

PETROLEUM INDUSTRY ORAL HISTORY PROJECT
TRANSCRIPT

INTERVIEWEE: Andy Kennedy

INTERVIEWER: Tina Crossfield

DATE: August 2001

TC: Today is August 14th, 2001 and we are with Mr. Andy Kennedy at his home at #103 Coach Side Terrace in Calgary and my name is Tina Crossfield.

AK: My name is Andrew Kennedy and I'm commonly known as Andy and I am looking forward to this interview.

TC: Mr. Kennedy could you tell me where you were born and when?

AK: I was born in Wadena, Saskatchewan in 1922, in April.

TC: Tell me a little bit about your parents?

AK: My parents were newcomers to this country. My mother was from south England, Devonshire and my father was from Northern Ireland and mostly Scotland.

TC: And what were their names?

AK: James Kennedy and Agnus Kate Kennedy.

TC: What year did they come to Canada?

AK: Dad, I'm not sure, he came across 2 or 3 times but he came I would say, it would be around about 1904 or something like that and my mother came in 1913.

TC: Did they meet each other in England?

AK: No, they met each other on my father's brother. . . he was farming southeast of Regina at Frances and he was a bachelor farmer and he met my mother, she was a housekeeper for his older brother and that's where he met her.

TC: And what did your dad do for a living?

AK: He was a construction worker and also a steam engineer?

TC: As in a train engineer?

AK: No, a steam engineer for farm traction engines. He had his 3rd grade paper I think it was.

TC: Those big old iron horses I guess eh, that worked on the land.

AK: That's right.

TC: It took a lot of skill to run those machines.

AK: That's right, yes. Well, he had his 3rd class papers and he was handling boilers up to about 300 lb. pressure or something like that. So that he could do night watchmen work in buildings, looking after the steam heat and all that sort of stuff.

#030 TC: Now, do you have brothers and sisters?

AK: One sister.

TC: And what's her name?

AK: Her name, her married name is Joyce Blomberg.

TC: Tell me about your childhood?

AK: It was very interesting. I was born at Wadena, Saskatchewan but Dad was farming just

north of the town of Margo which is a few miles from Wadena. He sold out and left there when I was 5 years old so I don't remember too much about that part but I did like it, I know that. We moved into Regina and he went on construction work at that time. I started school in Regina and went the first 3 grades then the Depression hit completely. He wasn't going to go on relief so he moved out and moved up to the same area, a little bit farther north from where we were before and it was around the town of Lintlaw. He took up a homestead there and I enjoyed being on that homestead, that was in 1931. To a boy 9 years old that was a great place to spend your time. I went the proverbial distance to school, which was about 3 miles to a country school house and I went right through from grades 4 to grade 10 and then I moved in, didn't move in but I went to the high school in Lintlaw for my grade 11 and 12. On that homestead life was just tremendous because we lived in a log shack to begin with and then he built a fairly good log house and I enjoyed that very much. I missed some of the things of the city, like getting into sports and things like that because there was nothing out there, you would get your little softball teams in the summertime and that was about it. The wintertime it was pretty much, snow, did a little bit of skiing on home made skis and that's about it. But most of the time I spent walking to school and back.

TC: Was it a mixed farm?

AK: It was a mixed farm yes.

TC: What were your favourite subjects at school?

AK: Well, mathematics and physics and things like that I guess.

TC: Did you have any sense of what career you wanted to follow?

AK: Not really. Because the Depression was on and the main thing on everybody's mind, we were known as children of the Depression, was to get a job that was a steady job and a dependable job so that you would never get laid off as long as you were doing your work properly. It was to get that little more. . . oh, I would say, you didn't know what you were going to do, you wanted to get some kind of a job of some kind. Physical job would be the labour work and stuff like that and when I had grade 12 I figured I had a pretty good start. But I just didn't know what would happen. And then of course, just before, in grade 11, the war broke out. That's when all of at that time were thinking about getting into the Air Force or the Army or whatever. Because anything would be better than sitting around working for peanuts on a farm. Besides that you might get conscripted but nobody was even worried about that, we wanted to get into the Air Force. I put my application in and finally got in as a radar technician. Because radar was something new then and England was trying to get as many as they possibly could over there so they had a standing order out for 5,000 technicians from Canada. We had to have grade 12 education and they gave us, let's see, it would be about 4 months basic training at the university in electricity and magnetism and mathematics to some extent, then we went overseas and we did our final 2 months of radar training at Preswick Radar School in Scotland. After that I was posted on to a coastal command squadron and the type of equipment was brand new and it was very secretive and you couldn't talk about it, you couldn't even hardly think about it unless you were working on it. It was hush, hush and they moved the radar guys around quite a bit. I was fortunate, I stayed on that squadron for almost 19 months. I went overseas with

the squadron and ended up in India and Ceylon and also into just the north edge of Burma. That's about it. I don't want to go into too much detail on that but it was a lot of travelling and it was all on troop ships and we stayed there for 2 1/2 years I guess it was or 3 years and then back to England again. Then the war was over. When we got back to England it was in April of 1945 and the war was over in June of 1995. 1945 I'm sorry. I got ahead of my time there. That's one thing I find getting older, I'm losing track of the decades a little bit. But I generally try and correct it.

#095 TC: That was a very interesting education, being involved in radar.

AK: Oh yes it was. Because that was the very foundation of it. And then of course, when I got back and got discharged I opted to go into electrical engineering. So that's what I did when I got back, I went to the University of Saskatchewan. I graduated in 1949. Then there were lots of guys, thousands of them in the same boat as me, looking for work. Jobs were getting to be plentiful but not as much as supply. So that I tried. . . our graduating class was being interviewed by a fellow from Imperial Oil, looking for seismic people for running on seismic crews. Because this was just a little over a year after Leduc came in. So that the oil industry was very active. I didn't get on with Imperial, I was interviewed by them and so were half a dozen other guys but they picked three out and I wasn't one of them but that was okay. So I figured if Esso was doing this the other companies must be doing it. So I wrote to the head office of every company I could think of to see if there was a chance of getting on. One of the companies at that time was McCall Frontenac Oil. McCall Frontenac replied to my letter saying that no, they didn't have any vacancies at the moment but they would keep it on hand. I had almost, this was the end of my third year and I had almost gone back into the Air Force, in fact, I had been accepted to go back in for the summer. But I got a telegram from McCall Frontenac Oil in Calgary saying that they found that they had a vacancy for an assistant recorder, or an assistant observer. So I scrapped the Air Force deal completely. That was in 1948 dead on. So I worked the summer with them there, then I came back and finished my 4th year and when I graduated I went back with them again. I got married in the meantime and I went back in 1949 so that I was with them from June 1949 right through until the end of 1985 I guess it was. And the company changed names, I only worked for McCall Frontenac under that name for one year and then it became Texaco Exploration Company. Because Texaco Incorporated in the United States took over a 50% interest and as soon as they did that it became Texaco Exploration Company for us, which was separate from Texaco. They had their own exploration but this was the parent company in the States. And there was the two of them operating in western Canada at that time, there was Texaco Canada and Texaco Exploration Company. I think it was about 1958 when we finally, the two companies joined together and became Texaco Canada Incorporated. So it was all Texaco at that time. Then we moved all over. I spent most of my career with them as a geophysicist, was in the prairie provinces, from southwestern Manitoba right up into the Northwest Territories. Most of it was in Alberta. To begin with, we were on field crews and field crews at that time, all of the companies, their seismic was done with their own crews, most of them anyway. Texaco at that time, they had 3 crews working in central

Alberta, in Edmonton and I stayed in Edmonton for the better part of 2 years. Then the crew moved to Pincher Creek and we operated in that area of Pincher Creek for some time but we were living in Lethbridge at that time. So that made it a little awkward, it was a long drive every morning. Then they finally consolidated a little more and all of us went back, the seismic office and everything moved in Pincher Creek. I stayed there for about 4 months and then we moved up to Claresholm. At Claresholm, Alberta, we stayed there, at least I stayed there for I guess it would be about 3 months. Then I was promoted to a Party Chief, with my own crew, they were bringing in a brand new crew from the United States and I was going to be the Party Chief on it. We operated out of Stettler, Alberta and then from Stettler, Alberta my crew moved to Ponoka and then from Ponoka back to Lethbridge and then from Lethbridge up to Three Hills and that's when I moved into Calgary to the head office. That was in 1956 I guess it was. Once in there, we centralized at that time, all of the field crews, Texaco had 5 of them at that time and they were all going to be moved into Calgary. One of them went down to the States but the other 4 stayed up here and then they disbanded one later on. They started going to contractors doing all the seismic and I think this applied to most of the major companies too, they were getting rid of their old crews or at least, they personnel would stay on in most cases. But they started to, they centralized everything and went with contract crews. I worked out of the head office in Calgary and I was attached to the southern district at that time and then, I guess it would be 1960 I was promoted to a district geophysicist and I was moved back to Regina and I spent 3 years in Regina and then back to Calgary. And the district had expanded quite a little and it took in all of southeastern Saskatchewan or southwestern Saskatchewan, a corner of Manitoba and at that time it was just the southern part of Alberta that I was responsible for. Later on they changed again and they changed the district boundaries, they were doing this all the time and I eventually ended up with northern Alberta as well as northeastern B.C. I stayed on that job for quite awhile as District Geophysicist, operating out of Calgary and then, in 1980 I believe it was I was promoted to an assistant Chief Geophysicist. There was two of us at that time so that I was one of them and I was looking after all of the activity in all of the prairie provinces right up to the Northwest Territories, just over the border in the Northwest Territories and that was it.

#187 TC: Who was the other man?

AK: The other guy who was assistant was Bob Baden. The Chief Geophysicist at that time was Bill McKenna. That's about it, I stayed in that position until, my health wasn't the greatest in the world and I finally retired in 1985. Now there was a lot of things different went on during those 36, 37 years, something like that. To begin with seismic crews in the field were all strictly analogue. You had paper records that were developed and printed right in the doghouse and all those field records went into the field office and all of the interpretation was made right there. We had field offices, you can visualize all that moving around we were doing, family moving with us all the time. But we made, in the first 7 years, we moved 13 times. Now they weren't all seismic moves, some of them

were. . . like I moved 3 times in Edmonton finally before we left there. And Pincher Creek, then we went to Lethbridge, then back to Pincher Creek and Claresholm etc., etc. It amounted to total of 13 moves. Some of them were only for about a month, the shortest period was one month and they average out at about, every 6 months we made a move. And the families went with you. Your living accommodation was not the greatest sometimes, sometimes it was pretty good. But we enjoyed it and I think a great deal of credit has to go to the wives of the crew members because it wasn't a very great life for a woman to be running around with kids and nothing permanent, you just were renting anything you could get. Some of them were terrible. It's a wonder that the health department allowed them to rent them you know, but you had to have a place to live and work. The crews, they type of work we did was basically all reflection seismic. We did do a little bit of refraction seismic in the Pincher Creek country but basically all of it was the reflection. And it was 100%, we were using at that time, I think it would be 12 stations on either side of your recording truck. That gradually evolved over a period of 30-40 years, it gradually evolved, instead of analogue seismic it became digital seismic. Everything was digitally recorded, but before that we kept on with the analogue. We did the tape recording on magnetic tape but it was still analogue and then from that stage we jumped to the digital recording where everything was recorded digitally and the processing was all done digitally. That was the final step that I was with. They finally, just about the time I left the company they had started to do 3 dimensional seismic. Previously it was all 2 dimensional which was easier to do but it was not quite as good. They still do most of it is 2 dimensional but the detail stuff, to get down to it, you get down to the 3 dimensional, which gives you a much better picture. That's about the way it changed over those years. The old idea of sitting in the doghouse cranking out paper and developing it when it was about 90 above in the summertime around Edmonton there and the chemicals all over the place, fixer and developer and stuff, it wasn't too pleasant. And then you suddenly realized you goofed up on something and you had to reshoot the whole again. The drillers that we used all the time, they were contract drillers, none of them were, Texaco did not have their own drillers, they were all under contract to you. We generally had, depending on the drilling conditions but the average was 2 drills on a crew and then if you got into real rough digging, gravelly and stuff like that, you might go up to 3 and maybe 4 drills. But always it was generally 2. We started out with 3 and then we got back to 2. And the crew moved around in those days, you had on the field, now I'm talking about the Texaco personnel now that were on the crew, you had a Party Chief that was running the whole show. On the field crew itself, you had a recorder or an instrument man or an observer and he was in charge of the field crew. Then you had an assistant, so you had two guys there. And you had usually, jug hustlers or the helpers that planted all the detectors up and down the line, you generally had about 4 or 5. So your field crew that's recording, I looked at it as the trucks, we had 3 trucks going out to the field, shooting truck, recording truck and a real truck for moving cable. And there was 3 men in each truck so that's 9 men. And occasionally you had an extra jug hustler around and the only place he could sit was in the doghouse of the instrument truck. So 9 or 10 men was what we had and we had a surveyor and a rodman, they were directly under the Party Chief's direction but we

cooperated very well with them, had to. So that would be 2 more men, so that would be up to 11 men. Then in the office there would be the Party Chief and you will get a kick out of this term now, two computers, a senior computer and a junior computer. So we were in the computer business long before a lot of people. But this was a name tag of your position, your work. You were the ones that computed the formations, you had your 2 way time on all your record sections and you had to convert that into depth and an awful lot of computations were involved which you did with a, you didn't even have a hand calculator, you used slide rules and log tables and that was about it. So that improved quite a bit as time went by.

#284 TC: Was there a geologist on that. . . ?

AK: We cooperated very closely with the geologists but we did not have any geologists on, well, not on a seismic crew. Now that's not quite right, we did have a couple of kids working with us that were geologists but they were working as geophysicists. Then we coordinated with the geologists and all our work was not our own interpretation completely. All the maps we made we would be working with the geologists, they would visit us once in awhile or we would visit them in Calgary. The Party Chief had to go into Calgary at least once a month, just to touch base with them and clarify everything. All his reports were in there and they had to be examined and discussed and given suggestions from the geologists and so on. And then the landman come into it as well. The land department, I'm going to just be jumping around now from pillar to post, but your exploration department as such was made up of geological department, a geophysical department and a land department. Any programs that we got into was all discussed thoroughly by these department heads and by the exploration manager. All the results when they came through, there's no such thing as one individual discovering an oil well or something like that. Lots of us would have our own pet anomalies that we were working on but if they did any drilling it would have to go right through to the exploration manger and the 3 department heads. And that's the way we worked.

TC: In the transition between analogue and digital, was there overlap where you did both?

AK: Analogue and digital?

TC: Yes, like during that transition from all the paper?

AK: No. You changed instruments completely in the field. Also you see, the field crews were not. . . I got ahead of myself here a little bit but the interpreting personnel, like the Party Chief and the computers on the crew moved into Calgary and they stayed at the head office quite a few years before the digital came in. It was just more convenient that way. Then when digital came in it was just a matter of changed instruments completely, went from analogue instruments to digital instruments and then that happened all at once and the interpretation work was going on all the time by the crew in Calgary but they had switched from doing the computations themselves to having the sections and everything turned out digitally but a processor. So that it made it a lot easier for the interpretation staff. It made it easier but there was more work involved because there was more stuff coming in, more data coming in and you were cranking out more maps so that the amount of work you did was still about the same.

#334 TC: But the truck was completely outfitted with the new equipment?

AK: Yes, with the new equipment.

TC: So at no time you would have carried two sets of equipment?

AK: No, never that way. The interpretation of course, was much the same except that it was just a little easier to pick up your reflection times and you could carry more horizons and you could make more maps and stuff like that. And then eventually they got to the point where they were cranking out the maps by digital. . . all the values were cranked out and then the maps themselves were made. Most of the geophysicists, although they use maps like that, they used to like to contour their own maps because you can put your feelings into it much better. You have an idea there's something, the geologist you're working with is really keen on something and you do your best to see if you can make it the way he thinks it should look. And then you get the idea yourself that by golly, this is a kind of interesting game and it's an interesting work and interesting study. Because you're converting seismic geophysical data, you are converting it into geology is what you're basically doing. And the more you know about geology with the seismic, the easier it is to interpret the seismic. And the geologists found the same thing, they found that lots of times they would stay with us and work and do our own little project themselves and take all the seismic data and contour it up in their own ideas and so on. The contouring of a map, it's not cut and dried 100% yes or no, there's a whole lot of feeling has to go into it. You've got to take into consideration your regional dip and what the wells are doing in the area, any dry holes in the area, the logs of all the wells, a geologist studies them and it gives you a little better idea. The logs that were used mostly by the geophysical people were the sonic logs because that gives you your velocities better. To begin with, in the first few years, we had to work up our own velocity data by doing what they called a velocity shoot on a well. When they were coming out of a hole they had a sond??? that they pulled up, they loaded it down to the bottom of the hole and then they'd pull up to the different formations or where the different formations should be and then they'd shoot a charge on the surface and the sond would pick it up. And you had the time on that and you had the depth of that so you could figure out your velocities from it. But the sonic log itself, it just measured the velocity as it came up the hole.

TC: Is it at all similar to the radar technology?

AK: There's quite a similarity between radar and geophysics. The only thing is that the radar is using radio waves and the seismic is using sound waves. So there's a tremendous difference there but the idea is the same, you're getting a reflection and that's what happens in both cases. Once you get that reflection the amplification of it is much the same except that one is a very, very high frequency and the other one is just. . . and also speed. The speed of sound is considerably less than the speed of radio waves.

#396 TC: I'm curious, when you went into digital and more and more material data was being analysed in an office rather than in the field, was that kind of a loss of control at all from the geophysicist?

AK: A loss of control?

TC: Well, not control but . . . how do I explain it?

AK: A loss of their expertise?

TC: Yes, a loss of expertise.

AK: To a certain degree it was but the results were so much better that you were working with that you didn't. . . someone else was putting that expertise into it. And they were geophysical people but they weren't especially interested in any one prospect, they were interested in the data and taking that data and processing it and coming out with the best sections they could. So then the interpretive geophysicist would take over on those sections and they were a lot easier to work with. But you've always got to remember that there was another person or another people or an organization that were making these sections and there might have been a little flaw somewhere here and there. But basically they got to be very good. And then another thing that came out, was developed during the years was the method of shooting. To begin with your shooting in the field was 100%, in other words you'd fire a shot off and you would record it and that would be your record section. Then they got to what they called multiple shooting and stacked data and the first was 6 CDP that went into. . . and 6 CDP you would be shooting the hole 6 times in various spreads. Sometimes it was called roll along shooting too. It gave you a much better, every depth point you got was arrived at through . . . that's what the CDP is, is a common depth point. You had a common depth point and you reached that from 6 different shotholes and 6 different positions of cable. That way it was much better than the straight 100% analogue. It was known as common depth point stacking. And you got a much better signal to noise ration by doing it that way. The reflected signals coming in would be the same reflected signal but the noise of that would be a few minutes apart when they were shot and the noise would be different all the time, so that by common depth point stacking, you would be stacking your common depth point reflections and you tended to cancel out some of the noise. So it was much better, much clearer records. Then they went from 6 CDP to 12 CDP and then they even went up to 24 CDP and that's about when I left, I don't know how many they got up to by now. And also, the cable length changed, instead of from 24 stations, they went right up to, that's 12 stations on either side of your recording truck, they went up to 72 and well over 100. And it was all done by digital work.

#468 TC: How long did it take to set up those?

AK: It takes quite a while. Your jug hustlers went out, instead of using real trucks like they did in the early days, they used breast reel cables, you have them strapped on to your. . . a cable of about, I can't even tell you how long the cable would be on there, it would be somewhere about maybe 1/4 mile of cable and then it would be reeled out and then you would connect it to another one and reel it out and connect it to another one. And ??? cable today is quite an art in a way I suppose. I have never got involved with that but it takes a long time to lay a spread out and if you get 72 group stations, and even over 100, then you're working, you probably quite often leave your cables out overnight if it's in an unsettled area. But it's tricky because you've got enough guys on the crew reeling cable, you can lay them down in the daytime and pick them up at night and so on but it's an

awful lot of extra work. And I would say, I can't even guess at it but the ordinary cable using trucks, way back when we started, if you were able to shoot up to say, anywhere from 15-25 holes in a day that was a good day's work. And that meant moving cables about 15-25 times.

TC: And the area per shoot, you know, when you have the truck and you lay out the cable, what would have been the . . . ?

AK: In distance you mean? In those days it was usually, from one shothole to another would be about 1,320', that's 1/4 mile. So you had a 1/4 mile cable on either side of your truck. And of course, that geometrically progressed as they got to the different shooting techniques.

TC: That's a lot of area to cordon off and to keep people from running over your cable.

AK: Oh yes. That's quite a problem. You had to . . . the recorder would always give a blast on the horn before he was ready to shoot and that meant that wherever you were out there, you just stood still and didn't move a muscle. Occasionally, on a highway, if it was on a road that had a lot of traffic, you would wait until all the traffic had cleared before you would shoot. And you had guys on either end of the cable, letting you know this. So many people have said, this is Joe Q Public now, I went by a seismic crew that was working today and I don't know, you guys never work at all, every time I go by one there's just guys standing around doing nothing. And I would answer and say, yes, they're waiting for you to get the heck out of the way.

#531 TC: If you were working on a road and you weren't ready to shoot yet, would you have vehicles passing over the cable?

AK: Oh yes. They wouldn't really be running over the cable, we didn't like them to do that too much but occasionally they had to. You would keep your cables so that you always had your vehicles parked on the right side of the road and you would always run your cables down on the right side of the road so that you didn't have any cable crossing the road. But occasionally you had to that and if you did that, you would slow them right down. Sometimes we would even put a protecting bridge across it, you know, lay a couple of planks or something on either side of it. You go to a great deal of effort when you're running a recording truck because if those wires and that cable get broken inside, you're the fellow that's got to fix them. And that's a shut down for the better part of half an hour to an hour and maybe more than that. There's an awful lot of wires in there and they get pretty small after awhile. But I would say that there are very few. . .

End of tape.

Tape 1 Side 2

TC: Okay, cable, a truck running over. . .

AK: Yes. It was very seldom that they would get run over but if they were going to be running over it constantly for a period of say, an hour and you were going to be sitting there, you would maybe put some planks on either side so that the truck would run over that. But

going to the breast cable, I think that they were easier to handle, they were a much smaller cable and they had more conductors in them too but it's still just progress, evolution you might call it.

TC: Did you say brass cables?

AK: Pardon?

TC: What kind of cables, brass cables?

AK: No, the reel cables, the cables that are on reels are much smaller and they ??? conductors in them and the conductors are a little smaller too so. But ??? truck running over them, if the truck has got relatively smooth tires, not great big ground grips and stuff like that, they very seldom will do any damage on a cable, if it's a fairly hard surface. But if it's on an uneven surface a truck running over it could do damage to them. But it was never a major problem. You would watch it and the crew would watch it. Lots of times if you had to bring a cable across to go into your recording truck and a car came along you would get them to slow down and stop until you would unplug your cables and take them across the road so they could go right through. I've done that before too.

TC: What about putting the cables over water, like rivers?

AK: If it was a fairly narrow stream you could get them across, just hang them across and you'd maybe shoot a few detectors where it goes over the water but at least you have continuity right across. But if it's wider than a reasonable amount, say 2 or 3 hundred feet, that's getting pretty wide. And you would just shoot up to the river bank and then you would drive around over bridges and stuff on the other way and then you'd come back and then you'd shoot from the other side. That's what you used to call end on shooting. You'd be shooting, instead of with your recording truck in the middle of your spread, you recording truck would be right at the end of the spread. Then you can make your correlation across when you look at your data.

#031 TC: Has the area that you would shoot remained similar even though you got into multiple or you know, up to 72 stations, was the area still basically the same?

AK: No, it would be longer then. It would go up to I guess it would be well over a mile.

TC: Gosh I can't imagine how hard that was?

AK: Well, it's tricky. I never worked myself, personally, with that kind of a spread and set up. It's a technique all on its own but you're using the breast reel cables and you've got the young guys there working. They've got pick up trucks, they're not walking all the time, they get as much of a lift as they can with the pick ups. And you radio control with your observer, most of the time. When we were there we didn't have that, we had an extra set of lines on the cable that you could use to talk to your recorder in the recording truck.

TC: So it would be like a two way radio?

AK: Yes. That's right. When they're doing refraction work your shooting truck is generally about anywhere from 5-10 miles from your spread. So that all of your ??? you have radio on your trucks then.

TC: And radio was in use right from the start?

AK: That's right. You could use communication, like you're always in radio communication with your truck and then when your truck would fire, the instant of the explosion would

be also radioed right back to the recording truck. So you had your, they call that the time break. That's time zero on the whole record, is the time break. When you're shooting your truck right along with the cable and the conventional method, it's done automatically on the cables, it's right there. But when you're doing it radio communication, everything has to be set by the radio, the time break and everything else. So it's vital that your radio communication is good. Lots of times they get a poor break and they're never sure within 2 or 3 milliseconds of the exact point and you sort of have to judge it a little bit. But if you've got a real sharp break you can pick it right down to, I'd say plus or minus 1 millisecond. And that's fairly good accuracy. But when everything is done digitally you can get it so much finer detail and more accurate than visually doing something.

TC: What do you think was one of the greatest advances in the technology? I know we've touched on it throughout this conversation.

AK: I would say going to the digital recording. When it's all done digitally because you can do so many different things and it's done faster. If it's all on analogue, analogue tapes and everything else, it's got to be, sure it's nice to look at the analogue stuff but when you record it digitally, once you get the record sections they're converted back into an analogue form so you can pick them and read them. So that you start out by recording the data digitally and it's recorded, you can do anything with it. Digitally recording, all you're recording are numbers. The voltage in other words, you're recording little spikes of voltages all the time. It's what they used to call analogue to digital, then do all your processing and friggng around in digital, then when you get the final results ready you crank it back into an analogue form so you can see it. That I think, was the biggest advantage.

#083 TC: Who were some of your colleagues?

AK: Pardon?

TC: Some of your colleagues, people you worked with, people in your circle, supervisors, friends, throughout your career that perhaps influenced you most or. . . ?

AK: Oh I see. Usually, as you're going through the mill, there's usually some senior geophysicists that impresses you a bit with things he can do and what he's done and you learn from them. It's usually people that have got anywhere from 5+ years of experience. Some people are great, if they've got a good personality and can get along with other people they can have a vast knowledge and they can dispense it so that you can pick it up very nicely. But some people are very, very brilliant and they can't explain anything and you don't get too much information out of them. But lots of guys will show it to you, the first field recorder I worked with, I was his assistant and I learned a lot from him. He was a big Texan, Guy Johnson and Guy had learned from experience and there wasn't much he didn't know about geophysics in the field and recording. He probably didn't know that much about the interpretation but he sure knew how to record and what to get and what he was looking for and I learned a lot from Guy, he was a heck of a nice fellow to work with. And I guess I tried to dispense an awful lot of information myself as I went through the mill. Particularly when I was working in the head office and working with the

geologists and so on. My argument was, same with guys coming in working as summer students on the crew, I'd give them as much information as I possibly could. One of the guys said to me, are you doing the right thing by doing that because he said, you're telling that guy everything you know, he's just picking your brain to pieces and then he's a real bright guy and he's going to go ahead and he's got all this information from you and first thing you know, you're going to be working for him. I said, that's okay, I don't mind that, I want a guy to get the information from me, if I can help him so much the better, he can stand on my shoulders and go on up. I like to give the guy this chance to do it because the more work he can do for me the less work I've got to do. So I give them every bit of information I know so they can do as good a job as I can, probably better. I think that's the case, in most cases it was better. But I did not believe on holding back information. And the geologist used to appreciate it very much because they said to me, I've learned more geophysics from you that what I would ever get going to a class because you give it to me first hand. And I said, well, I'll say the same to you guys, I have learned more geology from you than I ever did at university. Because you have to know your geology or formations and what you're looking at, sandstone, shale and all this sort of stuff. The prairie evaporite salt for instance. Huge bed of salt under southern Saskatchewan there, they get their potash from it and stuff like that. But that comes in as a pretty good reflection, you can pick that up and map it pretty good. But I learned a lot from the geologists, same with faulting in the mountains. Fault and fault control and the up thrown side and the down thrown side and how to map them and how to correlate one to the other. So it works both ways, I think the geologists learned a lot of geophysics from us and we on the other hand, learned an awful lot of geology from them, which is a good combination. For awhile there, they were trying to call us, instead of a geologist or a geophysicist, they were trying to refer to us as explorationists. Because you can't be a good geologist and finding formations and so on unless you know an awful lot about geophysics. A lot of guys think they can and maybe in the olden days they did and they were very successful but it's so much easier for them if they've got a bit of geophysics to back them. And it's the same thing with the geophysicist, you can't go out and just because you're a geophysicist and you've measured all these things and come up with a map that's going to find an oil reef or something like this, a Devonian reef that's full of oil, you've got to have the geologists in there working with you. The one guy definitely is an asset to the other, there's no doubt about it. And usually every project that's set up to work, it used to be there would be a geophysicist assigned to it, it was his main project but he would also have a coordinating geologist working with him. And that's always the case. So that if there's anything you want to know about the geology you go and ask him. And then you talk about it and that's the way it goes. You get along good together that way, you're a team in other words. And then of course, the land people come into it for posting land for sale. If the geologists and the geophysicists come up with a fairly good looking anomaly of some kind they'll go to the land department and discuss it with them and the land department will check it and see who owns it. If it's a Crown acreage fine and dandy, they recommend it or we may recommend it for a land sale and then you try and pick it up at the land sale. And that's where all the mystery and intrigue comes into it.

Because you don't want everybody to know that you're looking at that acreage. And then if it's already owned by an oil company then you'll try and make some deal, you'll say, we're interested in that acreage too, could we farm it out from you. Then you'll come into some farm out agreement or something. If it's successful and you get a producer from it then it becomes, each one of them owns part of it, a joint effort.

#162 TC: Did it happen when you were out working on the seismic crews that you would meet other seismic contractors?

AK: In the field? Oh yes, quite often. One time, way back about the time that the Innisfail reef came in there was a real hue and cry, everybody knew there was a land sale coming up and I was out there one time with a crew and there was 2 or 3 other crews out there shooting along the same area as us. And there, you've got to be very careful because you can't do anything about it but lots of time you would fire a shot and your record would be completely loused up because during that. . . you're recording after a shot you're recording for about, maybe, oh 3-4 seconds. And if another shot happens to go off anywhere near you within a mile or two miles it'll louse up your reflections completely. And it does happen. And also refraction shooting is very bad for that. But you generally know when somebody else is. . . because you're always on roughly the same frequency. So that if I've talked to the other one time, the recorder of another crew that was working, and we were both doing refraction in Pincher Creek country and he was on the same frequency as we were on and I could hear him and his shooter talking and you generally know when the other guy is going to shoot. If I would be all ready to shoot too, not quite but just about ready and all of my cables are all laid out, and this other guy's going to shoot, just for the heck of it, I did it once or twice, as soon as he said he was going to shoot, you had the idea and I'd start my camera going just to see what I could pick up. It didn't do you any good because you didn't have any. . . you would have a time break too I guess but you didn't know how far away they were or where they were, that was always hush, hush. You didn't say, well, I'm 5 miles north of you right now, etc., etc. and on this road and doing this sort of thing. But once we fired and recorded and then as soon as it's shot, everybody goes back to listening again and you'd get that big roll of paper coming out in your doghouse and you'd be busy fixing it and developing it and everything else and a voice came on the radio, a recorder was talking to his shooter and he said, by golly, we got loused up on that one, there was some blast came through from another crew. You could do that, I had one of my records completely destroyed too that way, well, not completely but we had to shoot it again. Because of interference you see. But you cooperated, it was much better like everything else, to cooperate, as long as you don't give away any trade secrets of what you're trying to do. That's another thing that I'd like to comment upon is that the integrity of all of the people in the petroleum industry, I think they deserve an awful lot of credit because they were so close together in Calgary, your buildings are close together, you have lunches with different guys all the time and you're always intermingling at parties and so on. And the amount of trade secrets that would be lost was very seldom. You could depend on anyone in the business, he's not going to go around shooting his face off about what a great prospect they've got and they're going to

make a fortune out of it and all this sort of stuff. They just don't do that. And if you know anything about a land sale coming up you just keep your mouth shut, you don't talk about it. You don't even give any inclination that you're interested in it because if you do you may not get a chance to bid on that. But you've got to be very, very careful and I think the whole industry deserves and awful lot of credit there, they kept their mouth shut. And that's the best thing to do, you don't talk about these things in public. Somebody might get some idea of it and you don't want them to get that.

#219 TC: Is that still true today?

AK: I'd say to a certain extent it is. You see, Crown land, there's still Crown land being sold and as long as there's still Crown land being sold, they're always trying to get it. And you've got to bid on it. And another thing I'd like to comment the whole industry on, I think the safety factor was extremely good. Because you think of all that dynamite that's being shot, tons and tons of it all the time, handled by different crews and different men, the number of fatal accidents was very, very few. Because after all, you're dealing with dynamite, boy you've got to watch it. And the other type they use is the Vibroseis which is entirely different. Your recording is still the same way but the source of the energy, instead of coming from an explosion, comes from these huge vibrators. There'll be about, generally 3, maybe 4 of them in tandem and they're all handled by a computer and they all vibrate at the same time. All those vibrations that they kick out are at the frequency that is one of the best frequencies for getting reflections.

TC: When did those start to be used?

AK: They started using Vibroseis about in the late 1950's I think, something like that. We had a couple of Vibroseis crews working for us, they go into areas where the dynamite. . . you can't always, in settled areas, rural areas, it's very difficult sometimes to use dynamite. Because you've got to be so far from a water well and so far from a house, a barn, a building. With the Vibroseis that's not near as bad, the vibrations from a Vibroseis truck is a lot weaker than a dynamite explosion. You can actually come right up fairly close to a house. Lots of farmers will disagree with you, they'll say that no, you came back there with these big vibrators and when it was vibrating I could feel it. Well, I said, yes that's true but you also can feel it when a big truck goes by too. And the vibrations from the vibrator is certainly not any stronger than a vibrations from a big truck bouncing around. Whereas dynamite, it's a little different, it will crack a concrete foundation of a house or seal off a water well somehow by ??? water sand and so on.

#263 TC: Did that happen frequently, that dynamite caused damage to . . . ?

AK: Oh yes. Up in central Alberta there, just north of Ponoka a ways there's a place where they're always drilling a hole and you get water flow from it, you hit an artery of water, arterial well and the farmers may have been tapped into that same water sand or whatever you want to call it. And if you happen to be shooting and you seal that off his well goes dry. I think every Party Chief somewhere down the line, some irate farmer comes roaring into his office some morning and saying, you so and so's, I have no water, my water well went completely dry 2 days after you guys shot, he said, it just turned into a muddy,

murky mess. Well, you talk to him about it and sometimes the Party Chief can settle these problems but sometimes you can't and you just turn it over to your claims department. I had one farmer one time, we had permission to cross his field, his pasture land and we hit a flowing hole lot. Well, when you hit a flowing hole, arterial well like, that could be of a lot of use to that farmer because he could use it you see. However, on the other hand, from a government any time you get a flowing hole, if it's on government land, like on road allowances, you have no alternative, you have to cement it up or seal it up as best you can right there. But if it's on the farmer's land he's got the right to use that water if he wants to. And this guy, when we reported it to him he said, boy oh boy and this is just in the right place too, this is a good pasture and I'd like a well out there and I'd like to keep it. But then they have to sign a release that they are taking over all the responsibility and any water from that well, they're responsible and not the company. Then you can maybe help him put casing in if you want to, it's up to you really. You drilled the hole and caused the water to flow and he got the pipe for it so you help him, get one of your drills out there to lower the pipe down the hole and this guy was real happy, he was real pleased. He got this well with water flowing nicely. Then about maybe 2 or 3 months later we came back around and we were tying in to that same general area and we went right by this well that we had given this guy and we were a legal distance from it on the road allowance and we shot a hole and be darned if we didn't penetrate the water sand that was feeding this well that we had given him and his well went dry. Then he came roaring back into my office and he said, you guys are a bunch of indian givers, you've given me a nice water well and then you come by and blast on it and you just seal it up completely. I said, yes, but if it hadn't have been for us, you're just as well off now as before we ever came here. You've got that pasture out there with no well in it and that's what you had before. Anyway I turned that one over to our claims department because I figured he had a legitimate complaint there and they looked after that one. But he was quite annoyed at me because he figured that I had done this on purpose.

#314 TC: Was there safety training given by the company?

AK: Very much so. They didn't have any great big courses you would go on but it was subject . . . we had safety meetings, every month you had a safety meeting and you were always bringing up some topic pertaining to your work. And everybody had to attend these meetings. Then we'd all quite often have our First Aid guy from Calgary coming out and giving up some instructions on it or somebody else from Calgary coming out and giving us instructions on safety. No, it's foremost in everybody's mind all the time because after all, you're dealing with dynamite and like nobody, for instance. . . our rules in the company were, nobody under 18. You actually were supposed to be 18 before you were hired but occasionally some guy, a big husky young fellow from the farms, he might be about 17 or so and we wouldn't hire him, we'd have to phone to head office, phone and talk to the Chief Geophysicist and see what he thinks about it. I had a case like that one time, this guy, he was about 2 months away from being 18 and we were desperately in need of help, I'd like to hire him and put him on. So I phoned our Chief Geophysicist and he said, well, Andy, go ahead and hire him but make darn sure, put him on the survey

crew, and make darn sure he doesn't get anywhere near the shooting truck or the dynamite. Then once he's 18 then that's okay. But I suppose it tangles up with the Workmen's Compensation or the government or something. But we wouldn't let that guy, he couldn't even ride to work in the shooting truck. And there's no dynamite in it when he was going to work but they said to keep him away from the shooting truck completely, that was our orders. So we kept him away from the shooting truck all the time. He turned out to be a pretty fair hand too. And First Aid, we always had these safety meetings once a month and it wasn't on their own time either, it was on company time. They'd tell them to come in early some afternoon and have a safety meeting. And any ideas you've got, you think we're doing something wrong, for Pete's sake, let us know and we'll discuss it. Because there might be something going on out there that I know nothing about and you think it's not safe and we'll check it out. I can't think of anything else really.

#362 TC: What have you enjoyed most about your career?

AK: I think the best job in the whole career and lots of guys agree with me on this, is when you're a Party Chief running your crew in the field, doing your interpretation out there and as the chief explorationist or the chief geophysicist says to me, when I was starting this crew new, he said, don't come phoning us every 15 minutes about something or other. We're putting you out there to run that crew, you run it and do it the way you want to. And if you do something wrong that isn't right, we'll dang soon let you know. But he said, you're like a local god out there, you're your own boss absolutely, from start to finish. And if you want to shoot an extra line down that road allowance to tie something in, you go ahead and shoot it. That was in the 1950's. That changed a little bit later on and this one guy in disgusts said, boy, when we started this 10 years ago we could run our crew the way we wanted to, now we just about have to phone New York or something if we want to turn a corner a different way, you know, or change the line. They didn't want you shooting line here and there, hither and yon. But if you were the Party chief doing the interpretation out there, you pick up something that looks pretty darn good and interesting to you and if you wanted to run another line across to confirm it you could do it. But later on you couldn't do that, 10 or 15 years later you couldn't do that. But those first years as a Party Chief on an analogue crew, I think that they were the best. Because you were your own boss and that means so much. But you had a lot of responsibility on your hands too.

TC: It would be pretty satisfying I think, to do that.

AK: Oh yes. It was long hours. You worked long hours, the crew generally went to work at 7:00 in the morning and they'd generally get in at around 5:00 - 5:30 and you would be talking with the crew and any problems they had and there was all these things, the drills were ??? and they didn't like the rock bits they had and could I get them different rock bits and all this sort of stuff. But it was very interesting. You really and truly, you were kind of on call or could be on call 24 hours a day because if anything happened on your crew or anything or if anything happened to one of your trucks you're the first guy that's going to know about it. But that very seldom would happen but you were kind of on call, you never knew when you might expect a call from Calgary. I got one one time saying,

Andy they want you to scout out, get your surveyor out there first thing tomorrow morning and you go out with him and we may send a crew over there to shoot up about 5 or 10 miles of line, get out there right away. So I did that and we spent a whole day out there. It would be a horrible place to run line, I was thinking somebody's got holes in his head. But nonetheless, if they want it shot we'll shoot it. But it was uphill and down dale and I didn't even think we could get a drill in there to drill some of that stuff. The surveyor felt the same way and he was all set to go but we got back in that night and I got a phone call again from him and he said, forget about the whole thing, we've scrapped it, we don't want to do it. And I said, well, thank goodness, I didn't think we could make much of a . . . you know, it was down a river valley ??? and I didn't we could work it at all. But we had to go out and check it just the same. Some of these Party Managers they have on the contract crews, I admired some of them very much because boy oh boy, they were really great fellows. They'd just about do the impossible if you asked them to.

#430 TC: Well, you're managing people too.

AK: Oh yes. That's right.

TC: Everybody's an individual.

AK: That's right. You had personalities to deal with and so on. Another thing I found, the drilling contract with the drills, usually was, they got so much a foot for drilling and they had to supply all their own material except rock bits. And the rock bits, the company would buy them for them you see. Well, usually the rock bit salesman would come around and contact the Party Manager and he would buy the rock bits for them. If you just had 2 drills sure as heck, one guy would like rock bit A made by company A and the other one much preferred the rock bits made by company B. Well, company A has got his on sale right now so we're going to buy they from them. Well, suit yourself but I sure don't like them. The guy that liked company A, in the next couple of days of drilling his drilling would be what it was normally, getting so many holes a day and the other guy that liked the other rock bit, he couldn't use them at all. He said, those damn bits are no good, they're just . . . my own brand is much better, brand B is a lot better than brand A. So I got to the point where I thought to myself, if I'm going to get these guys to drill holes I don't give a darn if the cost of the bits is more, I'm going to buy him the bit he wants. And if you do that and both drills got the bit they want, they'll go out there and each one of them will do their darndest to outdo the other guy and your drilling production goes right up. But you just give the guy some bits to use and say, I want you to use them, yes, but I don't like them. So I soon caught on to that one in a hurry. It's interesting, you just have all sorts of little problems crop up.

TC: Not all of the guys would have had their families along either would they?

AK: No. A lot of crews, in fact the bulk of the contract crews do not have their families with them. Some of them do but Texaco, at that time, on seismic crews, the families, they didn't have to go out. If you had kids in school and you felt that they shouldn't just the husband would go out. But in nearly all cases we had the whole family there. And that made nicer too, for the ladies and stuff.

TC: It would be like having your own community.

AK: That's right yes. Then when you get into the bush camps it's a little different too. We had our crews operating out of bush camps and at that point the wives and family would stay in either Calgary or Edmonton.

End of tape.

Tape 2 Side 1

TC: Maybe tell me a little bit about your own family?

AK: We've got 5 kids that are all grown up adults. The oldest boy is 51 this year and he's got 3 daughters and the 2 oldest are at university, one of them will be graduating next year. Jim, that's my oldest boy, he himself is a graduate in engineering physics and then he took a Masters degree in physics and he's working for the Defence Research Board in Ottawa. My next son, Bob, he's a lawyer in Saskatoon and my youngest son Bill, he's an actuary in Toronto. Then our 2 daughters are both, believe it or not, they're both geologists basically and then Jean, the oldest one had a course in zoology to begin with and she's ended up looking after the federal government's fossils in Ottawa. Her husband is in the Department of Ecology up there, his specialty is toxic wastes and stuff like that. Joyce our youngest daughter has got a degree in geology and also in computer science and that's a real good combination. And I might add that my oldest son, his oldest daughter will be graduating in computer engineering in the spring. Jim the oldest one, we've got 3 granddaughters and then Bob, he married later in life and his wife had 2 children all grown up so they don't have any children. Jean in Ottawa has got 2 daughters and Bill in Toronto has got 1 daughter and Joyce here in Calgary, she's living right here, she's down in Austin right now on an extended course on some darn thing or other for 2 weeks, but she's got 3 sons. So we've got 3 grandsons and then we've got another invalid grandson in Calgary here too. But we've got 4 grandsons and 6 granddaughters and that's about it.

TC: And tell me your wife's name again?

AK: Bea.

TC: Is it short for Beatrice?

AK: Yes.

TC: I have a grandmother actually by that name.

AK: It's Beatryce but it's spelt y-c-e instead of i-c-e.

TC: Gosh, you have a very talented family.

AK: Actually they're too damn talented, they know more than I do.

#030 TC: You inspired them all.

AK: I inspired them. Well, it's rather interesting in a way. But when they first started coming out with these processed record sections, I'd be working in Calgary or out on the field crew and that and I would take them home sometimes and just be tracing in the various horizons I wanted you see. Well, Jean in particular, she was maybe 5 or 6 then, she would say Daddy I think I can do that with those coloured pencils, you're just colouring that one line right along there are you. You know, this was the reflection that I'm following and I'd say, yes, just like that, well, I can do that, so I'd give her one, okay you do it. She

started, she could get that colour right all the way to the end and ??? and she'd do a better job than I did on it. And then Joyce the youngest one was much the same. So the both of them got a great interest in geology long before they even got to university. Because I was always talking geology, more so than geophysics, about the earth and the reflections and we bounce the energy off these reflections down there and it comes up and we record it and we can measure out how deep it is and all this sort of stuff. And both my oldest boy Jim and Bob, both of them worked on a seismic crew as summer students, so they all were well versed on geophysics and geology. In fact, the boys in the office used to kid me when both of my daughters went through as geologists and they said, boy Andy when you retire you can put up a shingle and say, A. Kennedy and daughters, geology and geophysics.

TC: Well, that's great. Is there anything else that you'd like to add?

AK: No, I don't think so, I've told you about all I can think of.

TC: It's been very interesting, very good. Okay, I'd like to thank you for taking the time to. . .

AK: You're very welcome, I enjoyed it. Sorry my voice was so raspy though because it's been bothering me quite a bit lately, I guess I talk too much or something.