether they're going to put some emphasis on energy efficiency, my sense is that facilities, say SAGD facilities were built with a lot of inefficiencies, simply because people wanted to produce oil as fast as possible and that was the criteria that they used, and now they can go back and say, if we can better integrate the reservoir with the facilities can we actually start to reduce the energy requirements, can we make use of waste heat that before that, we just didn't want to bother with, because it was not a priority, the priority was to produce as much oil, so I think that there is certainly, it is wedges, you're right, but we didn't think of it this way, and maybe we should be thinking of that, that way.

PMB: Maybe now the Princeton Wedges. Well this has been great, I'm going to ask you just a couple of questions and we'll come back to this later on, other people we should interview for this project and you mentioned somebody...

ISAACS: I'm sure **Duke Du Plessis** should be certainly...

PMB: Duke Du Plessis. D-U P-L-E-S-S-I-S?

ISAACS: D-U P-L-E-S-S-I-S, double "S" I-S, sorry.

PMB: Okay, so that would be great, and I guess another question, all of this material will eventually end up in the Glenbow Archives, do you, or does this organization have materials or photographs or documents that can somehow be contributed to the Glenbow?

ISAACS: Sure.

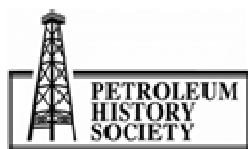
PMB: It is the world's greatest, one of the world's great archives of oil and gas material.

ISAACS: So we've got some books that have been left behind in the AOSTRA era, I've given you one of those. Is that kind of the things that you're looking for?

PMB: Things that you think would be very significant.

ISAACS: Yeah.

PMB: And, I mean, I'm sure, I know they have copies of this for example because they have a specialized library on oil and gas, but in any case, that kind of technical material or what a lot of organizations do, is everything after seven years goes to the Glenbow when it's no longer required.



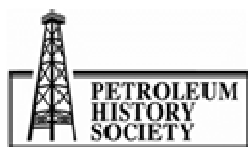
Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.

ISAACS: Well I'll take you to our store of books and we'd certainly be happy to contribute what we can.

PMB: Okay, that would be great. And I guess that's it, so I'm going to, unless there's something you specifically want to say?

ISAACS: No, I'm going to introduce you to Duke.

[END OF RECORDING]



Sponsors of The Oil Sands Oral History Project include the Alberta Historical Resources Foundation, Athabasca Oil Sands Corp., Canadian Natural Resources Limited, Canadian Oil Sands Limited, Connacher Oil and Gas Limited, Imperial Oil Limited, MEG Energy Corp., Nexen Inc., Suncor Energy and Syncrude Canada.