ALAN E. FAIR

Alan E. Fair, P Eng, Director, Canadian Oil Sands Innovation Alliance (COSIA) Tailings Environmental Priority Area graduated from the University of British Columbia in 1978 with a Bachelor's degree in Geological Engineering. He spent one year working for a geotechnical consulting firm before joining Syncrude Canada Ltd. in June, 1979 at its Fort McMurray operation. In 1995, he completed his Master's degree in Business Administration from the University of Alberta. During his 32 years at Syncrude, Fair held several different engineering and operations management positions within the mine, extraction and technology areas. He assumed the role of Manager of Research & Development in May, 2004. As Manager of Syncrude's R & D department, Alan was responsible for both the technical direction and overall management of all research and development activities. He retired from this position in June 2011 to assume the role of Executive Director of the then, newly-created Oil Sand Tailings Consortium (OSTC). The OSTC was recently integrated into Canada's Oil Sands Innovation Alliance (COSIA) and is now known as the COSIA Tailings Environmental Priority Area. As the Director of the COSIA Tailings EPA, Alan is responsible for coordinating the industries' R&D efforts to develop technologies aimed at enabling more timely and effective reclamation of oil sand tailings. Throughout his career, Alan has been involved in many aspects of reclamation and mine closure, including a key role in the development of various Oil Sand Tailings Technologies.

Date and place of birth (if available): September 29, 1954 at Smithers, BC

Date and place of interview: May 21, 2013, 1:10pm at Alan Fair's residence

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Initials of Interviewer: AD

Last name of subject: FAIR

AD: My name is Adriana Davies and I'm a Researcher/Writer on the Petroleum History Society Oil Sands Oral History Project. It is May 21, 2013 and it is 1:10 pm and I am with Alan Fair. Alan, thank you for agreeing to be interviewed for this project; you have an extensive history in the oil sands. Can I ask you to give me a potted biography because, of course, we'll get into the details of it later, but if you could – where were you born, what year, and where you received your education, and then proceed from there.

FAIR: Ok, well I'm not an original Albertan, although I have spent more than half my life here. I was actually born in Northern BC, a place called Smithers, lived there till I was about six or so, and then my folks and, of course myself, moved to Vancouver Island – principally where I grew up, in a little community called Ladysmith. When I finished high school, went on to UBC [University of British Columbia] and did my engineering undergraduate degree there, and graduated in about 1978. Relative to where I was born in Smithers, 1954 seems like a long time ago; sometimes it feels that too. And then after I graduated, worked for a year for a consulting firm called Dames & Moore, and through Dames & Moore ultimately got introduced, if you will, to the oil sands.

AD: And so you began work in 1979 with Syncrude.

FAIR: I did; yes that's right. What had happened, the consulting company I mentioned had done some work for Syncrude and I was a part of that. I smile now; I recall while I was working there for this consulting firm, being offered a position at Syncrude. These were early days at Syncrude and confusion reigned. I remember thinking to myself, "Are you insane, I'm not coming to work here." But, as things turned out, probably six or eight months later I found myself being interviewed for a position there. I realized the consulting business – it's very interesting work but you are on the road constantly and I recently had gotten married, and my wife and I had discussed that I'd sooner be home kind of thing and Syncrude – but that was part of that initial motivation to go there and, of course, soon after I came there I began to appreciate the scale of the operations, the opportunities there and really never looked back after that. Although I will say, like many people that came at that time, in the late 1970's even early 1980's, many of us looked at it and thought, "Okay, I'll give it a couple of years; I'll raise some money and then on to bigger and better other things," but, after a 32-year career with Syncrude, I clearly missed out on the two-year window.

AD: So, what was your first job and what was your title?

FAIR: My background is in Geological and, in particular, Geotechnical Engineering. I must say I was very fortunate to work in exactly my field because, often, engineers – you quickly become sidelined into other related but not necessarily aligned with your own technical training. For me for a short while, I was the lead geotechnical engineer on something referred to as Surface Preparation and, at that time in 1979 at Syncrude, we were still utilizing draglines and bucket wheel reclaimers, and, moreover, we were actually attempting to operate them on the overburden material, with many, many challenges in terms of the bearing capacity of this material. So, my job was to ensure that the operating benches in the mine site were stable enough such that they would support the draglines and bucketwheels. Now, many years later, that changed dramatically but that was the job at the time. I lasted a short while in that and then I was reassigned to replace an individual who was leaving at that time; there was lots of people coming and going because lots of things were happening. And just as an aside, curiously – after more than 30 years, I get an email out of the blue, from the guy that I replaced, a guy by the name of Keith Pedwell, and he and I just had the opportunity to meet last week in Calgary to talk about the role, but his role was the responsibility for tailings geotechnical issues, which at the time was really mainly focused on the stability on various tailings dykes. And, it's kind of interesting that was my first sort of involvement in oil sands tailings, which has been a kind of re-occurring thing throughout my career and, even today. I've kind of gone full circle.

AD: But at a different technological level and different area of responsibility. So, was Jim Carter there at that time?

FAIR: Jim was not initially; he came soon after. My guess [is] Jim came in maybe 1980-81 and was there with a lot of fellows that spent time at IOC [Iron Ore Company]. Jim was one of those folks but he did not come directly from there; he was at Smoky River Coal. And, his experience at the time was utilizing mobile equipment for mining activities. Up until then, there was very little, limited, use of mobile equipment in the oil sands. Part of the reasoning was at the time that Syncrude was being contemplated, the largest-available mobile equipment was really a Caterpillar 777 85-ton truck and relatively small shovels to load the trucks. So, when Jim came, he started up something called the JOF [Job Owned Fleet] and those were 170-ton trucks and were significantly larger than other trucks of the day, and that set the groundwork for a pretty significant switch to basically use mobile equipment totally and move away from the draglines and bucketwheel reclaimers that I spoke of earlier, and not just in the case of Syncrude. Suncor also adopted that technology (which is an interesting story in itself) but, of course, now all of the companies engaged in surface mining of the oil sands use mobile equipment. But that was in the early 1980s; that was pioneering thinking that was not the norm by any stretch. A lot of it related to the bearing capacity. Mobile capacity is often used in hardrock mining operations, so the bearing capacity of your rock and what not isn't even a consideration; it's all built on a rock. But when you go to the oil sands that is a huge consideration and I remember doing all kinds of projects trying to develop haul roads that would sustain the loading resulting from these loaded trucks. And, now, when you think about the industry today with 400-ton trucks, and the oil sands industry and guys like Jim Carter and Gord Ball were key in encouraging companies like Caterpillar to develop these larger trucks. Today I don't know what the exact numbers are but roughly half of the 400-ton trucks that are operating in the world are operating in the oil sands.

AD: So, you know, the story that you are telling me is that the whole era of the science of separation once you create a plant, you establish a plant, then you are dealing with day-to-day operational issues and instability of the ground that you are using–the draglines–and that you have to get the equipment even though in today's terms it was relatively small, you had to have a stable surface; and, of course, we know that bitumen can be very unstable.

FAIR: Inherently unstable, especially the high-grade stuff. I often tell people that no matter who you are, what you do when you come to visit the oil sands, two things strike you: one the industry has either the biggest or the most when you look at the scale of these operations, so things that you tend to take for granted in other smaller operations or what not, because of the scale of the operations there, become huge operational challenges. And I look at – we've been talking about bearing capacity, but another one, the abrasive nature of the oil sands in the early days–the shovel and bucketwheel teeth, or dragline teeth or the portion of the bucket or the shovel that contacts the oil sand, these were wearing out in a 12-hour shift.

These are things that you just don't even think about in other kinds of operations; they are just not a significant consideration. But, in the oil sands, they absolutely are so my - at a high level–my experience with the oil sands is that, in order for the industry to be successful, you have to be able to take technology that others are utilizing, whether it be mobile equipment or the nature of some metal alloy that you are using in these dragline teeth, and adapt it to the oil sands. Because it's the abrasiveness, in general, the harshness of the environment, the cold weather that you get. I can recall weeks at a time where it never got above minus 40. It's interesting what happens to large steel shafts at those temperatures. So, what you have to do is to take technology that may have been progressed and developed elsewhere, and modify it so that you can use it on the oil sands. And, if you look at most of the technology in the oil sands, to a degree, is used elsewhere, with the exception of the extraction technology; that's very unique to the oil sands. But, there is a lot more to it than just taking something off the shelf and putting it to work in the industry. So, in the early days, that was very much the focus, ramping up the reliability of our operations or what not – which continues to be a challenge. But, if you compare where we were to where the industry is today, its two very different places.

AD: Now, of course, tailings is a huge issue today, but take me back to when you assumed responsibility, what did that involve, what were you dealing with?

FAIR: Well it's kind of interesting, I'm often asked the question today, and "You guys have been at this 30-40 years, why haven't you figured out the challenge of the tailings?" So, I've had a chance to kind of reflect on that. If I think back to my early days, no question, a couple of things were happening at that stage. One is we were becoming painfully aware that there was a very unique feature to the oil sand tailings that centered around the accumulation of these large volumes of fluid fine tailings. But, in the early going, that was a revelation because certainly any of the other metal mines, other mining operations – there are thousands and thousands of tailings ponds around the world; have been for hundreds of years. But none of those, at least to the degree that the oil sands

have accumulated these fluid fine tailings, so, in the early going, it was recognizing these tailings were, in fact, different.

Just as an aside, I recall recently sitting in a lecture with Dr. [Norbert] Morgenstern. He had come across the original plans that date back into the 60's for Suncor's [GCOS at the time] tailings operations. And they amounted to where the current location of the Tar Island Dyke or Pond One is, [and consisted of] something in the order of a 10-metre high tailings pond. The expectation was they would discharge the tailings off the edge of the embankment along the river, and capture the returning water and send it back, and they would have these tailings draped along the escarpment contained by this 10-metre high berm. At the end of the day, that 10-metre high berm was in the order of 100-metres, and that is one of about seven tailings ponds that Suncor has.

It kind of speaks to the mindset of the industry at the time; the assumption was we would operate it just like any other tailings pond. So, at Syncrude, what began to happen just as the case at Suncor, these volumes began to accumulate, so the initial concern was – because there wasn't a clear understanding how long it would take for these fines to settle out and reuse the water, so the issue was that you had to continue to build larger and larger containment areas. And some of these structures like the Mildred Lake Settling Basin at Syncrude are the largest tailings dams in the world as a result. So, there became a need to ensure that these structures were very stable because, if they ever failed, it would be catastrophic. A lot of the tailings engineering in the early-going was ensuring the stability of these structures. As the volume of fluid fine tailings began to continue to accumulate, and it was obvious this wasn't going to settle out in any time soon; and, in fact, probably about about 26-27 years ago. In order to understand this, we constructed a couple of very large, 10- metre-high stand pipes at the University of Alberta and, again, Dr. Morgenstern was involved and the intent was to monitor the settling rates. We recently decommissioned those; there was a need to decommission them for various reasons. Over that 26 years that those stand pipes were monitored, there was no consolidation whatsoever of the tailings, so, in retrospect, maybe we should have known that a lot sooner but we did learn that, perhaps the hard way.

The next phase of managing tailings, which again I was involved [with] was to come up with some technologies that would deal with these fluid fine tailings. The early thinking was kind of simple and, in many ways eloquent, to recognize that the fines come from the oil sands matrix in the first place– all we do is we process them and end up with coarse tailing sand; of course, we recover the bitumen, and we have these fluid fines. Well, why don't we just reintroduce them back into the pour space of the coarse particles, and it's called either composite tailings or combined tailings depending if you are Syncrude or Suncor. So, in the 1990s, that was very much what was put to work and into the early 2000s with the expectation – problem solved. Well, as it turns out, the very things that you need to do to encourage this capture or this creation of this non-segregating slurry, things like making sure that your tailings slurry are high density–are counter to the things you need to do in order to enhance the recovery of bitumen. You want a very diluted slurry so that it's easy for the bitumen to rise–so this has been a struggle since day one; now, having said that, Syncrude has certainly continued to progress the technology. The other challenge, with the CT [Combined/Composite Tailings] Technology has been that–of course as the industry continued to

accumulate these fluid fine tailings and process water because they don't discharge any of it, a lot of the areas that are intended to be made available to store these CT tailings are now under water. Well, when you are trying to deposit slurry underwater that introduces a whole new series of challenges. So, at the end of the day, CT is not the one and only "silver bullet" answer to managing tailings.

In more recent years, and that's kind of what I'm involved in now, we are looking at a host of other technologies to develop that. But it's interesting how it's progressed over the years; a lot of it is related to our level of understanding. You don't start off knowing all the answers, and you have to figure them out along the way. It may seem in hindsight that maybe we should have been a little smarter and figured them out quicker but, trust me, when you are there at the time, you are working with a whole bunch of smart people, it's not as simple as people would believe.

AD: Now, you mentioned Norbert Morgenstern who, of course, is Canada's pre-eminent Geotechnical Engineer and I've also interviewed Elmer Brooker, of course, who did the work –

FAIR: with EBA [Elmer Brooker Associates consultants].

AD: Exactly, and then got Norbert involved, but as Elmer told me, of course, you had the engineers– the Casagrande brothers [Arthur, at Harvard University, and Leo were experts in soil mechanics and foundation engineering], so that you had the brains in the world working but, of course, the world today is very different from then. At that point, it was containment; it was not necessarily remediation or all of those other issues. So what would a typical day have looked like when you were given those responsibilities?

FAIR: Well, you know what, I can honestly say in my career at Syncrude every day was different; mostly in a positive way, not always. In that time, and it's interesting you mention Nordie Morgenstern and the Casagrande brothers and Bob Hardy (may he rest in peace, since he has passed away) Karl Taylor, and Chuck Brawner or some of these people. So, I had the good fortune, you can just imagine – you are reasonably fresh out of school, a geotechnical engineer and you move to this operation and, through good fortune or fate, you wind up being in a fairly senior lead role in this. So, I had the glorious opportunity to be Syncrude's liaison with our Geotechnical Review Board for many, many years. In fact, soon after I arrived, it had gone from the so called "big board," where I forgot the exact number 10-12 people were engaged in this, and it was then reduced to a small board by the then Syncrude management and, curiously, Dr Morgenstern was not on the shortlist at the time. When I got there, I remember quickly realizing–"Oh, oh, we got to fix this." I think that was one of my first orders of the day. I encouraged Dennis Love, who was General Manager of Mining at that time, to encourage Nordie to join our group, which he did. But a lot of–I would characterize it as the work that you did made sense at the time, you have to – as you point out Adriana, these were and are the pre-eminent geotechnical engineers of the day. The focus during most of their involvement was very much the stability of the containment dykes and whatnot.

Another big issue that I also had significant involvement was–I remember this vividly–was the stability of our highwall slopes because, in the early going, they used draglines to mine the ore in. So,

for a time, when I wasn't looking after tailings, I was involved in, and I can recall being told that the then big board of geotechnical consultants advised Syncrude that they should plan on somewhere every 20-25 years losing a dragline into the pit, which happens elsewhere. In fact, I used to have this photo on my wall just to remind me that this could happen. So, you're the guy that is responsible for this, for developing this monitoring program to ensure that doesn't happen. And the good news is you have these very pre-eminent senior people that come periodically to overview what you are doing and whatnot, but those typical days [that] they weren't there. So you are left to–I can remember countless times looking at the plot of some instrument that was showing movement on a highwall and trying to make a judgement as to what we should do.

I vividly remember one time, Jerry Krause was at the time, the General Manager of Mining Engineering and, as I mentioned, Dennis Love was the Vice President of Mining Operations–so, in the night, sure enough, we had a block slide and it undermined a significant portion of the tub of one of the draglines. So, I was out there in the very early morning scouting this out and realizing this was bad; this was the closest we had ever come. And, I recall talking to Jerry and Jerry hadn't had the opportunity to be out there to look at it yet, and he was saying, "How bad is it?" And, it was, really, "When can we get the machine back to work?" And I said, "Gee Jerry, I don't know; I think we need to think this through a little bit." And Jerry goes, "Well let's talk later." In the meantime, Dennis Love had the opportunity to go out there and have a look at this. He was stressed; it was the closest we had ever come, so I remember it leading to an extensive review of all of our highwall monitoring.

In all of that, having the council of people like Nordie Morgenstern and, at the time, Bob Hardy and Karl Taylor, these guys – I had the [best of the best], not to go on about it, but I can think of so many stories. I recall being out of school two-to-three years–going back to a conference, it was in San Francisco and Dr. Morgenstern was one of the plenary speakers there; I actually think he was getting a Terzaghi Award at this particular–it was a significant world conference [Morgenstern gave the Terzaghi Lecture to the American Society of Civil Engineering in 1992.] A couple of my former classmates were, we were just engaged in the lobby of this hotel having a little conversation, catching up, and Dr. Morgenstern walks by and I just said, "Hey Nordie, how's it going?" These guys were mortified, they were, "Oh my god, you know Dr. Morgenstern?" but he has been so instrumental in sort of helping develop, and his area of expertise, the oil sands. And I don't want to just single out Dr. Morgenstern, several other members of the GRB were very instrumental in influencing people like me, but others, like Bob Cameron, and some of the significant engineering people at Syncrude have benefited greatly from their involvement. It was interesting times.

AD: Well, I discussed with Elmer the whole issue of losing a dragline and he said he never felt that this was a potential–because you design so that it does not happen, but the Casagrande brothers really insisted that that eventuality be there in the assessment and the report because it's a question of risk management, that if you don't identify that risk and it happens–"the sky's falling, the sky's falling"–so that you have to anticipate those risks. Now, my understanding from interviewing various people was that the big issue was this earth dam that these walls would not fail; the second was the issue of seepage, to prevent seepage. Do you want to talk a bit about that?

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FAIR: I can recall, I'm trying to recall who was our CEO at the time, who before Eric Newell came on the scene? Eric Newell was there, but….

AD: I'm thinking Mike Supple, but no.

FAIR: Definitely not Mike Supple; Mike was the other guy; he was the Suncor guy.

AD: Oh yes. Sorry

FAIR: Ralph Shepherd; it was Ralph Shepherd, that's exactly who it was. Mike and Ralph were contemporaries. So, I was asked to conduct an extensive risk assessment of our major tailings structures and whatnot. There were other aspects to this as well but just focusing on the tailings one. So, as you point out, there were different modes of potential failure for this. Now, a dam failure had recently occurred in the States and there it was a seepage-type of failure, a phenomenon we call "piping" in the business. So what the deal is–you have a hydraulic gradient between the material that's stored behind the dam and, of course, the toe of the dam and, if there is some sort of feature that allows the water to drain through there, it will begin to flow through there, and erode the dyke and whatnot. So this was the mechanism of failure of the Teton Dam in the States [June 5, 1976 the dam, which was in Idaho, failed as it was first filling]. So this was on peoples' minds and so that was one failure mechanism.

The other one was an interesting one, a liquefaction failure mode, and liquefaction is kind of like it sounds; you have a material that has inherent strength but, if the water, the pour pressure there is loaded in such a way that you exceed something called the "static," steady-state line, the material just collapses and flows. And I'm sure you can–there are lots on a small scale where this happens. So, in the case of Syncrude's Mildred Lake Settling Basin, in the early going, and I can recall this when the initial structures were built as the foundation to build the subsequent dykes upon, there were a couple of areas, one the Mildred Lake Crossing itself. Most people see Mildred Lake today and assume that's the lake, well, in actual fact the lake was twice as big as that, the northern half of the lake is now overlain by the tailings area. So, there was a portion of that where we had to build, in effect, a kind of coffer dam that subsequently became the foundation for the rest of the structure. So, material was being placed into there with limited compaction that subsequently became the foundation for the rest of the structure; material was being placed into there with limited compaction. The other area, the Beaver Creek flowed right through where the Mildred Lake Settling Basin now lies, so similarly there, there was a need to build a supporting dam structure up fairly quickly. In the meantime, you are in production–your tailings are flowing into the tailings pond, there's not time–you are trying to keep the perimeter of the dyke above the level of the water. So, some years later when we went back to assess these two areas, Mildred Lake and where the Beaver Creek Crossing was, we learned and "confirmed" may be a better way to say it, that the underlying material was very loose, not dense.

There's something–a phenomena called static liquefaction–and what that is, if you continue to load something up, even though it was initially stable, as you load the material up, the risk of the static

liquefaction becomes more and more pronounced. So, those were the kind of two principal failure mechanisms. There was a third as well, which we did subsequently address, [and this] was portions of the Mildred Lake Settling Dyke were built on over-consolidated clays that had slip planes, inherent slip planes within them, so again as you load it up, there is a potential for it to flow out.

The way we addressed them, and this was part of–I presented this; I recall it was interesting because, of course, people like Ralph Shepherd were process engineers, so you are trying to describe and explain all this in layman's terms and they're looking at some photos you have of dam failures elsewhere and say," We don't want any of that, so what do we have to do?" So, we did, we build a series of "toe" berms that dealt with some of our instability issues, allowed us to continue to raise the dyke. The piping feature was really a more comprehensive monitoring system that was used to ensure that there was no–typically, with these type of failures, you will start to see a wet area on the down stolpe portion of your dyke and you know you've got an issue. So, we became more vigilant at monitoring [for] that.

The liquefaction one was maybe the most interesting one. This is another one of those exciting parts of my career there. So, we've got these loose zones–they are now 50 metres down–what you going to do about them? Well, maybe 50 is an overstatement but certainly 30-40. So, what we developed was a method, which is interesting [and] now in common use today. I can assure you at the time, this was a first of, certainly, at the scale we were doing it. It's called explosive densification, and this might be counter to what you think you might do to deal with this, but you deliberately liquefy the material in a controlled fashion–meaning small areas at a time instead of the whole thing all at once. You basically drill a number of blast holes, put explosives down in the hole and detonate them; force the material to liquefy, the water drains out and now you are no longer, relative to the steady-state line because your water pressure, your "pour pressures" are much, much lower; the issue goes away. I remember the–as always you kind of start these things out–let's just do one hole and see what happens? And, then, we went to this pattern of 10 holes that was impressive; well, then, we were ready for the big time.

I had some guidance, I can remember guys like Steve Poulos, he was one of the pre-eminent geotechnical engineers on liquefaction but again they give you some guidance and then you're it – you're the guy. I can vividly remember, Adriana, being out there, the blaster is there; it's taken him several days, maybe a week, to wire up all these blast-hole, [and complete the] drill-hole pattern. Then, he has the little blast detonator thing and he's looking at you, and you check to make sure all the area is secure, all that kind of thing, and you give him the thumbs up. And, then, you kind of look like everyone else–"Now, what happens?" Well, he shoots it, and I remember standing next to his truck, we were closer than others and, at first, for a split second, nothing happens. I see the flashes of the delays out in the blast pattern and, then, the whole dam sways, I remember having to grab hold of the mirror of the truck so that I wouldn't fall over, thinking "Oh my god, we've just failed the dyke." And then the most miraculous [thing], you see these geysers of water relieving the pour pressure, like a foot in diameter flowing eight-ten feet in the air. It didn't last long, and then they just continue to flow into the pond. I'll remember that for all my days; so we went on to deal with both of these areas and eliminate the potential for liquefaction, but those were exciting days.

AD: Theoretically it should work, but whether practically…

FAIR: Well, especially at this scale, no-one had ever done it at this scale. So, it's now used; it's called Dynamic Compaction because they don't always use explosives–there is other vibration kinds of things they can use to densify material. There is actually–I wrote a paper or two on this and whatnot, and I know others have since contacted me and, in fact, there is a Swedish firm that has a similar problem with a copper mine in northern Sweden that's kind of wondering if this is something that they could utilize in their tailings operations as well. But those were, that may not have been a typical day, but it was one of those days.

AD: And, so, how long did you stay in this tailings area as Senior Geotechnical Engineer?

FAIR: I can't remember exactly, but what happened–one of the exciting things working at a place like Syncrude, it's a big company so there are lots of opportunities to do things. I had been counseled and, in fact, I had counseled young engineers today not to get pigeon-holed in one area, to go and do other things. So, it's a bit of a long story, but I had been offered another opportunity from the mine area; I'll just say it was concluded, it was better for everybody if I didn't go there, if I stayed where I was. So, there was subsequently a sense that, because I wasn't allowed to capitalize on that opportunity, the next opportunity was owed to me "kind of thing." That resulted in me leaving the tailings area.

I went and did something very different. I was part of one of the expansion teams. Syncrude's gone through various expansions at the time and I led a group of engineers in this. So, I'm a mining/geotechnical engineer; I was now responsible for the design of new extraction and treatment technology, kind of different from what I had done. I remember being at this meeting at Syncrude Research–I can share this now because at the time I was wondering what I was doing–but, anyway, there was a group of about 30 people in one of the large conference rooms at the Syncrude Research Centre, at their old centre and the group is going through something called a PFD of this new extraction process and I'm sitting in there realizing I haven't a clue what they are talking about. So, it's one of those career-defining moments where you sit there and say, "You know what? I can just be a wallflower and go with the flow, but I am the boss so I'm not sure about this. So, I finally piped up and, you know, you've asked one of those questions you might want to reconsider and the question was, "Can we just stop for a second and can somebody tell me what a PFD is?" There is dead silence in the room, and you know you've asked one of those questions. Well, it turns out a PFD is a Process Flow Diagram. And I went on to learn all about PFDs and new extraction processes and new froth treatment processes but at the time you are kind of–what am in doing here, but it was fun and exciting. So I spent some time there, but then was moved back into the mining side of the business and was put in charge of the mine development group. This was when we were considering the move to the North Mine and this was another really exciting time. This was when–we were talking earlier about mobile equipment and whatnot–so the move to the North Mine, this was an opportunity to reassess the mining technology they were using when we [originally] moved to the base mine.

A number of significant things happened around that time– one was the development of hydro-transport technology which has become the mainstay in the industry. So, those things were coming together. We had done some initial pilot work that had been originated in research and then was put into the mine development group to develop and commercialize the technology. What became painfully apparent was that the bucketwheel reclaimers that we were using–which only operate about 50% of the time (that's the reflection of their availability) and just the mining pattern or the reclaiming pattern–they slew back and forth across a windrow [pile]–so, when they are in the middle of a windrow there is lots of feed going onto the belt but, when they go out to the side, it drops off considerably. So, you get this very inconsistent feed pattern, which is ok if you have a big dump pocket–you can kind of even it out–but with the introduction of hydrotransport technology, we weren't going to have that benefit. We had to have a way to more continuously feed the processing equipment for hydrotransport so that's when mobile equipment became–what was happening at the time we'd had the positive experience with the job-owned fleet that people like Jim Carter and then Earl Dionne and others (Gord Ball) had operated so it gave us the confidence to kind of go to the next scale.

At that time, 240-ton trucks were becoming, not super-reliable but they were becoming available; they were limited by the availability of large-haul truck tires and power–the engines in them–and that's one of the activities to encourage Caterpillar and Komatsu to develop these bigger trucks so we could better deal with the economies of scale associated with big heavy equipment to support the hydrotransport equipment. Ultimately, in 1994, when we started up the North Mine using hydrotransport technology, using mobile equipment, these were significant departures because, up until then, we were using draglines, bucketwheels with conveyer system and tumbler system in the extraction plant, so all of that got parked, and we started up using hydrotransport, and whatnot.

I remember it being interesting because I was involved in developing this technology and the mine plans in moving into it, and then was actually moved out of there into the operational side of the business–was moved into Mine Maintenance for about six years in the end and another year in Mine Production. I remember people explaining to me, initially, Gord Ball was my boss at the time saying, "Okay, Al, the good news is you had a chance to [have a] hand in developing this technology, now you get to employ it and make it work." I found there was very different challenges associated with that; just getting people–you know, people are always interesting and so you've got a kind of culture and mindset in the mine maintenance area associated with maintaining draglines and bucketwheels and it's amazing how attached these people get. It becomes a big part of their life and whatnot. Well, then, when we started talking about parking draglines and bucketwheels, I kid you not, there were some of these folks that were kind of "over my dead body" kind of a thing, or "I'll retire; I'll quit before I work on a truck or a shovel." Here is an engineer who's a lot more adept at dealing with technical issues, now all of a sudden there is kind of psychological things that–I remember myself and Gord Winkel at the time were tasked with making this transition. We were primarily focused on the maintenance side and Gord Ball and Andy Fediuk were the guys on the production side. Those were interesting times too.

AD: Well, I guess for those people that had used the technology, it was unique, they had a mastery of it, and it also gave them status that they were dealing with this unique technology, and so it was very threatening to their whole work-a-day world.

FAIR: And I think that is a lot of it, for them they saw it that that was who they were and that piece of equipment. And many of them even had favorite draglines or bucketwheels or whatnot, and they very much saw themselves as the keepers of this equipment. For me, I didn't necessarily have that kind of an issue but I understood what they were dealing with, and we had some interesting times in getting people onside with the switch.

AD: I've interviewed people on the Suncor side and, of course, as you know, they had a death in terms of one of the bucketwheels and they talked about that. But also the move to truck-and-shovel was an opportunity to restructure and to downsize; so jobs were threatened and were lost. Now was that an issue at Syncrude?

FAIR: Less so, I mean Syncrude was always good about their commitments to their employees and continues to be today. The Suncor situation [move to mobile equipment] was different, and this is another one of these things you remember and mostly fondly in your career. Jim Carter was a big part of this and Al Hyndman was also engaged in this. When we were developing this mobile equipment or truck shovel technology or application of that technology to the oil sands, we utilized a fellow by the name of Harvey Clark, a very prominent consultant in the industry then that Jim knew well. So, he was the guy that ultimately kind of did the groundwork to say this can be made to work. And, then, I can remember making a pitch at a meeting in Calgary to Jim Carter at the time, and Jim–it took him two minutes and he was there. We went through the rest of the presentation but I could tell Jim was there. So, then, it became, "Okay, we have to get this in front of our Executive Committee and make this recommendation, this significant recommendation." So, in the meantime, we had been working with Suncor and, of course, as you know Syncrude and Suncor share lease boundaries. There was a lease boundary kind of where the old highway [was]–well where the new highway is once again realigned, for a time it wasn't. So, as you can appreciate when two companies come together; there isn't a vertical line that you can just say this is yours and this is yours, so you have to plan how you are going to do this and create a highwall slope. So, there was about 20-million barrels of bitumen engaged in this lease-boundary pillar area. We were working through, and I was in Mine Development at the time trying to negotiate with the Suncor folks relative to this, and what it ultimately came down to is we agreed to share our hydrotransport technology with them, some money, we get the 20 million barrels, I can't remember the dollar amount–by today's standard it wasn't a significant amount–they got the hydrotransport technology and we essentially threw in the truck-shovel technology, which seems almost comical now. This was guys like Bert Lang and whatnot were key and involved in these discussions at Suncor.

To Suncor's credit, it took us many months to arrive at the conclusion that this was the right thing to do. Suncor [did this] in a matter of weeks–would be an exaggeration but a month or two no more. I remember Dee Parkinson was the CEO of Suncor at the time.

So, going back to Jim being excited about this, wanting to take it to the Executive Committee; so, at that time, the Executive Committee met on Mondays but the Wednesday prior to, you had to put in your topic summary of whatever you were recommending in sort of like a pre-read so the Executive Committee knew what you were talking about. Eric Newell was the CEO at the time. So, I put this in on Wednesday–a simple piece of paper–but making the recommendation that, when we develop the North Mine, we move to truck-shovel, hydrotransport and the whole nine yards. So, I kid you not, on the Thursday after I've submitted this package to the Executive Committee, Suncor announces they are switching to truck-shovel technology. And, if you think about it, when Dee Parkinson came there, and I'm not speaking out of school, the view was to consider shutting down the Suncor operations. The price of oil in the mid-late 1980s was not that pretty, etc., so they–to their credit–were able to take that. I think it was a bit motivated by their recognition to shut this down with some of the inherent issues associated with that–like the tailings–was going to be a challenge as well. But they managed to turn that around. Look at Suncor today; it's amazing what they have done. I can say if Jim watches this, and I know he will agree, that that was, we felt scooped. This was our technology, and not that there's anything magical about truck-shovel technology but, at the time, utilizing that in the oil sands industry, that was a big deal, a game changer. But, in the end, it has all worked out well. Syncrude has been able to use it; Suncor kind of turned the corner as a result, and now it's the norm in the industry. But it wasn't, when you go back to when this was decided, it was a very different place at that point in time.

AD: As people that I have interviewed have said that, of course, that gives you–you can choose where you mine so that you get the appropriate feedstock because earlier on you referenced that, when you were on the edge with the bucketwheel excavators and it wasn't a particularly fruitful area, you were stuck with it.

FAIR: You had a lot more, when you think about the industry today, and arguably some people suggest that using draglines gave you the–because you drag the shovel up the face you got a lot of blending that occurred. But the industry today in order to optimize recoveries and whatnot, if you don't have the ability to blend the oil, you are hooped, your recoveries just go in the tank, while with mobile equipment you've got infinite flexibility to do that because you position your shovels in different parts of the pit. You're not reliant on where the dragline is, and you blend off ore; one truck load from here, another from there, perhaps another one from there. That was just one of the benefits.

With mobile equipment, typically, you get 10-years out of a truck. Well, [with] technology progressing and advancing so quickly these days–I mean with bucketwheels you operate those things for, there's draglines out there that have been operated for over 100 years, so you keep band-aiding them together and whatnot–whereas when you get a new truck every 10 years, you get the greatest and latest technology. There were numerous benefits associated with it.

The other one, which is more of a capital cost one–in order to utilize bucketwheel reclaimers and draglines and whatnot, there is a whole bunch of area that you have to pre-strip and you have to set up this network of conveyers and whatnot. So, there is a big investment in pre-stripping a bunch of

material; whereas, the mobile equipment, of course, none of that is required. There was a bunch of operational and sort of economical considerations that went with it. In retrospect, it makes all kinds of sense, but, again, if you look back to the early days, the mobile equipment available, we knew the early days of Syncrude, one of the considerations was to use scrapers–those little buggies that you see building roads–can you imagine how many of those–there would have been hundreds of these running around the pit mine at the scales that we do today. So, it was all neat and fun to be a part of –you reflect back on those days and maybe people today say, "This is all obvious; what was so high tech about that?" Well, trust me, back then it was not obvious and it was high tech.

AD: And, in terms of other mining operations, strip mining operations, you were dealing with knowns, coal had been mined for millenia, gold whatever, copper, but of course it was the uniqueness of the material that you were mining and the conditions of the Boreal Forest, that particular geomorphology of it all.

FAIR: Well, that's kind of what I said earlier, Adriana, any time you wanted to do something you had to kind of modify the approach because of one of those kind of differences, either the scale of the operation, the temperature regime, the properties of oil sand material itself, but that's kind of what made it interesting as well. And even today that continues to play out; certainly it's an industry we've learned hugely since then but in the early days a lot of these things were just not [known]. Another, just a small example, that Russ Slayback, who used to be a geo-hydrologist, the water sands that underlines the oil sands – well GCOS [Great Canadian Oil Sands] had been in operation at the time but they were mining the river escarpment adjacent to the river so any under-laying material had drained and there wasn't any issues. Well, Syncrude had to develop a flat piece of ground–to develop a pit as you excavate down it and this happened in the test pit, it was called the Beaver Pit, and the Little Beaver Dragline was used to excavate it, the bottom of the pit blew out because of the artesian pressures, the excess pour pressures in the underlying water sands. Well, this is like, "Holy smokes, how did that happen?" So, now you've got to think about–so we get into the massive de-pressurization program that–and, again, this isn't, other mining industries have dealt with this, but when you look at the scale and the immensity of what we are trying to do there, it was–I mentioned that a minute or two ago. Well, the reality of the amount of effort that was spent developing these programs, executing them and continuing to monitor them was huge. That was just one little challenge that you had to deal with along the way.

AD: You mentioned the Research unit at Syncrude; can you describe that and the kind of expertise and work they were doing?

FAIR: Well I can, so that is where I finished the last eight years of my career with Syncrude. I have to tell you when–it was Jim Carter and Gord Winkel [who] asked me to go there, so you've got to understand I'm coming from six years in Mine Maintenance and then some time in Mine Production and then back in a Mine Development role but very much focused on sorting out some of the issues with Aurora.

The move to Aurora was going to be lower temperature, and I remember Jerry Krause–I had signed on and the idea was that I was going to develop all these new technologies, "Put that over there; what I need you to focus on right now is getting Aurora sorted out and fixed." It was myself, Gord Winkel and Jerry Handford that were kind of tasked with figuring this all out, which was an interesting challenge, but through that, I had become a lot more re-engaged with the Research Group. And I remember there was a fellow–Wayne McKee–who was my predecessor; he had replaced a guy by the name of John Clark, and Wayne I knew well, we had worked together for many years in the mine area. My youngest son had not yet finished, he still had two more years of high school, my daughters had gone off to university–so, ideally another couple of years would have fit better so that our son could finish school in Fort McMurray. So, I went and talked to Wayne and said, "Wayne, what's the hurry? (he was only 55). Why don't you stick around a few more years?" Well, he explained to me that this date had been decided on 10 years ago, that he and his wife Diane were retiring when he was 55. I knew that was a lost cause after that. I was not going to change his thinking. So then I hummed and hawed a little bit with Jim and with Gord, at one point it was explained to me, "What part of you are going to Research, don't you get?" So, I thought, "Okay, you know what, why don't I go to Research?"

Well, I must say, for me to finish up my career there and, to be honest, I did work with the folks there but really in terms of understanding the scope of what went on there, and particularly my exposure up until then had been the mine/extraction side of the business, the whole upgrading end of the business, analytical investigations and whatnot that I knew nothing about. Well, when I went there it was an eye opener for me. I was instantly impressed by the quality of the people and the scope and nature of the work. But, like any place when you come there–someone once told me that when you're in a leadership role, you take on a new role, you got six months. In six months you either make the changes that you think are needed, or you stick with the status quo. So, when I went there, and along the way I had finished my MBA, and so I had that kind of business view of the world that's, I think, all things considered, is helpful. So, I had that hat on, at least one of the hats I wore. I remember looking and thinking–I forget the exact number but there is like 120-130 different projects and about that time about 80-85 people. I'm going, "How can there be more projects then there are people?"

To make a long story short, I implemented really a different basis in terms of reviewing and deciding on which projects, and how to develop your research project portfolio. I remember naively thinking that many of these people are Ph Ds and have advanced degrees. They're all smart people; they will clue into this and they will be onboard like that; wrong; "Oh, my god what an uphill battle."

Again, I realized that many of these were pet projects and people saw–people with advanced degrees they view that the work they do is who they are. If you want to change the work they are doing, you are changing them; and–they need to think about that for a bit. But, in the end, I was able to win them over. It takes some time and some effort and so, now, it's kind of interesting. In simple terms, the way I would characterize it–suppose you have an idea or project and you came to me and said, "Al, I got this idea." First question I would ask, "Assume it works perfectly; tell me about the size of the prize. What's it going to do for me?" Well, sometimes that was the end of the conversation, but

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then if you came back to me and said, "Here's what it's going to do for you," and I'd say, "That is pretty impressive. Tell me the two or three things that, if they don't go right, none of this happens; everything is in the toilet; the show stoppers?" So, then, you'd come back and share with me, "Here are the key assumptions or key issues related to this idea, or project, or technology." Then I would say, "Okay, tell me about your program to address those potential show stoppers; if you can come back to me and convince me there is a prize to go after here, you understand what the issues are that can prevent that from happening, and that you've got a program to address them, we will fund this."

That became the kind of … in almost a comical way, the norm now that people will say, "Here's the size of the prize; here's the potential show stoppers; and here's the program to address them," and that is still kind of the–it's a little more sophisticated than that now. We talk about stage gating and all these things now, but the essence of that is still there. I take a lot of pride in that, actually, of all the things that I have done at Syncrude, because I get known for my sayings and it was kind of comical when I retired. I was in the Research Group so they put this function on for me, which I much enjoyed, and I would have these sayings, so they read them back to me and their interpretation of what they actually really meant, and it would be things like, "If you don't know where you're going, any road will get you there." Well, their interpretation is, "You have no idea what you're talking about; go away until you do." There were a number of these.

AD: So they translated your sayings.

FAIR: They did; it was very entertaining. By and large, they were pretty much on the money. But I enjoyed my time at Research. I remember when Syncrude's whole management structure was being reassessed by its owners and, ultimately, Exxon Mobil as they have today, they have a much larger role in there, research is one of the areas, not initially but subsequently, was put through an extensive review as to what the right path forward was. And there was a range of options: one was status quo to the other extreme – let's do away with research kind of thing. Although I obviously wasn't supportive of the let's get rid of research, I didn't believe that the status quo was the right option either. The answer often lies somewhere in the middle and, by and large, Syncrude's Research organization was kept pretty much as it was, because it was seen to be–deliver on the goods sort to speak, and whatnot, and, to my knowledge, that is still the case today.

AD: So what would have been your annual budget?

FAIR: It ranged–I will be the first to confess, I'm a little bit of an empire builder, but you've got–I like building things; that's my thing. So, when I came there, I think I mentioned it had about 85 employees and an annual budget of roughly 50 million dollars, something in that range. So, when I left, we–in fairness, we took parts of the old Environmental Research Group that Don Thompson had and the Development Group that I previously had and combined those all. So, instead of Research, it became Research and Development. But we had a budget of about 115 or so people, and an annual operating budget of about 70-75 million dollars. But none of this was done because Al wanted to build an empire. There was a basis for it all.

Going back to those sayings, one of the sayings I used to always remind people, "Don't ever forget that you live in a 'what have you done for me lately world,' especially if you are a researcher. Soon, on an annual basis, you got to go out there and convince the Executive Team that the money that is being made available to you is being put to a good cause." We routinely were able to demonstrate a dollar invested in research led to a 10 dollar savings more broadly in the operation. You get a 10 to 1 payback; that's pretty impressive. So that was, at least I chose to believe, that that's why our Executive Committee and others at the time chose to continue to support research as they do today.

AD: Now the research was done through partnerships as well, and, so, in terms of the Syncrude era, we are basically talking AOSTRA [Alberta Oil Sands Technology and Research Authority], relationships with the University of Alberta, University of Calgary, perhaps other universities across the country because Clem Bowman at AOSTRA nurtured that and then funded that. Can you tell me about some of those relationships and how that worked out?

FAIR: As my career progressed, I began to understand and believe that the collaborative approach to doing pretty much anything is always better–the synergistic way of doing things. So, in the early days, I would say it was more structured, certainly AOSTRA which evolved and is really now become AI-EES [Alberta Innovates - Energy & Environment Solutions] with Eddy Isaacs but, as an aside, I mean I'm a surface miner but the work that AOSTRA did, if you look what that's led to, it's huge; it's massive. To basically develop the SAGD technology, which of course is very different from the surface mining technology–and I can remember going out there and visiting the UTF [Underground Test Facility] at the time, going underground. I had been underground before and I remember thinking–they had all the walls shot-creted, and whatnot, and that was the driest, tightest tunnel I'd ever been in in my life–thinking "Wow, they got it good here." But the technology they developed there and then subsequently the horizontal-drilling technology which people take for granted today, but it was not back in those days, and, again, AOSTRA was one of the pioneers in developing that technology. Now, others have taken it steps beyond, of course, now and, if you look at oil sands production, today, it's kind of 50-50 from surface mining and subsurface or in situ production. And, if you look at the relative makeup of the reserves, the numbers typically talk about 80-20 and the 80% being aligned with the in situ mining operations, then, it's not question, that that's key technology.

But, on the collaborative thing, which has really led me to the role that I'm in now is because I believe so strongly in the collaborative approach. In the early days, when I think about it, you know when there was just Syncrude and Suncor, often kind of depended who the CEOs were in charge. Sometimes they got on better than other times but, when they did get along, there was appetite–like when tailings, in particular, was one of them. As years went by, we began to realize that this is a real issue and we would have these sort of "ad hoc" collaborative initiatives that we would engage in, and even when Shell came along, I could remember being approached independently by Shell in my role at Syncrude, and Suncor both wanting to collaborate on this and I said, "Well this is ridiculous, if you're interested in working with us, you guys, let's just collectively work together." So, for–a lot of people don't know, but as a precursor to the OSTC [Oil Sands Tailings Consortium] and all this COSIA today, there was an MOU signed between Shell, Suncor and Syncrude to work [together]. It

had a narrowly-defined scope, much narrower than what we are doing today, of course, but those were kind of precursors to it.

But the other area, the U of A, without question, is a huge collaborator and partner. Now, the oil sands are in their backyard, of course; maybe we are in each other's back yards and you've got a lot of kids that graduate from the U of A and carry that sort of affinity for the university there. For me, my [current] Edmonton offices are actually located at the U of A. Syncrude, I remember with Jacob Masliyah supporting his research in a very generic name–Oil Sands Engineering–or something was the name of his Industrial Research Chair–well that Chair has gone on. Jacob has since retired but Zhenghe Xu, who has now taken it over, that Chair is the longest-running Industrial Research Chair in all of Canada. And Syncrude was the one and only first company that supported that. Now all of the players support it, and wouldn't even remotely think of otherwise.

But it gives you some insight into Syncrude's role–was very much the leader of the industry at that time, and some others have now become much more significant players, so things have changed a bit, but all through this collaboration, whether it was with your neighbor across the highway meaning Suncor, or it was engaging a lot of the expertise–fortunately on a global basis to come and work with you, or working with CANMET [Canmet ENERGY in Devon focuses on the development of cleaner fossil fuels and related environmental technologies with a focus on oil sands and heavy oil]–has been a partner in the oil sands industry for many, many years. Guys like Hassan Hamza–I remember when we developed the Fine Tailings Fundamental Consortium–Hassan and CANMET were kind of chartered partners of that–froth treatment technologies, the paraffinic froth treatment technology; that's where it all started–was developed in these partnerships. Even today, they are a little more focused now sort of more on the bitumen extraction and tailings side of the business, but still integral partners with the industry in this.

What really , for me, has changed dramatically (in a positive way)with the focus on the oil sands now, the "dirty oil" and all, it's a bit of a struggle–you spend your whole career doing this and you sort of–we have a lot of critics now and, in some ways, I blame us as an industry, when we achieved the success of–and it was really led by the Alberta Chamber of Resources–Brad Anderson and Eric Newell obviously (was a key person)–were successful in negotiating new fiscal terms, or whatnot, which really led to the explosion of the industry so that, of course, that was the good news part of it. The bad news part of it–as an industry, I think, we kind of dropped the ball and really focused on developing the industry and didn't acknowledge, recognize, do anything as Green Peace and others began to target the industry.

You know, we didn't counter with what we are doing, so consequently we sort of lost the (hopefully temporarily) the PR battle, but today, whether its Keystone Pipeline or the Gateway Pipeline, every day someone has something negative to say about the industry. But its–and maybe I'm biased, but a lot of it feels unfair; much of it is grounded on half-truths or misinformation that people don't chose to take the time to really understand. They see it on a blog on the Internet somewhere, and "it must be true."

I was recently in Germany; I'm part of–a Lead Science Coordinator for another collaborative initiative between the Helmholtz Institute or Helmholtz Association in Germany, and the University of Alberta, really, more broadly, the Government of Alberta, but, through the University of Alberta. And so this partnership is aimed at collectively working together to deal with some of the issues, challenges associated with the oil sands–treatment of process-affected water, tailings, land reclamation, these kinds of things.

Well, the view within the European Union of the oil sands is not a positive one, and I don't begin to understand the politics but, when Canada dropped out of the Kyoto Accord, and whatnot, that sent the wrong message to a lot of people. So, going to Germany with the intent to speak to these folks and encourage them to reconsider their view of the oil sands, you become painfully aware of the misinformation that people, they have all these–Dave Lynch has this talk; he talks about the myths and the realities of the oil sands–well it's very apropos. Like some of the things that are assumed, you just shake your head and, "Where do you get that?" But that's the belief that many of these people have. So, when you get some of the NGOs that are sort of championing this anti-oil sands sentiment, then, people–and I'm not suggesting that there's clearly all kinds of things that need to be done, from an environmental perspective to improve the oil sands but, in general, hydrocarbons–I often give talks to big groups of people, and sometimes they aren't always the friendliest audience so at one point of the talk, I'll stop, and I'll say, "I suspect that there are some, maybe many of you that believe that the pace of development in the oil sands should be slowed, maybe even stopped." And then I'll typically pick on someone in the audience and I'll point to them and I'll say, "I'm here to tell you that you personally can make that happen." And that usually gets their attention.

I'll say, "Here is what you have to do; you have got to park your car; you don't fly anywhere; you turn off the heat in your house; you don't use any hydrocarbon-based products like pharmaceuticals, plastics or whatnot; and convince everyone else to do the same thing; and we are there." Guaranteed either that person or someone else will say, "That's ridiculous." And I say, "Exactly my point." It's ridiculous to talk about shutting down the industry, so let's get on with developing it more responsibly."

I get different reactions to it as you can imagine, but that is the reality of the situation. We need to get on with responsibly [developing the oil sands]–when I was in Germany at the session I talked about recently–one of the individuals that leads one of the Helmholtz Association Institutes, I turned and I said to him at one point because he was kind of giving us a hard time about this moratorium, we can't work on oil sands and I'm saying, " Really, so tell me, if the oil sands, and let's just assume this for now, instead of being in Northern Alberta they are in the middle of Germany, what would you guys do?" Well, at that point what can they say; they are going to develop it responsibly. And then I say, "Then, why do you give us a hard time for trying to do exactly that?" It gets very hypocritical sometimes these arguments.

But, anyway, that's for me to–as you know I retired from Syncrude so that I could take on a role as, initially, as part of something called the OSTC [the Oil Sands Tailings Consortium], which was kind of short lived for all the right reasons because it has now been integrated into a broader initiative

called COSIA [Canadian Oil Sands Innovation Alliance], but was really exciting. I wasn't necessarily looking to retire, was still young at heart at least, but that was such an exciting opportunity. It's kind of interesting, though, as an aside, you go from working for a company where you've got all kinds of resources at your beck and call, and systems and processes and all this sort of thing and you kind of grow up in that; then, you go to a situation where you are it. You're the one person; you have nothing. That's not true; I had an agreement signed by all the seven member-companies of the Oil Sands Tailings Consortium; basically all of the surface-mining oil sands companies and I had a budget with some money; that was it.

Now, the budget, I understand, compared to a lot of entrepreneurial types is more than what many of them have, but you go there, just simple things like Internet, email address, an office, admin support; all these things. So, you do what you got to do and you develop it, and I was supported by the U of A, guys like Dave Lynch and kind of put it together. In fact, I had to step down from my role as the Chair of CONRAD [Canadian Oil Sands Network for Research and Development], who was promoting collaborative work in the oil sands, and since has been integrated into COSIA as well. But, soon after I was there, it became apparent there was something bigger happening and, of course, that turned out to be COSIA, which in many ways is patterned after the OSTC, but has a broader scope than the Oil Sands Tailings Consortium. It's exciting to be involved in it and, for me, it's likely where I will finish out my career.

I am getting to a stage that there are other things I want to do in my life, other than working 70 hours a week, but, for now, it's fun; it's exciting. You like to sort of feel like you can make a difference somehow. And, as you progress in your career, in the early stages money matters and you have a family you have to raise, and you are trying to do all these things. Eventually, not that money doesn't matter, it always does, but it matters less; the fact that you can make a contribution of something to something, to the greater good, starts to matter more; that's kind of where I'm at now; and its fun.

AD: Now, in terms of you really essentially becoming a one-company man, and you were given the opportunity to learn different aspects of the enterprise and contribute in different ways, do you want to talk about the culture at Syncrude; I mean you stayed.

FAIR: Yes, I did. I think I mentioned earlier that I initially came for two years and then like many was going to go and seek my fortune. But, you know, you get a little bit hooked but there were numerous opportunities along the way to go do something different. I never, never took advantage of them; part of it was– would always ask myself, "Well, if I'm going to go do something different, presumably it's something better than what I have now." Well there was never anything better–I was paid well, but it was exciting. I was a part of something that really mattered. The culture at Syncrude has changed a lot, as these things do happen. But I remember in the early days, it was kind of–and it wasn't just Syncrude, it was Fort McMurray, if you had an idea and you wanted to go make something happen; you were supported, you went and found some like-minded people.

I was involved, I started the Gentleman's Hockey League in Fort McMurray; I was part of the School Board there; a lot of these things. Would I have had the opportunity to do them in a larger centre somewhere? Probably not, so those, that was part of the reason that kept me there. We raised our family there, three kids–two daughters and a son. They were born and raised in Fort McMurray; they were educated there, lived basically their growing up years there. One's a doctor; one's a reclamation scientist; and one is a chemical engineer. They have all done awesome. Syncrude was a special place. When I think back on it, I remember, in the early years, you had one thing in common with everybody whether it be at Syncrude or Fort McMurray (with almost everyone), you were from somewhere else. Everybody came there from somewhere else, so you had that in common right to start with. I remember everyone there would ask you, "Where are you from?" Well, I come from Vancouver Island, right, so if you come from BC you say, "You come from the Island"; never met a Newfoundlander in my life, they would instantly say, "You don't sound like a Newf," I'd say, "Other coast, not that island, Vancouver Island."

I also began to realize that anybody west of Toronto viewed themselves from Western Canada, so it's kind of interesting, you learn those things. But I think back, my formative years there, and the people on the Executive Committee, like Eric Newell, like Jim Carter, like Murray Smart, Gord Ball, Gord Winkel, Phil Lachambre; these guys were…they truly were leaders in the broadest sense. I consider people like Jim a mentor for me and they truly were. Even today, I'm very much in–they are still very much engaged in the industry. So, it really was kind of the "golden years" of Syncrude, and it was stressful–things didn't always go well, and sometimes you had to answer hard questions.

One of the things at Syncrude that was always a challenge and, frankly, if I knew then what I know now, I think I might have done it differently but Syncrude is a joint venture and has had, and continues to have, a number of different owners who had different motivations and had different views on how things would be run. And, in the early part of your career, you are oblivious to all of this, but as you progress and get into the more senior roles, then, you begin to understand how involved the owners are or want to be, and you realize what the Executive does to kind of buffer you from them. But, as you progress, there is less buffering that goes on, but even that was part of the deal, and you learned from that, and learned how to work in a situation where you have multiple masters. So, if I could do it all over again I don't think I'd change a thing.

AD: So, really, it's rare now to have a job for life and to have that mobility within that company to be able to try different things, which is what you did.

FAIR: Yes, I think, Adriana, today–the longevity of a career in a company like that isn't as prevalent today; I think that is driven by a number of things. I have this conversation with my son, who works at Imperial Oil. I don't think he believes that he will spend his career with Imperial Oil. I think it's partly–if you think back to the early days, Syncrude and Suncor, if you worked for the oil sands you worked for one or the other. So that, now there was lot of service companies supporting the industry that were interested in hiring you. I don't mean this in a negative way, but people today, young professionals today, are a lot more mercenary; they are more out–giving them the benefit of the doubt, they are more interested in their profession and progressing that. I suspect in the case of

some it's more, you have got more opportunities; you can play one company against another. Maybe I was naive or something. I never thought of it that way. I was always totally engaged in the work I was in. If you asked my wife and kids, maybe sometimes too much but I enjoyed what I did; you made a contribution. Could I have made more money going and doing some other things? Maybe. Would I have enjoyed living in a bigger centre? Maybe. But I was happy with what I was, what I did, and can really honestly say I wouldn't have done it any different if I could do it over again.

AD: Do you think that there is a difference between loyalty to a pioneer enterprise that is innovative and cutting edge versus loyalty to an established company that has been there forever and that you know you are going to be a cog...

FAIR: In a big wheel?

AD: Yes.

FAIR: I suspect there probably is. For me, and the timing of my career, it wasn't just the company you were working with, it was the industry. It was all the stuff we talked about before; it was exciting learning and developing. Had that not been a part of it, I'm not sure I would have been as engaged and as interested in staying a part of it. But you were also growing with the people and the company, as you described. I never felt like a small wheel on a big cog ever. You felt that you were a part of something and whether you were there or not–mattered. So, for me, I came from a small town, I enjoyed living in a small community. Would it be nice if the winters were a little shorter–absolutely. Maybe not quite as cold or [less] bugs in summer or whatnot, but those were all things that you factored into the total equation. And it will be interesting to see–it's kind of fun for me at this stage in my life to now watch my kids in their own professional careers and we will see what kind of choices they make. I, in the end, I offer them advice and counsel them but, at the end of the day, I always tell them, "It's your choice, you've got to do what makes sense to you and that's what we did."

My wife had a great career there as well, working in the hospital as a nurse in a number of different areas. So, in retrospect, when I think about it and I meet former classmates from high school; in the early years they like, "Are you insane?" I come from Vancouver Island, right, a very nice part of the country to come from, but I look at them today and I'm financially secure. I feel like I've had a solid career behind me. If I have an interest in a consulting role beyond this, there will be opportunities, so I look at it from that perspective. If those were my two choices, I definitely made the right choice.

Did you sacrifice some things? Absolutely, being apart and away from family was a big thing in Fort McMurray; you had friends that would help you out but they were in the same boat you were in. Childcare, without a doubt, the most difficult thing to deal with all the time we were in Fort McMurray, and I know [it] continues to be a challenge for people. But those were some of the puts and takes that you make when you make a choice to live in a place like Fort McMurray, and to stay with a company like Syncrude. But, you know, it could have; would you have done some things

differently, if you could do it all over again? I'm sure I would have but in totality of what I did, I wouldn't change anything.

AD: Now, you mentioned the MBA and it would appear that Syncrude really supported professional development in terms of its upper management and that again instills loyalty doesn't it?

FAIR: It does; it does and, in fact, my case, the MBA program and it was really Phil Lachambre, the former CFO. He worked for years with the U of A to set up a part-time MBA program that would be taught remotely in Fort McMurray, principally sponsored by Syncrude. So, I was in that first class that did it. I believe they are now on the 10th class. When I did it, it was a four-year deal, so this was not an insignificant commitment. I can remember my days when I was doing the classes, I'd wake up at six in the morning; go to work, typically our class time was from three to seven (early afternoon to late evening); go to class, do my best to stay awake. Had the three kids then, all young, come home, help my wife out; look after them, and feed them; all that kind of thing. I'd typically crash for about an hour, from 10-11pm, just because I was too tired to do anything else; get up and then work till about two in the morning on my MBA work, and then do it all over again the next day. Four years of that.

I can remember learning something about a concept called "sunk costs," which in simple terms is "you shouldn't make an investment decision based on the money you have already spent." It's got to be based on forward-looking kind of thing. Well, realizing half-way through my MBA, and it's really sunk cost that was really driving me to carry on. But Syncrude, the MBA program was really one significant one but there were certainly other engineering programs they supported as well, and many others. That class, as I think about it today, people like Paul and Colleen Kearney, who are a husband and wife team, that are both in the senior management ranks at Syncrude today were there. There are just numerous other people, some that have since retired. As I finished the program in 1995, that was, and for me, I always had an interest in an MBA, but not to the degree that I was willing to leave my job and go do it on a full-time basis for two years. In fact, when I enrolled in the program, I was already in the management ranks at Syncrude so, arguably, didn't necessarily need to do it but, for me, it was a personal goal that I wanted to do; so I took it on.

Syncrude–and you have to put this in context, previous to this any, even a part-time MBA program, you went to the university to do this. Mike (Percy) was the Dean at the Business school at the time so he got people to agree to do this, and I can remember in the early years he had a terrible time getting Profs to agree. Think of it from their perspective, they had to fly up to Fort McMurray, teach this course and fly back, very disruptive, two or three times a week. Well, by the midpoint of that program, people were fighting because they began to realize this was really special; these weren't just your usual students. In fact, when we graduated, one of my claims to fame is–I was part of as were the other 20 students that graduated or 19 that graduated with me, were the first-ever group of students to convocate off of U of A turf. They flew the Chancellor (Syncrude did), all of our Profs, faculty members, what not. I remember there were 24 of them and 20 of us at our convocation ceremonies and they were held in Fort McMurray. Now, I know they have happened since, elsewhere–convocated off the U of A turf somewhere, but we were the first ones back in 1995 to do

that, and that was all enabled by Syncrude's generosity. They were smart enough to realize then that it's good to get people [to stay].

AD: Well, they were investing in their employees.

FAIR: Absolutely.

AD: So, can you tell me some of your Profs and some of the topic areas?

FAIR: I apologize, I can't remember all of their names but I do remember taking this micro-economics course, and this Prof explaining that he was the oldest active Prof in the department–and meticulous, by-the-book everything. And it was at that point, it doesn't matter that I'm a manager type and been out of school for X number of years, a student is a student is a student. But it was individuals like that that kind of reminded you that this was serious stuff. And, in the end, whether I finished the program or not, probably didn't matter in what I was doing. But, with fellows like him, and Mike Percy himself came and taught some of those courses, to show the commitment to the program, and some of the others that you got engaged with, it ultimately led into work related–back at the job kind of thing. They started to recognize that this mattered.

AD: Was it just a course MBA or did you have to do a "mini" thesis or a project?

FAIR: It was a course-based one and that was part of the challenge. I can remember these sessions when we had to collectively decide, "Okay, what is the elective going to be this term," because there was no such thing as you take that elective, we all took the same elective. So, that made it a bit more challenging. They tried for a time doing a teleconferencing thing but technology at the time was hopeless; it's much different than it is today. So, that was a bit of a challenge. There was a project that I recall; it's kind of going back to the SAGD thing. So, at the time the SAGD had not been commercialized; there were companies conveying an interest, so the project that myself and three other colleagues took on was the commercialization of the UTF, which subsequently came to happen, and we were asked to provide our report on this to the folks involved in it. It was kind of neat; so that was fun. When I look back, in retrospect, four years of that was a bit painful, but it's like many things in life, when you reflect back on it, you see it differently. Whether I would do it all over again, I'm not sure, but I'm glad I did.

AD: How did you think it helped you on the job?

FAIR: Engineers were trained to be problem solvers, and by and large they are good at it, very analytical but business savvy–and engineering is changing now; there is getting more focus on understanding the economics of things and just simple things like learning to use Excel (like a spreadsheet); you get very proficient in using that. Even in your personal finances, you kind of view things differently. There is no question an MBA, in my mind in any case, is that it broadens your perspective. So, I recall when I was transferred to look after the Research Group, I took my MBA skills there–front and centre and they became–because I quickly realized that I can't compete on an intellectual level in terms of the technical aspects of many of the Ph Ds that are working there. I

don't understand surficial science and all these things; I never will; I'm not even sure I want to. But, in terms of how it all comes together and how to decide on the mix in our project portfolio ought to be, the MBA was ideal for helping with that. And I think if you talked to others they would share that as well.

AD: So, the company was basically looking at creating the senior managers that they needed but with the current best management skills right?

FAIR: Absolutely, and, as I say, many of my former classmates went on to do exactly that. I haven't kept in touch with them subsequently–as I say, I think they are on their tenth tranche of students, so our class, there was 20 in the end, I think we started with 24, so if you do the arithmetic that's in excess of 200 MBA students that have graduated as a result of that program. And I'm willing to bet that many of them, not just necessarily Syncrude but broadly within the industry, are in those management roles, so, it's as you say, it instills that loyalty. But that was always one of the potential negatives of being located in Fort McMurray; you didn't have the opportunity like, say, the guys in Research did to enroll in some kind of night school classes or whatever. But, when this program was put in place, it enabled a lot of that stuff. It was a tough haul but it was definitely worth it.

AD: Now, I know that you published jointly a number of papers and I do have a list here. I'm intrigued by a number of them and want to ask you some questions about it. Some of them, you would expect, they are related to the tailings ponds and the structure; like the depressurization and basal highwall stability of the Syncrude Mine, now was that around the failures that you were...

FAIR: That was the depressurization problems that I talked about. An extensive program was developed to manage that. Like with the papers, it's an interesting thing. If you are in the academic world, you live and die by what you publish. When you are industry, it's different; the expectation isn't the same. But I always believed that, and I encouraged my staff over the years to publish as well; it's clearly a form of collaboration but it's how you tell your story; it's how you get it out there. And you'd be astounded how many times–even today some of these papers that I wrote 15-20-25 years ago, that people will make me aware that they have recently used it in some fashion or what not. But the other thing that it did–if you wanted to really truly understand something, try writing it down in a paper and explaining it and presenting it to others, then you have got to make sure that you understand the details; all the aspects of it, particularly when people can then question you on it. So, that was always part of my rationale for doing this, and I didn't write them to be published and all this sort of thing, but more because I felt it was part of what I owed to my profession to kind of put some of these things out there; and some of them are fun, the odd time you got to go to an interesting place to present them.

AD: So, you actually did present them at conferences.

FAIR: I did.

AD: So, this whole series of them relating to the monitoring potential highwall slope and stability at Syncrude's dragline mining operations, so this was sharing that experience and making it known worldwide and, then, the development of pre-blasting techniques to stabilize.

FAIR: That one, I didn't mention it earlier but this is another one of those "wow, I can't believe I was there." So, the pre-blasting techniques I talked about the earlier highwall slope failures. One of the technologies we came up with after we did the blast densification of the tailings area was, "Well what if we were to go out there, drill a bunch of holes and just shoot it, raise the whole thing up and drop it down again and fragment, break up all of these slip planes?" Well, we did this and this was no small-scale thing. These were large scale–we used an explosive called ANFO [or AN/FO, for ammonium nitrate/fuel oil is a widely used bulk industrial explosive mixture] and we would shoot these large–I mean it would take a week or two, maybe more, to drill off the pattern and, I think, it was two–three weeks. And, then, same deal–I'd be the guy, "Okay!"

I remember this time, we had the Geotechnical Review Board and their meeting was coincident with when we were going to detonate one of these blasts. So, there were a number of us out there. I remember Dennis Love being out there and Jerry Krause and our Geotechnical Review Board, and we were standing under one of the houses of one of the draglines–I think it was Drag Four–on the east side of the mine. So, I'm there and I got the radio and I give the blaster, a guy by the name of Don Friesen, the thumbs up, go ahead and shoot it. So, we are standing under the house there and we are 300-400 metres away, maybe even 500 metres–a longways away. The blast goes and it's impressive; I mean the whole ground lifts up and down it comes, so we watch it and the nitric oxide, this sort of orange smoke from the nitric oxide from the ANFO explosion is sort of drifting around and so we are going to walk over and inspect our handy work. Well, just as we are going to step out from underneath the house of this dragline, because you are in an undercover kind of area behind the house, there's this big bang! A piece of fly rock hits the back of the house and falls down about 10-12 feet from us and this was a big, the size of your head piece of fly rock. There is silence and we all look at each other saying, "Oh–my–God!" We look up and think, is it safe to go? This wasn't that long after the blast but was seconds, so this piece of fly rock had been launched way up in the air and gone a ways. So, anyways, we wrote a paper about this and, to my knowledge, and I don't know what has happened elsewhere but I don't believe anyone has done this type of pre-blasting on that scale.

AD: So, you are consolidating to get rid of fracture planes and other areas of potential weakness?

FAIR: Yes, so you have these sloping planes that are sloping into the pit and the concern is that, as you excavate the highwall, these things are allowed to slide and, of course, if your dragline is on top of it, that's a problem. So, you go out and try to fracture these planes and, so, you drill all these blast holes and you literally lift the ground up. These are significant blast areas and then it just comes down; it just goes "zoomp" and it comes down and lands, and then you go and level it out and you mine away.

AD: Wow!

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FAIR: It's kind of cool.

AD: So, who was responsible for theorizing about that and suggesting that it could work?

FAIR: If I think back on it, I can recall us having conversations with the Geotechnical Review Board, like it was born out of the blasting work we had done on the tailings area on a very different application but similar sort of thinking. I may have been, and I stand corrected, I remember Chuck Brawner being on the Geotechnical Review Board and Chuck was always full of all of these ideas, a lot of them you'd be like, "We'll get back to you on that Chuck." But I think he was, in fact, the guy–I don't even know if he knew what he was suggesting at the time but it prompted the rest of us to think, "Well maybe this is worth a shot," no pun intented, and it kind of grows from there.

Those were the fun years at Syncrude where you had an idea like that and–like I think today, and I'm not trying to be critical of and this isn't just a Syncrude thing, this is just an industry general thing, and I don't want to make light of safety, of course, safety is paramount but to be given the latitude to do something like this today, just wouldn't happen. There would be so many potential risks that had to be understood. Back, then, and I don't mean in a cavalier way, it was all thought through and no-one was ever injured when we did any of these things, but you were supported. You were a relatively-young guy and have you ever done this before, well no; but it's not to say we didn't consult people on it, but at the end of the day, like with a number of these things, you are the guy and you go, and you figure it out. And, if I thought back through it, were you a bit lucky at times, or didn't really know what you were doing, but it worked out ok, probably. But that's part of how you learn and that's why writing those papers, you share that with others because–and that particular one, I've been consulted with others in years since–and I can remember talking to these people and saying, "You guys really did that?" "Yes."

AD: Well you know you sort of–it's interesting to be doing a project like this and interviewing people. We have interviewed a number of the first 300 hired at GCOS and, of course, the labourers were–a lot of them were farm boys and so these teeth breaking off and so on. Some of those things they used the skills they had learned back on the farm and dealing with equipment.

FAIR: Very much so.

AD: Because the Bechtel Engineers were in California, or wherever, and they would reflect and then come and visit and talk and would redesign stuff, but those who were charged with those responsibilities of getting the plant running were being innovative in ways that you don't expect that of staff today.

FAIR: You don't find that stuff in text books; you go out there. And you referenced farm boys, I remember an engineer that worked for me, a guy by the name of Don Quapp, was a farm boy, mechanical engineer. He had this ability to, and he took great pride in, "I'm from the farm, and this is how we do things at the farm." He was a phenomenal engineer and he may not have been the most technical whatever kind of guy but he knew what would work and what wouldn't and was able to put it to work for him. Today, and I mean–I sound like my dad, but I truly believe you don't

completely understand some of these things until you have been there, done that kind of thing. Today the environment isn't as conducive; it isn't as friendly as an environment for the farm boys sort of speak anymore. I'm not going to argue if it's right or wrong, that's just how it is.

AD: It's a different world; a mature industry with mature technology has these broad relationships with academic institutions and institutes and so on. It's a different level of innovation isn't there?

FAIR: There are procedures and standards, which is a good thing. But you don't start off with those; you've got to get there somehow. And that's why, for many of the things that I was able to be involved in, were part of that process, to be able to do that.

AD: And I note that you did present a paper in 1987 on the "Role of Geotechnical Engineering in the Development and Operation of Syncrude's Open Pit Mine and Tailings Pond." Now, talking to Elmer Brooker and Norbert Morgenstern, Canada has played an enormous role in terms of the development of geotechnology as a field.

FAIR: Absolutely. That particular paper, I was invited by Dr. Morgenstern and Ed McRoberts and it was actually written on the occasion of the 25th anniversary of the *Canadian Geotechnical Journal* [1988] and I was, one of the three of us, and it was kind of a landmark paper because it was supposed to describe the current state of geotechnical engineering relative to some of the challenges in the oil sands, in particular, Syncrude. For me, that was an honour to have the opportunity. You have to understand at that time, guys like Dr. Morgenstern were just mega huge, and to be able to be invited to co-author a paper with them is just like, "Wow." I was happy to. I remember when we called together, this meeting and Dr. Morgenstern, Ed McRoberts and myself, of course, he was on faculty at the U of A and so we had lunch at the Faculty Club and I'm still relatively wet behind the ears at the time. We were sitting at this table and, for whatever reason, we had orange juice, maybe it was a breakfast meeting but, anyways, I reached for something and knocked this orange juice over, over the lap of Dr. Morgenstern, thinking did I just do that? He was very gracious; we've smiled about it since but it was comical.

AD: It either would have prejudiced your career or not.

FAIR: You know, I really believe there are moments in your life that define you, whether it's your career or–and you come into a situation and there are choices on how you are going to handle that. And the choices that you make define who you are, and whatever the aspect of it that you are dealing with. So, for that particular one, I remember instead of being sort of terrified by this, I said, "Oh my God, I can't believe I did that, am I going to be on your bad books Nordie?" You just manage it in a way, well, of course, not but you can imagine it in other ways and the outcome might not be as good. I've had, as most people do, throughout career, your life, you have those defining moments that you got to decide how you are going to deal with. It's not so much a right or a wrong, but there can be a better or worse, in how you deal with it.

AD: Now, there is also a group of papers that, where you have looked at in situ–"A Cost Comparison Study of Open Pit Mining Versus In-Situ Gravity Assisted Drainage." This was 1991;

1992–"Can In-Situ Recovery Compete with Open Pit Mining in the Oil Sands," and so on. Does Syncrude have any leases that would be amenable to using SAGD technology?

FAIR: No, Syncrude doesn't. So, those papers were commensurate with my time finishing my MBA so you were being guided, you recall one of the projects we did, we wrote a paper about it, one of the ones you referenced. So, you have to understand, at that time in-situ [technology] was just [being developed] - surface mining, GCOS [Great Canadian Oil Sands] and now Suncor and Syncrude that was seen as the industry [at the time].

AD: The standard.

FAIR: So for in-situ–you have to recognize in the early going at this UTF facility, there weren't even–you had to go drill these audits and tunnels and whatnot to access the resource. You sort of looked at it and said, "Is this ever going to make sense?" But, to the credit of the innovators of the day, I think horizontal drilling as much as anything is kind of a big part of the reason we have the industry that we have today. And not just horizontal drilling, the ability to–because when you think about the in-situ [operations], you've got to drill two well pairs, typically anywhere from one to three metres apart. So, it may be easy to drill the first one, but you've got to get the second one, and you've got to kind of mirror where the other one went, but you can't–you've got to keep it in the same relative spot to it. So, the technology that was developed in order for that to happen, like now with GPS technology, it's "Mickey Mouse" but none of that stuff existed back then. When I wrote those papers, it was really kind of as a surface miner, but kind of looking across the way to what was happening next door, and really wanting to understand whether that would–now I can't remember what I concluded, hopefully, I concluded the right thing. Half of our production comes from in-situ today.

AD: Now, of course, your big area of responsibility is tailings and the whole tailings technology. Of course, when people today think of tailings, those who do read newspapers or go on the web or whatever, they think of the birds, land and...

FAIR: Yes, hard not to.

AD: And I want to ask a kind of two-part question. One is around better tailings management and reclamation, which of course is very dear to your heart at the moment and I want you to talk about what is being explored, who's doing what? The other thing, then, is the whole public perception, bird deaths, those other things. So, do you want to start with what is happening now?

FAIR: Actually, I will start with the public perception thing.

AD: Okay.

FAIR: So, you rightly point out that, rightly or wrongly, the oil sands tailings is kind of seen as everything that's wrong with the industry, and how does that happen? Well, take a young duck coated in bitumen and have it go viral on the Internet, and who can't sympathize and relate to that?

The fact that it's one duck and there are millions of them killed other ways is irrelevant at that point. So, when you think of it relative to some of the other environmental challenges that the industry has personally I think greenhouse gases are the biggest issue. But that is not a visual issue; you can try and take a picture of a stack or something but people don't–there are stacks everywhere.

If you think about water, well, water is definitely an emotional thing but the industry right now doesn't release any water; we use too much water, maybe not; but we don't release it. So, so far, we are okay there. And land reclamation that is certainly something we can relate to but, frankly, the industry is reclaiming land so there is something you can hold up there. When you kind of think of it in those terms, am I not surprised that tailings is kind of labeled as the "bad boy of environmental issues" in the industry, particularly coupled with this duck? No. And, when 1606 ducks landed on one of Syncrude's tailings ponds and bad things happened, was it avoidable? Absolutely; but, if you look at Syncrude's track record, and in general the industries' up until that time, in a typical year, 20-25 ducks may have died. I feel slightly guilty of using the analogy but everyone does and talks about windmills. Far more ducks and birds are killed with windmills than they are in the oil sands but people don't see it that way.

The other aspect of it is, I think we all have to acknowledge that we have accumulated, as an industry, very large volumes and, in particular, Syncrude of fluid fine tailings. Today, it numbers about 850 million cubic metres; it's a lot; that's approaching a cubic square kilometre. So, when you think about that, it's a lot but, on the other perspective, we are talking about a small area of the Boreal Forest in Northern Alberta; this is not a global phenomenon; this is something that is isolated. Does that mean we don't have to do something about it? Of course not, we absolutely do, but let's keep it in perspective is my point.

Having said that and this is maybe now talking about–it's kind of comical, this one little story on that. Soon after the duck issue had occurred at Syncrude, 2008 I think it was, I was giving a keynote to these grad students that was being hosted at the U of A. They were from across Canada and I remember my son, although he wasn't a grad student, he chose to participate in this thing and Fraser Forbes, who was the Department Head at the time, was introducing me and he said, "Syncrude has been very supportive of the U of A, and of the Engineering Faculty, in particular, Chemical Engineering, in terms of funding, in terms of hiring, supporting various projects and initiatives, Chairs, that kind of thing; but Alan has taken it to a whole new level, not only is he continuing to do all those things, he is always giving to the Faculty of Engineering his first-born son." My son gave me that look of horror saying, "Oh my God, did he just say that?" It made me think of that.

So, back to the issue around tailings; well, the reason I mentioned that story was because there was a Q and A part afterwards and, of course, I just got lambasted by, "What about the ducks, etc, etc?" I remember the first time the question came up, me making a comment saying, "I'm glad you asked that, I would be disappointed if you didn't, because it gives me an opportunity to share another perspective on this," which I did.

So, in terms of getting back to the large volume of fluid fine tailings that we have today, and the need to ensure that we manage the wildlife mortality on our ponds and what not, we absolutely do need to do that, and that's where for me in many ways it's kind of gone full circle. I'm now focused on tailings, perhaps in a different role but still trying to manage some of the challenges associated with it. If you look in terms of COSIA, for those that aren't familiar with COSIA, its Canada's Oil Sands Innovation Alliance, which has really got both the in-situ side and the surface mining side for 14 companies–over 90% of the production of the oil sands is represented in those companies–really the only two that don't participate at this point and are considering are Husky and MEG Energy; all the rest are a part of this.

The opportunity, the power to bring together the companies in the context of COSIA where its supported by all the legal agreements and, when you are dealing with oil and gas companies, trust me, those are an integral part of it. So, that's all behind us now; we have the various agreements in place that enable technology to be shared, if you think about it in simple terms. So, now if I talk about tailings, now instead of company A, B, C and D, etc, all having to do their independent work on the same topic, we now just say, pick Company A, "You guys go ahead and work with whoever, do this. Company B you do this." The inherent synergy is astounding, but it goes beyond that. That's a productivity efficiency kind of measure but the other piece in the case of tailings, any technology that's being developed by any of the Consortium members is shared on a license free, royalty free, basis. So, Company A may have a technology that Company C or D, or both, think is useful, they have the ability to implement that and not only the ability to implement that, the opportunity to go to Company A and say, "Tell us how to implement this," and, even once it's implemented, "tell us what the best practises are." This is unprecedented, especially at this scale.

So, to be able to be a part of that is really cool. For me, it's something that I personally have been championing for a long time, and to sort of be around when it's actually happening–I wouldn't miss it for anything. It's really, to me, these things kind of snowball, so who knows what this will ultimately evolve to.

Now, there are critics that are–"Is this just green washing; you guys are on the ropes; you have to do something about it," and maybe there is a little part of that, but the reality is that this is about way more than that. One of the things that were not contemplated as part of the OSTC[Oil Sand Tailings Consortium] but is contemplated as part of COSIA [Canada's Oil Sands Innovation Alliance] are putting these public targets out there, as an industry. So, individual companies still choose to do what they do, and, then, obviously, they have the right and the onus to do exactly that. But through COSIA as an industry, in all four of the [Environmental Priority Areas]–so I look after the tailings side, there is one on water treatment, land reclamation, and greenhouse gas management–so each of those four areas, they will be framed by what we referred to as an aspiration, kind of a "high level" where do we want to get to at the end of the day. But, then, at a more nearer-term as we typically characterize these as a three-to-ten-year horizon, of goals that will be shared publicly but not only that, that the industry will steward to publicly. That goes way beyond what you typically see as a commitment.

Now, if you want to be cynical and argue that "You guys have to do that anyways to maintain your social license to operate." And, sure, I would acknowledge that part of that is true, but I would argue that what is being done here and contemplated here goes way beyond this sort of minimalistic kind of a–you just want to do the minimum and keep going–we certainly wouldn't take it to this extent. We are talking about extensive dollar commitments, people commitments, like in every sense of the word. So, that again, I'll be the first to acknowledge I'm biased, I'm part of this, but you know what, I'm proud to be a part of it because it really is something.

We have lots of naysayers out there, so we've got to address some of the issues around the environmental side of it. COSIA is totally focused on the environmental issues associated with the industry. So, I think, through my career, admittedly in the early years, environmentally–there were certain conditions in your approval that had to be met, and often-times, those were not that significant. Of course, that has changed dramatically since then. I recall being in the Research and Development Group and, when I started there, I was there eight years so when I started there, I finished in 2011, so, in about 2003, I would guesstimate about 30% of the budget within the Research Group was focused on environmental; when I finished, two-thirds of the budget was allocated to environmental issues. That didn't make another drop of oil but addressed an environmental issue. And I felt that that was right and appropriate, and that is what makes sense. It speaks to a level of awareness in the industry. Again, you can argue maybe we should have been there 10-20 years ago to get ahead of the curve but you can't change the past. You've got to focus on the future. That's kind of what this COSIA initiative is doing, and being supported by the companies.

But tailings, it's not an easy road, trust me, there are a lot of very smart people focused on trying to sort this thing out, and it's like my dad used to say, "If it was easy, everybody would have figured it out by now." I always marvel–we have this at the U of A–Dave Sego, in particular, hosts this semi-annual (once every two years) International Tailings Conference and I'm always astounded–but I go to this conference and I am astounded by the number of people that are working in this from around the world, and the ideas. So, in the role I'm in now, it's really to encourage that. Now, at the end of the day, we can't work on everything, so you've got to prioritize things and focus on the things that show the most promise. But I'm always both astounded and encouraged that there are many people out there that are engaged in trying to help the industry find a solution, relative to the whole tailings thing.

AD: Now I've heard about dry tailings, do you want to talk about that area?

FAIR: Dry tailings, so just to make sure that people understand what tailings are, tailings are an integral part of a water-based extraction process; in fact, the tailings pond is an essential part of that because it enables the water to be recycled and reused, and the industry, in general, typically talks about reusing 85% or even 90% of the water. So, that's important that we can do that. Having said that, when using water-based extraction process, part of the separation process results in this accumulation of these fluid tailings that don't settle. So, when people talk about dry tailings, they talk about somehow treating those so that they can be reclaimed in a dry, terrestrial–what most of us

think of land reclamation, so you plant trees on it, and things grow and it becomes a functioning part of the Boreal Forest again. So, I think that is kind of the norm.

What it comes down to, in the context of dry tailings, is how long does it take you to get there? So, a lot of the technologies we are focused on today are trying to accelerate the pace that we get there to generate these dry, reclaimed tailings. Some entrepreneurs out there are promoting the notion that you have dry tailings right at the end of the pipe when you produce it, well that's going to be challenging because in a water-based extraction process you are, fundamentally, you are creating a slurry in order to enable the separation of the bitumen. So, to somehow–and there are technologies that have been successfully used elsewhere, vacuum filter presses, where you use a vacuum to draw the water out very quickly. As soon as you try to scale those kinds–and different operators have considered this on a commercial scale–in pretty short order you convince yourself, no. The scale you are talking about here, this just isn't viable, at least with the technologies that we have today. So, for now, much of the focus is on now, treating these subsequent fluid fine tailings which we have a large inventory of and continuing to produce today so that they can be reclaimed as dry tailings.

Now, the other technology that is and will be huge in the industry in terms of tailings is not a dry tailings technology, but exactly the opposite, wet tailings. The context of that is, any mining operation, you eventually get to a point that you finish mining the pit; you have exhausted all the resources; you will have an end pit, a hole left. The question is, "Well what do you fill it with?" Well, we all know water flows downhill so, if you don't do anything, it will fill with water. Well, in the water-capped fluid fine tailings technology, the idea is to take some of these fluid fine tailings, with potentially some level of treatment or not, and place it in the pit. So, there is a large lake right now, it's called the Base Mine Lake that Syncrude is sort of leading the way on. This has been in the works for 10 plus years, to develop this commercial demonstration lake. The idea is take that hole that is left over, fill it with a portion of fluid fine tailings, and yet to be determined just how much, and then develop a lake over top of it. So that those are not dry tailings, those are, in fact, exactly the opposite.

But look at a satellite photo of the Boreal Forest; yes you see a lot of dry land Boreal Forest, but you also see a lot of lakes. Lakes are an integral part of any topography; that's how you manage the surface water flow, and even the ground water flow. So, lakes are an essential ingredient to successfully reclaiming the area. The other thing, spend time in Northern Alberta or any part of Alberta or you are south of the [Canadian] Shield, lakes are not deep; lakes are kind of giant sloughs, and they have soft bottoms. So, if you have an end-pit lake that's 50-60 metres deep, that's not very commensurate with the type of lake that you typically find in Northern Alberta in the Boreal Forest. So, the notion that the bottom portion of that, something needs to use that space because in terms of overturning the salinity of the lake, there is a whole host of issues that you run into if you don't manage that. So, roughly half of the total volume of fluid fine tailings and/or will be produced in the future, are intended to me managed in those end-pit lakes. Now, critics will argue, "Yes, because that is the cheapest way of doing things," and that may be so but let remind those critics that given the royalty regime and the related tax regime that the companies are in, anywhere from 40-50% of every

dollar that is spent on some other technology is taking away from the ability to build a school or a hospital.

Now, if collectively the view is, "No, we still want to spend it on that," then I'm all for it, but particularly given Alberta's current economic situation, you've got to ask yourself, "Is that the way?" And, again, it comes down to choices; how you want to spend money. We can spend billions and billions (as we are today) dollars on treating tailings and I'm not arguing whether that's the right or wrong course, that's one option. Or, we can agree to utilize some of these other technologies that still have to meet all the environmental standards, etc. I'm not trying to say we take shortcuts here but that are viable and can be supported in the eventual closure and reclamation plans. It takes longer, granted, but at the end of the day these mines aren't going away any time soon; they are there for the long haul, the duration. I struggle with why that's somehow not okay.

AD: Now, you mentioned earlier the standing pipes installations, I guess in an offsite area of the University of Alberta, was happening and they were monitoring those and there were no significant changes over a number of years. So, the current tailings ponds basically are not going to change dramatically.

FAIR: That's right.

AD: So, therefore, you, whether its dry tailings or whether it's this new idea of using these pits once an area has been mined, to create these artificial lakes and to put tailings at the bottom. Now, have studies been done? Do the tailings stay at the bottom? And that, then, you have fresh water or whatever which would be from rain, runoff, whatever. Do you get an emulsification, as it were, that would then bring those toxic tailings up to the surface? What is the science of it?

FAIR: So, no question that is one of the concerns that people have. It's kind of curious of all the tailings technologies being developed the one that's been worked on the longest is that water-capped fluid fine tailings. Syncrude and, as I recall vividly being out there, being a part of this, is actually developed albeit much smaller scale, going back to the late 1980s of these lakes that they monitored since, and the largest is, in fact, four hectares. So, it's kind of curious that this technology has a lot of naysayers but it's actually the technology that has the most basis for research to support it. Now the issue with it is, though, is the scale up. So, that's where some of the issues that you talk about. It's one thing when you have a small pond, even as large as four hectares, to then go to like in the case of the Base Mine Lake, 800 hectares; that's a significant scale up.

The good news is there is a density difference, so, generally, the material, the fluid fine tailings, will in fact stay at the bottom of the lake. But, having said that, as we are very aware of, depending on the fetch, the distance across the lake that the wind will blow and create turbulence, so that's an issue that we need to understand on a larger scale. The other issue is, in order for it to develop into a lake that is a usable lake, that can be rendered in the environment, and understand the nature that this takes a very long time to mature and develop, you need something called the littoral zone. So, the littoral zone is that portion of the bottom of the lake where sunlight, when it shines through the

water, still penetrates to. And that promotes the growth of all kinds of aquatic life and what not, so that is very important to the sustainability of the lake. When you have small-scale ones, kind of the whole thing is a littoral zone, because it's only a couple of metres deep, so the water all shines through there. The Base Mine Lake, only about eight or nine percent of the total shoreline will actually be a littoral zone, so there are all kinds of studies that are done and, to be honest that's on the low side of the minimum littoral zone. But you've got to understand these pits; they don't have gentle slopes–they are deep pits, so to try to create a littoral zone, a sloping beach is a challenge; but, having said that, there is that requirement. So that will be one of the other issues that will have to be sorted out in the scale up.

And the other is the diurnal turnover that you typically experience in lakes, the salinity of the water, the naphthenic acids, these organic acids that are inherent in the oil sands, so all of those things need to be better understood. To me, it's a question of time. I don't think there is any question over time, in spite of what happened with the stand pipes (it was actually Don Scott who put those in place, a long-time Prof at the U of A). What we are talking about is not necessarily looking to disturb that, but actually creating typically what's talked about something in the order of five metres of depth of cover over that, which can be–it's difficult, like once you have established your water level that's inherent because things drain into it, things drain out of it; you can't play with that going up and down a lot but what will happen is you will continue to see some measure of consolidation and separation of the underlying area. People talk about the fish and what not; they can't swim in that. The fish don't live at the bottom of a 50 metre pond; they live in the littoral zone in the upper part of that.

AD: Where there is oxygen and all of those other nutrients.

FAIR: Go to any lake in Northern Alberta today, it's the same deal; there's this kind of soft muddy bottom that nothing lives there because it's anaerobic and whatnot, but lots of things live around the upper part of the lake, and around the perimeter. So, these will be no different. It's, again, I'm biased; I've been involved in this since the early 1980s, when the study was done. Will it work? I certainly think so but we've got to demonstrate that to assure our stakeholders and the regulators that it's a viable technology.

AD: So, this really is the whole new generation of tailings-related research.

FAIR: Yes, very much so. As I described earlier, a lot of emphasis was put into developing these CT technologies [Combined Tailings/Composite Tailings] with the sort of view that that was going to be the silver bullet, and was going to manage this. Well, it takes a lot of sand to do that. I didn't get into the technical details but one of the limitations is there something referred to a sand-to-fines ratio [SFR], so, the lower the SFR, the smaller volume of sand-to-fines ratio so, if you have lots of fines and only so much sand, you need a low SFR. The reality in terms of what thus far the companies have been able to achieve, the SFRs are in the five-six, even higher range. In order to make the mass balance work, they would have to be two-three [range], which is a huge difference in volumes. So, I think people have recognized that although that can be part of the solution–and

tailing sand itself is a very useful construction material, so every bit of sand that you are using to trap these fines are not used as part of a haul road or as part of another containment structure somewhere. So, you've got to kind of manage the volume of your coarse tailings. Where we have migrated from there, like Suncor for example, they refer to it as TRO [Tailings Reduction Operations]–their thin lift evaporated drying technology–1.2 billion dollars Suncor has committed to over the last three or so years in implementing that technology, Syncrude has recently committed 1.9 billion dollars to introducing Centrifuge technology. CNRL is well on the way to utilizing thickeners and what they call NST [Non-Segregating Tailings]. Shell as well has a similar combination that they are–but they are also considering other options. So, the companies are spending significant dollars in developing and implementing these new-generation technologies. And I'm not necessarily arguing if that's right or wrong but there are other technologies that we are developing that, in reality, will not be compliant with Directive 74 [Directive 074 - Energy Resources Conservation Board - Tailings Performance Criteria and Requirements for Oil Sands Mining Schemes], and we haven't talked a lot about that but that's in the ERCB directive.

AD: I was going to ask you about that. This is the nice transition of the whole issue of government regulation in this area; do you want to talk about that?

FAIR: Well, for someone who has seen this granted, from an industry perspective, up close and personal for a long, long time, I smile at some of the folks that argue the industry isn't regulated enough. Oh my God, we have got to be one of the most regulated industries in the world, especially in tailings. It shows up in two or three ways; one it inevitably shows up in conditions in any approval–so any time you want to make a significant change to your mine plan or to your operation, or increase your production, you've got to file for a new application and you go through, and it may or may not be a public hearing, but you go through a process with the ERCB. Every time you do that, another opportunity to attach a few more conditions to your–and more and more the majority of them, relate to tailings. So, you've got to kind of been mindful of that. Through APEA [The Alberta Environmental Protection Act], it's more focused on the reclamation aspect of it, but, when you recognize that, on average, a reclaimed mine site, 60% of the area of the reclaimed land area will be underlaid by tailings–some form of tailings, it becomes a big consideration in your reclamation plan.

You also have the Mine Financial Security Plan that was enacted a year or two ago (two years I think), which industry had a big part of–people like Ray Hansen were a huge part of that from Syncrude. That is another–if you basically don't (in simple terms), if you don't do what you say you are going to do, it costs you money and, until you do what you say you are going to do, the government hangs on to that money.

Then, the last one which is very specific is Directive 74. So, it was placed in February 2009; it's an effort to manage the ongoing volume of fluid fine tailings that are being produced, so not the legacy tailings, those are intended to be dealt with separately. What it requires–a couple of things–so the fluid fine tailings result from these fine materials, and without getting too technical–we talk about this, -44 micron material; in reality, it is much, much smaller than that but it gets very challenging to

measure and monitor. So, we focus on this -44 micron, that's easier to measure. What the Directive 74 requires is, if you look at the fines in feed, so when you do these core holes and you determine how much fines there is in various areas of your ore body, and you follow through your process through to tailings and the eventual disposal of tailings, 50% of the fines that are in–and it's a gradual scale, but now its ramped up to 50% of the fines there have to be trapped in the pour spaces, or somehow contained in these DDA's [Designated Disposal Areas]. Much of the rest of it is envisioned being captured in the beaches–it's just a natural phenomenon that, when you place/discharge your tailings, these fines materials, just as they would with CT technology, get trapped in the pour space and, then, the residual material runs off. That's one aspect; then, the other aspect is, within one-year, placement of these tailings in the so-called DDAs. You have to obtain a shear strength, and that's kind of a geotechnical term, but in simple terms it's just a reflection of the strength, the trafficability of the deposit; it has to achieve a shear strength of 5 kPa.

So, the challenge for industry with this has been on two fronts: the volume that it ramped up to 50% fairly quickly, but the industry will catch up on that side; the 5 kPa in one year is a real challenge because what it forces you to do, it limits the number of technologies you can consider. You really can only go after the technologies that very aggressively dewater the tailings. In some circumstances, that may well be appropriate. What I and others argue is that the way that we ought to be coming at this, let's look at the closure reclamation program. Every company, every three years, has to submit a closure and reclamation plan (C & R Plan) and, in there, they have to provide, make commitments on areas that will be reclaimed, areas tailings will be placed, etc, so my suggestion is companies need to, within their regular C & R Plans, indicate how they intend to reclaim their tailings.

Now, some parts of your mine site will remain active and available for reclamation for 20-30 years, and that part I talked about. So, you kind of ask yourself, then, if that's the case, why do we care about getting 5kPa in one year; maybe we don't need that for 5 years or 10 years. Now, it's not right to push this out for 20-30-40 years, then, people begin to get concerned - you are just pushing this out and wait till the 11th hour and then bail. That wouldn't be the first time that has happened. But, if you make commitments on a three-year incremental basis, to where you are reclaiming these, and which may well include deposits that take 5-10-15 years to get to a point that you can do dryland reclamation, but that's part of your C & R plan, and you've got the Mine Financial Security Plan as a sort of basis - if you don't do what you say you are going to do it will cost you money. From my perspective, and I'm biased, but to me that sounds like a more balanced approach to do this. If we insist on sticking on where we are now, you are going to drive the companies that spend the billions that they are today, so we won't build hospitals or schools, and whatnot. And maybe I'm being a bit cavalier and simplistic, but, at the end of the day, that's what it comes down to.

AD: But I think that now, it's the timeframe that environmentalists are looking at and, I guess, that Directive was the Governments' saying, "Okay, we are doing the right thing. We are holding their feet to the fire; they are now going to this." I think what is emerging is that you have to invest heavily in research because it is – and even in terms of the extraction technologies, refining those – and so that addressing the by-products of extraction, which is what the tailings are, in a way that is more environmentally-appropriate and also that diminishes some of those elements.

FAIR: There is no question, you can't sort of just push everything out and sort of deal with it at the end of the day. And, from an NPV basis or something that may make a lot of sense but people aren't going to sign onto that because trust and a few other things become an issue. Your remark regarding research, you are speaking to the converted here.

AD: That's what this unit is going to be doing.

FAIR: No question that we need to ramp up our research efforts. But, I think, what we have to acknowledge as an industry that are stakeholders–the world has changed. There is an expectation in terms of environmental performance as society, in general, is a lot more conscious of that. You could argue whether this is a pendulum that swings different ways and right now is swinging very hard in one direction. But, the reality is, those are the stakeholders; they are the people that grant you your social license to operate and, frankly, if I divorce myself from my role in all this, just as a citizen of Alberta–you are absolutely right, I want to see this reclaimed, that's my expectation. So, the need, the expectation that we do this quicker, I think that's a reasonable one. But, it's like most things in life, if you take either extreme, that's not where you want to be. You've got to look for that sweet spot in the middle somewhere. And my concern is that we get, and not just in the oil sands, in many fronts, the focus on renewables. I'm right there with people who are cheerleaders for renewables. But, for Germany, to be [35]% reliant on renewables by 2020, that's not going to happen.

AD: Or the move away from nuclear power.

FAIR: You've got to be realistic. I mean the world needs energy, so, unless all of us are willing to do what I described earlier like parking cars and airplanes, I don't think the average person thinks it through that far. So, it comes back to finding the right compromise and to me that is what developing the resource responsibly all is about. And I'm not trying to take anything away from the various NGOs, the Greenpeaces, of this world. I respect their role and what they are attempting to do, but they don't speak for the broader populace here; they are certainly very vocal; they are able to attract media attention so people hear what they say. There is a tendency these days, if you see something on the Internet, it must be right because it's in print, but people don't challenge what they are being told like they used to. There is no peer review of things that are said in so many places now. In many ways, that's unfortunate because you don't tend to get this balanced perspective on things that lead you to that sweet spot in the middle of all this.

AD: It would appear from what you have said, the companies doing this work jointly with government focusing on environmental protection - EPA - of course, that is a part of the name of your entity that they're being responsive and proactive which, I think, at this stage is an important reaction.

FAIR: Yes, it's curious, COSIA right now is trying to develop these aspirations and goals that I described earlier. So, we have sort of developed them in a draft stage and used different focus groups both internal to companies but external ones–like in New York and Toronto and Vancouver.

So, in these focus groups you get, I'm not a communications person so I don't know the specifics of it but, in general, you get a group of people; you sit them together; you display, share things with them; and get their reaction. Well, their reaction we get when we share these aspirations, in particular, firstly, there is pretty unilateral–"Hey this is awesome, that the industry is doing this," pretty much how you described, so that's encouraging. It would be pretty discouraging if they didn't feel that way. What the other piece you get out of it is a range from "What are tailings," you don't tend to get the extremist thing that this is bad, get rid of them, it's "Okay, yes you guys should be doing more about this," and whatnot. So, to me this is more indicative of the general populace that you have, it's not a more extreme view of the thing. But, at the end of the day, you have to be responsive to your stakeholders whether you believe they are making the right choices or whatnot, is kind of irrelevant. They are ultimately the ones that support you.

AD: It's a part of the growth of the industry and now it is an environmentally-conscious phase.

FAIR: Yes, which is a good thing; we all have got to call this planet our home for a long time to come.

AD: Exactly.

FAIR: I have grandkids, a grandchild anyway that I want to know that there is a place for them here, but you've got to do it responsibly. You've got to be realistic; you can't make these outrageous statements. I'm all for challenging ourselves but you have to temper your expectations and what you're challenging yourself to do with reality. And, maybe that's my task-orientated engineering side showing through, but its people like me that have to figure out how to do this stuff. Yes, nothing is impossible, but when you say that, recognize the other half of that–nothing is impossible if you are willing to forego all else, and most of us are not. You want to improve your overall lot in life and are we ready to make a lot of personal sacrifices in order to promote the environment? Definitely, some are but I would argue the majority would prefer if we could find a way to do it in a way that allows the standard of living that people aspire to today, yet preserves the environment for the future. So that's–you can't have one extreme or the other, that's not where the right answer lies. But it's challenging and maybe we should of been more proactive, but there no point in debating the past; learn from it and move on. That's kind of what through COSIA, at least in that little part of it, that's what the industry is trying to do.

AD: Well, that's a nice summative statement. I couldn't have ended it better. So, basically, thank you so much.

FAIR: My pleasure and I hope it's of some use to somebody.

AD: It is; we covered all sorts of ground with other interviewees.

FAIR: Is that right?

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AD: So, that's great.

FAIR: It's been a fun ride for me, like reminiscing with you about these things reminds me of these things that I have forgotten all about that.

AD: That's what everybody says and that they have been a part of making history, getting that perspective on your life.

FAIR: Its cool; it helps you, most of us as we age, you want to think like you actually mattered somehow, even if just in a small way, and when you sort of think through that, you think, "Well yes, some of that stuff actually matters." Today, when you are approached by some of the younger engineers, or even I had a fun opportunity. I was asked to speak at my daughter's–she works for a company called BGC and they are headquartered in Vancouver, and I and Nordie Morgenstern were asked to speak there, as well, at their AGM. Their President/CEO asked me, "Well your daughter works for us, so you are a little different from the rest, could you say something to focus on a third of our [employees]" (a third of their employees are under 27 or 28 of age, amazing – including my daughter).

So, I came up with this thing, I always like to do things a little–you don't have a lot of time so you have to keep people's interest but you have got to get your story across. So, I came up with these things, what I called–and I forgot the numbers–six or eight things that my parents taught me but I never really understood what they meant. So, I went through this and I talked about–don't be afraid to get your hands dirty, and make sure you know where you are going and some of these things and I was able to bring my daughter into it. It was kind of cool when you can do those things because they are there because of what you have accomplished in your career, and your daughter is sitting out there and everyone says it's so cool to meet your dad. I'm not thinking I'm really that special, but when you get those opportunities for that little bit of time, you are special.

AD: To talk to the next generation.

FAIR: It really is kind of cool.

AD: Well, it's their world and it's their problems isn't it–the next generation of geotechnical and other engineers.

FAIR: And you know what, I have the utmost confidence in them that they will do just as we did, and I think they will be better at it then we were. Maybe a part of me hopes that; the problems are getting more challenging, that's the piece.

[INTERVIEW ENDS]

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