

PETROLEUM INDUSTRY ORAL HISTORY PROJECT
TRANSCRIPT

INTERVIEWEE: Don Crane

INTERVIEWER: Tina Crossfield

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TC: Today is June 12th, 2001 and we are with Don Crane at his home at 31182 Kolodi Valley Rd. in Calgary. My name is Tina Crossfield. Okay, now can you tell me where you were born and when, if you're willing to disclose that information?

DC: Yes, I was born in Winnipeg in 1928, that makes me 73 today. After leaving Winnipeg when I was about 2 we moved to Calgary and we were here for about 4 years and then when I started to remember things, around 6 or so, we moved back to Saskatchewan where my grandfather had a homestead. He'd homesteaded there in 1904 and my dad had been raised in northern Saskatchewan so we went back to his home place and my dad started up a general store in a little village called Valperez, it's right next to Tisdale or east of Prince Albert. I was raised in a small village of about 100 people. We had two schools and when I got out of school I had to decide what to do so I went to the next biggest town, which was Tisdale and I stayed there for about a year and then through persuasion and desire and everything I set off for university.

TC: Do you have brothers and sister?

DC: Yes, I have two sisters, Norma and Arlie. One lives in Tennessee now and one out in Whistler, B.C. and my mother and dad have long gone now, they both died years ago. I do have contact with my sisters a lot and it's been fun, a fun time.

TC: Was your mom at home throughout those years?

DC: Oh yes. My mom had an interesting history, she was born just off on a river in northern Manitoba, around Moose Lake, where her father was a fur trader. She was born on a river bank where the boat broke down. Anyway when she married my dad she stayed at home all the time and she was a homemaker. In those days women didn't have extended careers at all so she stayed home and looked after us and made a good life for us.

#032 TC: I'm sure it was a great childhood, a great youth.

DC: Oh yes, we had just unlimited run of the town and the fields and the rivers and the lakes and so on. And we had a dog, so everything is just great when you're a kid.

TC: The school in Tisdale, did you finish Grade 11 there or did it go to 12?

DC: No, I took the first 11 years in Valperez and then the Grade 12 I took in Tisdale, which was a bigger town, it was about 3,000 people so it was huge. So that's where I went for Grade 12.

TC: Did you have to board there?

DC: No, I lived with my grandmother who was living there. She's an old English lady, a widow, had a fairly good house so she took all her grandchildren in one after another, to go to school.

TC: That was lucky.

DC: Yes, she was great.

TC: And after Tisdale you went to university?

DC: Yes, well that was the thing. My dad was a butcher by this time and I became a butcher too, for a year and decided that maybe I should go and get some education. People always asked me, what would you do if you went to university and the easiest way out was to say I'm going to be a doctor. So I went off to Winnipeg and took a year of pre-med first year and decided no, that really wasn't what I was after, I was more interested in math and physics and chemistry and so on. So I came back and then the next year I went to university in Saskatoon and I started there in 1947 I think it was, '47 or '48 in the faculty of engineering. And that was great, I really took to that and I wanted to become an engineer but in those days the first two years were quite general, you could take general math, physics and so on and then the third year you had to decide whether you wanted to be in engineering physics or chemistry or ceramics or geological or quite a few different things. And I was attracted to geology mostly at that time, so there were 7 others and myself, we were in the faculty of geological engineering.

TC: Can you describe what your program was like in geological engineering, what sort of courses you took and what the faculty was like back then.

DC: Well, the oil industry, Leduc had not been discovered yet and the oil industry was in its infancy. Turner Valley was an interest, Viking Kinsella, a few other fields around had been discovered. So we didn't get much on the oil industry. There was a lot on hard rock, mining, gold, so on. Two of our professors had come from mines, had worked in mines in Ontario so there was a concentration on hard rock. But we had one professor, Professor Edmonds who was an oil man and he was the one that was so influential I guess, in keeping our interest up in the oil industry, even though it was in its infancy. It seemed rather boring to study lithologies??? which you didn't have much information on compared with gold and zinc and all the fancy minerals and so on of hard rock. So we kept it open but we were concentrating on hard rock. And of course, there was no geophysics at all. But we took geo, which was a geology and physics, which was the physics part of geophysics, never thinking that we could link the two together as a career. So we studied a lot of extra engineering things, like hydraulics and structural problem, mechanical things, but I kept coming back to this geology and I liked physics the first time around and I liked geology so I kept my options open as much as possible. Then in the winter. . well, before that, to keep things going we did big summer jobs of course, three of them in the four year course, the first year I went off and became a pilot in the Air Force, I was a cadet. I wanted to be a pilot but when I got down to Centralia to train for the summer I failed my eye test and they wouldn't take anybody that couldn't see to fly an aeroplane so I transferred into the education branch of the Air Force and they were bringing these young Air Force people up to Grade 12 level and they had a regular school. So I taught all the mathematical parts to bring these young fellows, well, they were all older than me really, bring them up to a Grade 12 level so they could then be promoted or whatever. So I spent the summer teaching. Then the next summer I was very fortunate that the Saskatchewan government was sending out a field party up into northern Saskatchewan to study a great big area there, just straight geology. My professor, Dr.

Bowers was leading this expedition so he took about 8 of us students and away we went, way up into around Flin Flon and Amisk Lake and we studied geology, just straight field geology which was great. He encouraged me to take a small portion of this area and study it on my own, after hours of course, in preparation for writing a thesis. In those days we did have to write a thesis to get your bachelors. So I studied the rocks of a peninsula on an island in the middle of Amisk Lake and he helped me. We took all the rocks and took them back and during the next year we studied the thin sections and so on of these rocks and tried to make maps from what we'd determined and I wrote a thesis.

#112 TC: So, it's Amisk Lake?

DC: Amisk. It's not far from Flin Flon on the Saskatchewan side. So I then had a good start on the thesis that we had to write and a good subject. So I wrote this thesis, it's not like a PhD thesis that's extensive, this was a young fellow writing a bachelors thesis. I still have a copy of it of course. And economics, and still again, this was all hard rock. But it was geology and approaching the oil industry, in that there are a lot of metamorphic rocks there that had some stratification, you could see the bedding and so on. That helped in really leading me into the oil industry eventually. Because it was interesting. It wasn't all blah, like when you compare it to gold and so on. So went back to the third year of university and then the next summer I spent underground in the Flin Flon mine, HBM&S, Hudson Bay Mining and Smelting Company, a great, huge, it's still big, copper, zinc, gold, lead mine. I became a mucker, which was an important job of picking up all the muck that fell off the cars underground.

TC: Gosh the things we do when we're in school eh?

DC: Yes. It was quite an experience, we were down at the 32-52 level in the mine. Every night you stripped down naked and then walked into the showers and then take off to explore the town after a hard day's work. That was a good experience too, but again, it was hard rock. They had lots of ore down there that we saw, smelrite??? and all these fancy copper ores. We did have to go up and work in the smelter a little bit there. But anyway that finished me off, that was really my last hard rock experience. And the last year of course, then I was ready to go to work. I was getting a B.Sc. in geological engineering, in those days they used to call it a BE even, so I got a BE in Geological Engineering.

#146 TC: Now that was a 3 year program?

DC: No, it was 4 years.

TC: It was 4 years, so by 4 years you were graduated then.

DC: Yes, then I graduated after 4. And there were 8 of us grads in that little class of Geological engineering. 4 of them are in Calgary yet today. One went into hard rock, one died and one, something else, he disappeared anyway. But we kept in touch all these years.

TC: Did any of them kind of follow the same career track that you did after?

DC: Yes. Quite a few of them, 4 of us went into the oil industry. And how the oil industry came about. In those days labour was scarce I guess, graduates were scarce and the oil companies used to come to the university to interview, they sent a group. I was

interviewed by Staniland and Western Geophysical and then Mobil Oil, which was really in those days, Socony Vacuum Exploration Company. Socony, it stands for Standard Oil of New York. They sent out 3 very interesting people to interview us, there was Dr. Spivac, who was the head of the Geology Department, Jim Kidder who was a geophysicist from the U.S., I think he's Oklahoma, everybody knows Jim Kidder of course. And the third one was an ER??? man and they sat at the table and we talked and talked and they told me in their version, what they oil industry was about and it seemed a lot more exciting than what I'd been studying. And they offered a tremendous salary of \$325 a month. So of all the interviews I took I selected, they selected, we got together with Socony and I became a geologist really, at Socony. They hired me as a geologist. So I was sent out immediately, out to Calgary here and spent about a week in the office, just wandering around looking at things and Jim Kidder called me in and said, look now, we have a training program and you're hired as a geologist but we want you to take some training as a geophysicist. On a seismic crew really, in preparation for the long term. They said, they do have long term training programs, which was really great because you could look forward to being in all departments really, of the company. You wouldn't be very useful for a few years but at least you were getting trained. So they sent me off to a seismic field crew in Crossfield, way out in Crossfield. And I didn't know one end of a seismic from another you know. So I went on the jug line as a helper and I learned how to lay geophones on the ground. There were two big ones about 5 or 6 lb. each and a big rope handle and you carried these around and put them down wherever these flags were and set them in properly. And there were just two geophones per trace. Then after 2 or 3 months of that I became a shooters helper and learned how to stick caps into dynamite and put the dynamite in the ground and I actually had to, it was part of their training program, we had to do this. So we did the labour and the pulling of the hole. The holes were extremely deep around where we were drilling, they were about 200' deep and we had 10' loading poles, so you'd link 20 of these loading poles together, one after another as the dynamite went down the holes. The cap fire was kept in one hand and you tried to keep it all from falling down the hole and you had to sometimes push very hard. So anyway, you get the dynamite down there and we could get one shot off.

#213 TC: Was that pretty hazardous work?

DC: Not really if you obeyed the safety rules. But that time we did have two young helpers, Reuben Ramoll??? and another one who were blown up with improper linkage of the dynamite. It was a great lesson to everybody, the dynamite blew up right beside them and they were gone. But we did not have any safety meetings in those days, people just said, be careful and the shooter would say this is how you open the wooden box of dynamite, get up on a truck and throw it down on the ground as hard as you can and the box breaks and out comes the dynamite. He said, it's perfectly safe until you put a cap on. So that was a safety rule, don't put the cap in.

TC: Were you wearing safety equipment in those days, like hard hat and boots and all that?

DC: No. We just wore runners and whatever, a cap, no hard hats. The shooter had to wear a hard hat for some reason. We wore mitts and the cable of course, we needed special

gloves to roll the cable up. There was a big power roller on the back of the truck and this long cable, a quarter mile would be hooked on there and then you'd push a little button and the electrical started would start and this thing would roll up the cable and you had to guide it with your hand. You'd let it slide over your glove and these gloves had a steel face on them so you wouldn't burn your hand. And often an arm would get caught in there if you weren't careful so that was another safety lesson, don't get your arm in there. So then after a few months of that, the crew moved to Bassano. Socony had sent up a brand new recorder with some men to run it and show us, from Dallas, on how to operate this recorder. So after going through the surveying system, I had to survey the surveyors to learn the survey part and then I had to go onto the drills as a helper to see the driller, how he drilled the holes. But after that we were all trying to get inside this truck, this recorder to see what happened. Because all this work was outside, for the first, long time really. We were competing with each other because I think we had 9 graduates on that crew, from B.C. and Manitoba, Saskatchewan, Alberta. They were all in the training phase and we had several trainers, experienced men to train us and of course, the competition was, among the 9 of us, to get inside that truck and became the next big job, which was the observer's helper, the JO, they call it Junior Observer. So I worked really hard and I became a JO and learned how to operate the truck inside. All the amplifiers and so on were all with tubes and we had to change the tubes now and then. We had a 24 trace capacity there and the galvanometers were always going screwy on it and we had to get the little wrench out and get these galvos so that they would reflect the light on to the paper at the right spacing. We learned all these little tricks, how to plug in and how to fix a cable when somebody ran over it and broke it. There's a lot of wires in there, we had to take it apart and solder it and so on. So it was a great training program there too.

#276 TC: Did that work go on throughout the season or was it only done in the summer?

DC: Yes, it was all winter and summer, all the same.

TC: So there must have been different challenges in the winter?

DC: Yes, winter was tough if you were outside laying jugs and so on, surveying. We had to wear rubber boots, big boots with felt socks in them and so on, and mitts and hats and all that. And push the snow off and get your boot to get this geophone planted. It was cold all right but. .

TC: Did the equipment behave differently in the cold weather?

DC: No. Everything was operating. They still have to do that of course, even today, in 2001. The jug hustlers have to wear all those clothes and lay the jugs on the ground. Nowadays of course, they lay hundreds and hundreds, thousands sometimes of geophones. We only had 2 per trace and 24 traces. Of course, the production was extremely slow in those days. For some reason you'd drill a hole in the ground, set the dynamite off, record it and it would come out on a paper and the observer or the JO would look at this and say, oh, there's too much noise on one of the stations, replant the jug. Also we didn't get a good up hole, we'll have to reload this hole. So out comes the shooters with their poles and they would have to put another load down this hole and that took a long time sometimes. Besides if we hit gravel or something the drills were very slow and quite often we only

shot 2 holes a day. They would shoot one hole maybe 3 times and the next hole twice or something. But the drills were slow and the loading was slow. And our production was extremely low, 1 or 2 holes per day. Some days if the holes were good we'd get 5. Now of course, look at the hundreds per day. And there was an awful lot of experimentation too, going on on the traces, on the records themselves. So that's why we had to shoot at different levels and use different powder sizes and so on. So then after about a year of this I got a promotion, I became the observer, which was the fellow that actually was in charge of the field crew. There was an observer and a helper and a JO, he had all the jug hustlers, the drills and so on to operate and he had to make decisions in the field for all these people. So that was a good job. I had to make sure the records were obtained properly. My hands became completely ruined. When you take a record, it was all on paper, photographic paper and we had to dip it in these solutions to develop it. So you had the developer and the fixer and the wash and so on and it was very hard on your hands, it was worse than detergent. So any observer always had cracked fingers and little bits of blood oozing out here and there. I tried to keep it off the record. So that was a good job and we worked in Bassano for a long time. Then I got into the office, which was the field office. The field office then was the next stage in this recording. We'd take the records in at night, hand wash them and dry them and hang them up on a clothesline in the office and then the office staff would take these in the morning and later on, when they were dry and roll them up and stamp them and mark them on the back and put all the ??? tips and so on. And I worked on that in the office as a junior computer they called it. The computer was a big wheel in the office but I was a junior computer. There was a lot of labour on these very few records that we had. We had to make cross sections on big graph paper, pick all your records, pick the times by hand, after computing it of course and we'd compute it to data, pick all the records, all the centre traces, all the end ties, plot everything on graph paper. One person would plot and the other would call off numbers and we'd plot and plot and plot and draw and draw and make a cross section of what we had. Today looking at a cross section like that, people would say, it wasn't very good but that was the best we had. We'd make these cross sections in 6 mile blocks, each section was 6 miles wide. And one would join the other and we just had rolls and rolls of them. After a few months of that, I became a computer, which was the head person there. And at that point Mobil said, you're on a training program, you've been out there, I think it was a year and a half, it's time for you to come back and get back into geology because really you're a geologist. I said, well, this is so interesting, can I stay for a little while longer on a seismic crew because I figured I hadn't learned everything yet. So they said, that's fine, but you better come into head office to do that so I was then transferred into the head office in Calgary.

End of tape.

Tape 1 Side 2

TC: Now you were telling me you were still very interested in seismic and you had gone to the head office in Calgary.

DC: Yes, I transferred into the Calgary head office, where all the activity was and at that point I just worked under Jim Kidder in his office there to see what happened to all this data that we keep bringing in. I'd see how the maps were made and what the different land problems were and how we could use this data advantageously to get the land department to acquire land and so on. You worked with the geologist, that was very interesting to see how we could coordinate what we had found in the field with the geological ideas that were being generated in the office and we could work together on that. This leads up to one of the big problems that I think we had. I'll address it later maybe, but the geological department, that land department, and the geophysical department were all sort of separate entities and the bosses, they would come together up at a higher level than the district people and the managers and the chiefs and so on. But the people working in these 3 different sections were separate, doing their own thing and the cooperation level was not good. The chiefs were always trying to get us to cooperate but they became sort of little companies within themselves and had to be good cooperation but we didn't cooperate. We would all take our own thing. And that led me to later life, spending an awful lot of my time trying to foster cooperation and I think that was one of the contributions I made in wherever, was to bring these people together and to get them talking and get away from petty jealousies of their own importance you might say. So anyway we were working away in this head office and I kept hearing rumours that they were going to create a hotshot crew and they were looking for people, or not looking, they were going to assign, people to work on this hotshot seismic crew, which was a roving crew really. It would go to all these different areas and start things and as land people and so on, demanded information on these different areas, this hotshot crew would go there. By this time of course, I was married, Vi and I had married in 1954 and we had a little girl, Cindy. One day Jim Kidder came down and slammed the door and said, okay you're going to be in charge of this hotshot crew. You'll be the Party Chief, in those days there was only one designation, it was called the Party Chief, and he said, you better bone up on what you have to do to be a good Party Chief because you'll be going out meeting this party pretty soon. Oh boy, that was a lot of thought went into that. So to help that along I was sent to Edmonton for a few months. It was just at that time that Arnie Nielsen and his group had discovered Pembina. So I was in and out of the field and into the geological department and so on in Edmonton, which was a very busy place at that time and very important because it was a huge discovery. So I was only there a little while and then we had an office in Grande Prairie, so I was sent up there. All the time with Kidder saying, this is training now, stick with it or else come back to geology. And I said, no, I'll stick with it. So I went to Grande Prairie and we had a Party Chief there called Bruce Jacobs, who was an old hand at all this and he helped me a lot. Then suddenly this new crew was started, this hotshot crew was started and I was put out in charge of that.

#047 TC: Now, the hotshot crew, were they a combination of different specialties?

DC: No, it was a straight seismic crew. With all the categories in there. But they called it hotshot because we had to be hopping a lot. So we hopped from place to place, maybe a week or two here and a week or two there. Not only that, all the training I'd had so far was very helpful but we now had to do accounting and I was given a budget. In those days a Party Chief was in charge of paying all the bills of a crew, except the payroll for the employees. So we'd have to get all the drill invoices in, they would submit invoices, we would check it all out and then the Party Chief would write cheques, actually write a cheque for the drills for the month. And all the supplies that we bought and so on, the rent on the office that we had to take when we moved, everything that was involved with accounting had to be done by the Party Chief. Plus all the field supervision, you know, all the . . . how deep are you going to drill the holes and how many drills do you really need and so on. Look after the observer and help him if he had trouble and also the office staff, which was 3 or 4, I had to supervise the staff. It was a very stressful, full time job. Nowadays of course, they break it up into Party Manager and so on. But we had to do it all then, everybody did it, every Party Chief had to do it.

TC: It's a lot of responsibility though.

DC: It was a lot. Great for a foundation if you could stand it.

TC: Was your family with you in that time?

DC: During that time, every time we'd move, like we moved to Barrhead and had to find a little house to rent. So we rented a house for a few months and decided that if the family was going to come with me they'd have to go in a trailer, a portable trailer. So I bought a 32' house trailer, massive, big 8' wide thing. We needed a truck to pull it and every time we moved we'd take this trailer with us. Vi and I would move to wherever we went to.

TC: Your wife's name is Vi?

DC: Vi, Violet or Vi. So by the time our little daughter was 2 years old she'd lives in 26 different places.

#080 TC: Someone told me actually, that they don't call it Mobil for nothing.

DC: That's right.

TC: But having the trailer must have simplified the moves.

DC: Oh yes, it was very much better for us personally. All the office stuff of course, had to be packed and hauled to the next place and so on. But the trailer, we just taped the doors shut on the cupboards and take off and then find a place to park it, hook up to electricity somewhere.

TC: It reminds me of back in the Turner Valley days, the skid houses that they had. You know, where they just hooked on a team of horses or a tractor and dragged them away. I met a woman who raised her family in a skid home. I know there's a huge difference between that and your nice trailer but the idea of it is similar.

DC: Yes. If the family's going to come with you, that's the way to do it. Of course, the whole crew, the drillers had trailers, the computers had trailers, the surveyors, they all had trailers by this time. And when we'd move into a town we'd either scatter and try and find a place or else if you could find a public spot that had enough power for us, we'd all go

together. I remember in Smoky Lake we all parked on an old burnt out garage that left the cement slab there for the garage, we parked all our trailers on there. The ladies had to make do with their washing machines, they'd come out the door and put it on the cement and wash the clothes. It was tough on ladies really.

TC: What happened with the schooling, were you in any place long enough that children would go to school?

DC: Well, in our case our kids were under 6 all the time. When they became 6 we moved back to town. A lot of them, as the kids got older the wife would go back to a village someplace and stay and he would sell his trailer and go back and forth. But yes, schooling was tough really. Then we moved from Warner, Athabasca, Smoky Lake, Peace River, Bigsby, a whole lot of places, we'd just go as needed. And of course, a lot of it was experimental too, because we'd move to Thorsby for instance and there was an awful lot of problems in getting good quality records. The ghosts, we call it ghosts on the records, Thorsby was notorious for ghosts and we were trying to determine many factors on what we could do about these ghosts. Do we change the shot depth or filters or whatever, or else just plot them up, the various shots and identify them and then eliminate them just by looking at the record, saying that's a ghost, that's a multiple and this is a true reflection. So we would experiment on how to do that and eventually, if we ever found an answer then we'd pass it back of course, to head office, which we were in contact with daily. And if another crew ever went in then they could use that as a starting point, to run a full survey. And we'd shoot maybe 4 or 5 miles and then move on. So this great training again. Mobil was just great for training and a lot of the big companies were, like Shell and. . well, all the big companies had training programs. Because they thought the employees would stay forever. And we thought the same thing, we're going to stay here forever.

#125 TC: Unlike today in a lot of companies. The seismic being almost in an experimental form, the interpretation of the seismic must have improved a lot, your interpretation of what you were seeing.

DC: Yes. Once we solved the problems then we'd have to make an interpretation of what is a true reflection. We'd identify sometimes, and map what we had on a map. It might only be 6 miles long but we'd put values there and contour it and say, it's going up or it's going down or whatever. We then tried to see some lithology changes, you know, how the reflections come together and go apart and so on. We'd try that and then one of the big things was to identify your record. You would take a record and it might be two seconds long with a bunch of reflections on it, what was this reflection geologically. We'd follow this event, we called it an event, and plot it and say, is that Cretaceous or is it Devonian or just what is it. So every time anybody would drill a well we would run what they called a well velocity survey. And we'd go to that well, the crew would just stop working, we'd all go to the well and set up geophones around the well. And as the well would drop a song??? down in there, we would shoot a shot into that and determine the time it takes for a reflection to go from the surface, down to the level of where this song was, whatever it was. And there was no such thing as a continuous velocity log or anything, we just had a

detector down the well that would detect a straight line from the shot down to where that. . So when you go to the Mississippian level, the geological person would say, hey this is the Mississippian, stop it and we would stop the geophone down there and shoot from both sides. And then of course, there was a triangulation and a trigonometric problem there, we had to correct it all to a vertical and we'd plot a time that an ordinary reflection would take from the surface to the Mississippian and we'd know that in time, 1.2 seconds or whatever and then go back to your seismic record the next day and plot the record and say, hey this reflection is the Mississippian. So we then identified those things, each level, for this particular area. And then we'd know when we mapped this, we'd put a mark on the bottom, Mississippian. And away we'd go, make a map. So the interpretation scales were then coming into play a little bit. The make up of a seismic record, the identification, the mapping, the corrections, the plotting and all that. Which we now were finding were now becoming a little more useful because we're now saying that hey, we can go back to the geological department and say, this is our map on the Mississippian. He'd say, hey great, we wondered which way it was going from this well, up or down. And we would then talk about it. They had to avoid this problem of the map then disappearing into the geological department with no further conversation and it would then be his and he would then take it. Whereas he wasn't cooperating with us and we weren't cooperating with him. So at that point I always tried to say, okay, let's keep this together and talk about it and jointly go to the boss and say, this is our interpretation rather than this is my interpretation. Mine is me, but we're a company, we should have more than just me that's the company. We want the people that are working there to really get together and go to the chief and say here's our interpretation. And then we got a lot more out of it. Because quite often if one was working alone, like if we just had the Mississippian without the geological people, they might say it's regionally dipping this way and so on, it's composition is such and such and we wouldn't know that. But when we talk back and forth and say, hey, is that what you said, look at this, here's the record, I think that's what you're talking about, is that right. And he said, oh, is that the way it goes, and it would be a great cooperation.

#189 TC: I can see how enthusiasm would then build over something like that because it's bringing a lot of new insights.

DC: Yes. And the more you talk the more things that there is to talk about.

TC: So the cooperation aspect then, just got better and better did it?

DC: Yes. One of the ways that they did it, Mobil or Socony, I give them credit, they put geological people out on the seismic crew and seismic people, sometimes would go on well site and learn about the geological problems. In my case I never did get back to the well site, I stuck with that darn seismic. So after seeing the potential for interpretation and having had, I was 2 years as a Party Chief, I could see these things disappearing into head office with great interest, something was happening to all this data. And I wanted to get back and see the interpretation of it. So then about 1957 I got off the crew, I went to Peace River, in the Peace River district office, Murdo MacIver was the chief there and he and I were great friends. He was a geologist that had been on the crew when I first went

out and he was on the training program too. So we were together on the crew aspect and then he branched back into geology. So there we were back in Peace River, half trained you might say. He was a good geologist and I think I knew a little bit about the seismic field. So we would get together on this interpretation and the cooperation level was high at that point. I was finding out that it's a personal ability I guess, to cooperate. Murdo was good at it, some other geologists were not I thought and certainly a lot of the geophysicists were not cooperators. But in Murdo's case it was great. So we learned how to make maps. We'd take more than this mile or so, we had by this time hundreds of miles of seismic had accumulated in the district. And you could then start expanding in a 2 dimensional way in your contouring. We would feed in all the reef information and so on and then look for it. So I was there until 1958, a year and then came back to the Calgary head office. They'd promoted me too quickly I feel. I thought I was ready and I guess they did but I wasn't ready for the big job of District Geophysicist, which was in charge of the whole of southern Alberta. To make plans and to make coordinated efforts and have meetings. I wasn't up to it at that point. So I had to struggle there for a long time and finally Jim Kidder and I sat down and decided that I would be better off not in that job. In fact, I was demoted. Because I wasn't up to it. So I worked as a helper in the district there and we did a lot of good work. It was great that way and in effect, it became more training.

#245 TC: How is that position different from being the Party Chief?

DC: Party Chief was in charge of the seismic party only. He paid the bills and so on for that but a district geophysicist was in charge of many crews, he was like a supervisor over several seismic parties out in the field. He might have 4 people like me out in the field, 4 different parties. And then they all reported to a district geophysicist and he was step up of course, and then he would plan where to send these crews. I didn't know where to send a crew but he would say, with these conversations with the managers we do it this way. And that was really new to me and I thought, oh boy, I don't know if I can handle this. Because it was too much until I knew what I was doing. So I was demoted to a district helper. But I kept at that and it was about another year or so and then a good friend of mine, Jerry Sykes, he was working for a new company called Canberra Oil Company. It seemed exciting that it was a small company, strictly seismic. Not much geology but a lot of work going on. So I quit Mobil, I quit the Socony Mobil organization. In part because I was not disappointed but found that I wasn't ready for the bigger job in a big oil company and that this other job seemed really exciting. So I went to Canberra and was in charge of several crews there. It was like a district person but we had a lot of crews going, we had a lot of interpretation and fast, we had to do it quickly, get the maps out. Don Sorgenfrei, he was the chief, he was a good fellow from the U.S. And we were doing great things, or we thought we were. We looked at the Berland River up in the Kaybob area. We were finding all sorts of these strange looking features which they called reefs. By this time tape had come in, magnetic tape and we were actually getting magnetic tape products, which were primitive sections but still, they were pretty good to work with. We didn't have to work with the paper anymore. Mobil actually started that, I started with tape with

Mobil about I forget, some time when tape first came in. So tape was a little faster, we could get the things out.

#298 TC: So you didn't have to develop it, right?

DC: No, it was all magnetic tape. Parallel with that though, I always kept paper records for several years. Because we didn't know what this tape was about.

TC: You didn't trust the tape.

DC: I didn't trust the tape, no. Then we were just going great guns. Superior Oil in the States, who were the parent company of Canberra, decided to disband this whole thing. And they transferred me to, or offered a transfer to Wyoming. But by this time we had some kids and my wife wasn't really happy about going to the States and I said, I'll look for a new job. So I then hired on with Pacific Petroleum in I think it was 1963. Pacific was a fantastic company in those days. The McMahon's had it and they were entrepreneurs, they were risk takers, they were money spenders, and they found oil and so on and the company was growing in leaps and bounds.

TC: Was that an American Company?

DC: No, Pacific Petroleum was started by the McMahon's in Calgary here. McMahon might have come from the U.S. himself, I just forget. But one of my long term friends came out of there, he hired me, Stan Oczkowski, he's dead now, poor guy. He was a trained geophysicist and the chief of course. He and I became great friends and he gave me an awful lot of opportunities. So I was there for 13 years and we did all sorts of very interesting work besides just seismic. We did a lot of experimental work in the Arctic. That was one of the big contributions I think. Stan had a vision, with the other managers there, Jim Scott and so on to go up to the Arctic Islands and the far Northwest Territories, to experiment and see if seismic could be obtained. And then we had a fellow, Dice Cameron, who was an exploration manager or exploration superintendent, anyway he was the boss of all the exploration. Through his vision Pacific acquired a lot of land in the Arctic Islands. Way up, offshore, onshore, all over the place. Pan Arctic was just getting started. So we were quite often pressed in the geophysical section to see, is the seismic any good up there, it's so cold, is it going to work or whatever. So Stan and I and a small crew went up there several times, winter and summer with a hotshot crew and a Twin Otter, or a single Otter aeroplane. And we'd fly way out on the ice, north of Graham Island and so on and set up and drill holes through the ice and take sample records, to see what the section was like, to see if the seismic would work at all. And we tried all sorts of funny things up there trying to get a seismic record. We went up with surface charges, which are big 25 lb. blocks of dynamite. We just set them on the ground and tried to record when they blew up and so on. We certainly got a lot of noise on the records. And we'd see hints of reflections. We didn't take enough time or effort to really. . .

End of tape.

Tape 2 Side 1

TC: I can just imagine trying to take seismic readings through ice, through water. I mean, if you're up there on snow you don't know really what you're on top of, it's a tremendous challenge.

DC: Well, the snow wasn't a problem, we could dig down through it to hit solid ground. If it was ice, you put the geophone on the ice, if it was ground, like on an island, you'd set it right on the dirt, frozen of course. The permafrost was maybe 1,500', 2,000' thick so it was all frozen. There were a lot of problems with the surface though because you created so much noise and you didn't get a good energy contact with the ground, that your quality was poor. So we would then try to dig a hole somewhere. We actually took an electric generator up one time, with a great big power drill and an auger, a specially built auger and we tried to drill into this frozen ground electrically. We'd get down a little bit, put a charge in there, tamp it and freeze it in and then shoot it and you'd get a little better quality that way, because there wasn't as much ground noise, air noise.

TC: Did you ever try melting?

DC: No, we never tried melting, no. Hey, you're hired. So we did experimental work at Graham Island, Cornwall Island, out on the Norwegian Bay ice, ??? over by Inuvik, Ramparts, west of Norman Wells, north of Great Slave, we were all over the place trying to get some kind of coherent data. And of course, we weren't the only ones, other companies were doing that too. Other companies had done a little more. They'd even gone in with tape and done CDP and got sections that were a little better. But always the challenge was improve the quality, improve the quality. We never, even today I don't think, reached the ultimate in quality that we want. There's always some little problem with multiples or interference or noise and a bunch of sophisticated new things that they've found that are bothersome. So we're always trying even yet, to improve quality. I guess I spent a lot of my life trying to improve quality. Then let's see, we're up around 1968-'69 now. Everything was progressing in the Arctic I guess. I was in charge of what they called the northern district, under Stan, which ranged from Fort St. John right through northern B.C., which was the main area we were looking after and then these experimental things all the way through the Territories and the Islands.

#038 TC: How was it when you met up with other seismic crews from other companies, was there an interaction there at all?

DC: Well socially there was a lot, meet in the beer parlours but officially there is not supposed to be any cooperation between competitors in what you're doing in the field, how come you're getting better records and so on. We would talk about things generally but the actual settings of the instruments and what type of geophones we were using and so on, wasn't always really out to the competitors. And sometimes inland sales, you know, we'd have a land sale up around Fort Nelson or something, there would be many crews in there shooting their own survey for whoever, Hudson Oil and Gas, West Coast, Shell, Imperial, they would all be in there shooting the same area maybe. And we would have to then quickly evaluate what we got and talk with the land people to see what kind of a bid we

would make on this land that was coming up for sale. And we'd all competitively bid and it was secret bidding of course. And if we thought oh boy, we see a great big extension to the Clark Lake reef and this is another little reef off the end or whatever and we think that's really good, the land department and the managers would say, we'd better bid pretty high on that. And if we got it, then that land became part of their inventory and we could go and explore it in great detail and eventually drill it you see.

TC: Was that handled the same way as say, an oil lease would have been?

DC: Yes.

TC: So the seismic would have to obtain the sort of lease rights?

DC: No, we would go and determine its value really, value seismically. Does this really have a reef under it, this land. Then if it's a permit or if it's a lease or whatever type of category it's in, you'd bid on it, the government would say, okay it's yours, you can have it for 5 years, there's certain commitments you must make on this. Like you have to do more seismic, you have to drill and so on. So it was a cooperative effort on establishing the value of a potential area. So around Fort Nelson, Pacific had tremendous holdings, they had Clark Lake field, which is a big gas field and I think it was 2 trillion cubic feet of gas, it was a big one. ???, went stretching up the reef, way up to Pedatoe???. And we were in there, Pacific was, I was in charge of the district and we sent crews in, especially in the winter of course. Mostly always in the winter when it was frozen because it was muskeg. And we might send in 5 or 6 crews in different spots along there to shoot all you can this winter, send it back and then we'd interpret it in head office. By this time the crews were evolving into a different pattern, there was a Party Manager on the crew and all he did was look after the field work and make sure the drills were drilling and so on. There was no more Party Chief who looked after everything. Because after the crew did something they would send all the data to head office. Then the head office would then put a battery of people on to determine what to do with it. So we spent several winters up there in the Fort St. John area, all through there and I was doing a lot of work just as a district geophysicist, under Stan, for years there. Then a very nice thing happened to me in 1969-'70, Pacific decided to send a surface geological crew into the Arctic Islands. Then I thought, boy oh boy, just like way back in my school days, a surface geology crew with Dr. Byers. So I went to Stan and said, you know, I had a lot of fun in the surface party, I'm a geophysicist but I do have nice memories of geology in the field. So eventually I was put on in charge of this party, to mobilize, to get everything ready. We had I think it was 6 geologists and myself. I was not going to do any geology but I was in charge of all of the logistics and keeping people happy and well fed and so on. So I spent many months getting all the helicopter contracts made up and going to the tent people and making special tents, making fuel arrangements. And then we had to have support aeroplanes, Beaver and Otter and so on, getting contracts made up with them. And working with the geologists, the Chief Geologist was Sid Smith at the time, a very nice guy. He and Stan were equal. We had a lot of good knock down fights about getting this crew going. Then we flew off and I had to get a Bristol bomber contract with Lamb Air, to haul in a helicopter, all taken apart because there was no place for the helicopter to fuel. So we had to take the helicopter in by aeroplane. So this Bristol bomber, Bristol plane, transport,

belonged to my cousin, he was in Lamb Air in Manitoba. Lamb Air was a big company, I had 6 cousins, all pilots, my uncle was the chief of this Lamb Air, so I just called him, called his son actually, Greg and said, hey we need a transport, how am I going to get this helicopter up there. No problem, he sent up this great big thing, it was a big aeroplane with a front opening, we took the helicopter apart, put it in there and took it up that way. Then we got up there and we had this geologist, Pat Denham his name was, he was the Chief Geologist on this party, I was managing it and he was looking after all the geology. He and I worked together, he said, here's my maps, Crocker and Chester and all these geologists were there and they'd say, we've got to examine this area so we'd fly them out with the helicopter and put a little tent there and they'd stay for 2 or 3 days, crawl over this mountain and do the geology. We'd have radio contact and everything, we were in touch with the world. We had a cook tent, everything was. . it was a tremendous summer for 4 months.

#122 TC: You actually had a runway that you could land the Bristol bomber?

DC: The Bristol landed at Eureka which was a weather station, then we flew the helicopter out from that. Of course, the Otter and the Beaver would just land on the mud flats around us, they didn't need a runway. I have a little story about that I even wrote.

TC: Really.

DC: Yes, it's in a little book that I wrote. I'll show it to you before you leave. Called the Crane's Tale and it's the stories of the north like that, it's a bunch of short stories. That's one of them, how we did things up that way.

TC: Did you encounter a lot of ??? or Dene people in your travels?

DC: Oh yes. All through British Columbia of course, we had the Indians and up through Norman Wells and Inuvik we had the Dene, or the Inuits I guess they're called. We had to have a lot of talks with them. In those days it was a little easier I think, now they're a little more demanding. But we could go in and show them what we wanted to do and hire them and quite often it worked well. But in the Arctic Islands of course, there's no people at all, at all, no Eskimos or anything. You had to take your own people in. Then after that summer, Pacific, I kept working as a district person there until 1975 or '76. Let's see, how did I go about this now. '76 I think it was. Anyway I went to work for Pan Canadian, as a district geophysicist for the U.S. district. Stan Paskevich was the geologist and my boss really. Pete Savage was there. Pete Savage the famous ???.

TC: Yes, I know him.

DC: So we had a lot to do in the States. They were expanding from Calgary into many areas down in the States and just about every two weeks there would be something to examine down there and we'd fly to all these different places, Denver, Houston, Louisiana, San Francisco, Santa Barbara even, to look at plays and different things that people had prepared for farm out. And wondering if you wanted to take this deal you know. So Stan and I would go down, spend 2 or 3 days, examine all the data, seismic and geology and come back and write a report and say, hey this is a good deal or no, it's no good. And then it would go on up through and Pan Canadian would then decide whether they wanted to get into it. They set up a small office in Houston and we would go in and out of there. But

Denver was the big thing, we would go down there many, many, many times. A tremendous experience again, in looking at so many different plays, different areas, different basins, different geology, everything was new and exciting of course. While I was there, after 2 years of that, I had another good friend, Harry Roody, who was a geologist and he had set up a company called Plastercico??? and he was looking from somebody to do the geophysics there. So I said, well, I'm going to start a company of my own. That was my first company, I called it Don Crane Geophysics Ltd. And I went on contract with Plastercico. There it was much the same, doing all the seismic, working with the geologists of course, doing all the work there. At this point in time, and the biggest change I guess I ever made was when Easton Wren was going to set up a consulting company consisting of geologists and geophysicists and make it into a real good company. It was a fairly large undertaking. So he and I talked and I went and joined the company, so there was three of us, four of us actually that started it and we called it Petrel Consultants Ltd. We hired a couple of guys and started in to do consulting. And we got some good contracts from various oil companies to do studies, coordinated studies. And that was the big goal of my life, to get these guys talking together and now that I was one of the principals in a company, Petrel, consisting of both, we made every effort to keep things together and come up with a unified, one approach solution to anybody's problems. Anybody in the whole world we'd tackle you see. We got quite busy so we hired people, we hired many geologists, geophysicists. Then we got into processing, we even started a processing centre, which was a centre where we took all the seismic tapes, information, records and so on and created these sections. It's a well known thing in industry, processing company. We'd make our own sections and did all the studies that needed to be done on that. We also branched out into Denver, we set up an office down there and hired a couple more people. At one time, well then, one of the partners left, so there was just three of us left, Easton and myself and Neil. Neil Hutton that is.

#215 TC: And who is the other man?

DC: Easton Wren and myself, Don Crane. And the fourth one was Bob Bolton, he quit. So at the time anyway, we were up to about 45 employees. It became quite a well known company in the early 80's, 1980-'87, it was quite a well known consulting company. We did processing, we did interpretation, we did coordinated reports. We'd handle all sorts of projects for companies that wanted to do something and they'd just hire us and we would handle everything, from permits, studies, the whole works anyway. And of course, we charged them handsomely it seemed. I thought we charged too much but Easton was always saying, no we're worth it. Anyway that's what we did.

TC: Did you ever get into the ocean seismic at all?

DC: Yes. We did quite a few things in the ocean. We did offshore surveys in the Beaufort Sea. I actually got seasick on the boat out there. On the east coast, we did a lot down around Sable Island and so on. Not a lot I guess, we had one contract down there to do an extensive survey, which lasted quite a while. We never did go overseas to do offshore overseas. But during the time we were with Petrel we did studies in different places, like

we did one in France, one in the Philippines, England, places like that around the world. As a company had an idea, whatever the company was that they'd like to get into Madagascar or wherever, they would say, what do we have to do and we'd look into it and try to do it. We never got to Madagascar but . . . Then I was sent on a mission once with the Alberta government to Nigeria. It was a trade mission. The government sponsored a group of scientists, everything from seismic, geology, medicine, telephones, any business that Alberta felt that they were able to contribute. So I went as the seismic person and talked to people in Nigeria to see if there was any way that we could, first help them and also help Alberta and of course, help ourselves by getting contracts. So we did a lot of things there, the telephone people were very successful. We didn't feel that we could handle, there were problems, many things that we weren't experienced in.

#283 TC: Well, the environment is a hard one too, isn't it?

DC: Yes, the environment and their way of doing business mostly. You know, you have to pay off somebody, how do you price things, it's a different mind set. So we didn't get in there. I was also sent to Poland for awhile. Polish professors had come up with a new exploration tool, I think it was called Wega-D. They were touting this as a way of finding oil, as a new method. So off we went again with a group, I think there were 6 of us, geologist, engineer, manager and so on and myself. And we went over and examined this in Warsaw and Krakow and way over, out into the field there and came back and reported on that effort. It eventually did arrive in Canada, through ??? and it was used in part, but my own feeling was that it wasn't really successful in finding oil. So I had to write that down.

TC: What is the success rate with seismic in finding oil?

DC: Well, in the old days it was poor I'd say. Nowadays it's very helpful because we have tremendous extra things like 3-D surveys and processing capabilities that are great. And I think you can maybe say it's 1 in 3, if you cooperate with geology. You can't do it yourself. If you cooperate I would say 1 in 3. So you've got two bad ones and one good one. Now sometimes you have to put in there the luck factor. You might get 6 in a row that are all great. But over the long term and years gone by, I think you'd have to say they've had a few misses. But with the geology and 3-D surveys, and horizontal drilling and all these funny things that they now have, the rates are better. Notwithstanding the fact that we've discovered so much already, finding something new is more difficult than it was in the old days, in that respect. If it wasn't found then you had a better chance of finding something. Now an awful lot has been found so the new things are harder to find in that respect. So it's a see-saw.

TC: I've been doing a little bit of research of the Turner Valley area and I was actually asking around for a piece of seismic to show from there. Someone told me that seismic is very highly protected even still, that people don't want to let any seismic go.

DC: That's true. There's a way around it, you cut the label off so you don't know what it's of.

TC: But it goes back that far that it's value, even seismic that was done years ago is still valuable today isn't it?

DC: To varying degrees. Of course, 1940's and 50's is not any good anymore. But as tape came

in and as records were taken in areas that you can't get at anymore, like maybe, this area out here, the city that was barren in those days. Now it's covered with people, the only data you have is what was taken years ago. There's a lot of agencies and companies that trade data and that's a very active business. Where we'll go in and shoot something, we interpret it, drill it and finish with it. We say, that area's dead, we don't want to go there anymore, let's sell that data. So we put it on the market through oh, many companies, Sigma, or somebody, that will actually market that. They will go out and put out a map and say, this Crossfield has some data for sale in Bassano and he wants \$500 a mile for it. And then it passes around, people will get a map on it and say oh yes, just exactly where we were going to shoot, why shoot it again when we can buy it so cheaply, let's buy it. That data might be sold once, twice, ten, sometimes in a hot area maybe 20 times, 20 companies will buy it. So you get that money, it's revenue to you, you don't mind selling it because you're making money on it too. And you can get maps all over western Canada, huge maps that show every line that's for sale. So you say, okay, we want to go into Bashaw, what's available, there's all sorts, this way, that way, every which kind of data, take your pick. So then at that point we say, I want to look at the quality of that, is it any good. So you go to this company and say, I want a piece of seismic data on Turner Valley, what does it look like. And they'll say, here's the section and then depending on their own management, they might give you the whole section to look at. Other companies will say, we'll give you a section, we'll cut off the top so you don't know exactly where it is but we say it's in this area. Some others will say, here's a piece that's all cut up in pieces and you get a whole flap full of stuff to look at. So it depends on you, the manager, what do you want to give. So if you really wanted something on Turner Valley we could get a pretty good look at what it's like. Turner Valley is very complex geology there of course, it goes up and down with big thrust faults and so on. Whereas if you got a section at Cessford, it's just like railroad tracks, it's flat you know.

TC: What have you most enjoyed about your career, I know that you've touched on this throughout our conversation?

DC: I guess it's the excitement of new discoveries. I feel like Columbus sometimes, new things to do, new things to learn, there's always. . .

End of tape.

Tape 2 Side 2

TC: So it's excitement and discovery?

DC: Yes, excitement and discovery and I guess the accomplishment of being able to say, with my efforts and with a company of other people, we have discovered something, a great big oil field or a gas field or a new way of doing things. You always have the opportunity to spread that word, that hey, this is a new way of doing things. With Easton Wren of course, he was a PhD in geophysics and he was exceptionally good at extracting these important things, and creating things, giving lectures, he teaches a lot in geophysics. Each time he comes up with these things and being associated with him for so long, that was great. It's always enthusiastic when you're with Easton. Then again, I guess the other thing is the social aspects, travelling and going through all the different towns and cities. We're dragging a lot of friends along behind us that we had made in all these places. Like in Willingdon for instance, we had one friend that's still alive, Swift Current, a lot of friends there and so on. So we had a lot of acquaintances and friends that had things in common, that was great. Then the children, that was an interest to see if anybody was interested in my job. Of the four kids we have zero interest.

TC: So you have four children, you have a daughter Cindy, she's the oldest.

DC: We have three daughters, Cindy, Brenda and Valerie and a son, Paul. I actually did get Paul out on a seismic crew in the Territories for one winter. And that was good for him, he decided to go into something else. So he's now in Abu Dhabi, teaching over there. That's his line.

TC: What kind of teaching does he do?

DC: It started out with English and now it's computers he's teaching.

TC: And your daughters, what did they do?

DC: They're all married. They all became housewives and then after their kids grew up a little bit they all went to work in various things. Valerie's a librarian, Brenda is a housewife and Cindy has quite a few different things under her belt, with geological. . in fact, she's quite interested in geology, geological things, accounting, computing, she does a lot of different things. Right now she's working in Cochrane for the business license people.

TC: Any grandchildren?

DC: Oh yes, we have 11. All over the place. So it's lots of fun. Now that I'm retired it's great. Anyway getting back to Petrel, did you want to go back a bit?

#037 TC: Sure.

DC: To 1987. 1987 there was a company in England, Robertson Research wanted to get into Canada in an exploration way. So I sold my shares in that company, Petrel to Robertson and it still exists today as Petrel, Robertson in Calgary here. So that left me free on my own again. So in '87 I started my last company called Finch Resources. Finch is still active in a way but I'm not. I worked at that, on my own, just me. My wife and I owned the company and I did a lot of consulting on that offshore down east, the east coast. And also up in the Territories. I would just consult on my own and that was I guess, the most enjoyable time in my life. I was doing my own thing and going in when I liked and so on.

So that was for about 10 or 12 years I was active in that, up until my clients, which I had several, half a dozen different small oil companies that were engaging me and one after another they got bought out or went bankrupt or quit or stopped. And as each one left me, I was left with less of a clientele. Finally I got down to one and that one took me maybe, just a few days a month to work for. And I was aiming for retirement, so I went down on a slope, as each one of these companies quit I would do less work. So it took me about 5 years to get to zero. But I think I can say today that I'm at zero. But Finch is still alive in that its profits are still. .it turned into a little investment company.

TC: How did that feel, every year you were left with a little less?

DC: It was great because I knew I'd have to retire sometimes and to quit just suddenly is difficult, especially for the wife I guess. But it would be difficult, but with this, as one or two quit I would then have a few days off and then I would go and build something or go on a holiday or whatever, maybe one or two days a week and it was great. Finally it was one or two days a month and then it just quit. And I don't miss it.

TC: So the transition was pretty easy.

DC: Yes, it was easy and slow and gave me time to do other things.

TC: What are your hobbies when you have time?

DC: Well, I have a pretty complete workshop for wood things. I make furniture or whatever, for my family, my three daughters especially are always needing something and I build things, tables and chairs and curio cabinets, whatever. So I like that. Then I have a lot of property to look after here so summer time it's busy, all that, grass and shrubs and gardens and repair.

TC: Do you cut all this grass by yourself, this is huge?

DC: Oh yes. There's about three acres of grass there to cut. So it takes me awhile to do that. So in summertime we always stay at home. Because it's the best time of the year around here and then winter we go somewhere. The last place we went to was Abu Dhabi, to see our son. We spent some time in the desert there, we go to the coast, cruising or something. We try and get away for the bad part of the winter because we can afford it.

#087 TC: Is there anything else that you'd like to mention about your career, just general comments?

DC: Well, we lived in the best of times, you know, from my point of view, for the oil industry. Everything was ideal, it was going up after the war and so on, everything was expanding. Now I don't think it's so interesting. A young person coming out of school like I did usually gets right into some specific part of a company, in the computer industry or whatever and then misses all the excitement of the broad base. And I think the broad base concept that the big companies had in the 40's, 50's, 60's was a wise thing. Because they certainly developed loyalty among employees, the employees just figured they were going to stay forever. The company did not downsize because there was no emergencies like that. It was the best of times I guess. But I suppose 20 years from now the young fellow will say he lived in the best of times. I hope he can say that.

TC: Well, I think I've covered most of my questions and I'd like to thank you for taking the time to participate in this.

DC: Oh, you're very welcome, it's been fun all right. It's a new venture again.

TC: It is.

DC: Well, I hope you and David Finch is it, can get something that's useful and incorporate things. It's such a big base you've got now, 2 or 3 hundred people, it's going to take a lot of listening.

TC: Yes, but you know, everyone has something important to say. Every time you interview someone you learn something new. So thank you.