

PETROLEUM INDUSTRY ORAL HISTORY PROJECT
TRANSCRIPT

INTERVIEWEE: Harry Carlyle

INTERVIEWER: Betty Cooper

DATE: April 14th 1982

Betty: This is Betty Cooper and I am interviewing Mr. Harry Carlyle at 385 Wildwood Dr. and it's April 14th, 1982. Could I Mr. Carlyle first of all get your whole name because I think that Harry is fine but for the record. . . .

Harry: It's a nickname and my name is Robert Harold Carlyle and I got Harry because my first boss with the company decided that's what he wanted to call me and I needed a job more than I needed to argue with him about my name so that's where. . .

Betty: Before that you were always Harold?

Harry: Right.

Betty: You were born in Lethbridge.

Harry: Right I was indeed and had my early schooling there and then when I was in grade 8 my family moved to Vancouver and I finished my schooling in Vancouver and attended the University of British Columbia there.

Betty: Do you remember the year that you moved to Vancouver?

Harry: It was 1933 I believe.

#010 Betty: And you went to the university for 2 years.

Harry: I went to the university '38-'40 and then I joined the Air Force and went overseas as a radar technician and subsequently became an officer attached to the Royal Air Force in charge of ground radar stations and eventually a mobile station that went on the Second Front in Europe and ended up in the heart of Germany at VE Day.

Betty: Had you trained in radar at the university, had you had background in that?

Harry: No, I'd just had my first 2 years of engineering at UBC and joined the Air Force and was sent to Edmonton. Luckily I was sent back to UBC to learn radio electronics and spent a 4 months period in behind the science building at UBC learning the basics of radio. And then subsequently went to Clinton, Ontario and learned about radar there and from there went overseas.

#020 Betty: You were very fortunate because this background was very good when you went into the oil company.

Harry: Well, that's correct and perhaps that kind of background helped me get the job with Gulf. When I left UBC in 1950 jobs were very scarce and I had 2 job offers, one from the government and one from Gulf. And I chose the one with Gulf and Gulf was a strange name to me at that time and I had to really do a little research on who Gulf Oil company was. I was hired by Canadian Gulf Oil Company to work on one of their field seismic crews and started out on July 1st, 1950 at Smoky Lake, Alberta as a jug hustler.

Betty: That's interesting, when you say July 1st, most people wouldn't be starting jobs on holidays. Perhaps you could tell us about that.

Harry: Well, in those days a seismic field crew worked 208 hours a month and that was comprised of 20 days at 10 hours a day, nominally and one at 8 hours a day. And to make sure you got your time in you always started at the first of the month and the holidays were taken off the end if you didn't lose some time with weather. And if we lost days with weather, well, we had to make it up. So it was not uncommon in the summer in Alberta when we had lots of rain that perhaps you didn't get your 208 hours in but you worked the whole month or were available to work the whole month on good days.

#035 Betty: Now when you say Smoky Lake, how did you get to Smoky Lake?

Harry: Well, I found my own way, I had a little car at that time and I appeared late at night on June 30th, 1950 at the hotel at Smoky Lake and reported for work at 7:00 in the morning which is when we went to work in those days.

Betty: Can you tell me what it was like, what the crew was like in 1950, arriving to be on a crew as a graduate and actually you had a year post-graduate work at UBC too, so you were pretty highly educated to be hustling jugs?

Harry: Well, I think in those days people recognized that field experience was important. And I didn't mind that. We had had lots of rough work in the Air Force on similar kinds of operations. A field radar crew was not dissimilar to a field seismic crew. And one of the things that was interesting about the work was the equipment was relatively primitive and subject to breakdowns which was always a challenge. The cables and the geophones were hand made and always needed some maintenance and I soon got to the role of technical trainee as an operator on the crew. That meant you spent your spare time in the evening repairing the instruments and making sure that everything was ready to work first thing in the morning. And it was not uncommon to work all night long at times to make sure that things were repaired.

#051 Betty: Now what training did you have for that other than your work in radar. Did you take some of this sort of thing in university?

Harry: Well, I was a graduate in Engineering Physics so that helped me in this area. The Engineering Physics and my post-graduate training had an emphasis on electronics. So I was trained to handle this kind of work really.

Betty: If we can just step back just for a minute Mr. Carlyle on deciding to become a geophysicist with Gulf. When you graduated of course, you weren't a geophysicist because there wasn't such an animal really, at least not in the universities, not in UBC. What made you decide that geophysics would be something that you could fit into?

Harry: Basically it wasn't a decision that I could fit into geophysics. Here was work and a job and job's were scarce in 1950. It was an either, or, I had an offer to go to the Northwest Territories in an electronic area or work in a similar area where I felt that having heard about the job I could have a role to play in this kind of work. So it was a new challenge, I certainly didn't go through university with the objective of becoming a geophysicist.

Betty: Had you heard much about oil out there in B.C.?

Harry: No, indeed not. There had been some oil exploration but oil exploration was farthest from my thoughts. My thoughts in going through university was to equip myself as best I could by taking the most challenging course at the university to be better equipped to work in industry. And I think in the 30's those of us who had the opportunity to go to university decided that engineering probably offered the best chances of some kind of security over any other kind of education you might get. So really the objective of most of us on those hard days was to get employment and keep it.

#073 Betty: There would be so many other people from the Forces that were out or had been out just a year before you that there would be a lot of people and not too many jobs around.

Harry: That's right and I felt very fortunate to get the job with Gulf at that time.

Betty: Who hired you?

Harry: It was a Mr. L. I. Brockway??? who was the Chief Geophysicist at Canadian Gulf Oil Company at that time. And he was a very interesting man and he and I had very interesting discussions over the years about electronics and instrumentation which were in the formative stages and he was very opinionated and his own ideas and we had some very interesting discussions at times. I don't think I ever won them but I feel today I never lost any either.

Betty: When you applied for your job there must have been many other people who had applied at that time, why do you think he chose you?

Harry: Well, I really don't know. I don't know how extensive his search was. Certainly there was a shortage of people in this area at that time because as a trainee I was stretched. I recall one time when I had mastered the technology of the instruments I had the role of training 3 operators on 3 different crews at once and I was floating around between the 3 crews during the day trying to keep the things hanging together and keeping the operators going. And of course, they were learning, they were not skilled people and quite often damaged the instruments which I would have to repair at night. So it was quite a hectic time. There was a shortage of skilled people at that time paradoxically but there was also a shortage of employment.

#092 Betty: When you were training all these others, was this in your first year that you were out there?

Harry: Yes it was. And after the first year I went down to Pittsburgh where Gulf has a very sophisticated laboratory and spent several months down there in interpretation and being coached by some of the people down there who were experts in their own field. Gulf had some very well known, world renowned experts in geophysics at that time and it was a great place to be. I must say though that we did do some interpretation of geophysics on the crews itself because we recorded our information on paper records which we made photographic copies out in the field and one copy either went to the head office and was interpreted and we did our own interpretation on the field. And I got involved in that of course, before I went to Pittsburgh so I did have some background there and I did very well in Pittsburgh and didn't stay there the full time and that was another indicator of the

shortage of people. I came back to a bush crew, which was in the spring of 1952 to Mayerthorpe at that time. And the reason we were at Mayerthorpe was that our bush crew which had been equipped with primitive Bombardier equipment was really immobile in the bush at that time. And when I sw this equipment I realized that it was primitive and it was unsuitable so we

#109 Betty: What was wrong with it?

Harry: Well, for example, the instruments were housed in a tent on a flat bed on top of a Bombardier TN Bombardier which was designed at the request of someone in the oil industry who had convinced Armand Bombardier that what was needed in the bush was a vehicle no wider than 5' so that two of them could pass on a narrow bulldozed trail. The disadvantage of these things was that they were long and narrow and would not turn and also because they were narrow, when you put the equipment on them they were unstable. So we had one very interesting summer with that equipment. It would not turn and people would run into the bush and hope that just banging into a pile of rubble would turn it and of course, you would probably break a wheel off in so doing or else the thing would tip over. I can recall finally getting out and doing some work in the fall of 1952 and in a whole month I think we managed to shoot 11 miles of seismic data with some 20 people. And I thought to myself there has to be some improvement. I could have shot more than ½ a mile myself if I had gone out there and done everything single handed. So clearly there was a great deal of inefficiency. Those were interesting days and the equipment today is vastly superior to what we had at that time. Our company did quite a lot in developing the field Bombardier equipment. As a matter of fact I had some very interesting experiences with Mr. Bombardier in developing the muskeg tractor. And spent the summer I think, of 1953 mounting equipment on 5 units that we had helped him design and work with.

#130 Betty: This would be as a result of the tragedy really almost of that spring that you were struggling with this. What did you do at that time, was there anything that you could do to make it function at all, other than pray?

Harry: Well, we worked away. We built an instrument truck which was self contained and it was an improvement over the tent at least. It was a metal truck with an aluminum body on it and it had accommodation for the lineman to sit in there and properly and safely store dynamite and that kind of thing. But it was inadequate for the job and our people in Calgary worked with our laboratory people and Mr. Bombardier to develop the muskeg tractor and the prototype of that came out in the spring of '53 and we tried it out and I designed the equipment to go on it. It was a very interesting summer but there was a lot of things to be done with that equipment. We eventually equipped 2 complete seismic crews with that equipment and it worked for a number of years. At that time Gulf operated it's own crews, we had 6 of our own crews and all the personnel were company personnel and we contracted I think, as many as a dozen or more contract crews at the same time. It was a very interesting time because we compared our own results with the results obtained by contractors and we tried to use that as a guide on what the cost should be on

that kind of work. Subsequently we decided that we had better things to do with our people than leave them out in the field and technology was developing to the point where a field interpretation was no longer viable. People were not willing to go out there and endure the hardships of field work, new people out of school. They didn't have to, there was a demand for them so we had some difficulty in keeping professional people in the field and moreover the technology developed so that computers were necessary and that eliminated the ability to make an interpretation in the field so today there are very few technical people out in the field. And in some ways it's very unfortunate because that field experience was a valuable one.

#157 Betty: Very Good for the interpreter.

Harry: Yes indeed. And to know the background and just exactly what the problems are out in the field and the practicalities of doing the work. An interesting thing when I was out there during that summer, I had a Fordson tractor as my own personal transportation with a Bombardier track attachment on it and this was a rather unreliable piece of equipment, the tracks would come off at the slightest provocation. But I recall one time coming back from the field and many fordings of rivers and through muskegs and I had a pair of overalls on and I was covered in mud from head to foot and someone took a picture of me and I sent it home to my father who promptly wrote back and told me to quit that job, with my education I could get a better job than that. I didn't listen to him and I have never regretted staying in this work, it's always challenging.

#169 Betty: Could we go back just for a moment to the first crew, do you remember any of the people that you worked with on that first crew that are still in the oil patch?

Harry: Most of my supervisors or have passed on. Some of the people are still with the company. One of the person's that I worked with that's still with the company is Carl Nyberg???, who's had a wealth of experience. He's now manager of Geophysics for Gulf.

Betty: Was he the Party Chief?

Harry: He was the Party Manager who did basically the administrative work on the crew at that time. The Party Chief on that first crew that I went to work with was Lorne Reid???, who is a consultant in town and a very capable geophysicist. He left the company in the middle 50's and has been a consultant since that time and I think quite successful. I see him still occasionally. The Geophysical Supervisor who was in charge of all this work at the time, Ralph Copeland??? has retired and lives in the district here, spend his winters in California.

Betty: He was down in

Harry: In Calgary here. He was Field Supervisor.

#186 Betty: The next year when you had all this trouble with the equipment under the tent, do you remember any of the people that were in that group that struggled together.

Harry: There were a number of the field people and a number of them are still with the company working in various gas plants. I guess I was the . . . there are still people within the company at that time who are still with the company. One of them is Gordon

Hollingshead??? who succeeded me on that crew. And he is a very capable geophysicist and is a Research Geophysicist on special projects with the company still. My supervisor at the time was a fellow named Mike Kelsey??? who is with our company in Toronto in Data Processing which is an area where a great number of geophysicists have migrated to over the years because of their special skills. Other than that you know, most of those people have moved on to other greener pastures, whether here or someplace else.

Betty: When you were working in the muskeg with the rather primitive equipment, what kind of records of the bit that you did get, how good were those records?

Harry: Well by today's standards I guess they would not be very good. But you know, a lot of oil was found with those early records. And the major oil fields of Alberta were found with those techniques. Our company was a pioneer in refraction seismograph which discovered the Pincher Creek field. And that technique is not used to any great extent today although it still has an application.

#210 Betty: Why is it not used, is it because of the different type of terrain you're working with?

Harry: Well, I think with the new technology we have with computers and the better field techniques we can get reflection records and profiles out of the computers that are vastly superior to what we were able to do at that time.

Betty: Could you have found Pincher Creek more easily with reflection rather than refraction?

Harry: No because what we thought is the reflection from the Mississippian limestone which is the producing formation at Pincher Creek was in fact a reflection from the Fernie??? which is above it. And in some cases and certainly in the case of Pincher Creek, the Fernie formation was not necessarily conformable with the Mississippian. So you could be misled and it's just an improvement in the state of the art that we can now distinguish various formations. This is in part as a result of the increased data base we have as a result of drilling many wells. Everything you learn adds to your base of knowledge and you can do a better job over time. And I think this is true in some of the newer frontier areas that we are exploring today. We are learning all the time and we go back and improve on what we did a few years ago. It's a continual process of learning.

#228 Betty: When you were working in Smoky Lake, that wasn't really considered north was it, although not too far from there was?

Harry: It was on the edge of civilization you might say because we were really working in the bush and on bulldozed trails on the outer fringes of the agricultural area of Alberta at the time.

Betty: How many days would you work before. . . like when you got your 21 days would you come out?

Harry: Yes, you would come out or you were free to do what you wished. And of course, most of the people had interests in other parts of the province or elsewhere and would go out. But as I mentioned the weather was always such that perhaps you didn't have much time to go anywhere. Ideally you might have 10 days off. If you did then you would plan to take a trip someplace. I occasionally was able to go home to Vancouver.

Betty: At one time they didn't do any winter geophysical work in Alberta?

Harry: That's right. When Gulf crews first came up in 1942, they were crews from the southern states and I recall people telling me that these people announced that they had never worked with snow on the ground and didn't propose to start it. And we had some difficulty in convincing these people that winter work wasn't going to. . . well, we had to do it basically. And of course, it subsequently developed that there were many places in Alberta when that was the only time you could work. In the really wet muskeg areas it was impossible to work in the summer. So you would wait until they froze up and work in the winter. And you could work with conventional trucks in these areas once the ground had frozen whereas if you had to work at other times of the year you would need tracked equipment or something specialized.

#253 Betty: When would you first have started working in the frozen. . . ?

Harry: I think our company started really working in northern Alberta in the winter about 1949. And Stan Pearson??? was one of our first Party Chief's and you will perhaps be talking to him and perhaps you can ask him to tell you about his experiences up in the Cadotte area northeast of Peace River. I eventually became the Area Supervisor in Peace River which was an interesting experience when we had a number of crews based out of there. We contacted them daily by radio and it was my job to see that they had the necessary equipment and supplies to keep them operating, assigned program and . . .

Betty: What year would that be?

Harry: That would be 1954 I guess, and I was up there for a year. . . or '53 and '54, in '54 I came to Calgary and I've been here ever since which is unusual for someone in this business to be in one place that

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Tape 1 Side 2

Betty: Before we bring you down into Calgary perhaps we could talk a bit about that time when you were up there for a year. Can you remember any sort of interesting experiences or stories?

Harry: Yes. We had some interesting experiences in those days. We were using aircraft to supply our crews and the aircraft were primitive. We got Beaver's eventually and the Beaver we thought was the ultimate in aircraft. It was a very fine airplane for bush work. It of course, has been superseded by the Otter and the Twin Otter which is a very fine machine, has much better performance than a Beaver. We had two Beaver's based in Peace River supplying our crews and we had an office in the town of Peace River. There were lots of interesting experiences. We crash landed one time in Berland River??? I recall. We'd gone in there to get some tools and we'd built an airstrip in the winter and had not been in there and we needed some equipment out of this camp. And the pilot and I flew in there this day and no one knew where we were which is amazing but that was the way things were in those days. And we flew over the airstrip and we looked at it very carefully and it looked fine but when we landed on it clearly it was just soft gravel and the wheels dug in and we went over on the nose of the aircraft. The pilot had been to Edmonton, we'd come from Edmonton and we were going up to Peace River and he had acquired a stone crock which I found out later, he alleged it was for his wife to make pickles but I found out he was going to make beer with it. But it flew through the air and I caught it as it hit me on the head so it wouldn't go through the window. And we were now nose down on the ground and got out quickly as gasoline was pouring out of the plane and managed to pull the tail down and right the plane. I then tried to hold the aerial out and radio for assistance but we got no one and we looked at the propellor and it was bent about 4" but it was running so we thought we might be able to get off this soft piece of runway onto a harder piece. I started to dig it out, well the more I dug on this soft gravel, the deeper in we got so we decided that we had to plank it out. There was an abandoned sawmill about 1/2 mile away and I hauled planks from this sawmill and we would plank the plane about 10 or 15 feet and then these planks would be disintegrated because they were rotten so I'd have to go back and get some more. We did that for about 5 hours and finally got the plane moved I guess, about 1,000 feet out of this gravel onto a harder piece of runway and still no one knew where we were and we thought well, the propeller has moved us 1,000 feet under these difficult circumstances, we might as well take off. So we took off about 2:00 in the morning. Of course, it's daylight for long hours up there and got to Peace River with a bent propellor. That was one of the interesting plane trips I had and there were others, similar kind of thing that you look back at. I recall one night coming from Peace River in a Barclay Grow??? which is I guess, an extinct aircraft and I was in the back and there was no heat in this thing. Of course, the pilot's had war surplus sheep skin lined suits and I had a pair of overalls on and I was kept from freezing by shoving a metal hose up one pant leg and then up the other. Incidentally there was a hatch in the pilot's compartment that wouldn't shut properly and was scooping arctic air all through this,

bypassing the pilots and blowing directly on me. Those are the kinds of experiences you look back on with a little bit of humour these days.

#043 Betty: Now I don't want to leave the Peace without looking at perhaps, do you remember any of the other people that were up there with you at that time?

Harry: Yes. Murray Bellina??? was our man in the office who kept contact with all these crews and I can recall one night, we had a transmitter up on top of a hill. If you recall Peace River is in a valley and it's a very prominent valley and a hill and of course, we had to have our transmitter up on the hill. In the middle of winter this thing tripped one night. It was about 3 or 4 miles by road up to this transmitter to reset it. And it was such a cold night that I left the car running on the highway and walked through the field in the snow to reset the transmitter and I did the stupid thing of locking my keys in the car. So once I got the transmitter I had to radio from the top of the hill down to the valley to come and rescue me which of course, I broadcast to all our crews much to their pleasure to find that I had done these dumb thing. I had a very interesting time there. I lived with an English couple and this was a very fine English lady. I recall flying over Snipe Lake??? one day and noting that there was a fisherman on the lake in the middle of winter catching perch. They were shipping the perch to Chicago as a delicacy. So I said to the pilot, maybe the fellows on the crew would enjoy some fresh fish so we landed and taxied up to this fellow and bought a box of fish for \$5 and I proudly took this into our crew that was just a few miles away. And he said, we're not cooking any fish around there, we're going to have steaks, so I sheepishly took the fish away and took them back up to Peace River and offered them to my landlady who was delighted to get them. This box of instant frozen fish was sitting on her counter in the kitchen and we were sitting there having a cut of tea when all of a sudden she let out a scream. These fish had thawed out and were starting to flip around on the kitchen floor. So there are some humorous aspects to life in the north in those days. It was bitterly cold. I can recall that the thermometer on the town post office in Peace River, the mercury would be nestled down in the bulb below the minus 70 mark on the scale so you couldn't tell where it was. And quite often a cord for a block heater would just snap in your hands if you weren't careful about it and your car doors would not shut and the wheels would be square in the morning and this kind of thing. I think we've had better technology in that area today than we had in those days.

#076 Betty: It must have been very difficult for the crew, working under those conditions, what did they do when it got so cold?

Harry: I have to tell you Betty that we didn't let them know. I recall as a Party Chief in the bush there, one of the office men who is still with us, Ray Prudholm???, had a clandestine thermometer and he stuck it outside one day and one of the field men had to come back for something and sw this thing and saw how cold it was and was immediately unhappy where he hadn't been unhappy before. But when you get out in the bush and even if it's 50 or 60 below, most of the time the air is still and if it's a reasonable day and you're dressed properly you have no problems.

Betty: But wouldn't you have problems with the instruments and . . .?

Harry: Well, you kept them running and we kept heat on in the equipment and the vehicles we would have people that would start them up all night long and run them and keep them warm so they would go.

#087 Betty: That would be their job?

Harry: That was their job during the night was to keep the equipment going. And of course, it still gets cold and I'm sure these problems still exist for vehicles today.

Betty: How many people would you have on one crew?

Harry: Well, in those days we had about 20 people on a crew.

Betty: And what would they consist of?

Harry: Well, there was the Party Chief and the Party Manager and then there would be the operator, there would be a surveyor and a rod man and there would probably be about 4 linemen and maybe 4 or 6 drillers and then there would be a camp staff of cook and perhaps 2 helpers, mechanic and a mechanic's helper, that would be about the staff.

Betty: Are the crews that big today?

Harry: I think they're bigger today because today they lay out longer lines and far more geophones so it's more labour intensive today in the field than it was in those days. Unless it's some special portable job but it's quite common to see a much larger crew.

#098 Betty: The geophones in those days were a little different?

Harry: Yes. Today they are very small. In those days they were perhaps 6" in diameter and maybe 8" high and they were valuable and expensive to replace. I recall an occasion up in Smoky Lake where we had lost one in the farmers yard we thought and we went back and asked him if he had seen this instrument. We described it as a brown bake-lite??? instrument about the size of a flower pot with an aluminum top on it and he said, did it have a bunch of wire and a magnet inside, we said, yes and he said, I didn't see it. So we knew where our geophone had gone.

Betty: I started to ask you about the different people who are on the crews up there and then we got off track or I got off the track a little. Do you remember any of the people who were your Party Chief's up there that year, '53, '53 it would be?

Harry: Yes let's see. Grant Fawcett??? is still with the company. He was up there at that time and he works in our Calgary office now. Bob MacGregor is another one and he's in Toronto. Those were the company crews. The rest were contractors and I must admit that I've lost touch with them.

Betty: Do you remember any of the names?

Harry: One of their supervisors was in the contractor's, Dick Baillie was on the Frontier Geophysical crew and Eddie Rutledge and both those fellows are still in geophysics in Calgary. Another one was Stu Burtles??? and I don't know where he is. Another crew that worked for us was Canadian Geophysical Company I believe their name was, Andy Lees??? who has passed away, a fine fellow.

#122 Betty: How would their work be different from your company crews, would they be in different parts, is that all?

Harry: They'd be assigned to a different area and that's really all. I think we tried to take on the difficult assignments with the company crews and leaves the contractors to the shorter assignments and ones that we felt could be handled with less sophisticated equipment.

Betty: Was it the policy of Gulf in those days, you mentioned that several of these people, like Grant Fawcett and Don MacGregor who came down into the main office later, was it the policy of Gulf and of other companies at that time in the early 50's to have your geophysicists first work out in the field.

Harry: Very definitely. That was considered necessary training for our geophysicists, to start in the field and hopefully to get to the point where he would be a Party Chief on the crew which gave you excellent geophysical training, also one of management of a group of people. You actually ran a little business because you bought your own supplies and maintained your own equipment and there was a cost centre there which had to be accounted for on a monthly basis. So you knew exactly what you were doing on a cost competitive basis with other company crews and also with the contractors. So it was really a very valuable business experience that people obtained in those days.

#139 Betty: But they don't get that training now?

Harry: No they don't get it today. We try to expose them to the field but basically they go out just for a few days as observers. Of course, they get much more sophisticated training in computers and that kind of technology than we were able to give them in those days.

Betty: And so that's the training that you really have to look at today. After you came out of your first experience at Smoky Lake and went down to Pittsburgh, you mentioned that there were a number of internationally know geophysicists that you were fortunate enough to work with or observe. Can you. . .

Harry: Yes, indeed. Louie Gardner was a recognized expert in refraction seismology. Dr. Sigmund Hammer is a world recognized expert in gravity and he's an amazing man. I believe he's still practicing although he's been retired from Gulf at the mandatory retirement age for many years. He has taught in Mexico in Spanish, and in South America and also in the University of Wisconsin. Dr. Eckhart was in charge of the laboratory at that time. I first met Dr. Eckhart when I got down there. At the time I went down there, Canada had some monetary restrictions on money leaving the country and I think I had but a few dollars to make the trip to Pittsburgh. And I was assured that once I got down there I would get paid and I was paid but I was paid with a Canadian Gulf Oil Company cheque drawn on the Royal Bank in Calgary, which basically made me a criminal having it in my possession. The Mellon??? Bank which was affiliated very closely with Gulf would not cash my cheque, so I had to go hat in hand to Dr. Eckhart and borrow \$100 to last to the end of the month when he assured me they would pay me in U.S. funds. And he assured me that it was not their intent to see me starve down there. But he was a very fine gentleman and one of the early pioneers in geophysics. Another one was Dr. Leo J. Peters, who again had done some very significant work in magnetics. His successor in that area was Scotty Affleck??? and Ralph Wycoff??? who had done considerable research during the war on torpedoes and was an expert in instrumentation. In those days Gulf made all of it's own instruments in Pittsburgh. So they were unique to the company.

#172 Betty: Would it make a difference in their ability did they feel, is that why they made them?

Harry: The geophysical industry was very competitive in those days and most of the major companies had their own instruments and they guarded them very closely. We had the patent on a process which was called variable density tape which is widely used today. But we had these special cameras on our crews at one time and we had to undertake special photographic techniques in developing these things and making profiles. We had a primitive profile machine here in Calgary which Mary Ditto??? who is still with us, operated and was very expert in making these profiles. I guess we still have a number of them but they are primitive by today's standards. But the technology was guarded very closely and as I mentioned earlier, the geophones were accounted for and each company thought that perhaps their geophones had some special characteristics that they prized. I don't know whether really anybody had any great leg up on anybody else but we thought we had anyway.

#188 Betty: Do you know what Gulf's particular expertise in the geophones, what they thought was better?

Harry: I really can't answer that. What they concentrated on was the response frequency of the geophones and some people would argue that a low frequency response was better than a higher one and the lower you could get the frequency response it was felt, the greater spectrum of energy that you could record from the surface of the earth. On the other hand it recorded more noise so you had some other problems too.

Betty: Having lost that one geophone then could have been really very bad for those of you that were involved if a spy from another company had gotten hold of it.

Harry: That's right and we were sure that we tracked down it's destiny as a result of that thing. But you're quite right that we wanted to make sure it didn't get into somebody else's hands. And also we had to account for them on our inventory for that reason. And they were valuable too.

#201 Betty: You mention a number of people who have been with Gulf since those days, from the early 50's til now but there has been a lot of trading or moving from company to company in the oil business. On fact at one time they used to say, that's how you got your promotion, you just moved to another company, if you wanted a raise you'd go to another company. Now would this cause problems, I know certainly with information that you would be privy to but would someone using your equipment then going to another company, could they kind of take these industrial secrets with them and did it happen.

Harry: Probably not at the field level. It may have done at the research laboratory levels, maybe people moving on had the kind of expertise. But I've never really felt that that was a real serious problem that we faced. There have been some court cases here in Calgary over people moving from one company to another and presumably taking company confidential information from one company to another but that has never to my knowledge, been substantiated in the court and I think most people who do move from

one company to another have a degree of integrity that they don't use the information they've got to the detriment of their previous employer. I think most of the people in our business have got a high degree of integrity.

#219 Betty: I think you really have to have in your business because so much of it is . . . well, you have to depend on the confidentiality because the land deals and everything that come out of it. What areas other than the Peace, was Gulf involved with in the 50's?

Harry: The Peace was the northern extremity in the early 50's but in the later 50's we were perhaps I think, the early pioneer in the exploration in the Mackenzie Delta. Our surface parties, of course, geological surface parties were in the vanguard of exploration and were up in the Northwest Territories studying the surface geology up there. In the middle 50's had gone as far down the river as the Mackenzie Delta. And these parties were under the able direction of Dr. Andy Baillie who has retired and does some teaching at the University of Alberta. I recall his parties telling us about the potential of the Mackenzie Delta and a group of us, Ralph Ross and Neil Taylor and I went down to the Delta in 1957 and selected some acreage that we thought we should file on for the company and filed on some three million acres.

#238 Betty: That's a lot of acres to file on.

Harry: Yes, it was and we filed on it and we explored it and we found that we couldn't, in the early 60's, could not keep it up because of the business conditions at that time. So we had to surrender some of it and some of it was subsequently taken up by Imperial Oil and others in bids with the government. So our company was the initial explorer in the Delta and of course as soon as we got up there Imperial and Shell filed around us and we got to a point where we felt we should drill a well and we pooled some land with Shell and Imperial to cut down the cost of this drilling and that was the first well up there. It was the Reindeer well which was on acreage that we put into the pool and which, while not a success gave us enough information to proceed with our exploration in the area and subsequently found the Parsons Lake field and Shell and Imperial also made discoveries up there. In 1972 I guess we found Parsons Lake, in '76 we were ready to develop that field, at which time the Berger??? Inquiry came along and precluded the development of the Mackenzie Valley Pipeline. That's another story that perhaps you should pursue and we ought to think about who was involved. Bill Wilder, who is now head of Hiram Walker Consumers I guess, was in charge of the Canadian Arctic Gas Pipeline and he was intimately involved in that particular study as was Bob Blair and that's another story and a chapter in the history of the oil industry in Canada that needs to be recorded. But we certainly did some early work there and we designed, again, back on to this muskeg tractor, we designed a tandem one to work on the tundra in the summer. With our experience in Alberta with muskeg vehicles we felt that really, the summer would be the optimal time to work up there on the Delta.

#272 Betty: Why did you feel this?

Harry: Because of the harsh climate and we felt that we had mastered the technology of working over soft terrain with the vehicles we had designed in Alberta. And we designed an air drill with a tandem vehicle that would go across the tundra with minimum disturbance and we did not use a bulldozer at all in those summer operations and you can't find today, where we were. We subsequently however, did work in the winter and found that we could work in the winter. Although of course in the winter it's totally dark and a very harsh area to work in the winter.

Betty: Hard for the people working I would think, being in the dark all the time, mentally.

Harry: Yes. And cold, very cold and windy. So it's a much more difficult terrain to work although crews now are working up in the Arctic Islands and they of course, work on the ice in the winter and it's the only time they can work up there. And they have had some very light crews working under very severe conditions up in the Arctic Islands. But you know, now we're seeing some results from all that work and there's oil discovered in the Beaufort Sea which is offshore and our company is taking some tremendous steps to explore the Beaufort Sea. Earlier last year we committed to spend 674 million dollars to build a drilling system to work in the Beaufort Sea. And that's just the cost of the equipment and the facilities.

#294 Betty: Where would you have that made?

Harry: We're trying to get as much of it made in Canada. But basically the drill units and what we call the mobile Arctic Cason??? are so big that there are no shipyards in Canada capable of building them and they are having to be built in Japan. But the equipment that can go on it that can be built in Canada and that's competitive to be built in Canada, we are getting it built in Canada. So we hope that at least 50% of the materials on it will be Canadian made.

Betty: This is something that people don't always remember. I think in looking at the oil picture, you have to look at, sure something is being drilled but all the material that goes into it is a vast. . .

Harry: It's a formidable, formidable job. We're just in the process of testing, getting the first test on our Tarsiet??? well which is being drilled from an island dredged up in 75 feet of water in the Beaufort Sea and it's topped by a cement Cason and it's a horrendously expensive operation.

#308 Betty: Have you been on the island?

Harry: I've been on islands up there. I have not been on the Tarsiet Island yet. Perhaps I'll get up there in the next few weeks I don't know.

Betty: That's a whole new expanse of the oil industry isn't it? The manmade islands and. . .

Harry: Yes it is.

Betty: What about the geophysics or working in that sort of, well it isn't terrain, that area?

Harry: Well, it's offshore and it's conventional marine geophysics. In other words we conduct it during the open water season in the summer and of course, then it comes back in here and it is interpreted. The problem out there is the short open water season to drill so we're now trying to. . . the islands permit you to drill throughout the winter. But other than that

you are forced to work with ships. Our system is going to have an icebreaking barge that will be anchored and we hope will stay out there longer than the ships are able to stay out there because of the strength of the design of this equipment.

#325 Betty: We've talked twice about the muskeg tractor that you designed but you haven't really described it to me, could you describe it?

End of tape.

Tape 2 Side 1

Harry: During the early 50's there was some considerable controversy over whether tired vehicles, soft tires or tracks were the ideal way to work over soft terrain and we concluded in our company that tracks made more sense. Basically the tracked vehicle is laying down a mat which is moving along to get over the terrain. A tire has a point of impact and it has to break the surface so it goes down as far as it needs to go until it gets flotation, so basically you are disturbing the surface. So we concluded that we should use tracks. Then the problem is to get a light track with a wide area. And this is where we felt the Bombardier track had an advantage because it was rubber belts much like a tank or a caterpillar tractor but those units are too heavy so the problem was to get light pressure and distribute it over a large area. So these are just what looked like conventional tracked or caterpillar units and they're steered by moving the tracks differentially. Calgary has become a very important centre in the development of this equipment. There's a firm, Flex Track, Nodwell now which I think is world renowned in this area and it is just a development of the technology that was generated for the oil industry in the early 50's.

#016 Betty: Would that be from your original muskeg tractor, yours was a sort of a prototype?

Harry: Under the Bombardier motif but there were other companies. Bruce Nodwell certainly did a lot of work and has been recognized by the Association of Professional Engineers, Geologists and Geophysicists of Alberta for his work and was made an honorary life member although he was not really an engineer. He was a self made practical man and he is retired now but his son is actively involved in the business and they have a world wide business centered here in Calgary. Resulting from the early work in the geophysical industry. But lots of people contributed to that, we did our own thing, others did their own thing and I think there's an assimilation of ideas from everybody, we can't say that we were the inventors of anything. We perhaps adapted things that other people had ideas about.

#026 Betty: Would the popularity of fibreglass, would that make it better because it would be lighter than metal?

Harry: We made ours out of metal. Fiberglass does break you know and you're in pretty harsh areas going through bush so I think the design, I think most of them now are still made of

metal but as light as you can make it without impairing it's reliability. Fiberglass, if you poke it, you'll poke a hole in it.

Betty: Right. So it isn't really used?

Harry: I would not want to go out in the bush in something made of fiberglass unless I had the patching kit right handy.

Betty: Mr. Carlyle could we look at 1953, when you were up in the Peace. Gulf did some shooting there in the Berland River.

Harry: Yes we did and subsequently followed up by drilling a discovery well at Berland River, which at that time was I think, the largest gas well in the world. And of course, we were extremely excited and subsequently drilled an offset well about 3 miles away and when it encountered the reef about the same elevation as the discovery well, we naturally thought we had a tremendous gas field, only to discover on tests that we had rather than encountering gas in great quantities like the discovery, we had water. And it turned out then that the initial discovery was, still a major discovery but a pinnacle reef which we have seen in other areas in reef country with rather small dimensions. Subsequently we have confirmed this by drilling a stand by well but that is basically a one well gas field in the Berland River country but these are the vagaries of our business. While I recall one of my colleagues and I had great anticipations of a huge gas field we were disappointed at that time but there still is a gas field there.

#048 Betty: And it's still producing so even though it was a single well it's still a pretty. . .

Harry: It's still a pretty large well. I think it produced as I recall 150 million cubic feet a day on test which was a record at that time.

Betty: Are there many of what you call pinnacle?

Harry: Well, subsequently the pinnacles that have been found in considerable number are up in the Hay Lake, Zama area where there are small pinnacles. Much smaller even than the Berland River one and these are little oil fields and you have to be very accurate where you place the drilling rig on the seismic data to make sure that you actually encounter the reef. These are in a lower formation than the Berland River which was the Leduc formation but they're still the same type of thing, pinnacle reefs and we do see them. Our company back in the days of the Leduc discovery had to step out and we bid I think a million and a half dollars on a quarter section of land at that time which was a lot of money and drilled a dry hole on a similar kind of anomalous situation. And these things of course, a million and a half dollars isn't a lot of money today but it was a major amount in those days.

#061 Betty: Right. Particularly with the fields just starting to open up, the fact that you would pay a million and a half at that time would just be what you'd expect to, perhaps, spend in five years.

Harry: That's right. The amount of money to drill a well today is astronomical compared to what it was 10 or 15 years ago.

Betty: Is this why, Mr. Carlyle, you see so many joint operations in work where companies now go together whereas at one time it was very much the individual company pioneering?

Harry: That's true Betty. The Beaufort Sea well that we're drilling today is estimated to cost \$160 million. And without sharing the risk and a substantial tax relief on expenditures of that magnitude, they just couldn't be drilled. Even so, one hesitates pretty much before you commit that kind of money to a wildcat well, which traditionally has much higher risk than your ordinary well. So it's a much riskier business today than it has been in the past.

Betty: When we're looking at Beaufort, that's looking at other kinds of problems in drilling in the sea but is it still that much more expensive now than it was say, in the 50's because everything easy has been discovered?

Harry: I guess that's probably true, all the easy obvious ones on land, now of course, the attractive areas are in the frontiers, particularly offshore and in Canada we have some extremely hostile environments. I mentioned the Beaufort Sea and \$160 million. One of the reasons for that is that the drilling season there is about 3 months of open water in the summer and you have to bring a drilling rig in say, one year, if you were just going to look at one well, and winter it, drill as much as you could and then you'd have to winter it again before you could even take it out. Even a single well is looking at perhaps a span of 3 seasons and furthermore the government requires that you have a backup for this drilling rig so there has to be two drilling systems in the area. And this has sort of grown over the years so that there is a tremendous expense involved. The Copenor??? discovery well for example, of which we are a participant was started in 1976 and in 1977 after 3 tries, the original participants had some difficulties with it and we came along and that first well wasn't completed until 1979 and was an indicated discovery. We attempted then to offset it a mile and a half away or so and that well wasn't completed until the end of 1981. Even so, we would have liked to have drilled longer had the weather conditions permitted it and got more information. So after drilling since '76, that is really the first well that has delineated a discovery in the Beaufort Sea in a period six drilling seasons. So you can see how the costs go up especially when you have to have all this equipment tied up year round to do this drilling which is confined to a 3 month period. And of course, this involves supply vessels and ice breakers and base support on land, all of the infrastructure has to be there for this short season. Our company now is in the process of building a drilling system for the Beaufort Sea which is estimated to cost \$674 million, which is the largest single expenditure that our company has ever been involved in. Even our parent company has never committed that amount of money for one single operation. And this involves a drilling barge which will have 12 stout anchors and it will be ice strengthened so it can withstand four feet of ice and perhaps extend the drilling season. We're hoping with this further strengthening and with the number of anchors we've got that we will perhaps be able to get out earlier in the season and stay longer. So if we can extend the drilling period from a little over 3 months to perhaps as much as 6 months we have made tremendous progress up there. We also, to accompany this we're building what we call our Mobile Arctic Cason which will be a big steel massive structure of about 250 feet across at the top and about 115 feet high which will sit on the bottom of the ocean and then be filled with sand to give it mass so it will withstand ice and it will of course be able to stay out there year round. So with these two systems we hope to be able

to do a lot more but the amount of money, if we're just going to put \$674 million into building the equipment itself, saying nothing of the operating costs and the program we're going to have to undertake to justify this just staggers the mind. We will be building ice strengthened supply boats and ice breakers to go along with this of course. So there's lots of things to be done up there yet and it's going to take a tremendous amount of money.

#118 Betty: Now you mentioned the Cason as being a moveable Cason. You could move, you could pump the stand out and move it somewhere else.

Harry: Yes. We will put water in the tanks around it and sink it, that will be pumped out and the sand that's in the core will be also dug out of the thing and then the thing will float away to another location to drill again. And we're looking for a program that will last several years to justify this kind of expenditure. So we see the Beaufort Sea as a long term prospect. Another area where activity is now undertaken is offshore in the Arctic Islands. And paradoxically you might think that the Arctic Islands might be the most difficult area that we have to work in Canada but actually the ice in the Arctic Islands is stable from late November until way on in June and what we do up there is we thicken the ice by drilling a hole through the ice and pumping up seawater and making it about 20 feet thick and then you can drill on it with a conventional drilling rig. So actually the cost in the Arctic Islands in the High Arctic is less than in the hostile Beaufort Sea. Another area is off Labrador and that's probably the worst area we've got in Canada because it has pack ice and icebergs that come off the coast of Greenland and then circle around Baffin Bay and down through Davis Strait and along the Labrador coast. You have to be on alert to move the drilling ship on more or less a moment's notice if there is a danger of an iceberg coming in your area of drilling. So we use dynamically positioned drill ships which are kept on location by propellers on the front and back and on the side so they basically hover over the hole but can move off rather quickly.

#138 Betty: Like a floating helicopter?

Harry: Yes. Like a sea born helicopter if you will. But then of course, if we do get some major discoveries there, we're going to have to think about the kind of infrastructure for that, that can withstand the tremendous forces of ice and I think perhaps that we're going to have to look at our priorities and probably say that if we find something worthwhile on the Laboratory coast it's going to have to be looked at in terms of, what are our priorities in Canada with the Grand Banks, obviously looks like a #1 priority, perhaps Beaufort Sea and the Arctic Islands come in after that. Perhaps even the Arctic Islands before the Beaufort Sea. Charles Heatherington of Pan Arctic is talking about getting a submarine tanker in there. That water is deep there and the ice is stable and we know it's about 15 or 20 feet thick so there are no icebergs in that area so maybe you can come in with a submarine under the ice and fill up some barges, submarine barges, towed by a submarine tug and pull a sausage string out of that area on to markets down south without ever having to get out into the cold air of the Arctic Islands.

#152 Betty: Did you ever think back, when you started in 1950 that this sort of work would

ever go on in the oil patch?

Harry: No. And I guess that perhaps things that we haven't even thought of today will be developed. There have been other schemes about hauling it out with dirigibles and I don't think that has ever gotten much serious attention. But these other schemes, ice strengthened tankers and submarines may have an application.

Betty: I know out on the west coast with the lumber industry, they use balloons, not balloons but dirigibles which you never would have thought that they would.

Harry: That's right. Well they're for a particular local situation. But this would be dirigibles to transport over several thousand miles and I just don't think . . . I doubt whether we can really do that.

Betty: Right. Before we get into the future let's slip back into the past again and look at, I want to go back to the Mackenzie and 1953. After the Berland River, where did you go after that, or where were you involved? I know that you were based down in Calgary but your influence and your responsibilities were wherever Gulf was involved geophysically.

Harry: Well I was up in Peace River in '53 and '54. And in 1954 I came to Calgary and I was assigned the responsibility of looking after the foothills at that time. And we had just undertaken a large farm in which we called the Sun, Royalite agreement where ourselves and BP farmed in several million acres from Sun Oil and Royalite. I guess they had despaired of the prospects and we felt that we had some techniques that were particularly appropriate, our refraction techniques. And again I mention the muskeg tractors, we felt that they would have an application in this refraction technique that we had. And we were quite successful in mapping the structures in the foothills in this area and drilled a discovery well called Mountain Park. And that's interesting Betty, because we were just talking about that today and I mentioned to one of our officers that I was there when we started our first exploration and we took over from Sun who'd had a rather disappointing experience. But we took over in 1954 and we now see a gas plant being constructed there which will go on stream early next year which is about 29 years after the initial work. And I don't know that people realize how much time it takes to do these things. I mentioned to you that we had started down in the Mackenzie Valley in 1954 and still there is no commercial production from the Mackenzie Delta or the Beaufort Sea. We were ready of course, to produce or go into the production stage in 1976 I think in the Mackenzie Delta at Parsons Lake where we had made discovery in 1972, a significant gas discovery and drilled a number of delineation wells and had outlined I think about 2 trillion cubic feet of gas at Parsons Lake. But the Judge Berger??? Commission came along and orchestrated a 10 year delay at least, so whether that still is in the cards today. It looks like it may be. Six years of that have gone by already. But clearly here is a span of 32 years I would guess at least that we can see, from the initiation of exploration in the Mackenzie Delta till we can even see getting approval to proceed. So I doubt if we will see any gas production from the Mackenzie Delta until the 1990's at least. Maybe if we get some oil in the Beaufort Sea it might be a little earlier than that but all this work leads to the additional work that's going on. The Beaufort Sea clearly is a result of looking at the geology that was discovered in the original well that we drilled up there. You mentioned earlier that today we have to get partners to help out and certainly that was a

case in the Mackenzie Delta where we pooled acreage with Shell and Imperial and the 3 companies shared in the cost of the first well in the Mackenzie Delta which was called Gulf et al, Reindeer. And that as I mentioned indicated favourable geology offshore. Subsequent to drilling that well Imperial and ourselves filed on offshore acreage. Later on of course, the discovery of Prudeau Bay in Alaska enhanced the expectations of people for the Mackenzie Delta and Beaufort Sea so there was a great deal of activity generated in the Beaufort Sea. By 1969 Imperial had done some work in the Beaufort Sea and surrendered some acreage and this had then come up for bonus bidding. Originally you filed on the acreage but once it's returned it has to be put up for bids. And the federal government took in \$15 million at that time, which was a tremendous amount of money in 1969 on the expectations that maybe the geology had some similar prospects to Prudeau Bay. And of course, I think some people thought we will just simply go up to the Beaufort Sea in the summer and we can do our geophysical work in the summer and certainly that was done with relatively little difficulty. And then we will just also bring a drillship in in the summer and drill a well and come out. As I mentioned to you earlier, with all the problems that you had up there, that was not possible. So there's much more complicated system than that today and the Beaufort Sea is still in the very early stages of exploration and development. I have high expectation for the Beaufort Sea but that's yet to come. Maybe we'll learn something more. Our well that's drilling there now, Tarsiet which I mentioned was going to cost \$164 million is about to start testing and maybe with a little bit of luck we'll get some encouraging results, which will then be the second step out well. Our first Tarsiet well was drilled I guess 2 years ago and it had some encouragement and we hope that this one will even enhance our expectations over what we found in the discovery well.

#236 Betty: If everything does go as you hope, what will that do to exploration in the Beaufort Sea by everybody, will it take a big turn upward or is it economically just not feasible to do any more than is being done right now?

Harry: What is being done right now is tremendously costly and we have this system that's being built and it will arrive in the Beaufort Sea in '83 and '84 so the first complete season of drilling with the two systems will be 1985. If we get some discoveries clearly, some delineation drilling will have to be done and we will have to use this more sophisticated equipment to do the delineation drilling. The Tarsiet Well is on a dredged island in 75 feet of water. The original well was drilled from a ship. Other wells have been drilled in progressively deeper water. The deepest one up until now was at Isonak??? which was in 63 feet of water and that was drilled jointly by ourselves and Imperial, Aquitaine and Westmin??? Resources and Norcen??? and it's a discovery but again, it's probably not going to be developed until other, similar discoveries are made and we're going to have to learn more about building islands in the water, putting these casons on top of them. The Tarsiet has a cement cason on top of it and it needs some refinements if it's going to stay there for any extended period. So there's a lot of work to be done and it's going to be a learning process and we're going to have to proceed cautiously and I'm sure that's what the government wants to do. We think that it's going to take 4 or 5 years even to get some

initial production out of there and to get any significant production out of the Beaufort Sea, I think it will either be very late in this decade or perhaps in the 1990's. So it's a long time frame but I've mentioned some longer time frames to you too.

#264 Betty: Indeed. Where we started was back on the foothills and 29 years later they're just putting the gas plant in there.

Harry: Yes. But I proceeded from the foothills to entire responsibility for all the geophysics in the country for the company. I went from there to Exploration Manager in southern Alberta and Saskatchewan for a few years.

Betty: When did you assume that position?

Harry: I believe that was in 1957 probably that I became the Exploration Manager for. . .

Betty: Who had been the Exploration Manager before you?

Harry: Before me in that particular role was Ralph Ross who had come up from the States and then went back down again.

Betty: What do you remember of Mr. Ross from your association?

Harry: I remember a great deal about Mr. Ross. A very interesting man, very well organized man and a very capable man. He's now retired and living down in Texas. He went from here to the research laboratory of Gulf in Hammerville and was in charge of that for a number of years and then retired to a beautiful spot at Lakeway in Texas. I've seen him in recent years. He's done a lot of work since then on the offshore technology conference arranging programs. But things change you know.

#286 Betty: At the time you took over in 1957 and you were in charge, this would really take in Alberta, Northwest Territories and Saskatchewan, you weren't doing much beyond there.

Harry: Actually we even had Alberta divided up. I was in southern Alberta and Saskatchewan and British Columbia at that time. I guess southern Canada because I even had the east coast at that point and the west coast too so I had some exploration programs going offshore in British Columbia.

Betty: Everybody's hopeful that oil will be discovered out there so they can all move to the banana belt. How successful was the work out in the west coast at that time?

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Tape 2 Side 2

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Tape 3 Side 1

Harry: Going back to that time, the offshore became interesting and Shell was a pioneer in the offshore and they built 3, what would seem today to be rather primitive semi-submersible drilling rigs, but they were quite spectacular at the time. And they built one in Victoria which drilled 14 holes off the west coast of Vancouver Island, all of which were failures. And I guess people today would say that really that wasn't an adequate exploration assessment of the potential of that area. We had gotten ourselves convinced that the straits of Georgia might be a prospect and had filed on the acreage in the Gulf Islands. At that time there was a rather serious blow out in Santa Barbara and the publicity resulting from that forced the government or for political reasons to cancel our permits in the Gulf Islands so we never really got beyond the exploration stage in that area.

#013 Betty: Did it have any promising look about it at all or had you gotten that far?

Harry: I don't think we had gotten terribly excited. We had got to the point where probably something might have been drilled but it was in rather the early stages that they withdrew the permits from us and we had both federal and provincial permits. And if you recall in 1967, the offshore jurisdiction on the west coast was referred to the Supreme Court of Canada and this was supposed to be the test case which would determine ownership on all the coast line of Canada. And the Supreme Court ruled that in fact the offshore did belong to the federal government and this has not been satisfactorily resolved on the east coast yet. Newfoundland, as you're undoubtedly aware is contending that it has the offshore in Newfoundland and Labrador, that it brought that into Confederation. So that is an ongoing dispute between Newfoundland, and as you know they just had a provincial election where this was the focal point of the election campaign for the Conservative government and they were returned with an increased majority. So they are going to be talking with a little more clout than they were previously to the federal government but again I'm sure this is going to be referred to the courts. So that's an ongoing dispute. But getting back to the pacific coast, politically both governments felt it was unwise to encourage exploration in the Gulf Islands and offshore in B.C. so the whole area has been in moratorium since that time.

#209 Betty: And it still is?

Harry: Still is. I would guess that in due course something will be lifted. But B.C. is still contending that it has the offshore and I think it claimed under the father of the current premier that they had the rights out to the middle of the Pacific Ocean. So it's an interesting dispute and it will have some interesting results.

Betty: In the meantime the people who live in the Gulf Islands will be very happy to see it disputed in the courts and not on their shores I'm sure.

Harry: You know, if you go down the coast of California you see these platforms offshore and they really do very little to harm the landscape or the environment which they live in. We

get very emotional about a little oil on the beach. I can remember growing up in Vancouver and we'd go down to the beach and there'd be oil on the beach and we'd say, oh, there's been a tanker in and he's pumped out his tanks. That was in the 1930's and we wouldn't accept that kind of situation today. But going back to that time again, the next day you would go back down to the beach and the oil would be gone off the beach. And I think if you can think of the tremendous amount of oil that has been dissipated into the atmosphere from deposits through natural causes, and we concern ourselves about a tanker which may break up on the rocks and we get all emotional about it for a month or two but then that disappears too. So I think the oil is of marine origin and if it's in the sea it is marine degradable too by natural courses. I'm not justifying spilling oil, don't misunderstand me.

#047 Betty: No of course not, but it isn't the end of the world if it happens.

Harry: No. One can speculate the tremendous amount of oil that has gone into say, the Mackenzie River system from the Athabasca deposits which were outcropping on the banks of the river and clearly have polluted the atmosphere for centuries up in that area. And of course, there's no evidence of it.

Betty: You mentioned the work in the foothills, what other work was done in the late 50's and early 60's by Gulf, what other areas were you really interested in?

Harry: The 50's were a key period for gulf and for the industry. Back in 1947 when Leduc was discovered, our company also discovered the Pincher Creek gas field and our people worked for a number of years, developing the field and I was involved in that in interpreting it and also looking after geophysical crews in the area. By 1957 we had built the plant and had encouraged the government to. . . I guess the Pincher Creek plant was really the spark that caused the government to build the Trans Canada Pipeline. And if you will recall that situation where C.D. Howe invoked closure in the House of Commons to get the pipeline bill through and actually see that Pincher Creek gas got to markets in eastern Canada. That particular field went on stream and I can recall the opening when the Premier came down and officials from our company. It was a big day for our company and Premier Manning at the time, officially opened the plant. It's rather interesting today that, that's another era that's just coming to a close because we're now thinking of abandoning the plant because the field is depleting to the point where it is too costly to operate the plant for the amount of gas that's being produced today. So we will be piping the gas over to Shell's plant at Waterton and arranging for a processing charge to finally deplete the field. So there's another stage where we've gone through a complete cycle of production in what now is some 25 years of production at that plant.

#073 Betty: Was the Pincher Creek field as big as you had hoped it would be? In the beginnings it looked like a very substantial field.

Harry: You've touched on a very sensitive point. In my early career as an interpreter I interpreted the Pincher Creek field as a faulted anticline, whereas it was considered to be a simple anticline by my predecessors. The company was proposing to drill a well which I, then Chief Geophysicist in my embryonic stages as Chief Geophysicist said it was going to be

a failure. And of course, they called in expert witnesses and I lost that battle and the well turned out to be a failure and we had to whipstock??? it, which means that we came up the hole and deviated it to where we anticipated we would find the field. And we did of course, find the field there. But this is one of the cases where you don't win by being right. It was a disappointment because basically it virtually cut the reserves in the field to about half of what we anticipated they would be at that time. Which was an extreme disappointment for everybody but we had got to the point of no return and it was still a major field and justified development but it was not the tremendous reserve that had been originally anticipated.

#090 Betty: You'd probably hoped it would go to the end of the century?

Harry: Or else be produced at a faster rate. We clearly scaled down the plant at that time from what we had intended to build. So I guess you can say the production was cut in half, either you maintain the kind of production we had for a longer period of time or larger production for about the same period and that's what happened is that we had lower production. 25 years is considered a normal lifetime for a plant.

Betty: Right. The foothills, geophysically plotting the foothills is very difficult.

Harry: It's extremely difficult but it gets easier in due course because we now have better geophysical techniques and also we have more well information which helps you tie down the geology. So ever well you drill gives you some more information to map the area more specifically. You then can go back and you have logs which help you then to refine your geophysical and geological interpretation. So we improve all the time. The foothills extends from Waterton all the way up into northeastern B.C. and it seems to get more complicated and more difficult as it goes into British Columbia.

#105 Betty: Is there any reason for that, that you have been able to discover?

Harry: The geology changes a little bit and the terrain is rougher and it's more difficult to drill up there because of geology. So there's a combination of things that makes it more difficult.

Betty: You mentioned that the 50's and late 50's were a very significant time for the petroleum industry and you mentioned Pincher Creek. What were the other areas that you felt were particularly significant that you were involved in?

Harry: In the 50's I guess the search was still for Leduc reefs for oil. And there were some discoveries, the Homeglen???, Rimbey trend was developed in the 50's which was similar geology to Leduc and Redwater and Stettler and there were other fields, Clive, that were discovered during that period. That was the main exploration thrust I think, for most companies, particularly for ours as well. One of our motivating factors was that we had made a very large deal with the CPR for their acreage in central Alberta, which was due to expire and we wanted to make sure that we had adequately explored it before it reverted back to the railroad so that was a big thrust. Although I would say that the main discoveries were in the early 50's and that later 50's were sort of clean up on that particular activity.

#122 Betty: Then going into the 60's, were you looking in different strata or different places?

Harry: I guess our big discovery in the 60's was the Strachan??? gas field and of course, this was again, another Leduc prospect which we had hoped to find oil but as you go farther west the structures and the geology is more gas prone than it is oil prone. We're finding some oil still in shallower formations such as the Cardium and it's still an attractive formation today. But basically we found a lot of gas and gas was something we weren't looking for because we had more than we could sell and that's still true today although I'm more optimistic that the gas markets will develop in the nearer term than some of the people. Because I think that our American friends are going to need our gas in greater quantities in just a few years time. But basically we were looking for oil and finding gas which was disappointing. In the late 60's the exploration turned to the frontiers and I'd have to say that some people were more optimistic than our company was at that time about the potential of the frontiers. There was a big exploration thrust into the Arctic Islands and Dome was the first company to drill a well up there at Winter Harbour in 1960 and that was a major step forward although people thought it was pretty far out to be drilling up there. One of the people who must get a lot credit for the Arctic Islands activity is Cam Sproule, who has passed away. But he was a very enthusiastic geologist and had his own consulting firm and really did a lot of work in the early mapping of the Arctic Islands and identified some huge structures up there which reminded people of the Middle East. Our geologists were excited about the prospects up there but we could not convince our management to go into that area until the early 70's.

#149 Betty: Why would that be, because of the expense or were they perhaps committed other places?

Harry: I think that the expense was one thing and then most of the companies felt that there was lots of reserves in the Middle East and why would you go up to the Arctic Islands in that hostile environment when oil was in abundance in the Middle East and selling at \$1.50 a barrel which seems like peanuts today. So I think that tempered the judgement. By the early 70's people were getting concerned about the economic climate in the Middle East and it was at that time that our company recognized that we better have a position in the Arctic Islands and I was put in charge of a small group of geologists to develop a frontier position for the company.

Betty: What year was that do you remember?

Harry: That would be in 1971, Betty. We didn't have a great deal of money to put into frontier exploration so we went into a joint venture with Gulf Oil Corporation where we put in our properties and they matched it with working capital and we took some farmouts in the first instance from Pan Arctic primarily and other operators in the Arctic Islands and drilled a number of wells which turned out to be basically disappointing. We got one good deal I think, which was from Global Marine and one of our wells that we drilled offshore extended the Drake Point field offshore so we did get some reserves there. With another deal we still have the dubious honour of drilling the well that's the farthest north well in the world and it happens to be a dry hole but it was drilled up in the northern end of Ellesmere Island. Ellesmere Island was a fascinating place because you can see the geology on the surface that would say it ought to be oil bearing but there's been some gas

and no oil up there. Now today there is some encouragement, as I mentioned earlier, that it's offshore in the deep water, ice covered and maybe that is a very good place to be finding oil. It's in the heart of the Svergot??? basin and I don't know whether this has anything significant but it's surrounding Lougheed Island which was clearly named after the current Premier's grandfather. So Lougheed Island is the focal point for the exploration activity right now. Oil has been seen in 3 or 4 wells drilled there in the last couple of years and this winter is going to. . . Well as a matter of fact, today the press release came out on the Cisco??? well that was a delineation well offsetting a discovery that was made there last year. And it indeed got oil as well. Additional drilling will have to be done to establish the size of that discovery but it's to me very encouraging that now we've got a discovery with a delineation well in the Arctic Islands. And I can see that that perhaps could get to markets. . .oh, perhaps not with the submarine tanker but with pipelines too. The technology is in hand to run island hopping pipelines from island to island and finally down to Viscount Malibou??? Sound where perhaps an ice strengthened tanker can come in and bring oil to market with rather uncomplicated production facilities in the Arctic Islands themselves.

#196 Betty: Which would make it much more favourable wouldn't it?

Harry: Well, it's closer to market. I'm not saying it's an either or situation, I think we in Canada need to develop all of these things but I can see some very good reasons to develop the Arctic Islands because we Canadians need to develop some industrial infrastructure for the good of the country. Because we're really holding them for very little good reason at the moment. We have a few little meteorological stations up there and a little base up at Alert which is at the northern end of Ellesmere Island but very little else going on up there. It would be excellent to have some industrial activity up there.

Betty: Ellesmere Island you think is written off as far as having oil discovery on the island?

Harry: I wouldn't write off Ellesmere Island. Somebody may be smarter one of these days and go back there and have a new interpretation of the geology and come up with something. There are large structures there and there hasn't been all that much drilling up there. I think it would be premature to write it off right now. The initial exploration has not met expectations.

#211 Betty: Going back down onto the mainland, when you look at geophysical work, there has been a lot of coal mining throughout the country, how much, when you are doing geophysical work, how often do you find that you are perhaps going along, somewhere along with a string of coal mines maybe.

Harry: In central Alberta there is coal underlying most of the area. So that is just taken into account when you are doing your exploration that we're probing beneath the coal seams in general. Again I guess, we in the oil industry, are helping the coal miners because we identify the coal geology as we penetrate it looking for oil. Indeed that also helps oil companies to get into the coal business because they map the coal deposits. So a lot of the companies are in the coal business and I think, are making a great contribution to the coal industry. But it has been a secondary prospect and I think it's still secondary today.

Paradoxically the coal industry, it's economic importance seems to be inversely related to the oil industry. As we are very successful in finding oil in quantity then the markets for coal decline and vice versa. You will recall in the early 50's well, I think we saw the demise of the coal fields around Drumheller. Perhaps in due course they will be needed again I'm sure, and be used appropriately where they have an application.

#234 Betty: Let's look from the foothills, we were looking at some of the foothill work that you did, moving out more into central Alberta. In the 70's were there any significant areas that Gulf was involved in?

Harry: The 70's were rather barren for Gulf. One of the reasons were that perhaps our focus had changed to some extent and we were putting a great deal of effort into the frontiers. We also got involved in exploration off Labrador and exploration off the Grand Banks. In the late 60's, with the interest on the Scotian shelf and the Grand Banks, as I mentioned earlier we were rather late getting in. We took a work bonus bid on a large block of acreage south of St. Pierre and Michelon???, the two little French islands off the south coast of Newfoundland which belong to France. And that acreage is still in dispute, a 3 way dispute this time, between Newfoundland, the federal government and France. And so we haven't been allowed to do any work there yet. That again, is 15 years that we've been sitting on that. But we took a farm in from Mobil on their Grand Banks acreage and drilled a number of wells and this was in the early 70's. One of them particularly was called Adolphus??? which was I guess, the first well to find some oil and it found about 250 barrels of oil per day on test, which would be nice if it were in Alberta but out 200 miles offshore in the Atlantic Ocean, it's uneconomic. We did drill a step out well from it and it was a failure but it did indicate the presence of oil in that geology there. And we looked at the geology of the other companies wells there and it led us to focus our activity in the Hibernia area. We had some difficulty, I think everybody was having difficulty financing exploration out there but the frontier allowances of the federal government in the late 70's, it attracted us to go back there with the incentives we could get from the government. And Chevron had a ship which needed to find a home for a well and we got together with Chevron and they took in Columbia as a partner. At this time we had gratuitously acquired Petro Canada as a partner and between the group a farm in was further taken from Mobil to drill that well which is now a discovery and it certainly is a major potential oil field on the east coast. So that was our change of direction if you will in the 70's, to look for the larger prospective areas in the offshore and frontier areas of Canada. In the 70's we did do a lot of drilling in northeastern British Columbia and in the southern part of the Northwest Territories with some encouragement but not with the great expectations that we foresaw in the frontier areas.

#285 Betty: Today is it necessary, for instance in the 50's you could perhaps accept something that was a little. . . .like, when you mention the pinnacle, well actually in the Burland area, that well, today can you afford that kind of thing in the same way?

Harry: Well, getting back again into the 70's, there was the Pembina play which everybody got excited about. Again, this was brief although it was a younger reef than the Leduc reef,

it's a niscue reef and we got involved in that and Chevron was one of the pioneers in that particular area and there were some discoveries but I think on the whole not as prolific as people had thought in the beginning. So to answer your question, you can look for things today that will be profitable because of a pricing regime that favours new oil discoveries, particularly discoveries made since the beginning of 1980. There was an incentive for oil that was discovered post 1974. So we have a very strange economic regime in our business today where oil that was found prior to 1974 is heavily taxed, '74 onward gets lesser royalties and now we have what we call, a New Oil Reference Price for oil that's discovered from 1980 onward. So the prospects of which would not be economic in the 50's or 60's, now can have some marginal economic value. So industry I'm sure, is all looking at areas where we can find the remaining oil in western Canada.

#312 Betty: Do you think this policy will more, for instance, your company and other companies such as yours, who've been concentrated in the frontier areas, they will move at least part of their operation back to the secondary discovery?

Harry: Certainly we will put additional funds into this area because what is necessary is that this kind of oil and the old oil has to provide the cash flow necessary for the massive expenditures that are going to be required to develop Tar Sands and conventional heavy oil. There's a lot of heavy oil in Saskatchewan and eastern Alberta which has some primary mobility. That is, that with pumps you can get a little bit out and with secondary recovery or water flooding you can get more of it out. But maybe steaming or some enhanced technology is necessary to get the remainder of it out. This then is still thick, heavy oil which will have to be upgraded by an upgrader which is going to be a billion dollar investment in a kind of a refinery to produce this oil. So there's oil there and there's oil in the Tar Sands and we've got oil in the frontiers. What is needed is a fiscal regime that will justify the massive expenditures to do it. But getting back to where we were, we are going to have to see a better fiscal regime for the conventional oil in Alberta. We know there's just a finite amount of that left. The expectation for finding large reserves in that area are pretty remote. What we expect to do is find a lot of little pools that collectively can make it justifiable to spend money still in the conventional area.

End of tape.

Tape 3 Side 2

Harry: So we have to have a balanced program.

Betty: Right. And with money scarce, this gets more difficult.

Harry: This is the problem because the National Energy Program with the punitive taxes that it had has taken the cash flow from this very key area and funneled it into the two levels of government. Now last week, we saw the Alberta government back off on the royalties that they have been charging which is a very positive sign and I take some encouragement from that and I hope that the federal government and the other provincial governments will see their way clear to then compliment what Alberta has done so that the industry has enough cash to do what it has to do.

Betty: Mr. Carlyle, I have some names here that I wondered if you could perhaps give me any of your recollections, Andrew Janish???

Harry: Andy Janish is alive and well and working for Canadian Superior. He just recently joined them as President and Chief Operating Officer. He's now part of a two man team with Arnie Nielson who is Chairman and Chief Executive Officer. And Arnie is a man who has a lot of the history of the oil business in Western Canada, was formerly President of Mobil here and I think gets the credit for the discovery of the Pembina field. Which was discovered by Mobil when they were looking for reef and ran through the Cardium formation which is a blanket formation covering several townships, many townships and so it's a huge field, it's probably the biggest one we have in Western Canada. Arnie gets the credit for that. Andy Janish worked for our company for a number of years, he's a Manitoba graduate and came out to our company in the 50's and advanced through the company and went to Toronto and looked after our pipeline department for awhile. Then took over our mineral activities in a joint venture with ourselves and Gulf Oil Corporation and then came back here as production manager. And was persuaded by Mr. Bill Hopper to join Petro Canada as President and just left them recently to go over to Canadian Superior. So he's back in the private sector after enduring about 5 years I guess with the Petro Canada group. Jack Bevell??? I guess is another name you're looking at.

#026 Betty: Yes.

Harry: Jack Bevell was the early manager of Canadian Gulf Oil Company in Calgary and was a very flamboyant character and a high flyer and that is not the character of Gulf and as a result Gulf and Jack Bevell parted company in the early 50's and he subsequently died in California.

Betty: I have another name here, Jim Coltus???, can you remember anything about when he was working with you, any recollections?

Harry: He was working as a core drill operator and I've lost touch with Jim Coltus??? I really don't know what became of Jim.

Betty: Have you any recollections of when he was with you?

Harry: He was contracted to us. He wasn't an employee of the company. He had a core drill operation and we used the core drill extensively in the early 50's to attempt to outline reef

anomalies and it had a debatable exploration success, shall we put it that way.

Betty: It is not used now?

Harry: No it's not used at all I'm sure, now. Core drills per se are certainly used today in the mining industry but I don't know of any that are being used today in petroleum exploration.

#041 Betty: This would mean that those men that were involved in that kind of contracting would have to go into another part of. . . .

Harry: Core drilling and shot hole drilling and other kinds of drilling are related so it wasn't a case of one industry folding. They would just transfer their equipment to shot hole drilling primarily, the kind of drills they had so they didn't lose out or there wasn't any financial disasters I believe, as a result of the transition.

Betty: Another name I have here is Neil Taylor.

Harry: Neil Taylor is a geologist and he is still with our company. He has spent quite a bit of time in Alberta. He was Area Manager for us in Edmonton at one time and Regina. He transferred to the parent corporation in about 1970 I guess, and was in Pittsburgh for awhile and went overseas, was in Japan, came back and he took over from Andy Janish in the minerals business until just recently, he's been transferred down to Houston as Vice-President of Exploration for Gulf Oil Exploration and Production Company. So he's now in Houston.

#054 Betty: Did you have any direct dealings with him, can you recall any particular incidents or work that you did together?

Harry: Neil was an Area Geologist and an Area Exploration Manager. I can't say that there was anything specific except I guess the highlight would be the time that we went with Andy Baillie and Ralph Ross up into the Mackenzie Delta to select our first acreage up there. And that would be in 1957 when Neil was area Exploration Manager in Edmonton and I was Chief Geophysicist I guess, at that time, in Calgary and Andy Baillie was our Research Geologist and his surface parties had proceeded down the Mackenzie Valley to the Richardson Mountains and identifies the Delta down there as being prospective. And so we all went up to look at the Delta and select some acreage. We filed on three million acres the next year in 1958. We immediately conducted an airborne magnetometer survey in the area and Inuvik, at that time was just a developing little town sight. The government had decided to build it there because they really wanted to have a transportation centre in the Delta and the only town that was there, Aklavik, was not amenable to building an airstrip. It's in the wet delta and you couldn't build an airstrip there so they chose Inuvik which was on the east side of the delta on higher ground and there was bedrock outcropping and lots of material there to make a good airstrip. And that's the reason for Inuvik, is that it was a place to build an airstrip. And I guess we were there, I recall being there when there was nothing but a little primitive Hudson Bay post on the shore was the initiation of the town. And it's a government town and it's planned by the government and unfortunately it I don't think, has done our government much credit for it's planning capabilities because it's a very poorly laid out town and I would

have thought in this day and age we would have done a better job than build Inuvik in it's present form. So that's probably the highlight of Neil's activities in Gulf Canada was the participation in the early exploration of the Mackenzie Delta. After doing our airborne magnetometer survey we did a photogrametric gravity survey with a helicopter and we had a photo transit, which was a new innovation. It simply meant that the helicopter was busy leapfrogging as a surveyor and a gravity operator and we got considerable coverage done in rapid order and we have a number of pictures here, Betty that show that operation with the helicopter and the operator taking readings under various conditions.

#091 Betty: They would land and then take a reading and then off they'd go?

Harry: The helicopter would transport the meter operator ahead, say half a mile, and set him down and then shuttle back and pick up the surveyor who would take a rod reading from the operator and then leap frog him over the operator. So the helicopter was just moving continuously and these people would take their readings and it went very fast.

Betty: With the 3 million acres you'd have to move rather quickly.

Harry: Yes. And of course, you did this in the summer. And we worked two shifts because it was daylight around the clock and easy to do. Following that we undertook to do a seismic survey and we developed some special tracked equipment to do that and we have some pictures showing the experimentation, first of all to determine whether we could get seismic readings up there and there are some interesting photographs here of me and some portable equipment on the tundra trying to fight off the mosquitos and get some readings of just what the seismicity of the Arctic coastal plane was. One of the things that we found was that you have a mossy cover which is an insulator for the geophones and to operate in the summer we had to have a little Madoc??? and just dig through the active layer which would be 6 - 12" deep and place the geophone on the ice, which was permanent there. The ice is up to 2,000' thick there or the permafrost, it's not all ice, it's frozen ground. But there are ice lenses in it where the terrain is in contact with water. And one of the characteristics of the area is the presence of pingoes???, which are great big almost, frost boils but they're 2 or 3 hundred feet high and several hundred feet across some of them, huge. Up in Tuktoyuktuk some years ago, they had a curling rink carved out of the core of a pingo???, which was of course, frozen and it had one lane of curling in this pingo. I guess it would be warm in there compared to the outside and very practical.

#119 Betty: What caused these pingoes?

Harry: What happens is that you get in contact with some surface water and it flows into say, a layer under, perhaps the active layer and then freezes and then expands and then more water comes in and it just gradually builds up into this ice mound. And you'll see many of them around Tuktoyuktuk.

Betty: What we might think of as rolling hills, it's just really the ice heaving.

Harry: They're not like rolling hills. They're discreet and you'll see them and then in another area, adjacent to another little lake there'll be another one. There's been quite a bit of research done on them, Dr. MacKie of the University of British Columbia has done a

great deal of research and is an expert in the area of pingoes. These present problems to the geophysicist because the ice and the frozen terrain have different velocities than the unfrozen terrain and it can give you some spurious effects if not properly accounted for. And this is one of the problems that the geophysicist has in working in that area. We also were concerned about whether the summer was the better time to work, the winter of course, is bitterly cold and dark. Subsequently we found that the sinter operations were preferable to the summer because the ground was all frozen and you could get better reflections in the winter than you could in the summer. After the first couple of years we went to winter geophysics and it turned out better. But again, you're affected by short daylight and bitter cold in the winter and the productivity is low but the results were better so we had to work subsequently in the winter.

#143 Betty: Did you have different instruments, did you have to adapt your instruments as you did adapt the ground vehicles?

Harry: No, the instruments were the state of the art instruments at that time which today would be regarded as very primitive. In those days no one was using magnetic tape to record. We had a system of our own which we called variable density and it was a primitive profile machine and we got a lot of good results out of it. It was a Gulf patent but we did find out in later years that some of our competitors were in fact, using a patent infringement although no recourse to the law was ever taken over the matter.

Betty: By that time had you sort of gone on to other things.

Harry: Yes it was becoming obsolescent and magnetic tape was coming in and magnetic tape gave a lot of advantage over the paper recordings.

#155 Betty: What would be the advantage?

Harry: You could play it back right in the machine and get another paper record and the records at that time were then. . .originally we had to develop them, they were photographic records. Later on we got records that were made by electrical methods on the paper so we eliminated the portable darkrooms and you can imagine what a mess it was having to carry a dark room around out on the field which had to be done until, oh I guess, sometime in the 60's, yes, in the early 60's I think we were still using dark rooms and this variable density had to be processed under very specific controlled conditions, so it was a problem too. We had a printer that made corrections for it and it was in the Calgary office, so it was a little cumbersome but it resulted in a better display than we had by other means at that time. When we had these paper recording we made a contact print from the record out in the field and we had a box there so we developed a copy of it and we sent the original into our Calgary office and it was interpreted there and the copy was interpreted in the field. So we always had a dual interpretation and there was considerable pride in the work that resulted from that. The geophysicist in the field versus the one in the head office. There was lots of discussion went on over the merits of one interpretation over another. We don't do that today because. . .

#176 Betty: When did that stop?

Harry: It stopped, I guess basically when we got the more sophisticated geophysical instruments that recorded everything on magnetic tape and then this was processed in a central computer and this just meant that there was no way that the tape could be processed in the field. You just didn't have the capability of putting another computer out in the field. And also our social structure has changed. Today it's no longer possible I guess, because of the improved economic situation to have a geophysicist to live out in the field. They want to live in town and most of them come to us now, already married and perhaps with a family and the nomadic life of the early days is no longer appealing to them and we couldn't keep people to day under those conditions that prevailed in the early 50's and 60's.

Betty: A lot of the geophysicists who are now in more senior positions in Calgary who started out in the field, I think, many of them met and married young ladies from the smaller areas.

Harry: That's right and also in those days we had area offices. Our company over the years has had offices in Lethbridge, here in Calgary of course, these would be area offices, Red Deer, Edmonton, Peace River, Stettler and Regina. Of course, today, they're all in Calgary and the computer has really brought the people into one central location.

#198 Betty: Do you find that this has made a difference in your public relations with the rural areas where you are still working?

Harry: We still have offices in the rural areas for the actual field activities. For example, we have offices in Pincher Creek where our plant is there and Stettler and Rimbey, where the plants are. We have a production office in Edmonton and one in Regina and one in North Battleford and they have good relations with the people there. But it's different today. The professional people live in Calgary and that's true of the industry generally.

Betty: It made quite a difference to the complex of the province I would think.

Harry: Yes. But lots of our key people now have wives from these small towns. Stettler has particularly been very good to the company in providing spouses and other areas too. Edmonton and Regina, we've got them from all over.

#212 Betty: We were going through some names here, Mr. Carlyle, before we went into the permafrost problem. The next one I have on my list is Bob Lockwood.

Harry: Bob Lockwood was our earliest geologist. He came up from the States and was involved in the early land selection. I think he had a great deal to do with the Stettler field, particularly they did some work at Pincher Creek. He eventually became the sort of staff geologist and finally went down to Toronto as a geologist at the head office when we became British American Oil Company. And from Toronto he advised the vice-President on exploration and activities and also conducted the exploration in eastern Canada, although we never did get very deeply involved in eastern Canada. We did some work in southern Ontario and Quebec primarily under Bob Lockwood's jurisdiction or direction. Finally he came to retirement and retired in Toronto and died there a number of years ago.

Betty: Did you work closely with him at any point?

Harry: Yes I knew him very well.

#231 Betty: Have you any recollections of him in some of the particular projects that you were involved in together?

Harry: People like Stan Pearson and Oscar Erdman??? had more intimate contact with Bob Lockwood than I had. I worked with him and helped him with his exploration in eastern Canada and we would often talk about what we ought to be doing and philosophizing at great length.

Betty: Was he a philosopher type of a man?

Harry: I guess we all are in this business to some extent. He had his own views on how things should be done. I think he was a man of high principle and great integrity and to be admired but I think that he went into his shell to some extent. For what reason I really don't know.

Betty: This was in his later years?

Harry: Yes.

Betty: Perhaps the distance between Calgary and Toronto was greater than you thought.

Harry: I guess so. He was quite happy down there and liked it in Toronto and he came out to Calgary quite frequently but I think he did lose touch with what was going on here. And I think he lost touch to some extent before he left here. As a staff geologist he did not get involved too much with the day to day activities.

#252 Betty: We have another name here, Max Littlefield.

Harry: Max Littlefield was an expert in carbonate geology and did a lot of the well sight work and interpretation in the early days of Pincher Creek. He was a well known geologist with a world wide reputation as being an expert in that type of geology and did a lot of the early reservoir work and studies on the Pincher Creek field. And he was an individual too, that you should talk to Stan Pearson about, who had a lot of contact with him in the early days.

Betty: Was he a bit of an oil patch character would you say?

Harry: He had his eccentricities and I guess we all do but he was a different kind of a guy. I knew him but I did not have the intimate contact that Oscar Erdman or Stan Pearson would have.

#263 Betty: I'll get to them about him then. And Ed Lofney?

Harry: Ed Lofney replaced Jack Bevell as General Manager and subsequently upon the merger of Canadian Gulf Oil Company and the British American Oil Company he became President of the British American Oil Co. Very hard working man, he worked 7 days a week all day long and burned the midnight oil and he watched every aspect of the business. He came at a time when there had been some concern about accounting practices and that was his background so he came with a certain amount of concern about the activities and he either trusted you implicitly or you never got along very well Mr. Lofney. And there are all kinds of people, he was a very thorough man, he knew exactly what was going on all the time and he had to be shown that everything was right. He watched the money like a hawk. I can recall one time when I was getting the muskeg tractor drill into the bush and it was the middle of the summer and these vehicles at that time were rather fragile and so

I contracted a Bristol??? freighter to pick up this drill in Grande Prairie and fly it into the Virginia Hills. We had to let the air out of the tires and do a little cutting to get the mast off and get it into this freighter but I got it in there in about ½ an hour when it would have taken about 3 or 4 days and a lot of hardship and mechanical damage to get it through the bush into this area. But it cost \$1,500 and that created quite a lot of controversy and a company policy came out that no aircraft would be chartered unless approved by the General Manager and that was on the books for a number of years until it became totally inappropriate in recent years. But I guess I was responsible for that particular episode. Another time Ralph Copeland was on a plane into a bush airstrip which was clearly too short and he had it lengthened and had to cut down some valuable timber which was sold to a sawmill but the end result was a bill for \$10,000 and that was highly scrutinized to put it mildly, but Mr. Copeland thought his life was worth more than \$10,000 of the company's money and I can attest to that myself because I had a crash landing on that particular airstrip on one occasion. Mr. Lofney had his same thorough approach to the company's total business which was new to the people in Toronto and some of them still talk about Lofney days and how they had to justify everything they did. Mr. Lofney left Toronto and eventually became Executive Vice-President of Gulf Oil Corporation and reached retirement age and has been consulting. He must be well up in his 70's now, probably approaching 80 years and people see him occasionally and he's doing very well.

#318 Betty: Was it different having someone who had an accounting background, the oil business throughout the early days had always had the exploration, the production people running it but the accounting is sort of a different approach.

Harry: Yes, but he'd come up through the production side of the business and perhaps he may have been a little more cautious but he was a good manager and very supportive of our exploration activities. I always liked him and we got along very well and I found him to be a very charming man.

Betty: You mentioned that he went back down to the United States and into the mother company. Did quite a number from your senior management in those days end up back down in the States.

Harry: They came from there originally. I don't think that was the case, most of them in fact stayed here.

Betty: So there were very few that went the way of Mr. Lofney?

Harry: Well, he's the only one that I know of that went through here to get up to the number two position in the entire corporation. As I mentioned to you earlier Neil Taylor is now back in Houston with the parent company and we do have a number of our geologists who are down in the exploration and production activities of Gulf Oil Corporation and they're highly regarded. We've always sent good people down to them and there are I would say, 15 or more perhaps, in Gulf Oil corporation.

#344 Betty: With having such a large organization it means that people can move into other areas without losing all of the benefit of the long term with the company.

Harry: Right. And it also gives us an opportunity to broaden some of our people and we

welcome the opportunities this creates for people. We have people now in foreign service and we try to specify that it's for a fixed term but we occasionally lose somebody and if he wants to stay in foreign service and they want to keep him, there's very little I can do to intervene once they've made that move. But it is an opportunity that we can offer young people that's not available in a lot of companies.

Betty: I think it's the kind of thing that a large company. . .many of the Japanese companies do this sort of thing I think, give that kind of. . .so that you get a life time commitment from them but you have a lifetime commitment too then.

Harry: Well, we don't have lifetime commitments in our society, unfortunately. I guess there are good and bad features of that but that's certainly a characteristic of Japan and we'd like to think that some of our younger people were more committed to us and I guess our senior people have the commitment to the company, the people that grew up in the Depression years appreciate the security offered by a big company and the youngsters today don't have those inhibitions that perhaps some of us have.

#368 Betty: I have one last name here, George Blunden.

Harry: George Blunden was an early geophysicist for our company and did a lot of the interpretation and field operations in the Pincher Creek field. George is still in town. He left us in the late 40's and started his own geophysical company and abandoned that and went into Home Oil I believe, from there as Exploration Manager and was there for many years and is retired now. I saw him not too long ago at a retirement function for one of our employees who had known him in the early years, that was Jack Weigh??? Jack Weigh has just retired, perhaps a year or two earlier than he could have but he wanted to get around and see things while he was still young enough to enjoy life. Jack Weigh is another person you might to talk to who goes back many years and he's an associate of George Blunden. George would be a very interesting person to talk to. One of his hobbies is figure skating and he was an excellent figure skater in his own right in his youth and became a judge and active in promoting figure skating in the city and indeed in the country.

#392 Betty: I have a note beside his name that he was involved with refraction.

Harry: Yes. Refraction was the technique that we used to explore in the Pincher Creek field and indeed in the foothills for many years. And we used the refraction technique which was developed in Pittsburgh and that's where George learned it. There was an expert there, Louis Gardner, who was a recognized expert in refraction geophysics and Gulf was pre-eminent in the use of the refraction seismograph in the early days.

Betty: And George Blunden was. . .?

Harry: Was a Party Chief at that time and did some, as I mentioned the interpretation in the field and used the refraction methods and also subsequently gave some paper on the refraction method. His paper specialized in refraction, the techniques that he had learned when he was with Gulf.

Betty: Did his company work for Gulf on contract at all?

Harry: I believe we did use. . .I think the name of his company was Northwest Geophysical

Company and I'm sure we used them but that goes back a long way.

#413 Betty: Actually he was probably on his own before you came into the company?

Harry: That's right. He'd started up the year before I came to the company. But I'd heard lots of things about George Blunden and of course, I've known him for many years in his capacity with Home. He was also President of the Canadian Society of Exploration Geophysicists prior to me. I was the President in 1963 I think. So we share that alumni position as well.

Betty: Lookout Butte, the discovery in 1959.

Harry: Lookout Butte was basically the extension of the exploration at Pincher Creek and we did some refraction geophysics down on strike with Pincher Creek and to the west and identified the Lookout Butte structure. Some of it was owned by the Blood Indians and some of it was provincial lands and it also extends on the border of the Waterton Park. Very difficult to explore because of the logistics, you're not allowed in the park and also the refraction technique requires you to spread out over a distance of some six miles as a rule in that terrain.

Betty: So what did you do?

Harry: I recall one time we got permission to go down onto the 49th parallel which is cut out between Canada and the United States in the mountains and that was a cut line that was there. We were not allowed to cut any other lines and in the middle of winter we moved some of our muskeg tractors down there to plow through the snow on this cut line. And we were not allowed of course, to disturb any of the monuments and we had to stay on the Canadian side of it.

#451 Betty: How wide was this cut line?

Harry: I think it was probably about 10' wide. It was a rather frustrating effort but we did succeed in getting a picture that justified bidding on it. We bought some of it and we were outbid on some of it by Shell. So we and Shell jointly own the Lookout Butte field. We subsequently pooled our interests and it's now produced into the Pincher Creek plant but the Pincher Creek plant is going to be shut down shortly because it basically has depleted the field and that gas is hopefully going to go to Shell's Waterton plant to be processed there.

Betty: You mentioned that there was really a contest between you and Shell over the bidding. Were they working the same 49th parallel?

Harry: No I don't think they got onto that 49th parallel but they clearly had an exploration picture of the area and whether they got down as far as we did or whatever, I don't know.

End of tape.

Tape 4 Side 1

Betty: I'd like to turn now if we could to some of the pictures that we have here. You mentioned them earlier and I thought looking at the pictures you might just be able to recall some of the things. Right in front of me I have this lovely picture of it looks like a bulldozer that's nose down in the mud.

Harry: This is a Fordson tractor with a Bombardier track attachment. Bombardier as I mentioned to you earlier was a pioneer in developing equipment for the oil industry exploration activities and this was one of his innovations. And it enabled us to get around but the tracks on these things were very touchy and they would come off at a moment's notice of course, and under very difficult circumstances. I can recall some very trying times when one or two people would be trying to put these tracks on and on one occasion in the middle of the night, in the middle of the muskeg and tempers were running a little high as a result of the difficulties. But this was my personal transportation as the Party Chief and you can see it's stuck here in this hole which is full of water and debris. I recall one place that we had to cross a river and it had a steep bank and the only way we could get across this thing was first of all to stop on the bank and back it up and take off the fan belt because it got in the water so deep that the fan would flip the water up and drown out the spark plugs on the thing. So we had to cross the river backwards and then when we got to the other bank, let out the winch and run up and tie it to a tree. It took two men to do this, one had to leap off on the bank and pull the winch out and tie it to a tree then pull the tractor up with the winch because you could not use power or the tracks would fall off. Then the winch on the Ford tractor would only reel in, it would not reel out, so you had to, when you got up, put it in gear and gently back it up, not hard enough so the tracks would fall off but just to give enough slack in the cable so the other fellow could untie it from the tree. Otherwise you found yourself wrapped around the tree with no way to get out.

#025 Betty: Was this the vehicle that you subsequently adapted or is this. . .?

Harry: No this was abandoned. We did have some equipment mounted on that, we had a shooting tractor mounted on that and you have a picture of that somewhere Betty. I can recall going out one time with my superiors to . . . I'm sure they were coming out to see why we were not getting more work done than we were doing. We went out on this tractor, and the one with the shooting equipment on it, we came across first and it was hanging from a tree because it had been winched up the tree and as I mentioned could not be released and there it was and the suitor??? had just left it because he had to go and get some tools to uncouple the winch cable from the tree.

Betty: What would you eventually have to do the, would you just have to chop it down?

Harry: You would either have to chop the cable or you usually had turn buckles on the cable, unbolt it and let it go and it would flop down but it was rather dangerous.

#039 Betty: Let's look through here and see if we can see, there's a . . .

Harry: That is a TN Bombardier and that tent on the back was the instruments. This was used in conjunction with that other equipment. The other equipment I was talking about was the support equipment. These were the basic units and I mentioned to you the other day that they were very unstable.

Betty: Yes. These are the ones that could tip over or. . .

Harry: This is a shooting tractor here that had dynamite on it.

Betty: Stuck right in the middle of the muskeg.

Harry: Yes. This is it here and that's the shooter and we had this cab on it and dynamite boxes in here.

Betty: Now these pictures we are looking at are from the Peace River area I would think are they? And this obviously is summer work because it's so muddy. Now working in the muskeg must have been dreadfully difficult.

Harry: It was. It was very miserable and today people avoid working these areas in the summer unless it's absolutely necessary. Most of this work is done in the winter when the terrain is firm. Here is another view of that shooting tractor towing a trailer. This is a Bombardier trailer that he would tow his additional equipment with. This is a picture of Ted Tracey??? who was the Party Manager at that crew. He's in town here selling pipe, today, he's an agent for a Japanese pipe firm. Here is that shooting tractor as you can see, it's mired at that point

#055 Betty: Now when they got bogged down like this, how would you get them out because there's another picture you have here of a bulldozer and it's up to it's neck in mud.

Harry: Well, here is a bulldozer mired right here. Over the tracks in mud. Now, the only way you can get a bulldozer out under those circumstances is to put logs under the blade and then press the blade down and in so doing lift the track up a little bit and then put logs under the track and hope that you can work your way out that way and we've spent many long hours just packing under the track and trying to get out. Bulldozers are basically just too heavy to work in muskeg in the summer so if you have a summer program the ideal thing in those days would be to cut the line in the winter. And then go over it with the lighter equipment in the summer. But as I mentioned most people do the entire operation in the winter now, when it's frozen and you get around these problems.

Betty: Do they continue to have this kind of problem or is the exploration quite different today, you mentioned about the helicopter dropping people off and picking them up again, is there much more of that type of work done?

Harry: Certainly helicopters are used for portable work in the foothills and hand cut lines and that's being done. And we have drills that you can carry around with a helicopter. The helicopter's of course today are bigger than they were in those days. We only had tiny ones that were totally incapable of lifting any significant equipment. This is a picture of a camp that we built on the Goose River in the Virginia Hills. We, under Mr. Lofney's regime, filed on a large block of acreage, I think 600,000 acres which we felt was prospective for reef in that area. And we built this permanent camp there to handle it,

primarily because I think we could not get a portable one at the time. So we had some people come in and build this thing and it was useful and was used several years.

#077 Betty: And then you would move out from there?

Harry: We used that as a base camp. There was enough work and that was centrally located so there was a good deal of activity based out of there. Of course, in the summer, when we worked in the summer, we would use this as a supply depot and work out in tents from there.

Betty: When you started working in the winter time, you'd have to get some of this heavy equipment out before the break up. This might cause a few problems would it not?

Harry: That equipment for example, we would leave in there. This equipment was not useful out of that terrain so it would be left there for the summer. This is a TD Bombardier and that one had a wider track on the front and you'll notice it has tracks, pardon me a wider track at the back and tracks on bogey wheels on the front as opposed to this one. . .

Betty: Which just had straight wheels on the front. What would be the advantage?

Harry: The idea of that one was to get more flotation and it was an improvement but again it had a great deal of difficulty in maneuvering and steering so we encouraged Mr. Bombardier to build a fully tracked vehicle.

Betty: Would this be the one in the back here?

Harry: Yes. This is the first tracked vehicle that Bombardier made, the fully tracked one.

Betty: It looks a bit like a tank but doesn't have so much super structure on it.

Harry: That's right and he built this cab which was totally useless for our activities.

#094 Betty: It looks like a little 1924 Ford truck sort of.

Harry: Mind you he has sold a number of these and you'll see them in cities in eastern Canada with a similar type cab on it. He eventually built one that only had a single track instead of a double track that you see here. And they're used with small plows in some of the cities to clean sidewalks. Here, this is a picture of Armand Bombardier and L. I. Brockway and Mr. Gustaffson??? of Gulf Research and Development Company. These people had a lot to do with Mr. Bombardier in developing this machine. I got into it at about this point and my assignment was to design the equipment for the system. These pictures show tests of a unit in Valcourt, Quebec where Bombardier lived. And this is a picture of Mr. Bombardier, Mr. Brockway and Mr. Gustaffson here. This is a picture of our first drill on a Bombardier muskeg tractor. And this one is the recording truck.

#107 Betty: A little different from the tent you had on earlier ones.

Harry: Yes. And this is the drill with the mast lowered.

Betty: Now you still had to do quite a lot of adapting from these didn't you, yourself?

Harry: I designed all the superstructure for these and the cabs and. .

Betty: Now this cab looks a little more practical, it's the whole width instead of a little bump in the middle.

Harry: We had to move the operator out of that hole in the middle and sit him up on the edge where it's a more practical location for him.

Betty: Was this so that he could see things better?

Harry: Surely. And also it meant, the way it was designed originally only one person could get into it, and now this provided accommodation for as many as 3 or 4 people.

Betty: Now you were mentioning, on one of them when you. . . .

Harry: This again is another view of a recording vehicle. We subsequently changed that design and got. . .the engine was right down in the middle and you can see we had to build this air scoop up here to bring cooling air into the thing and it exhausted out the back which was not a very efficient use of space. So on the next crew we had the engine moved up to the front and built a cab-over engine thing and it gave us a much better utilization of space and I think there's a picture of one of those somewhere here Betty. Anyway let's go back Mr. Bombardier suggested that when we designed our water truck that the weight of it should be right over the back wheels and on filling the tank the first time, I was standing beside it filling it and it just reared up on it's back wheels and sat on the tail so we had to go back to the drawing board and cut a piece out of the tank and slide it forward which is the way this finally ended up. But I spent a summer living at the Airlines Hotel which was an interesting place in those days.

#130 Betty: In Edmonton?

Harry: Yes. A Mr. Cashouer??? ran it and it was quite a place. I lived there and worked at the other side of the airport building this equipment.

Betty: So you had it brought out and you readjusted it right on the tarmac?

Harry: We tried them out and indeed we did try them out on the tarmac at times. We filled that tank in a little slough which was right by the airport there. I just had to go to the gate and fill it. There was no difficulty in finding the place.

Betty: Much better to practice there than to practice out on the muskeg.

Harry: That's right. This is the back of the recording vehicle and this is the exhaust air coming out that went in the scoop in the front and these are dynamite boxes here. This is a picture of the set-up of the drilling mechanism and how it was coupled to the engine, it worked out very well..

Betty: Made quite a difference to your field operations.

Harry: Yes. This is a view inside the recording cab with our instruments in there and the engine of the vehicle is right here and we just put a pad on top of it for the operator to sit on. And this is his developing equipment over here in this tank over here.

#143 Betty: Very compact.

Harry: Yes. It was an improvement over what we had at the time and you can see now how we have moved the operator up.

Betty: Oh yes, so he can see what he's doing. There was some pictures near the front of this book about a blizzard. . . I think a blizzard in Stettler.

Harry: Yes. In the early 50's. . . 1951 was a great year for snow Betty. I recall that we had snow every month of the year in 1951 including 16 inches in June. But we did have 3 crews in what we called at that time the Donalda project and we had a crew at Forestburg and one in Donalda and one in Bashaw and in late March there was a heavy snow storm which

just tied us all up. None of the crews could work and they couldn't get out of there. Finally I guess, it melted to the point where we could get out but we knew there was a road ban coming on at midnight and we had to get out on short notice and move down into the Red Deer, Innisfail area with the 3 crews. And that was a hectic time in my career. At that time I guess I had become the operator on one of the crews and we were very short of people who could operate the seismic instruments and I was training operators on 3 crews in one area at one time and just going from one to the other and having a disaster every time I arrived. Something would be broken down. Those were frustrating times. And in those days we worked 10 hours a day nominally and the operator and anybody who was in charge of equipment worked at night to make sure that you got 10 hours in the field each day. I started to work for the company, I don't know whether I mentioned this to you, on July 1st and a lot of people said to me, how come you started on July 1st, that's a holiday. But we in those days, worked 208 hours a month, 21 days and if there was a holiday you took it at the end of the month to make sure that you got the 208 hours minus the 10 that you were allowed. So if there was a holiday you worked 198 hours that month. But you started at the beginning of the month to make sure you got your hours in. And of course, one of the problems was that you had weather days and couldn't work, we sat in town and did nothing but we tried to get the 208 hours of work in the month and you may have used up the spare days at the end of the month to get that. There were months that people worked less than the 208 hours simply because they were rained out but they were tied up 31 days that month.

#179 Betty: Right. And so you wouldn't get out at all. No break at all. The north Peace River, there's some. . . .were you involved. . .it looks like again, going through the ice or something.

Harry: This is a bulldozer that has fallen through on a lake and you can see that the blade was up and they're packing it underneath here to try and get it out. There have been some horror stories with bulldozers in those early days.

Betty: Did you ever have to just leave the equipment and just write it off?

Harry: There has been the odd bulldozer disappear completely but not very often. This was a Bombardier snowmobile which was a step up from the Fordson tractor with a Bombardier track attachment. It either had wheels or skis and it had the same kind of difficulty. It wasn't quite so bad as the TN Bombardier because it was wider and could turn easier but the wheels and the skis would quite often break off and you'd have to carry spare wheels and skis and spindles. In the back was full of junk half the time with spare parts.

Betty: What do they use today instead of all this equipment or do they still use some of this?

Harry: These are not used very much today. In fact I think some of them are up on the Columbia Ice Fields. They were a few years ago, whether they're still using them.

#199 Betty: Oh to drive around and look at the ice fields?

Harry: Yes, but they're certainly not used to any great extent, I haven't seen one for years.

Betty: Now going through here, the Cadot River, you were involved there, this is . . .

Harry: The Cadot River is something you want to talk to Mr. Pearson about. I think this was his

operation.

Betty: All right. This was his baby. Well, I'll flip through to the next one. There's the Stettler blizzard that we have here now so there's some pictures of it.

Harry: Yes. You can see here the power wagon that's been sitting out and completely blown in, the engine is covered with snow and trying to work. There's been a bulldozer here to clear out a path but the equipment is not performing too well. This has been bulldozed out as you can see, plowed out.

Betty: Certainly you can say, not necessarily the good old days but you certainly had to do more than just know geophysics in order to survive.

Harry: No they weren't the good old days. Here you can see a bulldozer that's fallen through the muskeg. Muskeg can be very treacherous, it's snow covered but may not be frozen underneath. A good heavy snowfall often keeps it from freezing and becoming firm. This is a situation where the operator has gone across what he thought was solid ground and suddenly fallen through and here's another cat here trying to pull this one out.

#217 Betty: And this is another of the vehicles.

Harry: These are the TN Bombardiers as I mentioned. . .

Betty: The Virginia Hills project, where was that?

Harry: That is west of the Swan Hills area, which is about 175 miles northwest of Edmonton. These are pictures of that camp that I mentioned that we built, the permanent one. These are the interior views of the camp and this is the power plant that provided the electricity for it.

Betty: When you had moveable camps how did you move them?

Harry: You just hooked them up into a train and towed them with a bulldozer.

Betty: Did they have skids?

Harry: Yes. They had sleighs underneath them.

Betty: How long might you move them?

Harry: They might go 50 or 60 miles through the bush.

Betty: This looks like you're working on a lake here.

Harry: This is a boat on the Peace River to get across for summer activities and they did in fact ford the Peace River, well not ford it, they just used a boat to cross the Peace River. You want to talk to Stan Pearson about that one.

#230 Betty: What I would like to ask you before I end the interview Mr. Carlyle, looking back on those early days, what stands out in your mind as significant in the early days of your career?

Harry: I don't know anything specific. I guess there was a lot of camaraderie with all the people on the crew. You had a group of 20 people and the families. The families of the employees had house trailers that the company owned and rented to them for \$15 a month, which was considered a fair rent at that time.

Betty: And the families would be with the crew would they?

Harry: Yes they would and they would move. So you were sort of a little community to yourself and would go from town to town and there was a lot of esprit d'corps. Also the company

at that time had I think, up to 6 crews and so there was a little bit of rivalry from crew to crew within the company. And also we contracted as many as 14 or 15 contractors so there was that aspect of it too, that the company crews wanted to be seen to be better than the contractors.

#250 Betty: Were they usually?

Harry: Yes, they were. And I think it was as a result of the company trying to improve techniques and getting better equipment all the time. We did quite a lot in developing equipment. One of the things that we did that seemed a major thing at the time was when we got into the foothills we developed some very large drills and water units on 4 wheel drive trucks. And to get the 4 wheel drive truck was no easy task. These were big Ford trucks and they did a very good job in working in the rugged foothills. So those were good old days, there were challenges and there was lots of funny stories that people relate about the activities and the kinds of people that were on the crew. They were a different breed of cats than you see today.

#264 Betty: Can you remember any particularly funny stories or are there just so many?

Harry: There are just so many. I can't recall any off hand right now but they were good times. I recall we had . . . when we developed this Virginia Hills project, it was an innovation and we had Premier Manning and see the activities one day. He was interested in what was going on there. And his Minister of Mines and Minerals at the time was Lucien Maynard??? and he had become interested in aircraft and bush flying and he came out first and saw our activities. He flew in there. I think actually later on he was very badly injured in an airplane crash and perhaps that ended his career. And I think it was just out here at Cochrane that he crashed. He got interested in our bush pilots who were flying into us and he flew into this airstrip one day and then he thought that it would interest the Premier. So a few days later we had the Premier out and I recall driving him around in a muskeg tractor seeing our activity. A fine man, Premier Manning was.

#282 Betty: What do you think has been the greatest improvement in the wells??? from 1950 to say, 1980, geophysically.

Harry: The techniques now. And one of the techniques. . . we certainly do everything today with a computer and it's the ability of a large computer to process the data that makes all the difference. One of the techniques now of course, is what we call 3D and that is basically accumulating a mass of data and processing it in a computer which would be totally impossible to do. . . it wouldn't be impossible to do but in a meaningful time frame to do it, that would be useful to you, you could not do it without a computer. And we're always learning better ways to handle data with a computer.

Betty: What does 3D mean?

Harry: 3 dimensional.

Betty: I realize that but as it applies to geophysics?

Harry: What it means is geophysical work is basically 2 dimensional. You obtain a profile of data through the terrain but actually it is not a profile. The seismic way there's a spherical

way that goes through the earth and we assume it's vertical but clearly it's a least time??? portrayal of the bedding and if you had some steeply dipping beds you would be looking at something off the profile, not vertically below it as we naturally assume. What you do in 3D is you take a lot of closely spaced profiles and then you ask the computer to look at these adjacent profiles which would be about 70' apart and ask it to interpret what goes on between two adjacent profiles. So we come out with a map, a 3 dimensional map, the computer draws the map. That's something that we had to do by hand before of course,

#314 Betty Much easier on the eyes?

Harry: Yes. And also we have these displays in colour which highlights the features on the map so there's lots of things that we're doing today that we couldn't do. And also it takes smarter people today to do it than it did then and I think the new graduates that we get are just marvelous people and can do things that we couldn't do and I certainly couldn't do if I had to go and do it over again.

Betty: Are they specializing more in universities?

Harry: Yes. And they give them the training. They get computer technology, they're all coming with a background in computer work and if you go to the university you see they have computers there. I don't know whether you've seen our computer at the office. You talk to Carl Nyberg???, he wandered all around it . . . it's a huge thing.

Betty: The whole middle is the computer?

Harry: Yes.

Betty: I wondered what was in there.

Harry: Well there are windows, you can take a look. And of course, the computer is a fussy animal, it has to be air conditioned and it's an expensive piece of equipment and it runs around the clock, 7 days a week, 24 hours a day. And even so it's difficult to keep up with the amount of data that we have to process.

#335 Betty: And yet at one time you just had the geophysicist to process it so are you able to move more rapidly on prospects, has it stepped up your exploration work or has it made it surer?

Harry: I guess nothing is sure and I guess maybe it steps it up in the sense that you can do things that you couldn't do before but on the other hand it takes a finite length of time and I guess there are times when we are waiting on the computer. I'm hearing that story and it's a time consuming operation. I don't know that we've speeded up anything significantly, we just do a better job. And perhaps it takes the same length of time but you get more information.

Betty: But with the costs as they are today you need to have that more exacting information I would think.

Harry: The costs today are astronomical compared to what they were 25 years ago. In the order of probably 50 times as much in lots of cases. Of course, there's inflation built in but certainly some of the things we do are just tremendously expensive.

#356 Betty: And very exciting too.

Harry: Yes. And a lot of the work today of course, now is offshore. And this is done with ships and some of them have computers on board and you can get the data in real time and this is where the computer has speeded things up. But on the other hand there are lots of cases, if you're doing a 3D survey offshore, it takes months to get the data and we just have to program that into the time frame of what we're doing. It works out all right because we know that we're going to shoot it this year and process it through the winter and perhaps drill it next year and that's the kind of timing that you have to look at.

Betty: Thank you very much for taking all this time with me, it's been most interesting. And I'll look forward. . . certainly I'll come back to you in 5 years and see the update on it.

Harry: Well, I don't know where we'll be in 5 years, I'll be a veteran by that time. It's been a pleasure Betty and I certainly wish you the best of luck with your project, I think it's very worthwhile.

Betty: Thank you.