PETROLEUM INDUSTRY ORAL HISTORY PROJECT
TRANSCRIPT

INTERVIEWEE: L. R. John Baxendale - Career

INTERVIEWER: David Finch

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DF: Today is the 24th day of May, in the year 2000 and we are with Mr. L. R. Baxendale at the offices of the Canadian Society of Exploration Geophysicists in Calgary. My name is David Finch. So nice of you to be with us Mr. Baxendale.

LB: Thank you very much.

DF: Where and when were you born?

LB: I was born in the Hanna Hospital in 1925 and I was the first son of a doctor to be born in the Hanna Hospital, so before I was born the nurses kept saying, when is Johnny coming, when is Johnny coming, so that name has stuck with me for 75 years.

DF: And that's not your given name is it?

LB: No.

DF: That's great. So your father was a physician at this place?

LB: Yes, he was a doctor there from his beginning until he died. He died about '55, so all that time. My mother was a teacher in the Hand Hills for awhile, so we have family throughout the Hand Hills, not many in Hanna. I have one brother who's 8 years younger than I am. He became a chief pilot with Canadian Airlines and he's still in the flying business.

DF: Wonderful. Describe your childhood and your education.

LB: Life in a small town is just simply fantastic. There are so many things to do, you have got all the sports in the winter and the summer. I played goal for the Hanna hockey team, I played goal for Lanny Macdonald's dad, who was a defenseman in Delia at that time. I played baseball and tennis and golf in the summertime and I worked at the tennis courts in the summertime during my school years. I graduated from school and took off and went to St. Francis Xavier University, which is in Antigonish in Nova Scotia. It was sort of a junior college, so I spent three years there but I graduated with a B.Sc., cum laude, there and then I went to University of Toronto and took Physics there and spent three years, decided I didn't want to get my Ph.D. so I finally quite. During the time at St. FX I had done field geology in the summertime out in the Rocky Mountains, with a company called Rio Brava, which is now Canadian Superior Oil Company. So after I graduated the person in charge hired me to come to work for, it was then Canadian Superior Oil Company. In the meantime, before that, when I was at Toronto, I did research during two of the summers that I was there. So life was good.

Video #16:04.06.27

#028 DF: Two questions for you, first what got you interested in sciences?

LB: I guess I like math more than sciences. I don't really know the answer to that, I can't tell you. In those days if you were in science, you got a Ph.D. and you went through for research and I didn't want to do that. So I took the easy way out and went into the seismic end of it.

DF: You say you did field geology in those years, what year was that and tell us about the work you did in the field?

LB: I did field geology for the three summers from 1944 through 1947. The first summer there was the geologist and myself, a cook and a fellow to look after the horses and we packed all our food and everything. We started at Jasper, went up to the Smoky River and every day we climbed a different mountain, took samples and measured the incline of the rocks and this sort of thing. We got to the Smoky River and it was too high so we couldn't cross it. So the next summer, we went up to Grande Prairie and came back down from Grand Cache, down to the Smoky River and did that, same thing again, with a different crew of course. We also hired another young fellow, Andrechuk was his name, he's in town famous. . .

DF: John.

LB: John, yes. So the two of us were doing this sort of work then. And then the third year we worked out of Calgary and we worked from Coleman to Banff and did the same sort of thing.

DF: What was your job on that crew?

LB: Well, I think I was along in case the geologist fell or something. All the rocks . . .I packed the rocks down from the top in my knapsack and of course, I loved horses so I helped with the horses too. So it was an interesting three years for me, I loved it.

#049 DF: Wonderful. Where did you go next?

LB: I came back here and went to work for Canadian Superior.

DF: Who hired you there?

LB: Nick Nichols hired me, he died in Hawaii some time ago and Art Feldmeyer who just died this year was then the head of Canadian Superior Oil Company. He was on parts of the trips with us too, so I knew him well.

DF: So you were hired on as a geophysicist then at this point?

LB: Yes.

DF: How did you make the transition from academic physics to geophysics, field geophysics.

LB: In those days, the physics wasn't that involved. It was more electronics than physics. Of course, you used geophones to record the sound waves and you had energy that went into the ground to generate these sound waves but it was all fairly simple. It became much more complicated when the computer came into being.

DF: What were your first jobs on geophysical crews?

LB: I worked in the office, just accumulating the field data that we got, for the first year, and then I took over as the fellow who ran the instruments in the field during the day, for about a year and a half. Then after that I went in to the Edmonton office where I worked for them for about 2 years and then after that, I got the wander lust and decided that I would go to Trinidad. So I went to Trinidad with Chevron for two years. We had two

children born, one in Barrhead and one in Edmonton, before we left for Trinidad and we were really fast movers, we had two children in Trinidad. But that was an interesting career too, because that was completely different than working up here. We had up to 100 men on a crew. They had to cut all of the forest and then lay all of the cable and all of the holes that we used for exploding the dynamite were all drilled by hand, little tiny machines, but basically by hand. So it was a fantastic new experience. So it was extremely interesting. They also had a marine operation at that time but I liked the land work so I stayed in that.

Video #16:09.30.00

#078 DF: What years were you in Trinidad?

LB: We were in Trinidad from '54, '55 and part of '56. Then I realized that they weren't going to find any oil in Trinidad so I decided to come back. At that time Nick Nichols had formed a new company called Great Plains Development Company and so I came back as their geophysicist.

DF: So by this point you were Chief Geophysicist?

LB: Yes. I was the only geophysicist. It was a new company, new exploration all over Alberta and they were extremely successful because they took a lot of farm outs from Superior Oil, who didn't have the money I guess, or didn't feel like they wanted to explore in Alberta anymore, and so they found a lot of oil during that time.

DF: What was the status of the geophysical instrumentation and records and so on in this period?

LB: It had developed tremendously by that time. It didn't become automatic but it became close to that. The seismic recoding had improved tremendously and the processing from the field data into records that we could use in the office had changed tremendously.

DF: Were you involved in any of those technological changes?

LB: No, not really.

DF: What did you do next?

LB: Well, I worked here for 10 years and then Burma Oil Company bought. . . they bought 3 or 4 companies in Calgary, they bought Great Plains, they bought a company that worked in the Arctic called Lobitos.

DF: And the name of the company that bought these was. . .?

LB: Burma Oil Company. They were out of London, and a couple of smaller companies, and they amalgamated them all. It was obvious that Burma really wasn't going to get into the exploration business here for awhile, they were too busy putting these companies together. So Burma asked me if I would go to London. So I went to London for a year and unfortunately I had to leave my family here, so it was a rough experience. But I got to London, they showed me an office, it had a table half the size of this one and we had 10,000 miles of seismic to review. So I looked at them. . first of all I phoned my wife and said, I'm either coming home tomorrow or I'm going to stay a year. So she was nice enough to let me stay. Anyway, when I got into this office I said, this won't do, we can't do this. We had an office in a hotel that had a sports facility in the back, they had two squash courts and used to have set up for ping pong and everything, so we set up our

office in the ping pong part of it and I started a revelation with Burma. I rented a squash court during the day and we strung seismic records out this way along them and then across them horizontally and I interpreted these and then I gave them to everybody to do the timing and put it all together. Of course, Burma had to bring their photography people out to see this because they had never seen anything like this before in their lives. So after this year Burma said to me, well, John, we'd like you in Australia and we'd like you in New Orleans. I said, where do you really want me and they said, we'd like you in both places. I said, what do I do with my family, your family, your family, why don't you leave them in Calgary. This is typical of the English attitude, when the English man went away, his wife stayed in England and they thought nothing of this. So I said, no, I won't do that. I'll go to New Orleans for you if you like, for a couple of years and see what it's like. So I went to New Orleans and the salt dome exploration in the Gulf of Mexico was well under way. So this was a tremendous experience for me because now I was working with salt domes and big marine seismic programs and it was really a great time. We only had 4 people in the office. Burma people came from all over the world to see our operations, so it was really interesting.

Video #16.14.52.24

#131 DF: Can you explain what salt domes are and why it's significant?

LB: What happens with the sub-surface, there's so much pressure built up that all of a sudden, the ocean surface cracks and these salt domes will form and they will come up to something like 5,000'. They're just like volcanoes actually. When you look at a picture of them, they're just exactly like a volcano. The sands come up with the salt and the sands get caught in the salt. So these sands then contain all of the oil. So you're working along the slopes of the salt domes, not on the tops of them, and you're trying to find these huge sand deposits, which they are immense. They're just tremendous size. So this was great. And then Burma, after 2 years found that they were spending 90 cent dollars to explore in the United States, because they had to pay taxes on it in England and everything and the United States companies were paying about 15% tax dollars. So I realized that Burma couldn't exist under these circumstances. So I decided to come back to Calgary and drag all my five kids back. I started working for a little tiny seismic, exploration, geophysical company called Seismotech. I worked for them for two years and then the Canadian companies, all of a sudden decided they wanted to go foreign. When this happened the first ones called me because they knew that I had been doing foreign work, and they said, John, what do we do with all this. So I started then, a career as a geophysical consultant, specializing in marine seismic.

DF: What year was this?

LB: This was in 1956.

DF: And why were Canadian companies going international at this time?

LB: they thought they had discovered all the oil that there was in western Canada and marine exploration was new. So there were lots of opportunities all over the world. Anyway I became sort of the expert in Calgary in this marine seismic and it turned out to be just a fantastic career.

DF: Tell us the status of marine seismic instrumentation in ‘56, ‘57, in there. What were you doing to get the data at that point?

LB: We were using . . . we had cable which had geophones attached to them and we’d pull, usually one and maybe two long cable behind a boat. We used air guns, which were put in the ocean and generated a sound wave which went down and reflected off all of the various formations in . . .at the bottom of the ocean and in the earth below the ocean floor. This was a continuous operation, they operated 24 hours a day doing this. I guess they still operate this way but they’ve improved it of course, over that time. But we would have at least a mile of cable strung out behind us. And it was intriguing sometimes. We did seismic work among the fishing boats off the Philippines and that was an interesting thing because we were petrified that we would wreck their nets and get into that. We could see all these fishing boats around us and here we were trying to sail through them. So after. .

#180 DF: Any adventures in that, any accidents, incidents. . .?

LB: No. Almost chased down by some of those huge ocean cargo ships because they can’t stop. You have to get out of their way, that’s all there is to it. They’re so big, they go so fast that they’re like a cement truck going down 8th Avenue. If you don’t get out of their way, you’ve had it. But those were the only thrilling things. Sometimes we’d get a cable stuck on the bottom, if there was a little reef growing up off the ocean floor, we’d lose a cable that way.

DF: Did you have the cables suspended at a certain. . .?

LB: Yes, they were down about 15 or 20 feet.

DF: Were you collecting. . . it sounds like if you were shooting 24 hours a day, continuously shooting and recording, you could collect quite a bit of data.

LB: We’d collect a tremendous amount of data. This part of it had improved tremendously. When I started out we were using paper records, then they went to magnetic tapes. So we had hundreds of rolls of magnetic tape on the boat so that we could record all this. Of course, we didn’t have any play back equipment so we weren’t sure what the results were going to be until we got back into the office.

DF: How did you process so much information?

LB: This started a new industry in Calgary because all of a sudden there was all this geophysical data to do. It was a new experience for these people because now they’re not interpreting 100 miles, they’re interpreting 10,000 miles of data. So companies like Digitech and GSI and there were others, started and got into that part of the business and so they’re still big companies doing that.

DF: So through the 60's you were a consultant to these people?

LB: Yes. And the 70's. I pretty well specialized in marine seismic all throughout my career.

DF: You said in the early days you liked the land based, what got you interested in the marine?

LB: I think the big challenge was the work in London, because I’m better off of the big picture. With this experience. . .you know, we did 10,000 miles of seismic in one year and people in England, a lot of them had never seen this sort of work before. So I liked

that.

DF: And where was that 10,000 miles?

LB: It was the start of the North Sea. Gulf had shot the data and they decided they didn't want this particular basin and so they sold the data to Burma.

Video #16:22.30.23

#213 DF: Does Burma still exist or did it become another company?

LB: No, it still exists but it's really never gotten big in the oil business because. . . just the way they think. They're not exploration people, they're all sort of oil drilling people. I don't know what's happened to them in the last while. As a result of all this I started working in western Canada and then I did a lot of work for a company, and I'll think of the name in a minute. But we worked in Greece, we worked offshore Spain, we worked in the Cameroons, we worked in the Philippines, we worked in Ghana. I haven't been to all those places, but I've been to quite a few of them. I've been to Greece, I've worked offshore Ghana for them and I've worked in the Philippines for other companies. I guess my one experience that's interesting is, I've done seismic across the Northwest Passage. We went to Resolute the first year, we went out west to the Pacific Ocean. We were fortunate because the ice is on an 8 year cycle, it's receding for four years and it's building up for four years and we just happened to hit the down part of the cycle. So we were able to sail out there and back again. The next year from Resolute, we went out to the Atlantic and back again. That was intriguing. We lost a cable there. All of a sudden. . . the interesting thing about all that was it was 24 hours of daylight. So you never knew. . I never knew when I was going to sleep or when I was going to work or what I was going to do. I didn't have a lot to do on the crew, I was just sort of supervising but I had just got to bed one time and all of a sudden a lot of commotion. I woke up and the cable had broken and it had disappeared and we're in over 1,000' of water. Fortunately we had another cable and we were able to keep going but that's the first time that's every happened to me. And then when we finished that project, I was back here. We had another interesting challenge up in the southern Arctic. We went up to Norman Wells and we decided to go in there in April because we had done surveys and found out that the weather should be pretty good for us. We flew everything in by small plane.

Video #16:25.29.22

#247 DF: What year?

LB: Gosh, I can't remember what year that was. It was about . . .I can't remember exactly what year that was.

DF: In the 1970's?

LB: No, it was in the 80's. So anyway, we took helicopters in because this was the only way we could move our equipment to drill holes. We found out that there was more snow than we thought, there was about 8' of snow in that country at that time of year and it got too cold in the morning so instead of working 8 hour days we could only work about 4 hour days. So we were able to do work but we didn't do what we thought we would in there. That was a tough one.

DF: Can we go back to the Northwest Passage, any more stories about that? That sounds like a

pretty big project.

LB: Unfortunately it didn't work out the way we thought it would. We had a helicopter pad on our boat and we had a helicopter with us and to position ourselves we used a little survey device that would reflect the sound waves that we shot to them, so that we would know where we were. But when the helicopters went to put these in position, we didn't have the exact longitude and latitude of these things and unfortunately when the wind blew some of them blew over so we lost our navigation in a lot of the cases. So we have the data but we can't really use it because we didn't know where some of it was. So it was an interesting project but it didn't work out as well as had we hoped it would.

DF: And who was that for?

LB: That was for a group of companies, my memory is going, I'm 75 years old and I can't remember all of this anymore. It was a group of Canadian companies that got together to do it and none of them are around anymore, they've all disappeared.

DF: What kind of ship did you use on that?

LB: It was almost like a freighter. We'd taken the back end off it so that we could slide our cables out and have room to bring them back. It was just a big old ship. We had to have a helicopter pad built on it too. It was a big project.

DF: What was your sound source?

LB: We used air guns in there too, we used air guns for all of that, everything in marine was air guns in those days.

#284 DF: No dynamite?

LB: Oh no, it was too dangerous. You'd have to have to much of it, your boat would be filled up with dynamite. Someone lit a match and that would be the end of you and everything.

DF: Good sound source but no recording.

LB: Yes, right. No, you used that on land but not on the marine work.

DF: We're going to change tapes here. This is great.

Side 2

LB: So what are we going to do now, is that enough of that?

DF: Oh no, any incidents, interesting stories from the Northwest Passage work? Any trouble with ice?

LB: We never saw a piece of ice any bigger than this room in two years, it was amazing. There was some collected along some of the shore lines, but no, nothing in the Northwest Passage, it was really great. We saw polar bears in the area, nothing at all unusual.

DF: Find anything unusual in the seismic work in your records?

LB: No, not really. I never did see much of that, actually I supervised the boat operation but I didn't do the interpretation so I never did see any of that.

DF: And you're still a consultant at this point?

LB: No. When I reached 65, the days of computer interpretation had started and I was going to have to go back and do some work, come here and learn how to interpret with the computer and I decided that was a good time to end my career so I quit. It's ten years ago now when I quit. I'm becoming almost a golf pro since then and a world traveler.

DF: What have been the biggest changes you've seen in the geophysical industry, over your career?

LB: Computer processing by far. Nothing can touch that. They can do . . . the one interesting thing about doing the seismic in the early days was that you had to think in 3-D but you couldn't put it on paper, you could only put it on paper in 2 dimensional. But you had to have this ability to do the 3-D thinking. So I think that was the challenge that you were asking me about before Dave, that I liked, because I felt I could do this and I had no trouble with it at all. But now this is all done by the compute you know. You can take a slice any way you want and put it all together. I guess I first came across that in work that we did in offshore Spain. There was a field in there called the Casablanca field and it was a huge thrust fault with the limestones brought up just like when you're looking at the Rocky Mountains, they're brought up from the bottom of the ocean and then they drop off on the other side. And when they drilled that field, the engineers were afraid to get close to the edge of it and so they missed the high part. They missed all along this field and it must be 50 miles long, they missed the top. So we went back with one of the first 3 dimensional surveys that had been done in the Mediterranean and I was working for Denison Mines then. We surveyed this and we came back with 20 positive locations right off the bat and that was just from our first look at the data. So they drilled all of these and they found. . .they would never have found all this oil because it was too high on the structure so they would never have sucked it out of the ground. So it was almost a whole new field for them. Canada Northwest Land and Denison Mines were the ones that did all the discovery work and the development work on that field.

Video#17:04.45.10

#039 DF: We jumped quite quickly from the early 1970's, the Northwest Passage work, to your retirement in 1990. What did you do in those intervening years? You said the Norman Wells work.

LB: I did a lot of work off the east coast too, because that was the start of all the exploration off the east coast. So I did a bunch of work there. As I say, I worked in the Philippines, I worked in the Cameroons for awhile. I did a lot of this for Denison. We did a lot of work with Petro Canada in Ghana. I was just in Ghana. . .well, this was all offshore work. I was in to see the operation start but not end. I guess it was in the Cameroons with Petro Canada, sorry. And I never did go there. On some of these the companies I represented were sort of third partners. They weren't in on the operation of it, they just paid their share to get the data and evaluate it.

DF: Before we went on tape you said something about doing something on a lake east of Norman Wells, 100 miles east or something.

LB: Yes, west.

DF: Oh west, what was that project, can you describe it for us?

LB: That was the one where we were in with the helicopters in the snow, in the deep snow. It was too cold parts of the days just to be able to work. We showed that you can do exploration work in that area but we also showed how difficult it was. But now, that's not too far north of these new discoveries that Chevron and other companies are making, just into the Northwest Territories, so they'll be back in there pretty soon.

DF: Now, as a geophysicist, you worked with geologists. How did that relationship change over the years?

LB: In the early days, they departments were completely separate and they had very little to do with each other. They were at logger heads most of the time because the geologists didn't believe the geophysicists and vice versa but it became more apparent as time went on that we were going to have to work together. Now they're all combined in one group, which is the way it should be.

DF: Did you learn some. . well, obviously you learned some geology along the way, did you consider yourself sort of an explorationist or just a geophysicist?

LB: No, I was an explorationist. Right from the beginning because the companies that I represented, they'd get into these great big plays as a third partner and they may not be very big companies. Denison Mines just had 2 or 3 geologists and a lot of the other small companies here wanted to get into that sort of work, that was the same with them. The only other place that we had trouble with our field work was a little bit of work I did off of the Virgin Islands. I went down for a group of companies out of Calgary and . . .there are reefs all over there of course. Unbeknownst to us and I think the seismic company did it on the way up, or when they were just getting all their cables ready to shoot, but we wrapped a cable around a reef. This long cable has a bunch of floats on it so that the cable will stay level and if these floats have water in them then the cable sinks and does all kinds of configurations and you don't know what these are. So we finally realized this is what had happened. This was supposed to be about a one week project and I was down there twice and gave up because they still didn't have all of the cables working properly.

So they finally shot it without me going down there.

Video #17.09.43.14

#086 DF: Any interesting people you met over the years?

LB: I think the people in the early days were much more interesting. They were much more opinionated and much more biased than people nowadays. We have so more experience now and we can take some of these things with a grain of salt or not but in the early days, it was, you do it my way or you don't do it at all sort of thing. So the drilling people, the exploration people, the seismic people, the geologists, there way was the only way to do it and that's all changed too.

DF: Which of your contributions do you consider most significant, what are you most proud of, of what you've accomplished over the years?

LB: In my career, during my time, I think I was the top marine explorationist in Canada and in Calgary for sure. So I was proud of that.

DF: What did you enjoy most about your career, the science, the technology, the discoveries, the people, the deal making, there's so many aspects to it, what really fired you up in the morning?

LB: Everything was always new. Every project you took on was a different kind of a project and so they were all challenges David, it was all of a different kind but it was all new work. You weren't regurgitating work that other people had done and trying to find what they had missed. It was just all new and it didn't matter where it was, whether it was in the Philippines, whether it was in the Northwest Territories, whether it was in Greece or Spain or what. Spain was the only one where we did really better work that had been done before and developed new parts of the structure. But the rest were all brand new. The same with the Atlantic. In those days the structures were fantastic out there, it was just a question of whether they contained oil. They're faulted too, so it was harder to find it than people thought originally. And it was the same in western Canada, when you were exploring. It was all. . .everything was new, that was the real challenge.

DF: Yes, people are still finding oil but not that kind of edge of the . . .

LB: No, you're not coming up with a new discovery in a new basin like we did.

#117 DF: Yes. Reworking old ones. Were you involved in any really exciting new discoveries, like were you with Canadian Superior when they found oil up in west of Edmonton there?

LB: In Pembina. No, but with Great Plains who took over some of that land, yes, we found a lot of oil in that area.

DF: Did you find any new fields in any of your work?

LB: We discovered new fields in Greece. Where else? I was never really in the discovery of the fields off the east coast but certainly some there. We did a lot of work in Stettler when I was with Canadian Superior and found some small fields there.

DF: Where were you in 1947 when Leduc came in?

LB: That was my third summer doing field geology out west of town here.
DF: So you were a pretty young man still. Do you have any regrets, things you wish you could have done?
LB: No. Nothing that I would have done different if I had a chance to do it all over again either. Except that I would have made sure that my wife and family came to London, but that was too complicated because the school system there was so horrible and our kids were spread out all over the place. But I look back on that and I don't know whether I would do that. . . well, I would have done it again, because it turned out to be the change in my career.
DF: What was it like living that year in London?
LB: Horrible.
DF: Why?
LB: Just terrible. England is a very difficult place to develop any friends. And we brought a bunch of people together who didn't know each other and there was nothing to do. We were way out in the boondocks and there was really nothing to do out there. I finally bought a car and took up my golfing. But I used to go to the office every Friday morning and I would make Friday my day out and London was fantastic from that standpoint. Because if I was in a bad mood, I went to a musical, if I was in a good mood I went to a detective play or something like that. London was fantastic for that sort of. . . but I was doing all these by myself and it's not as much fun.
DF: But certainly lots of cultural entertainment options.
LB: Definitely, yes. Just super.

Video #17.16.11.28
#149 DF: Now if you had a car did you go further afield, did you go explore around?
LB: No, I had a little old car that I was afraid wouldn't go very far, it would get me to the golf course but I wasn't sure how far it would take me. I did a little bit but not much. I've done some of that since. We've taken a lot of great golfing holidays during and since that time.
DF: Where to?
LB: Well, we toured Scotland and golfed there for a month.
DF: What's Scotland like, here the golf courses are all so artificial but Scotland is where it all got started?
LB: They're fantastic, they're just great. I played all the great golf courses in Scotland. But they're all wide open, there's no housing around them, there's no nothing, there's just these golf courses and the dunes. The only one I didn't like was the one they just played the British Open at, at Carnousty. What they did for the British Open was they doctored that course up so much, just to make if difficult, they ruined the course. Then we've gone to New Zealand and golfed there for a month and done the touring bit and parts of the States.
DF: Your wife golfs too.
LB: Under duress.
DF: So what does she do on these trips?
LB: Oh, she golfs.

DF: Now, what have your children gone on to do?

LB: I guess two of them are in the oil business. My oldest daughter Barbara, is a geologist in Calgary, my son is an engineer who took after me, he's worked in Russia, he worked off the Sakalin Islands, which are just north of Japan in Russia. He's worked in Saudi. Where else has he worked? So those two are in the oil business. Bob is a drilling engineer in Calgary with Apache right now. And we've a daughter who's a teacher in Peace River right now, another daughter who's a teacher on Vancouver Island and another daughter who's a music teacher and married to a minister in Weyburn, Saskatchewan. So they're all doing well.

DF: Anything else you'd like to tell us about your career?

LB: No, I don't think so.

DF: It's been good?

LB: It's been fantastic.

DF: Okay, on behalf of the Canadian Society of Exploration Geophysicists and the Petroleum Industry Oral History Project, I'd like to thank you so much for taking the time to meet with you today and let us record your recollections and we'll end the interview at this time. Thank you very much.

LB: Thank you very much, it was great.