

PETROLEUM INDUSTRY ORAL HISTORY PROJECT
TRANSCRIPT

INTERVIEWEE: Alex Hemstock

INTERVIEWER: W. J. Wood

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JW: Today is Tuesday, June 5th, 1984. I'm at the home of Mr. Alex Hemstock in Calgary, Alberta. My name is Jim Wood, and I'll be interviewing Mr. Hemstock on his career in the petroleum industry. This is tape 1, side 1. Alex, I wonder if we could start off then this morning by finding out a little bit about where you grew up and more specifically when and where you were born?

AH: I was born in 1921 and I was brought up on a farm just northeast of Hanna, Alberta.

JW: So that got you through the Depression then didn't you, on the farm out there.

AH: That's right. We saw most of the Depression years on the farm and I can remember that times were pretty tough. My father, in addition to being a mixed farmer, operated a small strip coal mine. People used to haul coal for 60 or 70 miles by team and wagon or by sleigh, to make sure they kept warm in the winter time. And the sales from the coal mine helped us to avoid the very worst of the Depression problems.

JW: Was it a mine in one of the coulees, the exposure in there?

AH: That's right. The coal was quite close to the surface, but it was very hard work to strip it. We used four horses on fresnos and we used to have to plow the overburden and remove it with the horse drawn fresnos. I can remember that in the latter stages, I think it would be in the late 30's, my father purchased a very small caterpillar tractor and that was our first mechanization for stripping.

JW: That must have made a big difference.

AH: It did make a big difference. We stripped, as I recall, about 8 or 10 feet of overburden to get to a coal seam that would be from 30 to 36 inches thick. I can remember telling my father that the new machines that were being proposed for Syncrude, would strip our mine in about 20 minutes and it took us all summer.

#026 JW: Well, that's right. That's the plight today, ??? has the big operation out there in Alberta Power. Did you have brothers and sisters?

AH: I had one brother and one sister. My sister is married to Leo Pearce, who is just retired but he was formerly Chief Engineer with the Parks Department in Western Canada here. My brother is a Sales Manager for western Canada for Canada Cement.

JW: Growing up on the farm then and through the conditions of the Depression, certainly not an ideal time to have been in that kind of work, you then went to the University of Alberta and attended the University of Alberta. What was your motivation for going there and specifically Mining Engineering?

AH: I think that the mining part of it came from my work with father in the coal mining. At

that time mining seemed to be one of the areas where one could be fairly sure of a job, of employment, after being educated. I was not particularly cut out to be a farmer I think, I had problems with allergies, with dust and so on. It seemed to me that taking up a career in engineering would be a pretty good bet.

JW: But you hadn't considered the underground conditions, also full of dust.

AH: That's right. And of course, to me at the time, most mines that I was thinking about were all surface mines. As it turned out I didn't really practice mining engineering at all. I went from university to work on the Canol project.

JW: Oh that's right, you did. You graduated, when, in 1945 with a B.Sc. in Mining.

AH: In 1943 with a B.Sc. in Mining.

JW: '43 right. How did it turn out then that you went up with Imperial's Norman Wells project, how did that work out or the Canol project?

AH: Well I had, with problems of eyesight and so on, I wasn't able to get a position with any of the Armed Forces and at the time, the Canol project was given a very, very high rating in terms of its national importance. Of course, it also provided a little bit of adventure and an opportunity for, what was then, quite a good paying job. So there were a lot of interviews at the university for opportunities at the Canol project and I went there with Imperial Oil.

#052 JW: How was it that they selected somebody with a mining engineering degree for that project?

AH: In those days of course, they didn't have that many to choose from. Many of the engineers had joined the Armed Forces. The other thing was that at the time, the work that they expected me to do was field geology and the mining course had a lot of geology as part of that course.

JW: First of all, do you recall who interviewed you or how you were recruited?

AH: I was interviewed by Sid Willer, formerly with Imperial Oil, and the person that I went to work with was Ted Link, the very famous geologist. Of course, a number of people that have since gone on and made quite a name in the industry.

JW: How did you get up there in 1943, what was the mode of travel?

AH: The mode of travel was in the aircraft and at the time there were aircrafts of various vintages being used. My recollection is that we went north in a DC-3, but a friend of mine, Don Winterburg???, who also graduated in mining, went up in an old Boeing and they ran out of gas just out of Hay River and had to land on, what was then, very fragile spring ice in Great Slave Lake, to wait for a refuelling plane and then they took off the ice again and went on to Norman Wells.

JW: Do you remember landing at Norman Wells and either coming in or getting off the aeroplane and what you saw, what were the conditions like?

AH: I can't remember too much about it. Obviously I was very impressed with the whole country. The camp as I recall, was a very, very busy place with a lot of tents and really, almost shacks that the people were living in. A tremendous amount of construction, a tremendous amount of activity in that there were several oil wells being drilled. It was the head of a lot of pipeline construction for the Canol pipeline. In my end of it of course,

there was several parties that were being prepared to work as far north as the Hare Indian River and I guess as far south as the Redstone River to do field geology. We had at least two, I believe three small aircraft at our disposal. So that with those aircraft coming and going, other military aircraft coming in with supplies being brought in from overland and along the winter road, it was a beehive of activity.

JW: You mention that you were working for Ted Link, how would you characterize him as someone to work for?

AH: Ted was a great character to work for and work with. You could never tell whether he was pulling your leg or he was giving you an assignment or lots of serious advice. But he did get I think, a great deal out of all the people that he worked with, a tremendous amount of enthusiasm that he generated and of course, he understood geology and was able to direct a large number of field parties and I think, get quite a bit out of them. Looking back, I think it's perhaps a wonder that we all survived it because, for instance, I had never been in a canoe before and I was one of the party of three who went down the Hare Indian River from the upper reaches near the northwest corner of Great Bear Lake. Certainly others went down rivers, probably faster and more dangerous, with no canoeing experience. You learn quickly and I guess you were pretty lucky.

#098 JW: Who was on your field party, you mentioned there were three of you at that time, who else were you working with?

AH: There was a fellow from. . . a lieutenant from the U.S. army, a John Harrison and a high school student from Vancouver.

JW: Why would they have a United States army representative along with you at that time?

AH: Again, they were short of people with geological training and so they were recruiting them from wherever they could find them. There were, as I recall 3 or 4 U.S. army officers that worked on the geology, plus other geologists from the Canadian scene, Fred McKinnon, Lorne Faulkner and so on.

JW: You were primarily doing field mapping and that sort of thing?

AH: It was really, I think you'd call it reconnaissance surveying, we were simply checking the outcrops, trying to classify them, whether they might be potentially reservoir source rocks or oil bearing rocks and so on.

JW: Obviously though you weren't out in the field the entire time, you met your wife up there didn't you?

AH: That was much later. We finished the first season of geology, completed those reports and then as I recall, there was a brief time outside for a vacation and then I hired back to the Canol project as a Civil Engineer, under Walter Dingle. It wasn't until 1945 that I met my wife, Emily. From the 1943 season onward then, I was involved in engineering.

JW: What kinds of activities did that involve?

AH: That was mainly the construction of the camp facilities. As I mentioned when I first went in there were a great number of tents and primitive buildings and the construction period from '43 through '45 was taken up with making more permanent buildings, better housing and so on. And of course, supplying things like the power plants and the machine shops and so on that were required to support a very large camp and a fairly big

construction effort. Probably my main interest then was associated with the foundations for those buildings.

JW: Well that's right and we'll get into that in a minute. How . . . were you able to get all the supplies and equipment that you needed fairly easily for that project, did you have problems with getting what you needed?

AH: My recollection is that supplies were not that difficult to come by. There was probably an imbalance in the amount of equipment and so on that was available to us and very often we would have a whole skip load of repair parts to something that perhaps we didn't even own. Whereas other times there would be certain critical items that you couldn't get very easily. But my recollection is that the project had a very high priority and that there was really no great problem in getting the necessary supplies and equipment to the job.

JW: What kind of relationship did you have with the United States army officials, was there a good rapport there at all times?

AH: I was pretty junior and so I wasn't involved in that sort of thing to any great extent. My recollection is of course, that the U.S. army was pretty much in control of the project but that there was reasonably good relations between them and the senior civilian people representing the Imperial Oil. I think it was a fairly satisfactory operation.

#145 JW: I guess one of the things to come out of that project, in your point of view, was a paper on the operations of the Canol pipeline. How did you view the operations of that pipeline at that time?

AH: Well, I suppose we should back up and remind ourselves that I was a pretty junior engineer, so I was very pleased to be picked to go and do this survey. It started out really, as I recall, as a special assignment to really evaluate what the problems had been on the pipeline and to, I suppose, evaluate how well the pipeline was working. Part of this assignment too, had to do with taking an inventory of the equipment that was along the pipeline. I'm not sure whether that was done with the idea that someday the pipeline might become a civilian operation, perhaps people wanted to know what was there, or whether it was simply a matter of perhaps clearing off the books and finding out what was left and what was operating. So it was a pretty interesting job. We travelled the pipeline for, I think it was 3 or 4 complete trips, from Norman Wells to Whitehorse.

JW: Who's we?

AH: I was working one time with an accountant from Imperial who was able to put the records in the proper order and so on, another time I travelled with a U.S. army officer who was interested in travelling from one end of the pipeline to the other to see how it was operating. On one occasion I was by myself on the trip from Whitehorse to Norman Wells.

JW: What kind of a trip was that?

AH: It was a pretty rough one. I can recall leaving Whitehorse, I think it was 49 below that night and my truck stopped 2 or 3 times before I got to the first camp. I never did find out why or what happened but it simply stopped. I can recall being a little concerned and after waiting for a few minutes and working with it a bit, I got it going again. But when it's that cold you certainly are conscious of how far the next camp is.

JW: Were there camps then, all along periodically?

AH: There were camps at every pump station, which was about every 50 miles. I think that those were . . . they were the major stopping places.

JW: What kind of camps were these, just a shack with a couple of guys in it?

AH: No, they were better than that because they had been construction camps and been the bases for the construction operation. So they were. . . of course, the housing for the pump station, plus warehousing, and my recollection is, most of the personnel quarters were what we called igloos, that is a half circle, which was put over a 16' floor. Those were the ??? quarters. They were heated with oil.

#190 JW: Getting back to the question, how did you, at that time anyway, perceive the operation of that pipeline, was it an engineering triumph or was it a disaster? It was both I suppose.

AH: It was both I think. It certainly was an engineering triumph in that the pipeline was built and put into operation in a very short time and across terrain that was completely unknown at the time that the project was conceived. So just the fact that it was built and operating was an engineering triumph. Even today it would be regarded as a very major project. It included the construction of a road, plus the pipeline for 600 and some miles. The operation however, was not that successful. The pipe was, by today's standards, a very low quality, it was not able to withstand the low temperature operation and therefore there was a large number of pipe failures. In most cases they originated from stress concentration areas, where the pipe had been damaged, or in some cases, from weld failures. And I think, again, mostly due to the low temperature. The pipe as you know, was on the surface of the ground and therefore it was subjected to extremes of high and low temperature. In fact, one of the most interesting parts of the study that I made was to observe the pipeline temperatures and the oil temperatures over a wide range of temperature conditions, in fact, over the whole life of the operating pipeline. I found that, as I recall, there were some days where the pipeline temperature would vary over 100 degrees. So you can well imagine this pipeline crawling all over the terrain as it expanded and contracted with temperature change. And those things of course, cause tremendous stress to be put on the pipeline. And there were a large number of failures and resulting leaks.

JW: Were there a lot of lessons learned however, did people, were they able to see, this is not the way to do it and here's how to correct that and did that lay a foundation for most future work in the northern pipelines, was that sort of the. . . .

AH: I don't think that really it did. I don't think that really we got to that stage because the pipeline was shut down really before those lessons that were being learned could be taken advantage of. Other than people like myself who observed the operation of the pipeline and probably later came into the oil business in Alberta, the experience wasn't that helpful to most. Of course, it was unique in the fact that it was a very small line and it was on the surface. All the pipelines conventionally in the south are buried, you don't have those temperature changes and you have a very different engineering environment.

#235 JW: You mentioned a minute ago that one of the things you became interested in were the foundations for some of the buildings in the camps, what were the kinds of problems that you were encountering?

AH: Well, the problems of course, were all associated with perma-frost and the fact that the terrain there at Norman Wells had high amounts of ice there in the soil. And that as the warm buildings were pounded on this material that thawing was caused and the foundation deteriorated to such extent that the buildings certainly sagged and bent and sometimes failed. Our approach was to really learn by doing, there was very little in the way of information available in text books in those days. There was some available from a book by the name of . . . written by a man by the name of Mueller, and we simply tried to understand what the problems were and design foundations that would take care of those problems. I think over the years we eventually got to where we did in fact know how to handle the design problems, but it did take several years.

JW: After leaving Canol project, or you mean. . .

AH: Well, that's right, after the Canol project was completed, of course Imperial Oil maintained an operation at Norman Wells and I was there several years after that. Even then we were still learning things with respect to foundations on perma-frost.

JW: What kind of measures did you take during the Canol project to stabilize these buildings?

AH: the first approach of course, was to put a substantial amount of fill over the muskeg or the perma-frost. I think that was probably done just to provide a working surface without realizing that it was also a pretty good thing to protect the perma-frost. The second approach was to found the buildings on flat slabs, with the idea that that might spread the load around well enough that there wouldn't be any failure. But in such structures as machine shops and the power plants for instance, even those slabs due to the settling of the support underneath, the thawing of the ice. And then we went to piled foundations. Again, the first approach was to drive fairly short piles to get down in the perma-frost and we found that the foundation failed then with heating of those piles due to frost action in the winter time. So it was a learning experience and it took quite a while to learn that you must protect the surface from any kind of heat, that is set the buildings up and separate from the foundation itself and that the piles had to be driven substantially into the perma-frost to make sure that they stayed there.

#282 JW: On leaving the Canol project then, were you offered a position with Imperial Oil full time in Alberta?

AH: Well, I went back to Norman Wells the summer of '46-'47 and '48 at which time I was taking my Masters' program. Imperial Oil was consolidating the operation at Norman Wells. They moved the housing facilities to support the refinery a bit downstream to make them closer to the refinery, picked a new site for that part of the facility. And we installed additional facilities, additional tankage and so on. Part of my job was to move some of the buildings that had been used during the Canol project into the refinery area so that they could be used for the refinery support.

JW: So these were summer time activities while you were a graduate student at the University of Alberta?

AH: That's right.

JW: And you were studying soil mechanics at the U. of A. at that time?

AH: Yes, I mastered in soil mechanics under Dr. Bob Hardy, with the emphasis again, on frost action in soils, which of course, was my interest, generated from the work at Norman Wells.

JW: Were you the only one doing that sort of thing at that time?

AH: No, I had a partner in the Masters program, Dr. Stuart Sinclair, who also worked on the same project under Dr. Hardy.

JW: When you got your Masters then in 1947, following that you went to the Arctic Institute?

AH: During the . . . I guess it's the last part of my university Masters program, I applied to the Arctic Institute for a grant and aid to continue the work on perma-frost at Norman Wells. And I was successful in obtaining that grant from the Arctic Institute. So I went north in '48 to work at the refinery, doing some more construction and also to carry out some of the research that was supported by the Arctic Institute. And that resulted in a report called Perma-Frost at Norman Wells, which I think was finally dated 1949.

JW: I'm going to turn the tape over here.

Tape 1 Side 2

- JW: I wonder, just as an aside, if you could just give a little bit of the history of the Arctic Institute. Personally I wasn't aware that they dated back quite that far. Had they been extant for quite some time?
- AH: I'm afraid I can't give you a very good history of the Arctic Institute. I can remember that the people that I dealt with were Dr. A. L. Washburn and Dr. Pat Baird. They were scientists that had a great interest in the Arctic. One of the early projects that they were involved with was what was called the Muskox Expedition, which as I recall was an overland expedition from Fort Churchill in Manitoba, up to the western Arctic, I believe on the Mackenzie River and then back up the Mackenzie River to Fort Simpson, I think, or in that vicinity. My recollection is, and I'm sure this can all be checked out, that the Arctic Institute was formed with offices in both Washington and Ottawa, being jointly supported by United States and Canada. And it was to build on and increase the knowledge of the Arctic to both countries.
- JW: So throughout that time, even through university and the research more or less, on behalf of the Arctic Institute, you were still associated with Imperial Oil then weren't you, you had never severed your ties with them?
- AH: Yes, I had actually severed my ties when I left to return to school. I was then hired as a summer employee, during the years of the Masters program and after my work was completed in 1948, in the fall, I went outside and I had no job at all. And I went to work with Barnes Construction, who as I recall, were being involved with the construction of the Edmonton Refinery, again for Imperial Oil. I was there not too many months. Walter Dingle had come back from Peru and I had worked with him at Norman Wells and he hired me back to work on the development of the Leduc field. My recollection is that was probably in the summer of 1948.
- #029 JW: Okay, before we get into the Leduc era, you had a trip to Rotterdam then too, didn't you, in 1948?
- AH: No, I didn't, my paper did.
- JW: Oh, you didn't go with it though?
- AH: No, that was simply a paper presented to the International Conference on Soil Mechanics I believe in Rotterdam.
- JW: I was just curious, was perma-frost at that time a topic of interest internationally?
- AH: I think it was more a topic of curiosity rather than any great interest in terms of construction or anything like that. Certainly there wasn't the emphasis that there is today. But because it was rather a unique type of soil, there was some interest in it. But I think it was not from a strong engineering or business sense.
- JW: So people at that time, 1948-1949, they weren't thinking in terms of Arctic exploration and development particularly?
- AH: No, I don't think so. I know that some of the senior people from. . I guess it was Standard Oil of New Jersey, Paul Lambright was one who had been an official on the Canol project

but who was a long time employee of Standard, they would very often talk to me about. . or ask me questions about perceptions of how pipelining could be done, how drilling would be done and so on. I'm sure that they were looking to the potential of the Arctic but they weren't nearly to the stage of development concerns or engineering detail.

JW: No, it was just something to think about.

AH: Star gazing a little bit, yes.

JW: I guess while you were in university then, in graduate school, the Leduc discovery was made in 1947. Do you recall that discovery and its significance from your point of view or was there any?

AH: My recollection was that when the discovery was made I was at Norman Wells at that time. I can remember some excitement about it. I guess I didn't think very much about it providing me with a career or anything like that but I can remember that part of it.

JW: How did it feel then, in effect, when you were hired again by Imperial as a Civil Engineer basically at Leduc and Redwater. Was that an exciting prospect to you, or was it simply well, here's a job and I've got to do it but I'd rather be up north?

AH: No, it was pretty exciting because there was a lot going on. I enjoyed it too, because I found that I was working with a lot of people that I had worked with at Norman Wells, the engineers that had been there. Very much the same team of engineering people were around Leduc in the early days as we had worked with at Norman Wells. So that part was good, there were a lot of old friends and a lot of people, a lot of engineers and young people all about the same age. There was lots going on, lots of activity. Plus the fact that it wasn't too long before the discovery at Redwater was announced and other discoveries too, which indicated I think, a great potential for Alberta, but probably not nearly what eventually turned out to be in impact to Alberta.

#066 JW: Maybe you could just talk about some of the activities you were involved in at Leduc?

AH: To start with I simply worked on the design of some of the production facilities. Again, I was learning a lot at the time. I remember I was pretty green and a lot of what I learned came from some of the old production hands, like Cam Blair??? and people in his position, who had a lot of experience coming out of Turner Valley and who had been at Norman Wells too. I think that was the main thing was to pick up and understand, it was really production engineering. There were some civil aspects but the production of oil and handling of the oil was the main concern, pipeline construction. And there was so much going on that it took a fairly large staff of engineers to handle it.

JW: Where were you living at that time?

AH: When we were hired, we were living in Edmonton but we moved to Devon in 1949.

JW: Had the town site been constructed at that time?

AH: It was under construction. There was quite a number of houses and some business sections which were already operating.

JW: Did you witness or participate at all in the Atlantic 3 blow out?

AH: I certainly witnessed it and I didn't participate in a direct way. Although some of the people that I was working with were involved in such things as surveys and so on around

the well site. We surveyed in the step out wells. You couldn't help but be involved with it, there was so much attention being paid to the field, but I was not directly a part of the team working on it.

JW: Did you run into Tip Maroney at that time?

AH: Oh yes. We knew Tip very, very well of course and used to see him around the field all the time.

JW: You moved up to Redwater then, once that came on stream?

AH: Yes, well, the Redwater field, the development of that had been started with people being seconded from the Leduc field. Eventually an office was set up there and I moved up to Redwater as Field Engineer in, I think it was 1951.

JW: Maybe you could just describe the conditions at Redwater at that time, were they pretty primitive, lots of mud. . .?

AH: Certainly they were a little different than they had been in Devon because Devon was a brand new town and it did start from scratch, there was a tremendous amount of mud around until the roads were gravelled and so on. In Redwater there had been a town there, a small prairie town and so there was some infrastructure in place, there were schools and church and so on. The town site that was occupied by the people in the oil industry was developed very much the same as Devon had been. New houses were being built and new streets and so on, new facilities being put in. But it was a little different in that there had been a town there and there was a certain amount of facilities that had already been constructed.

#106 JW: Do you recall the relationship of the oil people with the town people in the existing community, were there any problems?

AH: I suppose there must have been problems but I wasn't aware of them. My recollection is that the people in the oil industry stayed fairly much to themselves. They had their own parties and their own. . . of course, interests were very different than the townspeople who had been there. I got to know a few of the people in the town. For instance we had Lions Club and that included both the oil people and some of the towns people. My recollection was that we had a pretty good time and we certainly enjoyed the local people very much.

JW: So there was a rapport established and there weren't from your point of view then, conflicts?

AH: No, I don't recall any conflicts. Again, I'm sure that there were some conflicts with the farmers where oil sites or well sites were being taken from their land and so on. There was obviously arguments over the proper and fair payment for those rights and things like that. But our dealings were always very satisfactory with the local people. My wife was involved with the church there and my recollection was we had a very good time with the local people.

JW: Redwater was apparently a fairly easy field from an engineering standpoint, wasn't it?

AH: Certainly it was an easy field to drill and develop, in that it was relatively shallow, it was a fairly massive reef and therefore there weren't too many holes that were a surprise to the geologist in terms of anything that he didn't expect. Production was good and therefore there was fast pay out on the wells and so on. So from that standpoint I think, at least in

the beginning it seemed to be very easy. I think perhaps looking back though, one would say that there were problems there that perhaps we didn't fully recognize at the time. I think they have since caused the industry some problems and they would be associated with the H₂S that was in the gas and the corrosion that goes with the presence of that material. Also the fairly high content of salt water that was eventually produced with the oil, which required a fairly extensive salt water disposal system. Again, which, over the years has taken some good engineering to handle the problems of corrosion and so on.

#143 JW: You were up there until about 1952 in Redwater?

AH: That's right. We were there until late fall, 1952.

JW: And you had a rather abrupt change in your activities with Imperial Oil, didn't you?

AH: Yes, it was a real change and as I recall it was quite a surprise to me to be asked to come to Calgary and work in the research area.

JW: I wonder, first of all, when you came to Calgary, who brought you down here, how did that come about as that change in jobs?

AH: As I mentioned I had been working for many years by that time, with Walt Dingle, and he was the . . . I probably don't have the title right but he would be the equivalent of the Chief Engineer here or certainly one of the senior engineers. He had working with him, Dr. Jimmy Young, who was heading up the research aspects of Imperial Oil. I'm not sure that even at that time a research arm had officially been formed. But certainly there were problems of metallurgy, problems of corrosion, things like that which were going to take some research to solve. Jim Young had a reputation of being a self-trained person with great interest in those areas, very capable person. He was put in charge of this aspect and I was to come down to work with him on the research program that was just being developed.

JW: Was this unique, this kind of program, an institutionalized program within the petroleum industry for the larger companies?

AH: It was unique as far as I'm aware in Canada. Certainly it would be patterned I think, after the operations of Carter Oil and Humble Oil in the United States who were further along in the development than we were. So I suspect that's the pattern for the development but I think it was unique for the oil industry in Canada and we were certainly kept busy with the number of problems that came up having to do with the production of oil. We were able to attack them really first hand because of having an operation here in Canada. I'm sure that some of the other larger companies had the same kinds of problems but probably referred them to their more established groups outside the country.

#181 JW: Where were your office facilities, research facilities here in town?

AH: The first facilities were at 335 - 7th Ave. S. W. We had two sections of the old building that was there at the time, the lower part was made into a lab where we did water analysis and oil and gas analysis and some chemical work. The upper part had to do with the, I think more the administrative offices and the research associated with reservoir engineering. I should probably add to the fact that in addition to doing the research associated with equipment and things like that, there was also the beginning of reservoir

engineering research. The first analogue computers brought into Canada and worked on by some of the people in that research organization.

JW: Who else was in your group?

AH: The lab end of it was handled by Dick Diamond who was a Chemical Engineer. Al Maclachie??? was there. A little later on Ron Shera??? was a part of the lab group and Harvey Clare came to the employ of Imperial Oil probably a little bit later but in the very early years, the early 50's. Vern Larson was one of the people involved in the very first work on the analogue computers, followed by Rolly Horsefield??? would be another one in the very first work.

JW: Were these people primarily PhD's or was that not a . . . were they more interested in people that just had good practical . . . ?

AH: I think that they were interested in people that had practical backgrounds. Dr. Young had been awarded an honorary degree, he was self trained. The others had been graduates either of Chemistry, or probably Chemical Engineering or Electrical Engineering. We had a Dr. Shidecker??? later on, who was an expert mathematician. But he was not involved so very long, 2 or 3 years is my recollection.

#219 JW; How were you perceived, your research group by other elements within Imperial Oil, were you viewed as that esoteric group out there or was there a good working relationship, lots of feedback and this type of thing?

AH: I think there was lots of feedback. We were . . . probably had some of those attributes of being remote and so on to the field people but most times they were actual problems we were working on and I think we were pretty well received. Certainly I can recall getting good cooperation in the field and I don't think there was any problem very much that way.

JW: I wonder if you could just talk about as you remember, the kinds of problems you were looking at, at that time?

AH: I can recall a few and I suppose they probably are just the ones that happen to come to mind rather than being the very important ones. I can recall a lot of difficulty with equipment failures. These would be failures of pipe, failures of some of the materials that were being used in oil production. There was a real problem at the time and I remember we did a lot of study on it, having to do with the protection of pipe that was going to be buried. What kind of corrosion protection would be suitable. And how could you assure that the protection was virtually 100%. We looked to others for experience with the various kinds of coal tars and asphalt and primers and wrapping materials and so on. There was no experience in Canada so it was a bit of a pioneer effort. I can remember some of the early work that we did with respect to plastic pipe, which was just coming on the market, which in most cases simply failed, it didn't do the job it was supposed to do. But we had to keep trying those things in order to make some progress and then try and define what the problems were. There was certainly investigation on the kinds of tankage that should be used and the protection of tankage, particularly when Redwater and some of the other fields had small quantities of hydrogen sulphide. Then there was the whole area of reservoir engineering research, which again, was a fairly new science and the

people that were working on that were really pioneering it as far as Canada was concerned.

JW: Would that be in terms of estimating the reserves or the management of the reservoir itself?

AH: I think it was the management of the reservoir itself. Although you can recall that in those days they oil production was pro-rated and therefore in determining reserves you were perhaps determining the amount of oil that you could produce. So there was a great deal of effort spent on determining what your reserves were and then determining how the reservoir ought to be produced. Whether you need water injection or perhaps gas injection. It was later on but there was a lot of work done, for instance, on the Golden Spike reservoir to get the very, very high recoveries that have since been associated with that reservoir.

JW: How would you view your success during those years, did you make a significant contribution do you think, your department?

AH: I think so. I think I was very fortunate in that I got to do some tremendously interesting work that probably suited my capabilities better than some of the complex math and so on associated with reservoir engineering. I was involved in the early 50's in the development of tracked vehicles, which would allow us to explore, do seismic work and haul in drill rigs and so on, over the muskeg in northern Alberta. I suppose this was probably a tie back to my experience with perma-frost and so on. But I found that a tremendously interesting job and I worked with several engineers in Imperial and with people like Bruce Nodwell, who was one of the pioneers in developing track type vehicles. We had good support from people like Tip Maroney and other people associated with the seismic end. They were able to provide good field test for the vehicles that we came up with and then were prepared to spend money and test other modifications and so on. So we were able to do, I think, some very good developmental research on vehicles.

#301 JW: Where did you get the track vehicles, there weren't too many civilian models kicking around at the time were there?

AH: The first ones that we worked with, other than a very few Bombardiers which were here, were manufactured by Bruce Nodwell. I could perhaps go back to say that some of the vehicles used in the Arctic were called Lyn Halftracks. They were tracked vehicles with either wheels or skis on the front. They were supposed to be heavy hauler type transports.

JW: Sort of like a Bombardier too.

AH: That's right, except much, much heavier. Also not particularly satisfactory, they seemed to have a lot of failures. Then I guess some of the first vehicles that were used in the industry were the army Weasels, track vehicles that had been developed during the war. They had been used in the field, I can't recall who would have been the first to develop that use but probably I would suspect they were simply put to work by people who were pretty inventive out in the field and had to get a job done and they started using Weasels. Mr. Nodwell's first vehicle was an articulated wheeled vehicle with a fair number of mechanical problems and again, it turned out the loads were much too high in terms of the ground loading on that type of wheeled vehicle. So we got into the soft tracked

vehicles where we could get the loads down to perhaps 2-3 pounds per square inch. That was really the beginning of what turned out to be a pretty successful development.

End of tape.

Tape 2 Side 1

JW: How would you test these tracked vehicles, would you just go out and find a patch of muskeg and take one of these things and run it through and see what happened to it?

AH: Yes. This first tests would be done that way. We used test sites out on, I think it was near Fallen Timber Creek, on the forestry road, west of Calgary. The there was also some test sites near Bragg Creek. However, the real test was to put the machine out and put it to work. That's really what had to be done and Mr. Nodwell I think, recognized that pretty well. I can remember many times being out on the crew that was actually doing the work and Bruce himself used to spend days and days with the vehicles, working with them, doing a job. That's the ultimate test and I think that's where they were eventually proven or not.

JW: Which they eventually did design units that were capable.

AH: Yes, that's right.

JW: Just one other question here, as a Senior Research Associate, were you given a fair bit of freedom to pursue some of these problems or were they quite directed, somebody at Imperial would say, here's a problem we're having, were you able to sit down and look at areas you were interested in that might be relevant to the industry?

AH: No, I was, certainly in my opinion, I was given a lot of freedom to assess what the problems were and then to make suggestions with respect to the possible solutions. I think that's what perhaps, made it so interesting to me, to be able to be involved directly with what the problems were and to be given a lot of support and free rein in trying to find the solutions. And I think the tracked vehicle example is one, where, if we had reasonable argument and reasonable confidence that what we were proposing would be a good solution, I don't recall it being any great difficulty in getting the money to do that. As a matter of fact, we were able to build the very first very large track transporter, that's before Mr. Nodwell built it. It was called a muskox, it was built primarily in the United States, the eastern United States, by track vehicle experts, working with ourselves. Our engineer on the job was Jim Thompson and that was a very, very successful vehicle and I think , was the pioneer in heavy transport. It would haul 20-30 ton loads quite nicely over very soft muskeg.

JW: In the summer.

AH: In the summer, that's right. It was used by the Transportation Department in Edmonton for many years.

#031 JW: What was the impact of having a vehicle designed that could traverse this kind of terrain in the summer, did it really open up whole new areas for exploration?

AH: I don't suppose it opened up new areas, because those areas could always be explored in the winter time, but what it did was extend the season, for both the exploration work, the seismic work and for the drilling, in that you could then be sure that you could operate during the summer if necessary. And so it extended the season and hopefully reduced the costs substantially for that kind of work.

JW: What year's are we talking about here, more or less, are we getting into the 1960's?

AH: No, my recollection is the first track vehicle we experimented with would be about 1953. So it would go through until the early 60's. Probably something less than 10 years there. One of the first people on Imperial's staff to work with specially designed vehicles was Jerry Remple. He's got a great collection of pictures and so on, with some of the early successes and disasters of some of the seismic vehicles.

JW: Were you involved at that time, or aware of Cam Sproule's interest in the Arctic?

AH: I had known Cam for many years, of course, and I followed with some interest, his work in exploration and his great enthusiasm for the Arctic. So yes, I was quite familiar with his activities and what was going on there.

JW: Did you share his enthusiasm, having . . . ?

AH: Oh yes, I thought that there was tremendous potential there. I still do think that there's great potential there. I perhaps, saw some of the problems that were going to be associated with the development, but I guess I didn't think that they were as difficult as they have turned out to be.

JW: Was Imperial, as a company, enthusiastic, was there a corporate interest in the north at that time or were they. . . ?

AH: I think that they were interested but I don't know that they were. . . I think they probably had a much more balanced view of it than some of the people who were closely associated with the Arctic. And I recall that they certainly evaluated the potential for oil up there and probably they, better than most, knew the time scale, the importance of timing up there. I can't recall the dates when they first took land position but certainly it's turned out that their land position was, in the Beaufort Sea, was extremely well taken. And I think that again, it was pretty astute not to be stampeded into tremendous land position in the Arctic Islands, but to find a good land position within the scope of probably engineering technology that would enable that to be developed almost any time.

#067 JW: At that time were you aware, or was Imperial aware of the nature of the reservoir underneath the Mackenzie River at Norman Wells?

AH: I would think that people like Ted Link were very well aware of the nature of the reservoir. Probably we were not aware at the time of the effect of natural water drive and so on, that is of the recovery mechanism, but certainly I think that people like Ted Link understood the geology pretty well and knew what the reservoir was like.

JW: But there was no attempt in the mid 50's, early 60's to start thinking about how to get that oil out of there.?

AH: I think that's not right. I can recall Scove??? Murray, and I can't recall just what year it

was, but in conversation with Scove, saying that he didn't see any great problem in building stone islands or rock islands to develop those reserves under the Mackenzie. Certainly it was looked at and I'm not sure that it ever was given any official look by the senior management of the company but certainly the people involved in drilling and so thought that it could be done.

JW: Okay, so it was probably largely economics then that. . .

AH: I think it was economics and that there's no point in developing the reserves if you don't have the economic incentive to do that. I think that was the bottom line.

JW: You acquired the title of Regional Systems Coordinator, what did that entail?

AH: That entailed me trying to learn a fair bit about computers. I'm not sure I was very successful at that. Anyway I was taken downtown, from the research lab, to coordinate the use of computers and computer technology, through the different departments if the producing department. At the time of course, the computers were already moving very quickly. There was a new model out before you'd really got the last one installed. There was tremendously wide spread use of computing technology, from the straight accounting, through exploration research and production research and particularly in the reservoir engineering. I guess that management felt that our efforts were probably not coordinated well enough, that we were going off in different directions. So my job was to try and coordinate those activities.

#103 JW: Was that a particularly stimulating activity or were you longing for the. . .?

AH: I didn't feel that I was particularly good at it. It was pretty interesting but it's not one that I think, made use of whatever capability I had. I enjoyed it and there was a lot of progress that I saw while I was there. We were in the times of the IBM 365 and so on, and there was tremendous activity, concerns with respect to where the computer should be centred and how it should be tied with the Toronto facilities and the Edmonton facilities and so on. There was a lot of work to do and a lot of planning had to be done.

JW: One of the other things you were involved in I understand, was the study of static electricity, with respect to gas blow outs. . . . You laugh.

AH: Well, I can remember working with Jim Young on this. Of course, one of the problems at the time was that there were occasionally fires which would occur at the top of tankage. We knew too that wells that were blowing wild, often ignited for apparently no reason that could be picked up. So Jim Young was very interested in trying to find out whether the flow of gas itself would generate static electricity and therefore cause the wells to ignite. Jim and I wrote a paper on this and did some testing in the field, where we found in fact that there were some potentials developed along the sides of the fast moving gas streams.

JW: Were you ever able to demonstrate that a particular fire had in fact, resulted from static electricity build-up, by almost a spontaneous combustion but not quite but as a direct result. . .?

AH: I don't think that we could prove it, although I think that we were able to show that that was the most likely cause of the fire. There were theories that some of the solid materials that were coming with the gas, like sands for instance, that they were striking pieces of

pipe or metal around the well head and so on or that the activity of those rubbing against each other caused the build up of potential, which would cause a spark.

JW: What kind of action could be taken to prevent static electric combustion?

AH: My recollection is that we didn't get into that too much I think. We suggested the possibility of water vapour being available, which would cut down the potential for that. It didn't go very far, we wrote a report and I think everybody filed it and that's about it.

#144 JW: Shortly thereafter then you got involved in the Canadian Arctic Gas Study Ltd., is that more or less chronologically right?

AH: That's right. There were a couple of other activities though, that I found tremendously interesting, before that. I don't know whether you want to talk about that or not. One of them was being sent to Libya, shortly after Zeltan??? had been discovered over there, to look at the transportation requirements for moving in the dessert. Again, I think that was a result of being involved in transportation in northern Canada. Went over there and we found of course, that they were using very large tired vehicles, dessert trucks. Their problems were associated more with mechanical failures and so on, rather than with the ability of the truck to traverse the dessert. We found that there was great ability with those big machines, to cross the dessert and that mobility wasn't a problem whereas it had been a problem in Canada. However I think an interesting part of that was to come back to Canada and then be involved, not too long later, with some of the first work in the Mackenzie Delta. And find that travel up there was greatly hampered because they had to move in the winter time and the tracked vehicles are not that good in terms of very, very cold weather, fairly high maintenance cost. And it occurred to me that the dessert trucks would be ideal vehicles for the Arctic, because it really is a dessert in the winter time. So a large dessert type truck was purchased from Kenworth, patterned almost exactly on the models that were being used in the north African dessert. And then of course, equipped with what the experienced people in Edmonton knew, were required for the cold wether, winterized. And that vehicle turned out to be very successful. It not only would carry 20-35 tons on it's bed, but it would tow slice at the same time and could travel virtually across the country in the winter time. So that was an interesting development that showed that the problems of mobility can be the same in the Arctic as they are in the tropics.

JW: That was a fortuitous trip they sent you on then to. . .

AH: Yes, I think it was, and I found it interesting to tie the two together. One other interesting part of my career had to do with some work in the late 60's on the Syncrude project, it was then City Service, Athabasca. I was on the mining sub-committees and on the separation sub-committee, representing Imperial in the group that was studying potential for developing the Tar Sands. In the mining operation we of course, looked at all the major mining methods that were being used and I had long been a supporter of dredging so we saw dredging operations in several places, including California. Then there was the strip mining that was being done in the north central states, conventional drag line and shovel operation, we studied that. And then finally we were in the fortuna??? pits in Germany, at the soft coal operation, looking at the German mining wheels and reported on all these mining methods to the City Service, Athabasca, which eventually became

Syncrude. I was involved in a lot of those early studies which I found really interesting.

#194 JW: Great Canadian Oil Sands hadn't gone on stream yet had they?

AH: No, as a matter of fact, we were applying for a permit at the same time as GCOS and we were competing with them in the hearings in front of the Conservation Board, for the right to build the first plant. I don't know whether it's fortunate or unfortunate, but the permit was granted to GCOS and City Service, Athabasca had to wait their turn. Of course, GCOS had a great deal of pioneering to do and a lot of difficulty with some of their first engineering operations. So maybe we'd have had similar problems, although we certainly had spent a lot of time studying those potential problems.

JW: And speaking with Doug Brown recently, he mentioned several of the problems they had.

AH: In looking back they might have wished that perhaps they hadn't won the day and at the time we were very disappointed. It's hard to say how things would have gone. They went the route of the mining wheel. Our recommendations were that the mining wheels would not be satisfactory.

JW: Why, what did you see as being their problems?

AH: I felt basically that any piece of machinery that has as many moving parts as the mining wheel does, belts and pulleys and rollers and wheels and so on, just has to be a potential problem. And then the other factor that concerned us greatly was that, the plans at that time were to have only one or two of these machines and if you did that, your whole operation downstream was subject to the high utilization rate of that one or two machines. The very day that we left Germany, after having spent something like a month looking at the mining machines, the main . . . one of the big wheels was down because it had broken a shaft. Some, I don't know, 16 or 18 inches in diameter and it was going to take three months to build a new shaft. Another of the big machines, in fact one of the other major ones, was down because of a fire that had been caused by belt wear, rubbing, in the wheel boom and had caused some unknown structural damage, which was going to require metallurgical investigation. It seemed to us that was pretty good example of the kind of problems that you could have if you hinged your whole mining operation onto a single piece of equipment. Of course, as it turned out there were many, many more studies done and eventually they did go with the drag line type of facility with a reclaiming wheel to do the actual loading onto the conveyor belts.

#241 JW: Well, and with those wheels as well, all the problems are compounded with all that abrasive sand that you. . .

AH: That's right. We were well aware, as a matter of fact, we did a lot of testing with a small wheel in the tar sands and I still have some examples of the teeth around that wore out in a matter of hours.

JW: There was a sulphur content in there too that was potentially destructive too, wasn't there?

AH: No, I don't think that caused any problem until you got down to the upgrading side and then of course, you had sulphur.

JW: What was going on in the Mackenzie Delta, you mentioned that you were looking at

transportation problems there, what was Imperial Oil. . . what kind of activities were they involved in, in the Delta at that time?

AH: They started looking in the Delta, as I recall, in about 1962, with some of the first gravity and seismic surveys. Then they followed that up. . . excuse me, we'll back up a little bit, I believe they had been drilling in the Peel??? Plateau area and down the Mackenzie, perhaps about the mid 50's. And then they switched the emphasis to the Mackenzie Delta area, beginning with gravity and seismic surveys. They were doing exploration drilling in the late 60's. I can remember them. . . we were all very excited when Prudhoe Bay was discovered in 1968. That seemed to confirm to us the potential of the Arctic Basin and sort of increased the interest that we had. I can't recall how many wells had been drilled at that time, but the discovery at Atkinson Point I think was 1970, so there had been some wells drilled. It was in that activity that the big wheeled trucks, the Kenworth trucks were really initiated.

JW: At that time, had you gotten involved in the refrigerated drilling technique or the chilled air drilling, or was that much later?

AH: No, I think that was being done then. I can't recall the dates but I do recall being involved with that briefly.

JW: So there were, not only transportation problems, but problems in seismic, I suppose this was seismic drilling at that time?

AH: Yes, there were problems with . . . that's right, with ways to drill. . . under the severe weather conditions and so on and it was a problem yes.

JW: Were you involved in finding . . . ?

AH: I was only involved peripherally, I think I was called in on some of the meetings and so on but I wasn't directly involved in the research or the development.

#284 JW: Alex, maybe this is a good time to stop for the day and as we get into a little bit of a transition shortly, with Canadian Arctic Gas and so forth, so why don't we wrap it up and continue next time.

End of tape.

Tape 2 Side 2

JW: Today is June 13th, 1984. This is my second interview with Mr. Alex Hemstock. Again, I am at his home and this is tape 2 of side 2. Alex, last time we were talking about the Canol project fairly early in the interview and you mentioned you and the U.S. army lieutenant and a high school student went on this canoe reconnaissance trip. How did you get up into the field, were you flown in?

AH: Yes, we were flown into the field by one of, I think, three aircraft that were being used that summer to support the field geological program. My recollection is it was a Norseman aircraft and we used to tie the canoes onto the struts that supported the floats and fill the plane with our supplies for several weeks. The trick was to find a lake close to the upper reaches of the river, so that you could transport your equipment from the lake over to the river and then go on down to the Mackenzie drainage. In our case, our first big trip was down the Hare Indian River, from the northwest corner really, of Great Bear Lake down to the Mackenzie at Fort Good Hope. We landed at a lake, I think it was called Hamilton Lake at the upper reaches of the Hare Indian River.

JW: Did you have. . there were not charts or good topographic maps like there are now for that area were there?

AH: They were pretty sketchy but we did have some aerial photography coverage and so we could piece together the aerial photographs and keep track of where we were.

JW: Okay, so then the rapids and areas of difficulty would sort of be observed ahead of time.

AH: They were and in our case, the Hare Indian is really a very quiet river and there was no problem at all, but it was a real problem for the crews that were working the west side of the Mackenzie and coming down the rivers flowing out of the Mackenzie mountains. They were fairly steep and there was a number of rapids and falls along those rivers. Two or three of the parties got into some fairly severe problems, had to walk out as a matter of fact, after having lost their canoes and their equipment in rapids.

JW: Boy, they were lucky because that's not an easy chore to walk through the bush is it?

AH: They were lucky, even to survive the problems with the canoes in the water. And even then it was a difficult walk. I think. . one of my best friends, Don Winterburg was one of the parties that came down the Redstone and had problems. Another person who you may be interviewing was Murray Hannah, coming down a river that's now called the Hannah River. I don't recall too much of their troubles, but I know that they did lose all of their equipment and supplies on that river.

#036 JW: How were these reconnaissance activities that you were undertaking intended to support the actual Canol project?

AH: The effort that was mounted in the summer of 1943 and '44 was really an exploration effort, ultimately aimed of course, at increasing the supplies of oil available from that part of the country. It was recognized then that Norman Wells was not an extremely large field. In fact, I think it was thought to be much smaller than it turned out to be in recent years. The effort headed by Dr. Link was to find other reserves. We may not have

mentioned but there was a large number of exploratory wells drilled to test out structures that had been located along the Mackenzie near Norman Wells. Unfortunately none of those found any additional oil at all. So this was part of that exploration effort.

JW: Okay. Also back tracking a little bit, you mentioned as you were a graduate student at the University of Alberta, you had some summer field work for Imperial Oil. I wonder if you could just fill in a little bit exactly what that work was?

AH: That work was involved with the remaining activity at Norman Wells, after the Canol project had been closed down. Of course, that activity had to do with the refinery which was there and which was to be kept in operation to supply the local market. My job was to work under Ronald McKinnon, who was the refinery superintendent and to look after the engineering that was being done as the refinery was consolidated I guess, would be a good word. We moved several of the buildings that had been in the upper end of the camp down to the refinery area. And we improved on some of the refinery services and so on, to make a more compact and viable camp for the support of the refinery.

JW: Okay. You also mentioned last time, when you were in the research arm of Imperial Oil, that you had . . . or Dr. Jim Young was in charge of that operation. I wonder if you could go into a little bit more about his background. You mentioned that he had an honorary PhD and that generally he was self taught or self trained as a . . . ?

AH: Yes, Jim was a chemist. I don't know too much about his earlier work history. I know that he did work in Turner Valley, doing some of the basic chemical work that was needed to support the operations there. He built on that knowledge he had of chemistry till he became very familiar with and very competent in all of the production engineering operations for Imperial as Leduc and Redwater expanded. Again, I can't be sure of the titles but he certainly got to the equivalent of Assistant Chief Engineer in the Calgary office. It was when he moved on to those broad engineering duties that I came down to work under him in the operation of the research laboratory.

#075 JW: Okay. Finally what was the year of the Zeltan discovery, we didn't get that, when you went to Libya, do you recall the year of that?

AH: I would expect that Zeltan was probably discovered about 1959 but that would be subject to check because it was still being tested and although they knew they had a big field, when I was there in 1960, the full scope of Zeltan was still not well understood. So I would think it had probably been discovered a year or perhaps two before that.

JW: Okay. All right, moving on then, you became involved with the Canadian Arctic Gas Study Ltd. How did that come about and when did that occur?

AH: That came about because they were building up staff, primarily from those companies associated with the Canadian Arctic Gas Study Ltd., in the Canadian side and my experience in the north was, I guess, thought to be useful in the potential studies that they had to undertake. My recollection was that it was about 1970 or '71 that I went to Canadian Arctic Gas Study Ltd. and it was as Director of Environmental Studies. Again, I had a little bit or work with Imperial, in the last few years before that, being concerned with the damage or the changes that were occurring in the terrain in the north as a result of a lot of activities, where the perma-frost had perhaps been caused to thaw by undue

surface disturbance. I think again, the concern I generated for that probably led to making it logical to move me over to Canadian Arctic Gas to continue that work.

JW: So when you talk about a Director of Environmental Studies, you were more concerned with environmental impact, rather than environmental concerns with respect to operating a gas pipeline?

AH: Yes, the major concern at the time of course, was with the construction of the pipeline, although I don't know whether you recall, it was at that time that the environmental movement per se, was attacking any kind of development by painting horror stories about the terrible things that would go on. They were using such phrases as the fragile north and so on and saying that for instance, thermal cost??? would go on forever and ever. Things that were completely illogical but it was designed primarily to gain the attention of the public and it did. In fact, it did a very good job of that sort of thing. But some of the claims were really far out. So primarily what we had to do was do what we call base line studies, that is find out what was there in terms of the terrain, the water resources and the animals and birds. Then the next step was to try and determine what the likely impact of construction and operation of a gas pipeline would be on those base line on those base line resources that occurred in the north. That was our approach and since there was very little known about the north, our base line studies came out in huge volume and were very, very complete.

#119 JW: That's right, because there was no other work of that sort really, to draw on was there?

AH: No, there wasn't. Again, the approach of Canadian Arctic Gas Study Ltd. was not to stint on the cost of doing a study, to study anything that anyone could raise as a potential and try and make the case for the gas pipeline as strong as possible. I could say, almost without regard to cost. Certainly there was not stinting on the depth and the extent of the studies that we did. Those biological studies were eventually published in a 37 volume series of biological reports, which I think, still is probably the most complete biological inventory of any area in Canada. In fact, the Mackenzie Valley has probably been studied far more than any pipeline route in Canada.

JW: Did you have a problem with, you know, at that time you mentioned that it was sort of the height of the ecological movement or the concerns for environment, and you mentioned a lot of the concerns people were expressing may not have been entirely rational. Was it hard for you to counter these kinds of, perhaps, way out statements, in a rational scientific way.

AH: Well, yes it was because first of all, there wasn't any precedent in the north and so it turned out to be one person's word or judgement against another. It was really very difficult to counter those kind of arguments. Of course, another thing that concerned us and I think concerned everybody was that there was also the common charge that you were in the pocket of the oil companies and therefore your scientific work had no value. I think this was perhaps, the one that bothered the scientists that we employed most of all. Many of the consultants we used came in as very strong environmentalists, being concerned about absolutely everything. And if you look at the very first publications and

reports, you'll find that the consultants were raising all sorts of these terrible things that could be entertained as a possible impact. It's kind of interesting to follow through as they developed their studies over the next four or five years, and then they became very strong witnesses for Canadian Arctic Gas to insist that in fact, the concerns were, in most cases, pretty much placed in the wrong areas and that there was no great concern for a pipeline being built. I think even what were the most high visibility areas, like the caribou calving grounds, I think the people who really understood caribou felt that there would be no great problem building the pipeline as we had proposed it in those areas. Even that was an area that was highly visible and even to the end it had strong detractors on the choice of that as a route.

#162 JW: Were you involved as well, in the socio-economic aspect, or was that another department?

AH: I was involved with it because it came under the environmental group. Jim Harvey was the Vice-President in charge of that whole area but I had responsibilities in that area too. Although not as complete as in the biological side.

JW: Did that get involved at all with the Berger??? Hearings?

AH: That's right, the Berger Hearings were sort of the ultimate conclusion of our study. Those studies were all presented to the Berger Hearing and then we were cross examined on those hearings, literally for months at those hearings, on these studies that had been accomplished.

JW: What was your reaction when Berger finally came to his conclusions?

AH: Well, I was disappointed because I think that he completely ignored the scientific facts and evidence that had been presented to him. He wrote a very strong political and social document but certainly ignored the scientific facts that were presented to him. We were concerned what supported the case which I think, he had predetermined long before he came to write his judgement. So there was a selective use of evidence.

JW: Who were the corporate participants in Canadian Arctic Gas Study?

AH: I'm afraid I can't give you the total. There was quite a number from the United States. From Canada, if I can recall, there was originally Imperial Oil, Gulf Oil, Shell Oil, Trans Canada Pipeline. I believe that Union Gas at one time was a member and I believe that Numac???, early in the game was a member and also CDC???. And in the United States there was Pacific Gas and Electric . . .

JW: A number of gas companies, I remember.

AH: Quite a large number of gas distribution companies, I'm afraid I can't recall.

JW: Okay. Would the companies then, each chip in a proportion of the cost?

AH: Yes, the companies were assessed a portion of the cost. And it was interesting that, at least in my opinion, there was 3 or 4 very separate and direct interests in the study. Therefore the objectives of these companies were not always. . in fact, were very seldom the same. There was the major producing companies in Canada, like Esso and Shell, there was the major gas distribution company, like Trans Canada, who would have a very different approach than the producers. In the United States there were gas transmission and distribution companies, and again they would have a very different approach than

say, the Canadian suppliers. There was also producers in the United States in the play there, Humble Oil for instance and Atlantic Richfield and so on. So they all had very different corporate objectives. I think that it made it difficult to maintain unity within the study and the company itself.

#214 JW: Was there sort of a Board that had representative from each of these interests, each of these companies?

AH: Yes, there was. Canadian Arctic Gas Study though, did have a complete corporate set-up themselves, they had a President and senior Directors and they met and established company policy and then had that company policy approved by, I'm not sure, I think they were probably called the Board of Directors or Board of Management, representing each one of the companies.

JW: That must have been a quite trying task to keep everybody together and . .

AH: I'm sure it was, very difficult yes.

JW: Whose idea was that originally, or how did Canadian Arctic Gas Study Ltd. originate?

AH: I think probably the person that could best answer that would be Vern Horthy???, because I think Vern was associated with it right from the start. My recollection is that there were at least. . .well there were three different study groups that initiated studies on the potential of bringing gas from Prudhoe Bay. And they would have been the Prudhoe Bay producers, as Humble, Atlantic Richfield and I believe probably Sohio???. And they started some studies which were, I think, based in the United States, but looked at the overall problems of route selections and so on, bringing gas out of Prudhoe Bay. Then there was a group, I believe it was headed up by Bectal??? Corporation, which were looking at it from a business development standpoint and they did some studies looking at the feasibility of various routes. Then there was a company headed up by Bob Blair and now the Nova group, it was called Gas Arctic and they were looking at a potential for bringing out Prudhoe Bay gas, but also bringing it by a Canadian route so they could pick up gas from the Beaufort Sea. My recollection is that the contractor group, under Bectal, I think they took their studies to a certain degree and then I believe that they dropped it or they may have passed some of that information to the American group. And the two. . .Gas Arctic and the American group, which may have been called the Northwest Study Group, I'm not sure of that name, continued their studies in parallel and eventually were merged to Canadian Arctic Gas Study Ltd. That was I think, a difficult marriage too. I'd forgotten to mention that Alberta Gas Trunk, I think as they were called at that time, were a member of the Canadian Arctic Gas Study group. That union held for a little while but before the Berger Hearings, Mr. Blair had broken off again and was conducting their own studies. And in fact were interveners. . .or were in an adversarial position with Canadian Arctic Gas Study Ltd. at the Berger, National Energy Board Hearing.

#268 JW: It was Blair that ultimately got his route too.

AH: Well no, he didn't get that route, but he was able to change with the times and see what the politics of the situation were and at the very last minute, in conjunction with some American gas companies, they suggested the route which paralleled the Alaska Highway

and supported that. Of course, the irony was that that route was selected without any environmental studies whatsoever. And yet everybody was expressing so much concern about the environment and it was for this reason that as I said, it didn't seem to me that any of the hard scientific evidence was used whatsoever. It was a political decision. It's interesting to look at the Federal Power Commission decision, which came out about that time and of course, was exactly contrary to the Berger conclusions. The Federal Power Commission judge felt that the Canadian Arctic Gas Study Ltd. line route could be followed, the line could be built without undue environmental problems and that the other routes suggested simply didn't . . . weren't nearly as logical. In fact, I can remember in his judgement he said, the route proposed from Prudhoe Bay to the Alaska Highway and hence by the Alaska Highway to market, he said, the pipeline starting from Prudhoe Bay, heading more directly to Hawaii and had really very relationship in its routing to the eventual markets that it was to serve.

JW: You had about the highest profile position then, within that study, didn't you, environment being the major concern or one of the . . . ?

AH: There was a lot of engineering concerns too. Again, there hadn't been very much experience with northern pipelines and there were all sorts of charges that the pipeline should not be built, that people couldn't stand the cold and that metal fatigue and so on would make it impossible to build a line. There was severe problems visualised with respect to frost heaving and thaw settlement. So the engineers also had a very high profile and I think, in terms of details, spent more time on the stand than we did.

#314 JW: How did you avoid getting involved in the engineering studies too, especially with your background. It would seem to me that they would be coming to you from both sides.

AH: We overlapped a bit on the terrain. As a matter of fact, I think I was on some of the engineering panels but we had a plateful doing the environmental work. I was involved in some of the engineering work that pertained to terrain but I didn't have a great deal of pipeline experience, that is for large gas pipelines. But that was all other engineers that were involved there.

JW: Did the Canadian Arctic Gas Study eventually evolve into the Polar Gas Project or are they just . . . ?

AH: They are entirely separate, very separate. It's interesting. . . well, to back up a little bit, the Polar gas people, originally proposed a pipeline that would come from the Arctic Islands in Canada, across some fairly large and deep water areas, and then down either the east or the west side of Hudson's Bay. So they were picking up gas from a very different source and eventually would market it in the eastern central United States. They changed that route, eventually they settled on the west of the Hudson's Bay, then they changed it to a route that ran from the islands, in a sort of westerly direction, to near Copper Mine, so that they could pick up Beaufort Sea gas and then ran in a southeast direction, right straight across, to somewhere in the area or Winnipeg. None of these lines were ever in fact, proposed in front of any regulatory agency, they were studied. But I understand that they are preparing to present a proposal to the National Energy Board this summer, which

will in fact, propose a pipeline, from the Beaufort Sea, up the Mackenzie River, to Edson in Alberta, which parallels, almost exactly the original Canadian Arctic Gas Study route proposed.

End of tape.

Tape 3 Side 1

JW: Alex, you mentioned that part of the Canadian Arctic Gas Study Ltd. study was also to look at tying in or bringing down Beaufort gas. There was no gas though then was there?

AH: Oh yes. They had reserves. I can't recall the reserve figures but certainly a few trillion cubic feet had been located at that time. It was a point of contention that there weren't enough reserves there to make it worth tying in but they located reserves and then on the basis of estimates, they projected future supplies.

JW: Did you enjoy that experience with Canadian Arctic Gas, was that a rewarding time or frustrating?

AH: I felt it was a rewarding time because I think that we did an awful lot of innovative and really, research type work that I think has really stood up well since then. And I think that our policy for instance, of making available these biological documents was a step forward in that they were available and have been used a great deal since. Canadian Arctic Gas Study Ltd. put those volumes in most libraries across Canada, so that there's a lot of information that has been put into the record as a result of that. Obviously I was disappointed with the results of the hearing because I felt that, had we had proper government support and intelligent decisions, the gas pipeline would have been in long ago and it would have been a very viable operation and one that would bring a great deal of income to Canadian people.

JW: You had gone to Canadian Arctic Gas Study Ltd. from Esso and at Esso you were the at that time, what they called the Arctic Coordinator, so you had been the Arctic Coordinator and then went to Canadian Arctic Gas. What I haven't done then really, is we haven't talked a little bit about your position as Arctic Coordinator. I wonder in fact then, if you could, just talk about, in the late 1960's I suppose, Imperial Oil's interest in the Arctic and the nature of your activities with the company?

AH: I don't remember a great deal of the details about those years, they seem to blend to me with the Arctic Gas work. But certainly Imperial Oil was exploring for oil and gas in the lower Mackenzie and out in the Delta. In fact, they were working the Peel area, I think in the mid 50's. But they had quite an extensive exploration effort in the Beaufort Sea. There were a number of problems that I was involved with, one was transportation, moving around in the perma-frost with seismic equipment and so on. Another one I think we mentioned the other day, about the use of vehicles to transport the drilling rigs and so on. That was a fairly low key program, until the discovery of Prudhoe Bay in '68. Then there was an extensive amount of work that was started. Not only was Imperial more

aggressive and had a larger program but we were involved in providing what help we could to what was then Humble Oil Company. And I was involved to quite a large extent in connecting the Humble people with the various Canadian sources of information. I remember we went to the National Research Council and we went and had interviews with Robertson, who formerly had been the skipper of, I think it was the ice breaker St. Laurent. In other words, help Humble quickly gather an understanding of what the problems were in the north, what sources of information there were, what was known for instance, about ice conditions. We talked with Mora Dunbar and Keith Greenway, who were they the experts on the ice in the polar seas. So that took quite a bit of time and at the same time with the increased Esso program, there were problems as I've spoke about, with transportation and so on. I guess there was no real thrust to my work then, except to gather this information and make it available, primarily to the American people, Humble, but also to some of the Canadian studies that we were doing. With the Manhattan Project I was involved, again, quite a bit in gathering what information was known on ice and trying to gather information on where the easiest ice conditions might be through the Northwest Passage. Providing contracts for people from Humble, in their dealing with the Canadian government and so on.

#061 JW: You mentioned the Manhattan Project, that's probably not to be confused with the World War II Manhattan project.

AH: That's right, it's not that one, it's the one that involved the reinforcing of the ship Manhattan, ice reinforcing of that ship and then using it as a test vehicle to see how well it performed in the Northwest Passage.

JW: What was Esso's motivation for providing a, in effect, or was it, a lot of free consulting services to Humble and other companies. You weren't charged out or was there anything expected in return or was this just the environment in which the petroleum industry operated, lots of good interchange of ideas and. . .?

AH: I really don't know whether my time was ever billed to them but I suspect that it was simply a part of the relatively free exchange of information that always went on between the various companies under Standard Oil of New Jersey. Certainly they had been very helpful I know, to Imperial Oil as Imperial were making the discoveries and beginning production in Leduc and Redwater and so on. We got a great deal of help with respect to production, reservoir engineering and so on from Humble. And I would guess but I don't know for sure that it was just an exchange of our know-how that perhaps we were helping to pay back some of the information we'd received from Humble.

JW: Okay. 1967 you had the opportunity to travel to the Soviet Union, how did that come about, what was that involving?

AH: That was, I guess initially we had gone on the basis of government discussions between the two countries that suggested that a technical exchange would be worthwhile and of benefit to both sides. It was initially set up that a Russian delegation from the Oil Ministry would come to Canada and would see our operations and would talk with our various people in those operations. And then in return we would go back to Russia and be shown around there. Again, I suppose because of the work I had been doing in

coordination and generally working in the north, I was nominated by Esso to help in the tour of the Russian delegation to Canada. There were others that were involved but I seemed to get a role in kind of coordinating their trip and making sure that the right people were available for them to talk to and so on. Then I was also made available to the exchange visit back to the Soviet Union later on.

#096 JW: Who benefited the most or was there. . . do you think that the Soviets got more information than you got or the Canadians had or was there. . . ?

AH: My personal opinion is that Canadians didn't benefit a great deal from the exchanges. I think that the Russians did benefit considerably from exchanges because it would be my opinion after visiting their country that our technology was really a bit ahead of theirs, so that they were picking up quite a bit of new information, useful information that would help them produce their oil and gas. Whereas in most cases I think that the Canadian people that went over found that their technology was either about the same that they had in Canada or perhaps even behind what we were using. Therefore there didn't seem to be a great deal of benefit to the Canadian companies. The one exception, which I couldn't judge at all and which you will talk to Scove Murray about, would be the use of the turbo drill.

JW: That's right. And he has spoken to us about that. That's an interesting story, about I understand, you getting Scove Murray involved in this exchange.

AH: As I said, I was involved in looking after some of the logistics. The Russians were always very enthusiastic about talking to everybody that they could and spending every minute that they could talking with people about what was going on. So we used to spend long, long days travelling maybe to Leduc or Redwater or perhaps out in the bush to see a seismic crew or whatever. Then we'd get back to the hotel and have dinner and they'd be all set to go for another couple of hours that evening, to talk about some matter that may have come up during the day. I can recall that in this day we had had quite a long and strenuous day and afterwards they had got to the hotel room and they wanted to talk to somebody that was an expert in drilling. We were in Edmonton and I called Vern Hunter and I remember that Vern said he would like very much to come down but for some reason or other he couldn't make it, he suggested I should call Scove Murray. So I did and Scove, in his usual enthusiastic way, said he'd be right down. I remember that the Russians had . . . I don't know whether it would be a 3 or 4 kilogram tin of caviar and of course, they always brought their own vodka along. They had lots of humorous stories about how their luggage leaked sometimes. We ordered up some of the Macdonald Hotel bread and butter and when Scove arrived they were well into the caviar and the vodka and bread and butter and so on. Scove of course, found people who were as enthusiastic as he was about drilling and they began their talks and they went on and on and on. I finally went to bed I think about 1:00 in the morning and Scove was still talking drilling when I left. Of course, that led to his being involved, eventually with a very extensive exchange in drilling techniques with the Russians.

#143 JW: How did you find night after night of vodka and caviar, did it wear on you a little

bit?

AH: It wears on you and you just have to make sure that you take very little of the vodka or else it just gets you down. And that's another interesting phenomena I think, that we quickly learned about in the Soviet Union on our trip there because every night as far as they were concerned was a night for a party. But what they were doing was bringing in a fresh team, we were always going to someplace new. It was a great excuse for them to have all sorts of vodka and everything that went with it. But we had to do this night after night and after I guess, the first night that we were there, we all very quickly learned that you have to take it very, very carefully. Personally I found one of the Russians that was with us most of the time that had ulcers and he couldn't drink vodka. So all I would do is say I had ulcers too and nobody would be upset. But they were very, very insistent hosts that you must drink with them and keep up to them.

JW: You retired from Imperial then in 1978, didn't you?

AH: Yes, that's right.

JW: And your retirement was fairly short lived, in so far as you went then to Hardy Associates?

AH: Yes, I formed my own company, Hemstock Engineering and went as a consultant to Hardy Associates, rather than as a direct employee. But yes, I worked with them full time then for about six years.

JW: Did Hardy know at that time that they were going to be involved in the Norman Wells expansion project?

AH: Oh no. I don't know when that study first started. I guess it wasn't long after I went to Hardy Associates. As a matter of fact, Dr. Jack Clark, who was then with Hardy and myself did a bit of a feasibility study in our own rough way to try and indicate that a small pipeline would make sense with much less reserves than anybody had ever talked about before for Arctic development. We presented that to a number of companies. Eventually and I'm sure at the same time, Esso was doing feasibility studies on the possibility of an oil pipeline out of Norman Wells.

#179 JW: Did you notice any significant differences in the consulting environment versus the corporate environment?

AH: Oh yes, it's a world of difference. Again, I'm sure I was fairly naive about how big the differences were, even though I had been using consultants, working with consultants very, very extensively in Canadian Arctic Gas Study. But it's a very different environment.

JW: How would you characterize some of the differences, as it relates to the petroleum industry anyway?

AH: The corporate environment, I think, is relatively slow moving, relatively stable. They do have their ups and downs but on a graph they're not anywhere what you find in the consulting industry, which seems to be a feast and famine type of operation. I'm sure that some of the larger companies in consulting have a certain base load that helps them maintain a more even employee level than many consulting companies do. But if you're not busy working at chargeable work, you're probably twice as busy out trying to market

the services of a consulting group. It tends to follow the economy very, very closely and of course, the peaks and valley are very sharp.

JW: Did you get involved in marketing as well?

AH: I never felt that marketing was a very strong point in my own capability but in fact, I did know a lot of people in the industry and therefore I was doing quite a bit of marketing from time to time.

JW: When you with Hardy Associates, did you get involved in other kinds of activities for the petroleum industry?

AH: That was my intent but it turned out that I was so fully occupied with Hardy Associates that I really didn't have much other activity with the oil industry.

JW: Even within Hardy?

AH: In what way do you mean?

#213 JW: Well, in terms of you consulting activities, were there other. . I know you got involved in the Norman Wells project, were there other kinds of projects that you were involved with?

AH: Oh yes. We were involved. . .in fact, I guess, most of my work was with the oil industry, but latterly I was involved with some of the first work on an impact statement for the Hibernia project off Newfoundland. We did the impact statement for the Venture operation, which eventually went to hearings in Nova Scotia. So that this was one of the things I liked about the consulting business that I was able to be involved in a large number or large variety of projects. A far greater variety than I would have been involved with in a large company. But we did work I guess, in most of the western provinces on mining, pipeline locations, in the Yukon on the mining activity associated with Placer Developments, in the Northwest Territories on potential pipelines and so on and worked from some of the government agencies in getting out handbooks, that sort of thing. Quite a bit of work in Alberta on the environmental impact of various, wither drilling or production operations and so on. So it was a wide variety of work. But since the economy of Alberta is so tied with the oil industry, most of my work eventually tied back to the oil industry.

JW: You were involved and are still involved in a number of associations and other kinds of groups. I wonder if we could just talk about a few of those right now. First of all, perhaps the Canadian Petroleum Association, you had a role in that organization.

AH: Not a very great role, no. I was active. . I'm afraid I can't even remember when but it was back, probably in the 60's with some of the activities on the early environmental studies that CPA was involved with. But I did not have an extensive time with CPA.

JW: Okay. Some people involved with CPA have expressed a disappointment at their, in effect, lack of effectiveness, as a lobbying organization, you wouldn't be able to reflect on their success or failure?

AH: I can recall that I felt that the small part I had was not particularly useful in the CPA. I guess I was rationalizing that the CPA is such a large organization with such a diverse group of members that by the time they can agree on any kind of a publication or a stand, it tends to be watered down to something that everybody can feel comfortable with but

it's probably not going to be very hard hitting or precise.

#266 JW: As well, the National Research Council, you've been I would suspect, quite frequently involved in some of their activities?

AH: Yes, I was involved with NRC almost from the beginning of the Division of Building research. As a matter of fact, I can recall it was a real decision point in my career, I was offered a job by Dr. Bob Leggitt, who was then setting up the Division of Building Research. That would be probably in the late 40's. I eventually decided to stay with industry. But some of the first work that was done in the Division of Building Research had to do with the study of perma-frost and since I'd done some work before, at Norman Wells on the perma-frost I was able to help them a little bit, just in logistics about their work up and down the Mackenzie. And then to tell them some of the problems and so on that I had encountered. I worked with Dr. Roger Brown and Hank Johnson and a fellow who unfortunately passed away early in his career, but who was a real early pioneer in perma-frost, Johnny Palenan???. So that was my first contact with the National Research Council. I can't recall the various committees that I was involved with but one of them would be the perma-frost sub-committee, another was the muskeg sub-committee and in that I was closely working with Dr. Norman W. Radforth???, who headed up that muskeg sub-committee for many years and that ties back to the work we mentioned on the early studies of vehicles to traverse muskeg in northern Alberta. One of the things that I felt was important was to study the actual make-up and the physical characteristics of muskeg. And this kind of work was being done by this sub-committee of the National research Council. We had technical meetings at least once a year of that sub-committee for many years and if you look back now on the proceedings of those meetings you can pretty well trace the history of the development of our knowledge, not only of muskeg from its biological standpoint but also the engineering of it. These are sub-committees of the associate committee on geo-technical research and I was a member of that committee, that parent committee for one of two sessions. Then there were other NRC committees. There was one on kind of an overall committee on building research and then latterly there was a committee on cold regions engineering research, which took about 2-2 1/2 years I think. Eventually that resulted in a proposal that a committee be put together to study the potential for the possibilities of establishing a cold regions engineering research laboratory at some location in Canada. I was involved with that committee and we submitted our report to the National Research Council, I believe about two years ago. I was co-chairman with Carl Crawford of that committee. I was just reading in the paper the other day that this latest agreement with Alberta has approved the construction of a research council facility in Edmonton for cold regions engineering studies.

#342 JW: How would you view the NRC's contribution to the petroleum industry. Have they had a practical contribution?

AH: I think they've had a very excellent and major contribution to the oil industry. Not only the perma-frost and muskeg work, which involves most of the northern terrain, but they were some of the pioneers in work on ice. I can recall that when the industry first became

involved in the Arctic regions of Canada that the NRC had delegations from western industry through their laboratories and offices almost weekly. I think everybody from western Canada went down there and visited. Even though they have a very small staff, they have a very fine staff and they contributed a great deal in some of the early basic studies on northern conditions.

JW: Okay, thank you.

End of tape.

Tape 3 Side 2

JW: You were instrumental in the formation of the Arctic Petroleum Operators Association weren't you?

AH: Yes, that's right. I was again, in the late 60's and thereabouts we were all involved with extending our knowledge in the Arctic and it seemed to me that any company that had acreage up there was spending a great deal of effort in trying to find out some of the limiting conditions in terms of perhaps ice or perma-frost or whatever on their operations. I proposed to . . . I guess it was to Walt Dingle that we should try and get together in some kind of an organization so that we weren't all pursuing the same studies at the same time and wasting effort. Walt was encouraging and I wrote to . . . remember Ed Lakusta??? in Gulf, and I can't recall who it was in Shell but certainly Max Wapenford??? was involved in some of early work. The idea was picked up with a great deal of enthusiasm and support and we formed the Arctic Petroleum Operators in, I think it was 1970. I recall the criteria for the charter I guess, or the rules that we were going to operate under, Jerry Burden and some of his other legal friends from the other companies do that up and our main objective was to keep it simple so that we could have a very simple organization, as informal as possible and freedom to opt in and out of studies so that we wouldn't be held up on something that one or two companies wanted to do, waiting for everybody else's approval. So we did, we formed an operating charter that was very simple and seemed to work extremely well. Just at the APEGGA meeting last week, Ken Crosedale??? gave a paper on ice and brought us up to date, we'll have to get some figures and perhaps we could read it into the record, but certainly it's an extensive amount of research and a large number of projects over the years.

#028 JW: Alex, you just looked up the recent figures on the Arctic Petroleum Operators Association?

AH: Yes, Ken Crosedale reported that they had undertaken some 200 projects at a total cost of \$70 million. So that they have made a major research contribution to northern studies since 1970.

JW: They certainly have. I take it you're also involved in the APEGGA, the Association of Professional Engineers, Geologists and Geophysicists of Alberta.

AH: I'm not any longer involved with APEGGA, but I have served the usual run I guess, being on Council and going through to Vice-President and President. That was in the 1970's that I was involved with APEGGA that way. Then I was appointed to the Canadian Council of Professional Engineers, as Director from Alberta.

JW: And you're now their President Elect?

AH: I'm now President. I was made President in Halifax in the latter part of May of this year.

JW: With respect to APEGGA, I just wondered if you'd care to comment on the current debate within that organization or within the field in general, as to whether or not geologists should be placed under the same sort of terms of reference or operating restraints or conditions as professional engineers.

AH: That's a long debate that I can recall some very heated sessions in my first contacts with APEGGA, in fact they weren't APEGGA then, they were Professional Engineers and Dr. Cam Sproule was probably the pioneer person in breaking down those barriers and having the geologists registered with engineers. And having them registered separately in their own profession. You may know that some of the other associations across Canada register geologists as engineers, even though their career path is in geology. Dr. Sproule felt that geologists and geophysicists should be registered and that they should be registered in their own profession, not as engineers and that it was logical that the association be expanded to include those two professions. I think it was mainly his initiative that brought this about and had the formation of APEGGA. That must be, I suppose 15-20 years ago that that was started. There has been a continuing debate. I know in my year as President, which I think was about 1971, there was protests, perhaps, from geologists that they didn't have a large enough voice in the association and that the association objectives really weren't very helpful to their profession. That debate really has continued over all these years and at the last annual meeting, which was in Banff last week, Dr. Jack Browning, who was then the President of APEGGA and who is a geologist, had set up a committee to study the relationship and to ensure that the needs and requirements of both geologists and geophysicists were taken care of. And I think ??? was that they now had the support of the SPG, that's Professional Geologists and . . . CSPG, Canadian Society of Professional Geophysicists, I think it is. . . anyway those two organizations were now supportive of the registration with engineers under APEGGA. So it seems to me that perhaps now we have come pretty close to settling the concerns and that this committee will be able to make real progress in the next year.

#081 JW: From the perspective of 1984 I wonder if you would care to comment on how you view the evolution of coping with northern environments, do we have a lot to learn yet?

AH: I think that we certainly have learned a lot and I think that most of the technical problems are now pretty well in hand or we have the right direction and it's a matter of gathering a little bit more data. At this last convention Ken Crosedale presented a paper on the developments in ice engineering and I think it was fairly clear from that, that we've got a pretty good handle on the physical properties of ice and what will be needed to operate in the adverse environments in the Arctic. However it doesn't mean that it's going to be

easy, I think we just know the parameters that we need to understand.

JW: Sort of in the same vein then, I wonder if you could just comment on what you perceive to be the future of the petroleum industry, especially with respect to the Arctic and the far north.

AH: I think that the oil industry has a pretty good future in the north. I wouldn't be able to predict what the timing is but what I think would make good sense for Arctic development is to begin on a fairly small scale, I think similar to what is going on at Norman Wells and to gain experience on a smaller scale.

JW: You were perhaps thinking in terms that proceeding on a smaller scale and gaining experience at that level before moving on.

AH: Yes, I think that the kind of development that, at least to me, would make sense, would be similar to the one at Norman Wells. For instance in the Beaufort Sea, I would think that it would make good sense to build a smaller pipeline to there, perhaps 16-20" and to begin production as soon as possible, as soon as reserves are located sufficient to support that size of a pipeline and to gain experience and at the same time have some cash flow so that the project could be expanded as reserves are outlined. I think the same kind of approach would make sense with the Arctic Islands and the proposal of Pan Arctic to develop just one well to me makes some sense, because they're going to learn a great deal and perhaps what is also important the politicians and the people in southern Canada will understand that oil and gas development can be done up there without undue concerns. I think from a political standpoint, we probably will shortly, either see the end or see a major revision, in the PIP??? grants. I guess, I would think, that if they were cut off entirely that the whole northern operation could be stopped or certainly very much hampered. It would seem to me to make sense to maintain a degree of activity up there, by supporting small production, development type operations. I think that would maintain jobs, it would continue to develop the technology and I think that it would also provide a little cash flow and ensure our future long term oil supply.

#126 JW: This may be difficult but I wonder, looking back on your career, if you could point to one or two areas that you would consider as highlights, that particularly stand out, in whatever way?

AH: I suppose that it's very likely that most people, when they are going through those highlights, don't recognize them as being highlights. It's as you're looking back, things that have turned out fairly well seem to have been the highlights. I suppose probably one of the things that affected my career more than most things would simply be my interest in northern engineering and perma-frost, which I picked up at Norman Wells. And I think that's had a lot to do with my career and one that I've enjoyed and so probably that would be one. I think another one, in terms of results and in terms of activity and I guess, learning something new all of the time is the work about the time that Arctic Petroleum Operators was formed. There was a tremendous amount of activity and a tremendous amount of enthusiasm with northern work, not only in Canada but of course, in Alaska too. That I think has to be a highlight. Another would be my work with Arctic Gas Study, which was so deeply involved with the regulatory aspects of northern work and which

was really different than my other career in that I was involved so much with biologists and other scientists. So that broadened my career a great deal, working with different scientific disciplines and has pretty much resulted in the career path I've been following with Hardy, which was very much environmentally oriented.

JW: You've mentioned periodically throughout the interview, Walt Dingle, who else or who would you consider that has been a great influence in your career?

AH: I suppose probably the one that comes most easily to mind would be Dr. Bob Hardy, who I studied with in. . or who was my senior professor during my Masters work at the University of Alberta and who of course, has been a leader in much of the engineering type work that I was doing, geo-technical work and so on. I've been a good friend with Bob over all those years and then eventually ended up working with his company, after I retired from Imperial Oil.

#163 JW: You've had a most interesting career and been involved in so many different things and I'm sure we haven't covered them all. Is there anything that you'd like to add that perhaps we haven't gone into?

AH: No, I think that we've covered, probably the highlights. And I have had a very interesting career. I've enjoyed every bit of it. 2 or 3 of these things that I think I found most interesting had to do with the foreign work, travelling to Russia. The work in Libya in transportation and then studying the German operations in the soft coal pit as we were involved with what is now the Syncrude project. Those activities outside of Canada certainly expand your knowledge of what's going on and I found them extremely interesting.

JW: Okay well then Alex, I certainly appreciate this and thank you very much.

AH: Thank you.