KATHRYN WOOD

Kathryn Wood, P Eng, MBA, Executive Director, Department of Energy, Electricity Markets Branch, Electricity, Alternative Energy & Carbon Capture and Storage Division, was born June 24th, 1958 in Edmonton. She attended the University of Alberta and received a B Sc in Mechanical Engineering in 1981. She began her career with the Alberta public service immediately after graduation. From July 1981 to November, 1988 she was Project Engineer – Water Treatment Technologies and Environmental Planning at AOSTRA. In 1986, she joined Alberta Energy and from November 1988 to July, 1996, she assumed as series of management positions with increasing responsibility in Research. Wood first worked with the Office of Coal Research and Technology, and later within the Research and Technology Branch for the Canada-Alberta Mineral Development Agreement, managing the processes related to the evaluation, approval, contracting and management of research projects targeted at the development of sustainable development of Alberta's Coal and Mineral Resources. From July 1996 to April 1999, she was the Senior Manager, Registrar & Secretariat Services, Alberta Energy, Research & Technology Branch. She provided Secretariat Services to AOSTRA acting as Registrar for the Department's research programs and communicating program guidelines and priorities to industry and the research community for the encouragement of research publications. She also managed the strategic business planning processes for the branch, including research project analysis and evaluation with the input of the Energy Research Council (ERC). In addition, she supervised the team that managed the day-to-day operational, records management and budget information for the Research and Technology Branch. Wood joined the Electricity Division in 1999 while earning her MBA from the University of Alberta. She has headed the Retail Market team, and is now Executive Director of the Electricity Markets Branch in the Electricity, Alternative Energy and Carbon Capture and Storage Division. Kathryn is a registered professional engineer in the province of Alberta.

Date and place of birth (if available): June 24th, 1958 in Edmonton

Date and place of interview: Thursday, May 30th at 9:20 am at Kathryn Wood's home

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

Consent form signed: Yes

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Initials of Interviewer: AD

Last name of subject: Wood

AD: My name is Adriana Davies and I'm a Researcher/Interviewer for the Petroleum History Society Oil Sands Oral History Project. It is Thursday, May 30th at 9:20 am and I am interviewing Kathryn Wood, Executive Director, Department of Energy, Electricity and Sustainable Energy Division. Good morning Kathryn.

WOOD: Good morning Adriana.

AD: Thanks so much for agreeing to be interviewed.

WOOD: You're welcome.

AD: Now, as discussed, would you mind giving me the short, potted summary of your education, career trajectory to the present, and also begin by telling me where you were born, and then date and year of your birth?

WOOD: So, I'm an Edmontonian. I was born in 1958 here in Edmonton. You need the date as well?

AD: Yes.

WOOD: It was June 24th, 1958. My education history is that after high school I studied Mechanical Engineering at the University of Alberta, and spent five years in the [program] because of

extraneous interests that added to the time in my degree. And, when I graduated from that degree, I started working at the Alberta Oil Sands Technology and Research Authority [AOSTRA]. In subsequent years as the trajectory of my career went on, I also went back to school and got an MBA at the University of Alberta and I graduated with that degree in 2003. So, as I said, I started my career with AOSTRA; I was a summer student in the last summer of my degree and, then, I was offered a full-time job as a project engineer and I spent seven years with AOSTRA. About six months before I left, they had promoted me to an entry-level Environmental Specialist, which made life interesting, but a few months later I headed over to the Department of Energy and I have been there ever since; except for a year when I went over to Alberta Environment. So, I've worked for Government my entire career and, for almost all of it, reporting through to the Minister of Energy.

I started in Government, then, in the Research and Technology Branch - I think it was before it was called the Research and Technology Branch - it was Scientific and Engineering Services Division. We had an office of Coal Research and Technology and a few years later there was a Canada/Alberta Mineral Development Agreement and I worked on that one. In 1993, AOSTRA was folded into the Department; this was when many agencies, boards and commissions in the government were folded into government. So, AOSTRA came back into Alberta Energy and it was the same team; so I was rejoined with my colleagues at AOSTRA. A few years later as my career developed, I was appointed Registrar for AOSTRA for a couple of years. Subsequent to my time with Research, when the research in government overall was being restructured, I chose to stay with Alberta Energy and I was looking for a nice place to land, and I landed in the Electricity Branch. It had been one of the most interesting places to be in my career because of the restructuring of the Electricity markets in Alberta. I was there for the change in 2001 and grew into my role as Head of the Retail team and later Head of all Markets for Electricity. I've now been moved into a role that works with MLAs trying to implement some expert recommendations on the retail market; so, it's been quite a ride.

AD: Well, I'll begin by, why did you choose mechanical engineering? I'm sure you are asked this; there can't be that many women who have got your career path as it were.

WOOD: I was trying to figure out what to do after high school and I spent a significant amount of my energy trying to figure that out. I was really considering Honor's Math, Honor's Physics, Computing Science and Engineering because I was really into the math side of things and the biological side of things was not part of my brain pattern; it did not work very well with me. And, as I started to eliminate things because I didn't think they would suit the life I wanted to lead (the Honor's Math and Physics), I thought I might get overwhelmed by one only focus. I thought Engineering was a little broader than that. And Computing Science sounded really quite attractive but I knew a lot of people going into that, and I thought I wanted to stretch out on my own. So, I headed into Engineering; I was actually planning to do a Chemical Engineering degree and I will say that there was a little bit of default in that because I took a Physical Chemistry course and I watched the professor draw that same diagram over and over again and the folks that understand Physical Chemistry will know the diagram and they will understand it but I saw the diagram and thought "why are we looking at another one that I don't understand." So, I went running over to the

Mechanical Engineering Department and said, "Please would you let me in," and they said, "Yes." And I really enjoyed the mechanical part, it was – mechanical engineering is turning one form of energy into another form of energy and I love the engineering principles of "figure out what the problem is first" and, then, start looking at solutions and the idea that no idea is too silly to consider because it might not be the answer but it might lead you to the answer. So, taking a look at all sides of the puzzle was great fun.

AD: And, so, who would have been your professors; who was the Department Chair at that time?

WOOD: I can't remember the Department Chair; I did have Dr. George Ford, Dr. Stewart Kennedy – as professors, Forest Whitaker, a bunch of really great names at the Department of Mechanical Engineering. I did run across a professor that said he had a three month old baby, a girl and he didn't want her to ever enter Engineering. And I decided that I didn't need that sort of frustration at that point in time. I didn't feel the need to prove to him that it was worth it. I was at a point where I just said, "Let me take it next term from somebody else." But I did run across a couple of interesting moments where even the professors were not necessarily supportive of women in Engineering.

AD: I mean at that time there must have been relatively few; it's not the case today.

WOOD: There were nearly about six percent of women in Chemical Engineering but they were sort of one and a half percent women in Mechanical. I did hang out with a bunch of engineers and many of them were the girls and it was about that time on campus that there were societies established like, Women in Engineering and Science and I think the acronym was "WISE," which has evolved into many other organisations. I was part of some conversations but I wasn't actively involved at that time. I have friends who have spent a lot of time working with that part and it was fun to watch; it really was.

AD: So, what was your awareness of the oil sands at that point?

WOOD: I knew that there was a thing called the Great Canadian Oil Sands. I only really discovered AOSTRA as an oil sands idea when I was looking at the job board and where the summer jobs were. I worked for Imperial Oil for two summers before I worked for AOSTRA, so, one summer in Devon and one summer in Calgary. And I did a little bit of – second summer I did a little bit of petroleum engineering and working with seismic and finding pockets where I thought it was worth doing some drilling, and I was aware that Imperial Oil was involved with oil sands things. But it was only when I started working with AOSTRA and had a tour of the oil sands on a nice, hot July day, where they issue you rubber boats up to your knees, and we were actually allowed to walk on the oil sands. I don't think you are allowed to do that anymore, but this was in the days when there were bucket-wheel extractors and they, of course, now moved to truck-and-shovel sorts of things. But it was really great to do that and, on a July day, you would sink up to your ankles into the oil sands because it was rich in the bituminous products and hot days – it would just melt and it was really interesting to see that thing back in the 1980s.

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AD: Now, when did you graduate?

WOOD: I graduated with my degree in 1981 and started with AOSTRA July 15th of that year.

AD: How did you find out about the AOSTRA job?

WOOD: Well, the AOSTRA job was a permanent job [that] came about after I had had a summer with them and, so, the summer job was through the job board and there were folks at AOSTRA who posted opportunities for work, and the students would read all the ads and apply – take your standard resume and mail it off to whomever. And you would be advised that you get an interview with Shell and Imperial Oil and AOSTRA and, "blah, blah" and, so, the first couple of years, I did it, I interviewed with Shell and Imperial and a couple of others, and, then, one year I interviewed with AOSTRA as well, and Imperial Oil and Shell and AOSTRA had offered me jobs those summers. I accepted the Imperial Oil jobs and then the summer I got the interview and opportunity with AOSTRA, I stayed in the city so I worked with them for the summer. It was good fun.

AD: And, so, what summer was that?

WOOD: That would have been the summer of 1980 that I was a summer student with AOSTRA.

AD: And what did you do as a summer student?

WOOD: I was asked to find how to determine the fair market value of technology which was an interesting puzzle because I had only taken a little bit of economics at this point in time, and I simply read and read and read about economics and determined that a fair market value – there is really no one way of determining it short of finding somebody that is willing to pay that price. And, if someone is willing to pay that price, then, that is a fair market value and, in advance of the actual sale going through, it's just a wild guess.

AD: It's intriguing where you have ended up since...

WOOD: Fair market values.

AD: The Electricity Market and no job is inconsequential. So, who were you doing this work for at AOSTRA?

WOOD: I was working with Frank Werth and he was working for Bob Taylor, I need to apologize to Bob, it was Bob Turner. So, this was the mining and extraction side of things.

AD: So, clearly something intrigued you because the opportunity came up for employment and you threw your hat in the ring.

WOOD: I did. When I was looking for permanent jobs, I was still applying for the folks in Calgary and the folks in Edmonton. Personal things in my life led me to be more attracted to the things in

Edmonton and the other opportunities that I had in the city were just not as appealing, as intellectually stimulating, and I like to learn. I like a new puzzle; if I didn't like a new puzzle, I wouldn't be playing with and having fun with the Electricity Markets and learning that. I wouldn't have gone back to doing an MBA. So, liking those things, I thought I could learn a lot about what was going on at AOSTRA.

AD: And, so, tell me a bit about what AOSTRA was doing in 1981.

WOOD: In 1981, we were working on – for the years that I was there, we were working on developing the Underground Test Facility [UTF]; it opened while I was at AOSTRA. There was working going on for international cooperation with the United Nations on oil sands research and AOSTRA staged, developed – I don't know whether you would call it a memorandum of understanding with Venezuela and some other countries to have international conferences on oil sands. So, at the time it was called UNITAR for "tar sands research," I think, but while I was there in 1988, the UNITAR conference that was held about every three years was held in Edmonton, and I volunteered to be part of the organizers of that, and did the facilities; 685 participants from around the world came and talked oil sands at the time. There was a lot of work on the mining and extraction side of things. I was working significantly on the water side of things and the water treatment because the oil sands used a lot of water and what were the ways we could reuse those waters and clean them up; what sort of cleaning was required; could some of those waters be minimally treated and put back in a boiler; what about boiler corrosion technologies; and all sort of wonderful things. During that time, once the Underground Test Facility was underway, you started looking at horizontal drilling and directional drilling, and a number of significant technologies that were necessary in order to develop SAGD [Steam assisted gravity drainage] but, before that, you had all sorts of pilots around the province on different forms of heating the formation, and gathering the oil sands products – so cyclic steaming and "huff and puff" and all sorts of different trail runs to see what would produce the best results for the value of the money invested to do it.

AD: So, who were the people that you were dealing with at AOSTRA; your supervisors or bosses?

WOOD: I dealt most significantly with Frank Werth; he was the manager on the mining side. A few years later, Roger Bailey joined and he was on the extraction side, and both of those gentlemen worked for Bob Turner. I would work with George Villet, who was Registrar when the projects came in, and we would occasionally be participants on helping to evaluate applications. There were a bunch of specialists who did that, and I wasn't involved in evaluating any or many of those, but was aware of what was going on in a number of places. Walter Kowaluk was Senior Financial Officer. At the time that I joined, Clem Bowman was the President – I think was the title he used – and Maurice Carrigy was Vice President. And, over the years, I met Ted Cyr; I met Dave Redford; and Brad Anderson was sort of across the hall and down on the way – we would have lunch together and chat about things. Alan Winestock was there for a few years that I recall. Tom Harkness was hired as the consultant to work on some of the industry consultations on the water projects that I worked on – the team projects – and we would gather industry in a room and say, "We think the

project could be like this, what do you think," and we would adapt the terms of reference to meet the needs of people in the room.

Industry would cooperate and say, "This is the terms of reference that we are all willing to support" Each industry participant – Shell and Imperial Oil and whoever else was in the market at the time would subscribe to the project and pay a $50,000 subscription fee and, then, they would have a right to be on the advisory committee that set the terms of reference, hired the consultants, or the researchers who would do the work. And, then, we would have a researcher examine the questions that were in the terms of reference and bring back her report and, sometimes, the companies would pay additional funds outside of the project itself directly to the same researcher so that their specific water samples could be tested, and have additional information that was proprietary to the company. Other than that, all the information was proprietary and held as intellectual property for AOSTRA and held in trust for Albertans generally. Helga Reid-Vanier was there as our librarian and holder of the intellectual property. She made sure we had data bases so that you could find the data as the reports came in and as the international papers were cataloged and assembled and put together.

AD: It's interesting that you're giving me these details and it was really an intellectual brain trust wasn't it?

WOOD: Yes.

AD: And, of course, so many of the people that you have mentioned are really superstars.

WOOD: Superstars – Harry Gunning, Ernie Wiggins and then the researchers at the Alberta Research Council and they had the Research Park out at Mill Woods, and the number of researchers working on different pieces of separation of the bitumen; is there a way to use flocculant to get it to rise to the top, and all sorts of different technologies that were being considered at the time. And some of the ideas didn't work but you wouldn't know where to go if you didn't have those ideas, and you got enough people in the room.

We would regularly put on a seminar or workshop where you would bring all the researchers for a whole bunch of the projects together, particularly Alberta Research Council and University of Alberta folks, and bring them into one room at a research facility or a conference facility and have them share papers with one another as a way to stimulate the "ideas formation" for, if you took that idea over there and this idea over there, you might be able to do something different here, and really try to get the researchers talking to each other because they practically finished each other's sentences. And, if they were in their own labs, they didn't get enough to see what else was being done. So, I worked with the organizers to put some of those together.

AD: And, of course, in terms of what became of SAGD technology, of course Roger Butler at the U of C was key to that, so you brought people together from these various research establishments to look at specific problems. Did you ever have people from outside of Alberta participating in these sessions?

WOOD: You know, I can't recall, Adriana, if some of those sessions had outside folks but it was the day when Imperial Oil's research facility, I mean Imperial Oil had a research facility in Calgary doing oil sands research, in addition to Alberta Research Council, in addition to the universities that the larger players in oil sands had their own research companies. So, when you had Imperial Oil folks in the room, you essentially had international players in the room, and so you had Syncrude and Suncor, I believe at the time as well. Shell certainly had their own research facility for a while too.

AD: Well, as you know, from 1975 to 1980 Syncrude was built and, of course, you had the massive environment impact assessments. Were you aware of the AOSERP [Alberta Oil Sands Environmental Research Program]?

WOOD: Yes, I was aware of it but only peripherally. I was aware that, certainly, the surface mining operations take a significant toll on the piece of land that they impact; I'm also aware that total volume, size of land is very small compared to the size of the Boreal Forest in Northern Alberta and Northern Canada. My perspective on some of that has been kind of interesting because I see some of the things we do as humans to our cities, and we pave over a lot of environment, and I don't see that we have an environmental remediation plan for recovering that land for "natural purposes" after we are done with it; and we do have an environmental remediation plan for the oil sands.

AD: You brought up the issue of the environment and I'm going to go back to this because, I think you have made a really interesting point that, in terms of the work at AOSTRA, you talked about your work on water and I'll ask you very specifically to talk about that but in terms of the work at AOSTRA - was any of it environmentally related?

WOOD: Yes, I think the reason we did the water work was a environmentally-related. The water work was trying to see how you could take the water that is produced during the cleanup of the oil sand product; it's now dirty water – dirty in that it has colloidal clays in it; it has small particles of the oil attached to the clay, attached to the water; it's an interesting piece of chemistry itself. And the idea was, how much could you clean up that was clean enough to either re-inject down hole, or that could be used again in a boiler, so that you wouldn't be having to be re-injecting it.

There were two or three focuses to the project; it was really reducing the total amount of water you wanted to use, and cleaning up the water after it's been used to recover the oil sands; cleaning it up so that it can be returned to the environment safely; so, what do you need to do that? And the third one was the use for boiler water. The water in the Peace River area is a completely different creature than the water in the Cold Lake area and different total dissolved-solids, different chemistry and different impact on boilers. We did even imagine developing a boiler that was very much less sensitive to corrosion and putting the dirty water through it, and could we make that work? And, so, we imagined a whole bunch of different ways of working it. I was less on the technical side on a number of these things when we got there to helping to manage, supporting Tom Harkness in managing some of the projects, and just getting all the paper work together for it. But reading that stuff was really fun. They then did - in the middle of the 1980's - work to establish an environmental officer within the organization charged with having an AOSTRA environmental policy, and that was

– I imagined it to be twofold. I imagined it to be for the operations of AOSTRA as an organization and, second, I imagined it for – what environmental projects would be needed for the rest of the world for the oil sands itself. And I had just been asked to take on that role - I had no background in it; I didn't have an environmental degree and, so, I sat in a really nice office and read for six months, and drafted everything I could think of for a policy, which was very elementary – high-level "We should do these things" policy. And, then, I moved on to the Department of Energy and they did, to their credit, hire somebody with an actual degree in Environmental Sciences, and I was really glad they did that; that they could make sure they had appropriate policies for environment. By the way, that was Rick Nelson, and I'm not sure if you have heard his name yet.

AD: Thank you, I will certainly look into it. Now, in terms of this basic policy that you drafted, do you want to give me what it said in broad strokes?

WOOD: On the external side, its suggested that we spend some of the endowment money, or the money that was AOSTRA's, to specifically look at environmental-mitigation remediation and that, within AOSTRA, that AOSTRA should look at its own business practices; the internal stuff was better recycling, using paper with a higher content – really how we, as an organization, operate and how we use our time and, where there other ways than traveling everywhere to get the conversations together, and to really as an organization to be more environmentally sensitive in the way we used our facilities; because, in my opinion, you couldn't go out and tell others how to do it if you weren't doing it yourself.

AD: So, in other words, that whole consciousness of the three R's; reuse, recycle, whatever, so looking at the whole "greening" of technology.

WOOD: Greening our operations and the way we thought about it so that, when we go out and ask people, "What are your projects on that," we weren't being hypocritical about it. But, I must say it was about the same time that I submitted my very small proposal to Bob Turner, that I was moving on, so, I actually - I don't know what AOSTRA did with my proposals, although they did hire someone else to look after things afterwards. I know that Rick had more contribution to what AOSTRA did environmentally.

AD: Now, I want to go back to the work on water, water treatment, water re-use. What kind of testing was going on with respect to these concepts?

WOOD: A little bit of whatever was needed. One company came with a reverse-osmosis proposal; they were out of Ontario and so they were working really at the bench level, would probably fit on the piece of equipment behind me. It was small units and sensitive membranes and we really had a sense that the sensitive membranes would foul very quickly with the bitumen product, which was true. But we tried a number of different membranes, and we tried different pre-treatment technologies to see if we could make it work. And that wasn't the technology that was going to go. There were other technologies that were based on chemical treatment, and that takes a lot of

chemicals and, then, you have to deal with the refresh of that one. One of them - you would heat the chemical afterward to refresh it and reuse it. Those are the ones that I remember.

AD: And what about the boiler experiments?

WOOD: We didn't ever take that to a "live" boiler and we tried some chemistry and we checked a few ideas. I don't think we ever got to the stage of testing a boiler.

AD: I ask because you see, 30 years later, they are still working on those issues, and the water area is huge.

WOOD: It's not an instant fix; there is no, not likely, a silver bullet on that.

AD: So, that this very early research was exploring some of those key ideas that are still being explored in research establishments.

WOOD: I am remembering a test we did on a couple of live boilers, so, we didn't change the water that the company was using, but we did put tabs of different metals in a boiler. So, when they did a maintenance upgrade, as they reassembled things, to put a sample of a different steel or metal, a different alloy, and they put different tabs in the boiler and then you would check it, the next year and determine the amount of pitting, or how the corrosion had affected this metal or that metal, and would one metal do better than the others. And, you can see, in the electricity industry alone, you can see that that is still a factor because we have had, in Alberta, boiler shutdowns because they are concerned [about] boiler-tube safety, and a 30 year old boiler you are still concerned about corrosion. It's still an ongoing concern.

AD: Now, you talked about the international level and the international agreements and cooperation, which is amazing; not only was Alberta a leader in this technology but the level of international cooperation and sharing that happened. I have seen a few of the papers presented including a slide tape presentation done by Clem Bowman at one of these international gatherings and I'm getting it for the Glenbow. But tell me a bit about your sense of that international work as you've mentioned it, and you've mentioned the events that happened in Edmonton.

WOOD: So, I wasn't involved in any of it but it was swirling around. I know that staff members from AOSTRA would travel to China and work with the Chinese on their oil sands because they have some. We worked with folks from Russia and, at one point in time, we sent an entire train car of bitumen over to Germany to be tested in someone else's technology to see if their plant could process our oil sands. It was interesting that we had so many international connections and I'm not sure exactly when they were formalized but I know that UNITAR, we started working on sending a group of people over to the conference; it was held every three years. So, when we did it in Edmonton, I was exposed to more of the people and more of the materials. We had 26 or 28 countries represented and my job had significantly to do with getting the flags in the right place. But all those people at the convention centre with simultaneous sessions on mining and extraction and water treatment and all the different bits of oil sands. For me, it was getting the logistics and, then,

seeing all the people come, and rooms and rooms full of people interested in – and there are researchers from across Canada, folks who participated in the ENSERC program who would come, and the U of A professors Farouq Ali and folks who would come and present and listen and lead conversations making sure that the speakers had met one another, putting together panels and just the conversations that swirled around how do we understand this material, how do we safely and economically process it. Economically means you use less water; economically means treatment that gives you – finding the highest-quality oil sand to work with; learning how to develop and in situ technology because we can't mine all of it in Alberta – you can mine in the order of 20%. At least that was the number that was in my head then. I don't know if that number has changed because of additional geologic work and discoveries, but making sure we had technologies for all the different parts of it. It was really fascinating to see the people come from China, from Venezuela, from Russia, from Germany and around the world to work on a technology to help us in Alberta, in addition to the other places in the world - unlock this resource.

AD: And, you see today when the Chinese Government oil company buys a Canadian company that people are surprised but, of course, it's no longer current knowledge, these research partnerships including the one with Japan that Ted Cyr was involved in, and he did his post docs in Japan. So that reaching out internationally, and that international interest and collaboration.

WOOD: It is interesting because, even in the world that I work in, in Electricity now, Alberta has always been a leader of, "Let's figure out how to do this," and really look to the rest of the world to see what other people are doing. But, if we don't see what we are needing, we'll go and invent it and we will develop it here and we will work with the world. And we see that happening with the carbon capture and storage stuff that is going on, which is happening in my Division at the Department of Energy, and we saw this in oil sands. We have this resource; it's an amazing resource, and Peter Lougheed (Premier Lougheed) had the vision that we could put enough mines together in a place where they would be thinking together and feeding off one another – you get that critical mass of people thinking about it, who then feed off one another's ideas and expand on one another's ideas so that we can actually move to unlocking it, making it economic, and making it a driving force for our economy. And, now, you see what we are doing, it is really fun to have watched that process, and some of it from inside.

AD: So, you began your career in a really visionary organization, highly motivated, great minds, and strategic thinkers. But, on the economic side, of course, in1981 when you began your career was when we had the oil-based economic downturn. How did that impinge, or did it impinge in any way, on the work of AOSTRA?

WOOD: AOSTRA was still fairly new in 1981; it had only been around for five or six years. And, so, to fund AOSTRA at that point in time didn't appear to waiver. It took a little while longer for that to change. The economic downturn affected me personally in that I got a job and started with AOSTRA and looked around at my colleagues in school and they were having a hard time finding jobs. I think, and I tease that I got the last good job out of my graduating class and that my colleagues had much more of a challenge. And the year before everybody graduated and got bonuses

to sign on board once they arrive, so it was a different time. But their need for research hadn't changed and, in 1981-1982, we weren't really feeling the economic downturn. The commitment of dollars in government was still solid at that point in time and, so, our challenge was making sure that folks could apply for these funds for research, helping them understand intellectual property obligations, and we did have obligations.

The researchers would be working on the research but it was funded by the Provincial government and the intellectual property was for the Provincial government. There were arguments made publicly if it was money paid for by the public that all the data should go public right away. We thought it was important that the researcher have some time to play with that data, so, there were some periods where the researcher could continue to work on things, and some periods were it was still confidential. There was some dissent on how intellectual property was handled, and Ted would know more of the lawyers and legal side than I would, but I remember the conversations about keeping things confidential because, any time I worked on a project, there would be an application process that George Villett as Registrar would deal with and, then, there was the application review, so technical specialists from around the world even would comment. It was a challenge because you had to make sure that the technical specialists were adequate to understand what was being posed, and still held by confidentiality that they didn't take an idea and run with it. You had some very interesting challenges to review it – review an application. Once an application was approved and the Board had said, "Yes, we are going to commit some funding to this," then, you would sign an arrangement to deal with the researcher and their organization. So, with the researcher and the Alberta Research Council, or the University of Alberta, and, then, the work would begin and it was some very interesting times in those negotiations too.

AD: Well, it's interesting because I've seen some of the patents were filed by individuals but, then, of cours,e the collective patents – AOSTRA as an agent of the Government of Alberta. But the thrust at that point for all of this research, which I really consider the second era of government research because, of course, the first era was centered around Karl Clark and Bitumount that, then, enabled Premier Manning to open up the oil sands for development, sharing this knowledge with the companies. But, then, this is the second era [of research] will be after the set up of GCOS [Great Canadian Oil Sands] and Syncrude; this is the second era and this has resulted in the massive development in the last 15 to 20 years and, so, there is a clear relationship between good research and development.

WOOD: Yes, it's an interesting pattern and there's a pretty standard understanding of – you have to do the theoretical research and the elementary bench testing so you can go along these areas. And, there is one area where, once you have done bench testing and pilot testing and sort of "large" lab testing where you now need venture capital to move it from here to there and, to a significant degree, AOSTRA filled that gap, and AOSTRA still did support the theoretical and bench testing and the early pilot stages things that could, in the "back 40" behind the Alberta Research Council facilities off in Mill Woods. But, once you had done those tests and proved that there was something worth doing here, you really do need that bigger chunk of capital, and it's not a million dollar project

or a five million dollar project; at that time it was 10-20 million to do from here to there before industry will take it and run with it.

And industry may want to participate in this stage but they might not want to take on all that risk on their own. And, so, I think all of society has benefited from all of the research in all of the fields over the years, but this really is a nice, clear example of putting money into this type of research, bridging that gap and, then, seeing how industry is able now to take these technologies; and they are still doing research at the industry level. But, you see now that the research is moving from companies like Syncrude and Suncor, and all of the folks in the oil sands now who are still doing some of it, but its moving into the service companies and they are doing a bunch of the research on how to better-perform this function that they serve for the companies – it's a good story.

AD: And, of course, it's still so relevant; here we have the Federal Government, yet again, rejigging what the National Research Council does; the Provincial Government in terms of Universities and, of course, that is really a hot issue at the moment – trying to get research that is directly applicable to the work of industries. In the early 1980's when I was a Science and Technology Editor of *The Canadian Encyclopedia* the buzz word was "technology transfer" from the lab, i.e. the universities, or the research councils to industry but it seems to me that the AOSTRA model worked.

WOOD: It was established to achieve those things specifically, so, we worked at trying to be the broker for some of that. We got the researchers together with each other and with industry to try and mix and mingle. We tried to be a catalyst to get that together and, I have noted over three years, that it has been an interesting struggle. You need folks in industry who understand the role of research to even be the node into which you communicate with the corporation. And, if the corporation has shed themselves of that level of individual whose high enough in the management stream that they can get the attention of the executives and the Board at the level that they understand the role and function of research, and what it can do for the corporation.

We worked at trying to help corporations and identify those people and get that together, and have those people come and meet their colleagues and the researchers, making sure that the researchers met one another and, then, you could start to see that they could do the work that they needed to do, once they were in the room together. AOSTRA, you know – we always wanted to find more ways of doing it and, when we would do it, we would think, "I'm not sure that that worked. Can we say that there was success from that workshop?" It was really hard to measure that that workshop helped. But, in fact, you might not know which workshop it was but, because you were continuing to have the conversation and getting the researchers together and getting the industry together, but I noted it was between 1993 and 1996 and research came into government more and, then, government in 1999 restructured how all of research was done and they established the Alberta Energy Research Institute [AERI], and they did the similar sorts of things for the Health Sciences research and they changed the structure of it. About the same time, industry changed their structures and you saw layers of management being shed at different times where you weren't sure that the industry had the nodes of people inside their corporations who could connect to the research organizations.

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So, we lost some of that at one point in time. I know AERI has worked to keep it up, and I'm not up to date on how it's going from their perspective. But there was a period in the Department of Energy where the research and technology Branch was just about gone. I left in 1999 from the Research and Technology Branch and Roger Bailey at that time was the Branch head. He was in Calgary with another bunch of folks, and Doug Komery comes to mind, Manager of Mining over a few years. And everybody who was in AOSTRA either went to AERI, or to the Research Council, or to someplace else in government, and really there were only about 10-11 folks who, I believe, went to AERI in 1999. April 1, 1999 I joined the Electricity team and, I think, for a few years Energy had no research, had no research and technology branch at all, but we continued as a Government to support certain things in research, and realized that, ultimately, we couldn't manage those things well unless we had a research and technology branch, so it was recreated a few years later.

AD: Because, you know, when reading about it, the hey-day of AOSTRA, you were a part of that in your early career that, once it got pulled into government, then – and I've asked this question, why was AOSTRA shut down? Well, it wasn't shut down; you can't say at this particular date but it was allowed to "peter out" in a sense as fiscal regimes change and the perception of the role of government changed and, so, those that supported small government – and it's the Thacherite and Douglas the New Zealand economist I believe was the one that advised Premier Klein – you had that whole restructuring and, then, those units, in effect, disappeared.

WOOD: Funding had been declining into the 1990s and, then, in 1993, AOSTRA was rolled into government as – I think there is a need for government to understand all the agencies that it creates to help deliver government functions and, I think, they did that to almost every agency, rolled it into government. That was a political part of trying to manage size and distance and, when your agencies get too far away from you, it's time to bring them in and there is a little bit of an "accordion effect" in government; it goes further away and comes back, or maybe you might call that a pendulum swinging. And, so, the pendulum swung and everything came into government and AOSTRA still existed but it was smaller by then, with fewer funds and the Board at one point in time was the Deputy Minister and the Branch Head and, I think, one other person. I was Registrar to the Board when the Board was [made up of] all staff members for a short period of time, and Bob King was Chair of the Board – he was Deputy Minister of Energy for a year and he was Chair of the Board for that year. And, I remember some of those days, but you are right, it didn't so much end, as get rolled into AERI, and AERI was not given the type of funding and the type of freedom and the type of flexibility and vision that AOSTRA had been given. And, you know, the vision that Peter Lougheed had went decades out and Ralph Klein had a vision; it was different and it was about keeping government manageable and he, to a significant degree within his term, was successful in what he was seeking to achieve. History will have some comments on both of those things.

AD: I asked that specifically because we've had commentators saying that there should be an AOSTRA Two.

WOOD: Sure. Is it time now to do more oil sands research? Is it time now to do oil sands environmental research? What about an AOSTRA environment research team? There is some really interesting questions out there that have not yet been answered, and that we are continuing to work on, and are we working on them hard enough, fast enough? I don't have the answer to those great questions.

AD: Well, you see the emergence now of agencies that not only have the traditional oil sands research under their umbrellas – so better mining, extraction, processing, all of those technologies – but now also the environmental equation and, so, the Oil Sands Tailings Consortium, which is now wrapped up into a larger entity – COSIA – all of those things, so that it may be that we are at the beginning of another cycle, and that the environmental "trashing" of the oil sands while unpleasant both for governments and industry may be forcing that shift to sustainable development that is not environmentally prejudicial, or prejudicial to the environment.

WOOD: I think these things come in cycles and I'd have to say that I'm not as aware of the where the cycle is going on – this one right now. I would love to see the cycle keep moving around because we all have our favorite parts of the cycle. And, for me, watching technology solve puzzles and problems that's the fun part for me.

AD: And, would you say that is the core of what AOSTRA did in its various incarnations?

WOOD: Oh, yes, when you can take the researchers who have the knowledge and unleash them on the problems, you unleash a tremendous amount of intellectual energy to try and solve something. When you give them the funds where they can actually play in the sand – I mean really play in the sand to solve the problem – you can have all sorts of wonderful things happen, and they had a place to go and, with good justification and rationale, say, "I'd like to research this piece," and, in the early days of AOSTRA, the hey-day, there was an untapped – it was almost limitless what you could do research on because so little had been done, and there was so much to do. It was a vast and wide-open playground. So, the pockets are a little smaller now because we have figured out this, so now you have to play around that; that's fine, there is still lots of puzzles to be solved and, if you had the resources where you could go solve them and get the people to sit in a lab and sit in a classroom and then go out into the "back-40" and build something and try it out, you can solve a bunch more problems.

AD: It's clear that you strongly feel that government has a role in this because you have people say, "Oh well, if it's research that is going to benefit industry, let industry fund it," but what's the case to be made for the government doing it?

WOOD: It's an interesting piece because government is the people, right? We elect our elected officials because they represent us and we, the people, want these new things in life; we want more "clean" and it's a developing social understanding that we want the things that we do in life to be "cleaner on the planet." Great, so we, the people, want these outcomes; we the people need to support those. How do we get from here to there? And, industry will take us part of the way, but

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their job is to support their shareholders and their job is to make money, and that's a good thing because we work for companies that make money so that we can earn a salary, so we can do this too.

But there are places in the pathway from – "we don't know anything" to "there is an industry making money"; somewhere in that path, there is no funding and industry will take it from to "here's a cool idea and we know it works" to "we will build a little one or we will build a big one," but industry has no reason in what they do to support the intellectual musings of the theoretical physicist or theoretical chemist to do this next thing that will lead to the next thing. So society does those things. Governments support research; governments support universities to find the people that think those things, who will have those ideas, and we support the research. We support students. We support learning. We as a society benefit when everyone in the society is better educated and there is some pieces of that pathway over time have been well funded and not well funded. But there is a role, in my opinion, there is a role for government to support that pathway and make sure that all those little bricks are connected so that, when it's at the stage where industry can take it away and go play with it, and build it and make money at it, we've got that pathway.

Is there a role for industry to support some of that? Absolutely. Are they going to lead that? I don't think they have the time and energy; they are busy just like everyone else. And, Peter Lougheed saw that path and, as a visionary said, "Let's pave some of that road so that the researchers can have that conversation and bring things from the theoretical stage to the - we can make it happen stage," and, somewhere in that last little bit, you have that crossover between industry and research. But there are a couple of stages back here where you need government funds; you need somebody to say, "Let's do this."

AD: And, of course, that has been lost in the sense that there isn't any readily-accessible story available to the public that says the fact that we have had this flowering of economic activity in the 1990s that that happened because you had investment in research and innovation that was government-led with industry as a partner.

WOOD: So, telling our own stories as a society is something that we don't do very often, and we need historians to do it. I'm working in an industry right now – electricity – that's 15 or 20 years into our story of restructuring the Alberta market. And, it was in the early 1990s, 1993-94-95 where we started this effort that came to fruition, part of it in 1998, part of it in 2001; we haven't told that story either and, so, it's in the heads of people, and I get part of it, and the people you are interviewing get part of it but, having a story told like that so that we as a society build it into our own history, and that we don't think that our history starts when somebody discovered North America, and all the little bits of stories about Canada that we learn as children, we need to learn this story too. We need to capture it, codify it, tell it, brag about it, it's part of our pride and we don't turn around and get proud about the work we have done in oil sands. There are people that are very unhappy about the oil sands and I am delighted with the story of oil sands but the story isn't finished yet. So, when people don't like the story, my response is we aren't finished yet; we aren't done; it's not over; you can't say you don't like the story yet, it hasn't finished unfolding.

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AD: Well, the least-interpreted aspect of history is science and technology history and, of course, that is in part what I do; I'm a historian of science and technology, and you get "space" and those different aspects but the mainstream science and technology story isn't told; it's well-known even in Canada, and I speak as the first Science and Technology Editor of the *Canadian Encyclopedia*. But also it used to be that you had the "heroes of science," the "heroes of medicine," all of those things but there is a deep distrust now of the "mad" scientist, and this figure had appeared in literature since Frankenstein and the monster. But, today, there is this pervasive distrust and how, then, one changes that is a struggle. I think the Petroleum History Society, in doing this documentation project, is gathering those first-hand experiential perspectives so that, if a historian wants to tell some of these stories, the raw material is available. Now, in terms of your time at AOSTRA are there any other stories that you want to share with us?

WOOD: I haven't really said about the number of summer students that AOSTRA worked with. AOSTRA hired a fair number of young engineers right out of school, I think of Atul Thakrar and Bob Germain, who joined pretty much the same time that I did and took on different projects throughout the organization and had their opportunity to understand research and technology, and then go onto their careers somewhere else. And the summer students that came and spent four months learning about the idea of research, and sort of how research worked, and what the role of research in society is, and the opportunity that AOSTRA gave to students. They also had, I think, there was a program to help students with school; I'm not sure what that was but its twigging something in my memory banks but that AOSTRA didn't just focus on the established researcher and helping that person go the next step. They focused on young folks and bringing them in and giving them this opportunity. The lawyer for AOSTRA was Elma Spady and Elma would hire young folks who had just finished their articling and who were just starting their career to practise writing these agreements, and to get their teeth into some of the intellectual agreements. We had a young man in the legal field come and work with us, who then left and went to specialize in intellectual law and, I think, patent law. So, to bring people along and help them find a place and specialize was really interesting to see that AOSTRA wasn't just focused on what already existed. They were trying to stimulate the growth of these things, and bring in the students and spend some time on campus. I also know that there was work being done to help people in "what's that next step in your career," and one of the fellows who had been a research director at AOSTRA, who had a really good mind for things, wrote a couple of papers on some of the work that was being done and ended up going back into the university as a professor, and helping to train the next generation of petroleum engineers; and, so, building into the community in different ways at the universities.

AD: Well, of course, we have seen, AOSTRA did fund research projects in the universities but we have also seen the companies endow chairs at the universities, both the University of Alberta and the University of Calgary, and that there is a very close linkage between the oil sands companies and the research in the university.

Now, we talked before about your choice of career, which is atypical for a woman. In terms of the oil sands and that period, there are very few women working in - either on the technological side or

the scientific side. There were women in the personnel area and other areas, so, in terms of AOSTRA, how did you feel as a woman? Where there many women in the AOSTRA establishment?

WOOD: Well, I will go back a little bit. I walked into that first classroom of engineering; when I did my degree where all 500 first-year students were required to come to the basement of the Jubilee Auditorium, and listen to an engineer talk about what it was to be an engineer. And, I stood in that room and looked around and that was the first moment that I had understood that engineering was a male-dominated profession. It simply hadn't occurred to me that just because I liked math and physics that I was joining a group of mostly guys to do math and physics. And, I looked around the room and went "there is one [a woman] over there," so it was quite a shock to me to discover I had made this choice, and nobody had told me to go and talk to those counsellors, what were they doing? And, so, every job I got, there were women around but they were the women that were providing the support services and the general "human relations" and things like that. I admit that the woman from Shell that interviewed two years in a row, and we laughed the second year that it was the most dreadful interview the first year. I'm not sure the second year was much better and she offered me a job both times, which was quite a surprise after the interview process. But I got to AOSTRA and, to the best of my recollection I was the only female professional in the field. Elma Spady as a lawyer was also a professional, so I lied; not the only but the lawyer was a woman and I was a woman, and I don't recall running across any other women in the first five or seven years of my career.

When I was in a meeting room of the technical conversations of the research, I remember going to that first industry meeting when Tom Harkness was the hired project manager and facilitator, and all these folks around the room, and just the whole beginning of my career was me in a room with a bunch of guys. And there was that one tremendously embarrassing moment although, I must say, that I was not the embarrassed one, when after a morning of industry conversation in Calgary, we went for lunch, and we were invited to go to the club, and I don't remember which club it was - I don't even want to mention names - but we were invited to essentially a private club, and it was a "boys" club. When we got there, I excused myself to go to use the washroom and, when I came out, our plans had changed, and we were now walking to another restaurant two blocks away. And it took me a while to find out what had happened, because they weren't really proud to tell me what had happened, but we had been refused entry because I was part of the party; refused entry in, probably, 1985 because you had a woman in your party. I was not the embarrassed party because that wasn't embarrassing to me but I'm hoping somebody was truly embarrassed that they belonged to a place that a woman was refused entry. And they thought a little more carefully where we should eat lunch after that.

AD: So, there were a number of firsts in your life, some pleasant and some not so pleasant. What then prompted you to then leave AOSTRA?

WOOD: Growth and development to a significant degree because, while the organization overall supported a lot of growth and development, I found that in my little pocket I wasn't being given the same opportunities that some of the other folks were being given. At that time, the students, the

young engineers that I was working with, were also leaving because there was a lot more work for the seasoned engineers and seasoned professionals but, if you were junior in your career, there was much less that you could achieve to the same degree. And, being a project manager of a project that other people had approved and other people knew about but, as an engineer, all you could do was really watch and make sure they weren't doing anything foolish; that they submitted their invoices on time; that was project management at a level that was less technical than I wanted. So, I was looking for something else. I was very fortunate; I was on a team that included a staff member at the Department of Energy. He was looking to hire someone and, through the course of being on the same group, we made a connection and I did some work for him to make sure that he could see that my "writing" style and my "thinking" style was adequate for his needs, and he hired me into the Department of Energy six or eight months later.

AD: And, so, when did you move to the Department of Energy?

WOOD: The fall of 1998.

AD: Did you think that you were going to become a career civil servant when you made that move?

WOOD: I actually thought I might be a career civil servant when I joined AOSTRA. The appeal of going to a company and being always looking at the next quarter, and always looking at the financial statement this time or that time, it wasn't my driving force. I have always, I don't know how you described it back then, but working for the people, working to make things better, and that "public service" feel, it's just been a part of who I am, and I just love working for the public service. I'm proud to work for the public service, and we don't always acquit ourselves with great pride and honour, but there are probably 99.5% who do, and we get frustrated like any other profession when there are members of our cohort who don't uphold the same values we have, but I am seeing some great things, and I'm really excited to be a part of the public service.

AD: So, then you shifted to the Alberta Department of Energy and what was your responsibility and what was your title at that point?

WOOD: Title was "Manager of Projects" as far as I can remember. I am not sure I kept my rookie card from the Department. I worked for Tom Sneddon in the office of Coal Research and Technology from about 1988, the fall of 1988 to the middle of 1989. Tom left after about 10 months; there was change in management and he could work for, and had a good working relationship with a leader at the time, and the new leader was much more defined in context; it was harder to work for. So, I worked for Tom for 10 months and, then, I worked for the new character for a couple months. He was a challenge to work for; I learned a lot from him but also a lot of what I didn't want to do as a manager. But I worked for the office of Coal Research and Technology and, generally, did the same sorts of things. I worked on coal programs and was looking at some coal research programs, a lot of coal mining efficiency work but I also helped the team develop the publications. So, while there was a professional writer who did this and a professional graphic artist who did that, and the guy in the shop who managed all those pieces, I would do some of the reading

through things, and helping to make sure we had the whole process together. And I worked to a significant degree on the projects that were going on in-house. We had, at that point in time, the most amazing management team: the boss was German; the "wind" guy who worked on wind projects, wind research was Spanish; we had a Turkish fellow; and East Indian fellow; myself and one other effectively Edmonton-born Canadian and, so, it was a great multicultural world, which is often true in the sciences and technologies. You get that wide spectrum and we had a very good time working on that.

In about 1984, sorry 1994, there was a negotiation that had been attempted for many years between the Federal government and their Western Economic Partnership Agreements, and Alberta, on minerals. So, a mineral-development agreement was initiated and I was tasked to organize the entire process and, essentially, set up the type of project application review process, funding program and managing the reporting when the Federal government came to Alberta, and would get their quarterly update on all of that. So, I worked on that program for the four years that it ran, and I gained some really great experience on project management and a few things, and leading those teams, gathering people together that would be the experts who would review the work. I worked with the Alberta Geological Survey and had some very good experiences with that program. That pretty much wrapped up in 1998, at which point in time, somewhere in that, in 1996, I was also promoted to be Registrar of AOSTRA, so, we had the Minerals Development side and the AOSTRA thing in the office at the same time. It was in 1999 when all the science and technology things were wrapped up at the Department of Energy: they went elsewhere to AERI and to other places, and I moved into the Electricity team.

AD: So, you were there at that winding up of AOSTRA.

WOOD: To a significant degree, yes, I was registrar of all the projects that were still being looked after, and there was a significant amount of making sure the files had everything they had, the functioning of the Alberta Oil Sands Information System [AOSIS] was now being handled through the Calgary office, which was in downtown Calgary, so, information management had moved to Calgary, and there were still projects ongoing and still a need for a board. So, staff members had been appointed to the Board and we would meet with the Deputy and go through all the paperwork, but there was still much less new research being initiated and much more "this is the status of these projects" and winding it down.

AD: Winding down the projects and you mentioned the whole communications area. Of course, AOSTRA published a lot, so do you want to talk about that because as Registrar at the end you would be aware of all of that?

WOOD: Actually, as Registrar, even by the time that AOSTRA was rolled into the Department, I have a much smaller awareness of communications. When AOSTRA was still an independent agency, and still in the Highfield Place in downtown Edmonton, there were a team of people who looked after the communications, and hiring the writers to get things done, and to get things published, and to take the proceedings of all the international conferences and have them published,

which was a month-long or year-long effort after each conference. So, yes, there was a lot of material published, and each report was published in one form or another; if only to the information system but it was available to the public after a certain amount of time. While I was Registrar, I have no significant memory of a communications effort, while it was in the mid-to-late-1990s.

AD: You see the industry and government today are faulted for lack of these communications pieces and, whereas, with AOSTRA, not only were there international collaborations, industry – government-university collaboration but there is an extensive publication program.

WOOD: Well, we are seeing right now that, yes, government is faulted for not having good communications and, then, they are faulted when they do communicate because effective communications are expensive. So, you are looking at a government that is trying to manage dollars and, every time they spend any dollars on communicating, there are complaints that they are spending money inappropriately. I think it's a question of what do you want to be and go be it; government has an obligation to figure out how much communication is appropriate and, then, to just do that. But, you are right, there are many things happening that could be communicated more effectively than they are right now.

AD: And, particularly, if this is research that is significant and impacts on the way that industry functions.

WOOD: Research that is not communicated will be repeated by the next guy that has the same idea. And that, effectively, is a waste of the available resource on the planet to do anything twice, unnecessarily, so the research dollars are important to be spent, and the incremental dollars to communicate it are small in comparison to allowing somebody to redo the same darn thing in five years. Sorry, do I have an opinion on that, yes, I do.

AD: That is perfectly alright. So, then, you helped to bring about closure of AOSTRA and what was the next move?

WOOD: For me, and it's interesting the way you described that. I have not in my head and heart described my role in the latter half of the 1990s as helping to close off AOSTRA; and, so, it's an interesting way for me to think of my role, then, as in closing it off. My role, then, moved into Electricity and I had started my MBA while I was still with AOSTRA. I credit Ted Cyr for the occasional conversation about the Department of Energy itself, which is filled with economists and engineers. His comment was, "Engineers can learn to speak economics but economists are not likely to go learn to speak engineering so, if you want to actually continue to advance in a career, it's useful to speak economics." He brought me an economics text book and, he is a persistent fellow, and I couldn't simply say, "no," after that many times that he came back. So, I read the text book and realized that "I can read a graph, I understand numbers, I am good to go." So, as I was looking at my life in the arc of my life I thought it was time to go to school, and decided that I would go get an MBA. I was a year into it when I was looking for a placement, somewhere in the Department of Energy, and I essentially wandered around and chatted with branch heads and looked at what they

were doing and where my interest lay. And I chatted with the head of Electricity and that was Harry Keirich at the time and he was pretty funny, he is a man that knew his strengths, and he was a man that acknowledged his weaknesses, and he said, "Right, let me see your resume," and so I handed it to him, and he looked that I was going to school and he saw my marks and he said, "Okay, I'm willing to talk to you, but I don't do this. You have to talk to each of my team leads and, if they recommend you, then you are in,"

So I shopped myself around, essentially, and made appointments to see each of his team leads and talk to them. And, one of his team leads at the time was Dr. Sid Carlson, an economist from the U of A who was working at the Electricity Branch at the time, helping in designing the wholesale market. I sat down with her and it was rescheduled three times because electricity is so busy, and, when we sat down, she gave me half an hour and I took an hour and a half of her time and, afterwards, she said to Larry, "Yes, let's add this woman to the staff." So, I joined the team in, effectively, April 1, 1999 and worked directly for Larry doing some project-management things. But my form of project management doesn't include "pestering" people. And certain times certain people need to be pestered, and I'm not particularly good at that. So, there was a bit of a rocky beginning and, ultimately, I did a few things that Larry really liked, and we started getting along a little better, and he started appreciating my skills and using my talents differently.

And, then, early in the 2000s, maybe 2002-2003, Ann Denman joined the department and she saw what I was capable of and she asked to have me moved into her team on the retail market. So, I spent a few years in her team, and life changed, and Larry retired, and we were looking to bring people in. She got moved to more of an executive role and I took over the retail team as "acting." So, I did a couple years as "acting head" of the Retail Team and realized that acting was still a frustrating place to be, because it's still not yours, and there is that sense that you are still not sure that people are giving you the obligations and accountability for things. So, I accepted an Executive Mobility secondment, and worked for Environment for a year, at which I got to work on elements that were a "refresh" of a Regional Plan for North East Alberta, which had an oil sands component.

The work I was doing was paralleling work that was being done on the oil sands secretariat at the time, which I think was Heather Kennedy seconded to Alberta Government to work on that, and things that were part of the work that I was doing ended up moving into parts that are part of the Land Use Framework, and the Regional Plan for Northeast Alberta. So, I worked on that part for a year; I learned a lot, particularly the piece that the skills I have are mobile; they come with me and I can use them in other context. And, when I was looking to wrap up my year "abroad," so to speak, there was a new lead of the Electricity Division and it was Tim Grant. Tim was Major General Tim Grant in the Canadian Armed Forces. So, we had a good leader come; he didn't know electricity but he was on the receiving end of a whole lot of learning and, when I met him, I thought that it would be an excellent experience to learn from his leadership style. So, he was holding a competition for the Head of Markets at that time, and there were several people that applied and some of my colleagues, and he offered me the position. So, I came back to Energy to work as the Head of the Electricity Markets Branch, and that included the wholesale market and the retail market, and my amazing team of policy advisors on those two markets. It was great fun.

AD: I want to go back to your work within the Department of the Environment because, of course, I've interviewed Ernie Hui from Alberta Environment, who was in charge of the policy development area and, particularly, the Northern Region and, at that point, they shifted, rather than having everything centralized within the Ministry, the policy portfolio remained within the Ministry, but you had regionalization of approvals and a whole range of things. That was a crucial era. So, I would like you to talk about what your responsibilities were and also your perceptions of what was going on.

WOOD: So, I joined the new branch that was created under Jane Dundrum and, I think, Shannon Flint was the Branch Head at that time hiring a bunch of people. I was brought in secondment, and Shannon and I were colleagues working for Jane, and it was the Oil Sands Environmental Management Branch, and I was brought in to facilitate – I was brought in to be the lead on the redevelopment of a regional development strategy for Northeast Alberta. I'm trying to remember the name of it, because the name of it changed while I was there, and there were some hiccups - getting me from Energy to Environment - because of political priorities going on in the Department of Energy, and I had a little bit of "to'ing and fro'ing." It ended up when I was fully at Environment, it was a Regional Environmental Management Plan for the North East, and I was coordinating a group that included staff and experts from Energy, from Environment and from Sustainable Resource Development, which at the time was a separate department, and bring those staff together to look at all of the issues that had been part of the Regional Development Strategy.

And, at the same time, there was work going on in Environment and, my apologies, I did this the first month; they both start with "EN" (Environment and Energy), and I got them mixed up all the time, and the "we" and the "they"; it was a very confusing time. In Environment, they were working on pieces that were systems-thinking for environmental management and, so, we were trying to put together the team that would go through the environmental, social and economic portions of a Regional Development Strategy. It was amazing work; it was crucial work. I didn't take it to completion and I'm not sure it ever ended up being completed under the format that it was initiated because the Land Use Framework was going on at the same time. Much of this work started with consultations under this project that, then, effectively migrated into the Regional Plan for the Northeastern Region after the Land Use Framework had been approved. So, there were many things going on at the same time with the Oil Sands Secretariat and the Land Use Frameworks Secretariat and the Oil Sands Environmental Team "systems thinking," and this refresh of the regional development strategy. It was wonderful to bring the teams together from Energy and Environment and Sustainable Resource Development. Every time I managed to get them all in a room, they all got called off to the other meetings for the Oil Sands Strategy because the work that I was hired to do ended up being of less priority, overall, than the oil sands stuff, or the land use framework stuff.

So, there were great opportunities and some frustrations with the sort of "shifting sands" of priorities in the middle of the work I was working on. But, there was a sense of urgency; there was a sense of real need and urgency to be sure we had it right in terms of oil sands environmental management for Northeast Alberta and, then, for every region in the province because of the very

visible public pressures, international pressures on oil sands, and how oil sands environmental management had been done.

So, Jane was tasked with putting together a team and this team had three people in it when I joined; Shannon Flint, Kate Rich and Sarah Earheart and, then, the three of them were doing the hiring for all of the positions to be filled, and we started in Oxbridge Place with just a few and, then, moved over to the Baker Centre when we were all in. And that was an exciting year because of the urgency, because you were getting all the "bright" minds in a room and pulling them together, because you were consulting with people from the region, because you were starting to take all the thinking that had been in the strategies - not just the regional development strategy - but you are starting to imagine how to do the "systems thinking" so that you weren't just saying for this one plant or plant owner, that this one stream of effluent, whether it be air, water or any other waste, that we aren't just approving you doing this, but we are taking it in context of the overall system and saying, "How much?" You want to know what the ecosystem can manage, and you want a safety factor so that you aren't exceeding that limit; then, you want everyone in the region to be within the safety limit of what the ecosystem can manage and, then, you have the question about what happens with the last guy in, or the guy in after that, and how you can't simply prorate-limit everybody by, if somebody comes in and adds 10%, you can't take everyone else down by one percent if their technology won't allow them to go there. So, how do you manage technology development and ecosystem impacts? It was a very fun year.

The "systems thinking" is something that I'm really pleased to see that we are bringing into it. And, I haven't heard recently since I left how that process has evolved with systems thinking in there, but it was very interesting at the time to see how that would roll out. And, of course, the challenge that they are having right now, as an observer from afar, is they have two or three things going on at once in that department. They are working to become "Environment and Sustainable Resource Development" as one department, not two, and so they are working to look at the people, and the roles and the mandates that they have as one department, and to rationalize their organization around that. But, while they do that, they are now working to move everything that was an "approval stage" over to the "one regulator" so they are sort of pulling things together, and taking things out ,and it's all sort of part of one process. Many blessings on how they are working on that now, because that is not an easy process.

AD: I'm asking these questions because critics of the oil sands today would say that government hasn't done anything; now we are getting "knee-jerk" reactions and that that – having interviewed people from within the Ministry including the whole land reclamation side, all of this – that the government never stopped working on these and that, in fact, that when they then began to look at the whole issue of regional planning, and how an impact on ecosystems that they had to amalgamate and bring to the table different units within not only the Department of the Environment but all of those people together and that, in terms of the water resources of the province, the majority are in that area; and, then, the resource of the oil sands; then you add in Crown lands, Treaty lands, all of those complexities.

WOOD: So, you will understand that this is a pendulum that has been swinging in different directions over decades. At one point in time, we were Energy, Forestry, Lands and Wildlife, which would have included the water parts and environment parts and, so, we have been disaggregated and re-aggregated and there are problems having us all in one [department] because it's so big, so you separate it out, so its manageable bites, but you have to have the linkages and, when Peter Watson was Deputy at Energy, and Jim Ellis was Deputy of Environment, and even before that, there was work to have the three departments sit and think about things together to simulate the one department idea.

I go back to the comment we made collectively earlier about communications; government has continued to do the work that is appropriate for government to do, we just haven't told the story. And, so now, players on the international media world are saying, "Alberta is not doing their job." Well, in fact, I believe we are; we have been and we've continued to throughout this entire period of decades. We have continued to work on water and air and land management, and to make sure that our policies are keeping up with the times. We haven't told people that, and that's been part of the problem. And, there will always be people who believe we can do better, and they may be right; you could do better but you also have to manage the process in government. We could do better over here, but we might leave hospitals without something. You have to balance how well we do in any element of government with all the other elements that government works on. So, we have been working on these areas, and the water strategies and "Water for Life"; we have been working on these things – we may not have told our story well enough, and you can see government working on telling the stories better, but we have been working on these things.

AD: And, it seems inevitable that you would have to take a "systems approach" to these that you cannot have resource exploitation happening in a silo and, then, the whole protection area and reclamation and monitoring and regulatory regimes scattered in different areas.

WOOD: Yes, and I'm – you know silos are an interesting way of thinking about it. I think that we, as individuals, will think in silos, if we aren't exposed to what is beside us and, if you take any group that works well horizontally across departments, and put a new guy here, he might feel like he is in a silo until he has made those connections. Government has always worked across government even when we were disaggregated, when we were looking at land use management even before it was the Land Use Framework; we always had integrated land management "sorts of efforts" going on, and they were cross-department, and, then, when departments were brought together, they were cross division and, then, cross department, and you would always see these three departments working very closely together. We haven't always communicated that we have been working together that way, and the challenge, when you are three different departments trying to work together that way, is that you have three different deputies, each with their own priority, and it takes it goes up to three ministers with their own priorities, and it, effectivel,y would take a Cabinet decision to say which one is more important, because you have to balance the priorities. And where do you go to the one group or person who makes the priority call on all of the elements that are there? And, so, having more of it in one department with ESRD means that more of those decisions will be made by the deputy, or recommended by the deputy through to the minister of ESRD, but I would say that this

government is taking more decisions collectively at the Cabinet table which is – there are some very good conversations.

AD: Well, the Department of the Environment, as you know, was the first in Canada and it implemented environmental impact, social impact assessments - the Syncrude one, 1975-80 - was humongous, and there is all that baseline data that people don't refer to but, I mean, there were over 200 studies to do with the natural environment; and also studies to do with the Aboriginal People in the area, the impact of the early development on them, oral histories, all that stuff.

WOOD: First, to put the price on carbon with the STER regulation - and I'm drawing a blank on what the STER regulation is - it will come back to me, but the regulation that puts the price on carbon. If you emit more than 100,000 tons in a year and you have to pay, either mitigate your carbon or pay for it - and the money goes into the Climate Change and Emissions Management Fund, which supports more technology development for climate mitigation measures. So, Alberta leads in so many ways: we simply don't have a "horn" section that's out there trumpeting our work.

AD: But, having said that, environment in terms of the other departments is still a really kind of "junior" ministry or is it fair to describe – but that, in fact, the criticism of Alberta with respect to the oil sands, I think, is making the case that it is a significant ministry, and it is going to become even more significant in the future. What is your take on that?

WOOD: You know, when I started my career, somebody might have said it was a junior ministry. I think we understand as a government, and my perception is, that this is not a junior ministry. I think, I'm not sure that we have such things as junior ministries anymore. We do have some places where, within a ministry, we will have an associate minister to make sure that something is getting appropriate attention, and some ministries don't do things that are as "sexy" as other ministries. But Energy and Environment and Sustainable Resource Development – I can't see any of them being junior. I think they all hold their weight; they all pull their weight; and they all know that they have to work together and, if one of them is perceived as less than the others, it's not going to work. We really – you know I think we put some significant might and significant emphasis on it, and the decisions that are being taken about Alberta's future, you couldn't possibly think of them as a junior ministry; I couldn't possibly imagine them as junior.

AD: Now, you've spent the last portion of your career to date in Electricity and, of course, we also know that the oil sands use huge amounts of power.

WOOD: And produce a huge amount of power.

AD: Exactly, do you want to talk a bit about that because I mean, when you look at your portfolio, of course, from the householder's perspective regulation hasn't always proved to be beneficial in terms of the price that you pay; you get your electricity bill, so that's a very narrow perspective. Of course, you deal with a broader perspective, and do you want to talk about electricity and power generally with respect to the oil sands?

WOOD: I almost cannot stop myself from suggesting that Albertans are getting a really good deal on their electricity, even though they don't like that the price fluctuates. And we've compared the price with the rest of Canada, and we might pay a little more for electricity, but you don't have the debt that your government holds in other places. So, my personal flag bearer and waving moment - the oil sands are a really cool part of the electricity industry in that the oil sands need a significant amount of steam. So, they are producing a significant amount of steam, and they understand that you can be more efficient if you take the steam, after you have heated the resource or cleaned the resource with it, you can use some of that heat energy to run a turbine to produce electricity.

So, the co-generation of heat and electricity is a significant part of what is going on at the oil sands. And, as we opened the market, we were seeing a new *tranche* of development and, as the companies were developing their plans for their new projects, they looked at the power needs of their own units, and they looked at the power availability of the market where they could sell excess power ,and they expanded the size of their steam generator so that they could take the excess steam and produce power, and sell it on the grid. Now these are corporations that – I mean their primary job is oil sands. They don't necessarily want to have the internal expertise to deal with the electricity market, so, they have often partnered with one of the larger companies in the electricity industry to manage the electricity of their shop.

But we have more than 2 200 Megawatts of co-generated power just from the oil sands alone, and we do measure the entire size of what they are producing, even when they consume it because, if they didn't have the capacity onsite to produce that power, they would be drawing that power from the grid. And, so, this co-generated electricity has a much smaller environmental footprint than if they were pulling the power directly from any of the other major sources in Alberta. And we are significantly still dependant on coal - our percentage of coal-fired power in Alberta has been declining since we opened the market, partly because industry alone figured that [when] coal power plant is old – let's build a more efficient one. And, other people have been putting gas-fired power plants on the grid, and co-fired generation has really been cleaning up the grid as well.

Over the period that we have been in a competitive [mode], which is 2001 till now for customer choice, and from 1998, in fact, for large power consumers, we had competition, and over those 15 years, we have seen a sort of "ebb and flow," a couple of investment cycles. And, so, the first investment cycle in oil sands said "Let's build excess capacity and sell onto the grid," and a next *tranche* said, "Well that's kind of risky and we are not sure we want that risk, and we are not sure of government policy all the time," So, they sized it for their steam needs without excess capacity to sell onto the grid, and we are looking at having the conversations with that next *tranche* to see if there is any capacity for the next *tranche* to sort of "supersize" their steam generators and electricity generators to sell onto the grid. And a significant piece of their ability, or interest, or capacity, or willingness to do that would be to use their transmission up to Fort McMurray so that, when they have excess capacity, they can sell it into the grid, and it can come down south. So, we are working on making sure our transmission grid is – has the capacity – to allow people to buy and sell power from wherever they are, and not have that be a constraint. I wouldn't want that to be a constraint to having power up in the oil sands available to the province, for example. But it has been a really

interesting question as we go through Federal government, environmental challenges – where do you capture the benefit that is co-generated steam and electricity, is that captured within the plant at the oil sands plants, so they get the benefit and they can improve their environmental picture, or is that part of the electricity generation side of things and, where do they want to keep that benefit. It makes the conversations very interesting with the Federal Government, when you are looking at each industry one by one – who'se getting the benefit of that environmental improvement.

AD: It's interesting because I have interviewed some of the pioneers who were there at the beginning of Great Canadian Oil Sands and there the processes are defined; I mean you've got the mining side of it, the extraction, the cokers, the refinery component, and then the power plant. And, of course, the power plants were so unreliable; they kept going down and that, of course, it jammed everything.

WOOD: Yes, if you go off line as an oil sands plant, you put everything in jeopardy. And, so, having their own power plants that are nice and reliable is useful; having a transmission line is critical. Your power plant will be taken offline for two-to-three weeks once a year, anyways, just to make sure it's got maintenance, so you have to be able to figure out when you are taking it offline, and what are you doing about that, and is there appropriate transmission for you to get power from the rest of Alberta, or your neighbor, or how do you do that? We live in that industrial world were you can't afford to be without power.

AD: And being 24-hour-a-day operation, shift operations. But, of course, in the end, much more recently, they felt "we are not in the electricity business" and, so, then, the alliances, the agreements with the electricity companies and, then, this more sophisticated co-generation. But the whole notion of that steam, then, being used to create electricity that can feed the grid just makes eminent sense doesn't it?

WOOD: Makes eminent sense and its true, they are not electricity companies, so, to have someone else do that, but if you have someone else running your steam generator and you're using the steam for this purpose, and they are generating electricity and trying to sell it, your operator needs to be aware that your primary need there is for the steam. Because they are connected to the grid, they can get power from the grid for their power needs, if they have to. But they can't be without the steam either, because they wouldn't be doing their production. So, your arrangement has some interesting points about how do you get the steam when the plant is down for this, that, or other things, and making sure you are getting what you need out of that power plant. And we are watching as they are always doing something innovative about it.

We have an interesting conundrum for the electricity market – we are at a point where there are hours in a day where we have more power than we need, that is being offered for sale at 0 dollars. And, so, an oil sands facility running a co-generator offers that power onto the grid at a 0 dollar because they want to run, and coal-fired power plants want to run because it's not good for the machinery to be turning them up and down all the time. And, then, the guys that own wind want to earn money on the wind whenever it runs, and whenever its windy, and so they offer that power in

at 0, so there are hours overnight when we have all the co-generators running at whatever they want to run, offering their power in, and coal-fired power plants offering in at 0, and the wind guys, if it's a windy night, offering power in at 0, and we are getting perilously close to a moment where we have more power than we need at a 0 dollar. And the question for the industry has been, what we do then; do we ask everybody to turn down a little – which could be terrifying for an oil sands facility to be asked to turn down. And we have set a series of rules and protocols that would indicate that we will never turn down an oil sands plant and their electricity supply, any more than they need for their steam generation. So, if they are producing excess capacity, we might ask for less of that onto the grid, but we will never dip into where they will need the steam. So, we have set a number of rules. But, you see how far that connection goes from inside an oil sands plant where you are trying to make sure you have steam and electricity for your purposes, to a province wide ranging combination of coal and co-generation and wind, were you might have excess capacity in an overnight period.

AD: Well, you see I asked you the question because you are the first person who could give me an answer, from the perspective of the plant operators and to move from reliable to secure and then getting a professional, an electricity company actually coming in, so you didn't have to run it yourself. But I've heard recently someone observe, "Oh well," because the whole reliance on coal fired and the fact – and of course it depends how old the plant is, how environmentally damaging potentially it is and one thinks of the Eastern seaboard of Canada and the U.S., particularly the U.S., you've got very, very old plants.

WOOD: So, my comment on those sort of things, a couple things. The coal that we use in Alberta is the most amazing coal; it is one of the lowest sulphur coals that exist, and it's less than half a percent of sulphur, which is one of the big, bad actors in the coal. So, we have a really great coal to use for coal-fired generation. We actually have a very young fleet of coal-generation plants. We have a couple of the super-critical coal plants and, so, we have a very efficient fleet and, because we have market pricing, it's industry who says, "That plant's a little old; we should take it out of service because we can do better over here." So, our coal fleet is being retired a little more quickly than we had any idea that it would be, and replaced with either other plants, or technologies. So, when we compare our fleet and one of our oldest plants is in the 42 years, in Alberta; 42.5 years is the average age of the coal fleet in the States, average age of the coal fleet.

It blew my mind when we found those numbers, and we were looking at it. We have a nice young fleet and it's really efficient, really cared for, well maintained, and the industry has been determining when to take the units off line, and they have done it faster than we expected. So, when we look at the average emissions-intensity of our fleet, it's been improving on its own without a lot of regulatory requirements imposed upon it, because the economics make it efficient, and to the advantage of the companies to make those improvements.

We also now have the Federal Government regulation for gas emissions on coal-fired power generation, and that plant is going to see additional retirement and, so, Alberta will see that some of our older plants will come out of service in the next – and I don't have the numbers in my head – between five to ten years, a number of them will come offline. But we have some plants that are

fairly new, and they have just come online in the past decade and, so, they will be allowed to continue working for their-50 year life, but some of those plants are some of the highest-efficiency plants, maybe not at the "bleeding" edge of highest efficiency, that you could find in the world but really high-efficiency plants.

AD: As I mentioned, someone commented, "Oh well, it's too bad Alberta doesn't have the capacity that B.C. has for the use of water power, hydro lectric rather than coal fired, but you've addressed that.

WOOD: Be also aware, B.C. doesn't have the capacity for hydro that B.C. has. They don't have a lot of new and available capacity to build hydro and, where would they build their next hydro? They have got Site C, up in the North there that they are looking at, but while hydro seems like the answer to a bunch of things, the development of hydro sites often involves a significant amount of land that is often not land that we would have the right to make decisions on; it's often First Nations' land.

AD: And the environmental impact in terms of the Peace country and everything else, you get into the whole other...

WOOD: It's not insignificant on its own.

AD: Exactly.

WOOD: And, so, after it's built, and you've already done the damage, it's a low cost to operate. Once it's already built and you've done the damage its low environmental impact. But do you know that the production of concrete releases carbon dioxide? And you use a lot of concrete as you build a dam. And, so, there are emissions in the building of that amount of concrete that we don't seem to take into account when we say how clean hydro is. And, I'm not convinced on hydro; I think it's lovely one once you have built it, but who are you displacing; do you have the right to displace people?

AD: You look at the James Bay – in terms of the early [Canadian] Encyclopedia era [early 1980s], I commissioned and edited the entries on all the major types of energy, alternative energy, the industry entries, environment section and, of course, here is the 1975 to 1980 environmental impact assessment for Syncrude; James Bay had no environmental impact assessment because the province of Quebec had not yet passed that requirement. The people who were – the chief engineer for the James Bay project was my Science Advisor. I mean huge, huge areas of land and you mentioned Aboriginal of course, Labrador and all of that area.

WOOD: The Indigenous People need to be...

AD: Exactly, and even if you look at Manitoba and, I mean, the power-generation projects there, and the areas of land that were flooded with respect to those projects; so, that again, when you look at the oil sands in terms of these various issues, it puts it into perspective doesn't it?

WOOD: There is no energy source short of solar that has, and even solar, it's available any time you wander outdoors to get the good solar power on a sunny day, that's great. But if you want five Megawatts of solar power, you have to dedicate a significant number of hectares of land covered in solar panels in order to capture that energy. So, you are still sacrificing a bunch of land to do that.

AD: And you think of the wind generators, the wind farms.

WOOD: Wind turbines, a significant amount of land; a significant amount of controversy over the visibility. Some people like the art on the landscape and some people think it's an eye sore.

AD: And I think of the bird kills.

WOOD: And I have so far avoided reading the stats on bird kills.

AD: Huge.

WOOD: Bat kills too; the night-time versions of it. So, there is no form of energy that is perfect. It doesn't exist; we are always making a trade-off. We are humans – everything we do is a trade-off, and the wind gets it for you without the carbon dioxide but it harms the birds; and the coal does it without maybe harming those birds, but there are other emissions. The hydro sacrifices land and displaces people, and has carbon emissions at the beginning, and it's a huge disruption to the natural environment to change the course of a river, and then flood entire valleys; huge impact. After it's done, it's kind of pretty, and we understand it, and we think of human marvels, and isn't that great. You, really, are disrupting a number of pieces. Nothing is for free; there is always a trade-off and we are not going to go back to just burning wood, so there is not enough.

AD: Now, you mentioned carbon capture and, of course, you know when you talked about being involved through Alberta Energy, the office of Coal Research and Technology, was that a part of CANMET [Canada Centre for Mineral and Energy Technology] at that point that you were involved?

WOOD: CANMET was a federal research facility out in Devon; it was the coal research run by CANMET and, so, the Office of Coal Research and Technology [OCERT] funded pieces of work that were done out in Devon with CANMET. I don't recall any specific things back then that tied CANMET and coal to the carbon capture and storage piece, but some of the same researchers that I met back in those days with the mineral development program that I worked on - Stephan Bashew, for example, who is now a geologist and has done some expert work on the carbon capture and storage piece. And, then, the Provincial Government with the two billion dollar fund that was set aside to support that, bridging the gap between this type of research and actual full-scale - we can say that it works because we demonstrated it in research. This two billion dollar fund, we, in a similar manner to AOSTRA, had done things, had an open call for applications, and industry and folks put their applications in, and we gathered a panel of experts. I wasn't on it, but I had colleagues on the panel to review the applications; some were accepted and some were rejected. Four projects were a go, and then you negotiated the timing of the dollars based on the proof of construction

here, there and everywhere, and all the investment pieces, and you finally get the agreement signed, and you announce and, then, changes to market economics happened, and not all those projects have gone ahead; and the Federal Government GHG-emissions on coal-fired power plants regulation was announced, and it changed one company's timing and availability to put carbon capture storage on their coal-fired power plant, and you see these things.

We still have two projects underway for carbon capture and storage, and Alberta is certainly a leader in carbon capture and storage. My boss Sondra Locke is Chairman of the International Standards Organization Panel that's putting together the set of standards for carbon capture and storage, and staffing that team, and that's a team that works alongside my team, so I know the people but I don't know the work as well as they do. They speak at international conferences on carbon capture around the world, and Australia and Canada and England are at least three of the key players in that work. And we are looking at what are the ways to capture that carbon which – there are some interesting pieces of it, we are actually - I think we finished the work on a regulatory framework assessment, which is taking a look at every rig in Alberta that affects how you would adapt our regulations for putting the carbon back into the ground.

And you can imagine that, as Alberta established a history of regulations that take a look at mineral rights, we looked at who has rights to do what - when you take stuff out of the ground - but when we were developing these, we had no idea that there would be a need to take a look at how to put stuff back to this scale. So, that regulatory framework assessment has been completed at a certain stage, and I'm not sure what the next stages are, but you can see the thoroughness with which it was done, with international experts helping us review every regulation to make sure that we have caught all the tentacles of the regulations for carbon storage.

AD: Which are the two projects that are current? If it's outside your area, don't worry about it.

WOOD: It is outside my area. For good general knowledge, I think I could name one of them but not the other, so I will decline. It is public knowledge, but it's not in my memory banks today.

AD: Not a problem. Now are there any questions that I have forgotten to ask you, in terms of this complex industry and your involvement in it in a variety of ways?

WOOD: It is really interesting for me to watch as the questions have gone from the beginnings of AOSTRA to the beginning of my career to see that there have been three or four times in my career where I have crossed path with it again. You know, the first seven years of my career with AOSTRA itself, then, time in the middle with AOSTRA coming back into the Department, and I was in the Research and Technology side as it was winding up and becoming something else. And, then, as I went through and did time, did a stint with Oil Sands Environmental Management, and come back into that. I think, because I had oil sands in my history early in my career, it gave me this opportunity to do it with Environment and that was one of the benefits of seeing this little thread through my career. But, aside from the occasional name that I've been name dropping during the conversation, I can't think of anything that we have missed specifically, no.

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AD: So, again then, kind of a summative question. As a career civil servant who has worked in key departments, the whole issue now is – has government regulated enough, or have the companies had it their own way, which is the crudest way of putting it? Mulcair and his very pejorative remarks about – and others about Alberta elected officials being the lackeys of the companies. Civil servants don't get the opportunity to talk about that.

WOOD: Development of a resource at this scale has to be supported by industry and government. If you left it to industry alone, it probably wouldn't happen. So, government has been there at the research side and, then, at the royalty side, and we worked on those royalty agreements that are stable enough to allow people to consider investing their millions and billions of dollars in this industry. And, we understand, as a government, and I would say the same thing for a coal-fired power generator and a hydro plant, it takes the investment upfront for a significant number of years to build this stuff, before you start earning money on it.

So, I can see the rationale for a royalty regime that takes a smaller amount in the early years as the companies try and get it past that – "Oh, my gosh this hurts stage," to where they are bringing in money that's supporting the company, to a point that we get the return that we are seeking – we are seeking the return on behalf of Albertans because the resource is the Albertan's and government is working to gather and maybe the word is "fair and long-term and equitable and sustainable return" for the resource. Making sure that the companies are doing the right thing by the environment, we have some amazing stories about companies doing the right thing by the environment.

So, I think we haven't told our story well. I think we've done a lot of the right things. Nobody will say that any one government has done all of the right things. We are humans too, but there has been a rationale behind why we have done what we have every single time, and we are working to make sure we are doing the right thing. And, so, no one group of people always hits the mark every time, but I'm really proud of the work that has been done. And we've gathered dollars for Albertans that has helped to support the lifestyle that we've grown accustomed to. I'm really impressed with what we have been able to do in Alberta and I'm proud to have been a tiny, tiny part of it. As a young junior engineer, we know squat as we start out; we all think we know everything, but we know so little at the beginning, and we make our contribution; and it's been fun to be part of this. I've been on two of the really big files. I've been part of the AOSTRA file, the oil sands file, and part of the electricity file; I can't imagine being so well blessed twice. It's great fun.

AD: Thank you so much for agreeing to be interviewed.

WOOD: Thank you Adriana, it's been a blast.

[THE INTERVIEW CONCLUDES.]

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