

## PETROLEUM INDUSTRY ORAL HISTORY PROJECT TRANSCRIPT

INTERVIEWEE: Paul Fuenning

INTERVIEWER: Robert Erickson

DATE: November 8<sup>th</sup>, 1991

**Side 1- 47:00**

RE: This is Robert Erickson. I'm going to interview today Paul Fuenning, geologist, Paul Fuenning, F-U-E-N-I-N-G. We are at 4320 Coronation Drive SW in Calgary. And the date is November 8th, 1991. I'm going to turn this over to Paul Fuenning now and let him talk. Paul, do you want to take this?

PF: Okay, I'm Paul Fuenning. I guess I started out my career, graduated from University of Nebraska in '39, in geology and had a Master's in '41. I spent most my grade school and high school in Lincoln, Nebraska. Lived in Lincoln, right. My father was a minister, so we had a parish there, not a parish, a church. So, we moved there about '28,'29. So, I went through grade school, junior high and high school and eventually through university. Following in '41 then I went into the Navy and actually got into photo intelligence. So, in photo interpretation there with the Navy and primarily I spent some time in the Aleutian Islands at the time of the invasion of the Japanese on Attu Kiska.

This experience was utilized after the war when we, a group of ex-Navy men got together and formed GeoPhoto and I joined them in '46 and we started a photo geologic-company combining the skills we had achieved in the Navy along with our background in geology. So we had a headquarters, was down in Denver, and was a natural because much of western, at that time not much of western U.S. of course had not been mapped, so it was a very rapid way to map out crop area. So GeoPhoto per se was formed in '46...

RE: Were you a participant or an employee?

PF: Actually, I was their first employee, I was not actually one of the partners. The partners were three ex-Navy photo intelligence officers, Dick Wassum and Lissae?? Smith and Robert Brundle. The fourth man, Bob, Bob McMillan, he was a well-known field man, a geologist in the Denver area. So, but this company grew rapidly, became quite large, in fact in the, in 1960, they had as much as 50 employees there in Denver. We had many branch offices. We had a branch office in Libya, in Argentina, and we also had one in the, finally an office was started in Calgary in '52 and that was initiated by, started out with Jerry Oliver was the manager of the time in '52. I came up briefly in '52 for a short stint and then actually met my wife here. So, then we got married here in '54 and we were transferred back to Denver, but went back to Denver but then came back to Calgary back in '57. Now we're supposed to, we were transferred back to Calgary for two years and we've been here ever since. So, one of those deals.

So, as I say, Jerry Oliver started and he left after about four or five years, then it was taken over by Fred Bretral. Fred Bretral was then the manager but he was manager until '65, at which time I took over in '65 until '75. The company was actually bought out by Texas Instruments in '65, so we became part of Texas Instruments in '65 as one of their divisions.

[00:05:35] The main contribution of photogeology in the early days, was the rapid mapping of vast areas, which prior to this time was essentially accomplished by, well, the ground, in the north country much was done in limited field seasons, and much of it done with canoes, because in many times that was the only access around, and pack horses and so forth. So, the early boys they spent 90% getting there and maybe 10% doing the work. With the, with a survey of photos, they could limit to their fieldwork to sampling specific areas, knew exactly where to go, where the outcrop is, and where there might be crucial points or difficult things to interpret from the photos. So that it speeded up mapping western Canada, basically the Alberta Basin, the Foothills. Obviously photogeology lent itself in those days to the outcrop area, which of course the Foothills, ??? the Territories and the Mackenzie Plain and then of course the Mackenzie Mountains, Eagle Plains, where they were outcrops and then of course eventually the Arctic Islands. These all were well and good outcrops and they lent itself to mapping on the air photos, not only structurally mapping but stratigraphic mapping, so that ... which was of course very important for sampling. So to know what was going on to the east in the non-outcrop area, of course was very important to be able to sample the bedrock and so forth just to see what's going to happen to the east. So, this really facilitated, to work up the picture of the geology as well as the stratigraphy.

RE: [unintelligible]

PF: In the Calgary office we had, by the time, in 1960 we had 30 people here. So, it got to be pretty large and we always had field seasons in the summertime. We would go out and do sampling. We had, we would also do field checks on our photo geology, plus we had, and in the Arctic Islands a number of field camps in the Arctic Islands in the summertime. So, it was a combination of field work in the summertime and of course doing the photos in the winter. In the early days, the area, speaking of western Canada, not all of it was covered with air photos. So, in the really early days some certain areas where we didn't have vertical coverage, they had the old tri-met photography. This was a quick rapid way of covering areas, not as, there would be two blanks??, one to the right, one to the left and one vertical. So, this... it was a quick way of mapping areas, not a very efficient, not as efficient as a straight vertical air photograph with stereoscopic coverage, but many of the... in some of the early days we did do interpretation from the tri-met or... of course the verticals were fine, but then they were blanks. They had stereo coverage for the verticals and there was stereo coverage for the blanks, but of course the projection scales would vary and the Canadian grid was developed in which you would, by virtue of the converging lines, we could come up with a reasonable projection, or to map where it should be planned metrically. But fortunately, by the time the, in the middle 50s, we were pretty well covered completely covered with vertical air photos.

Now the... Alberta, for example, they did cover the, much of the areas covered of Alberta is covered with 1949 and '50 photography which is a scale of 1:40,000, which is good quality photos. This was particularly important once you got through with doing outcrop geology, once we turned away from outcrop geology and into non-outcrop geology. The progression was generally... first of all we would do exclusive work for people, for the majors, this was back in say, '50, '52, and so forth, and also in the States in '46, the majors all through western US, Arizona, New Mexico, Wyoming and once we exhausted exclusive work, then we'd go in a non-exclusive and we would start mapping on a non-exclusive basis, which made it more attractive for smaller companies as well as majors, it made it cheaper to acquire the data on a non-exclusive basis.

So, the heyday of course in photo geology was in the 40s and the 50s. And the, perhaps the last barrier was the Arctic Islands and that also lent itself to good photo geology because of the barren and nature

of the area. And that was finally flown in the middle 50s and they were able to again map all of the Arctic Islands. Again, that that was a real boon there because of the limited field season up there and when the big rush came for the Arctic islands this was the main tool used to take leases. There was quite a rush there in the late 50s when the Arctic Islands became available for leasing. So again, the photo geology, the photo geologic mask, were the prime tools used to locate leases or to plot leases. Once we got... then we went back and mapped all the outcrop area again on a non-exclusive basis and made that available to Industry. So, we, for example western Canada, all of the foothills of Alberta and BC and in the Territories, the Field Basin, the Mackenzie Plain, the Mackenzie Mountains and again was then put all on a non-exclusive basis, which is still available.

RE: [unintelligible]

PF: I myself now, my particular... what happened up here was that in '75 we were put part of the Geoside, which is a part of the Texas Instruments. They phased us out, we were phased out of the photo geologic company per se. I guess the people who bought us out, and Texas Instruments had long since gone, and so the people who were left, they didn't know what to do with us, I guess. So, we were kind of put together by decree with GSI, they being geophysicists, we being geologists. Our main forte was to interpret, their main was data gathers, that is, which is nothing wrong with that. And they did very well particularly their marine. So that was where their money was in marine as well as land crews, whereas we were more in the interpretation of it. We never did get a mix between the two which was unfortunate. So finally, we were phased out, the interest in photo geology became less because all of the outcrop area had been pretty well leased in western Canada, was available. We then had to turn our attention to the non-outcrop areas.

[00:14:37] This was an analysis of drainage and liniment work. Liniment on the... as we see on the air photos. There was not the reception in the non-outcrop area like there was in the outcrop area, because our crop area was definitive, we knew the structure, you could see the structure, you could see the faults, but on liniments you can't, it's just more of a subjective thing, so it didn't quite have the response. Consequently, we didn't have to have quite the large staff. So, the essence was that in '75 we were... GeoPhoto as an active company was terminated, I took early retirement personally, but stayed on as an agent for them, agent for their non-exclusive library, which I still do, it is still active for they're non-exclusive library. We also did drainage and liniment analysis on areas in the non-outcrop area, such as the Peace River Arch, the Swan Hills Arch, Swan Hills area, Sweetgrass Arch. These were put on a non-exclusive basis and are still being marketed per se. But now with the advent of satellite imagery, this was all done before satellite imagery, satellite imagery came up in '72. Now GeoPhoto did make liniment studies from the satellite imagery, this was generally at a scale of one to a million. We did make, one of the first in western Canada, to make Landsat mosaics of all of Western Canada, of all of Canada before the government did, before CCRS did. So, we had a complete coverage of all, we actually went in and we purchased all the imagery available, the cloud free imagery and made...

RE: [unintelligible]

PF: We at GeoPhoto, this was back in '72. The first satellite imagery was launched in '72 the, multispectral, MSS, so from this coverage, we made a complete set of mosaics available for all of Canada and for a while that did have a certain amount of Interest as far as mosaics, and we did liniment studies which were quite reconnaissance because at a scale of one to a million. But then after a couple years the government came along and they made mosaics, so we were essentially... of course they were able to come up with more recent photography... we still had black spots of cloud areas, so they came

along and they made all of Canada, so they of course could sell a lot cheaper, as they essentially would just sell it for the price of reproduction. So that market area was pretty well, we were, pretty much lost to us at the time. We did make interpretation of Landsat imagery, but as I say again that was quite coarse, and it had a limited response. One thing I failed to mention that we did do photogrammetric work. We had that Kelshes??, which is a photogrammetric machine in industry. So, we did do in the early days, we also had, we did structural contour maps.

RE: [unintelligible]

PF: Yeah, this is a photogrammetric instrument that you measure, actually measure quantitatively the actual values of elevations. So, rather than looking at air photograph... and all this was done with stereoscopically, that is qualitative, whereas with these photogrammetric instruments, we had to get glass plates and put them into actual projections, you then have scale-stable imagery to begin with and with acrid scaling you then can have sufficient control for benchmarks, then we could actually determine elevations on say a bed, follow a bed and make a structure contour map. This was for example, one example was the Eagle Plains in the Yukon, which is a nice little inter-mountain basin between the Mackenzie Mountains and the Ogilvy Mountains. There was sufficient bedding there that we could actually determine elevation points, and come up with quantitative structural contour maps. We also made structure contour maps of one of the better-known structures say ,in the Foothills. We can actually number the good anticlines in the Foothills, we're also, Moose Mountain things like that, we actually contoured that for clients. So, this was another adjunct of photo geology, that it's actually a quantitative type thing.

[00:20:23] We digressed in, let's see in '63, we digressed into minerals and we actually had... in '63, for example, we started to do minerals projects. What we did there was to designate an area, say in British Columbia, for example, and we'd designate an area, say Telegraph Creek, and we'd do a fairly large area, and we'd map that area from the photos, photo geologic mapping, and in the summertime we'd go out with a helicopter and we would sample the sediments, stream sediments, and we actually had an atomic absorption lab here in Calgary. We'd send the sediments back and we'd analyze it, and if, we were looking for base metals, if suddenly anomalies would show up, or good values would show up then we'd go back into that area, do more detail work and actually make claims, plot the claims for the client. So this had, many of the major oil companies had their first taste in minerals work, in minerals divisions from these initial geophoto surveys. For 12 years there we had 14 major exclusive minerals exploration programs. These were based on helicopter supported geochemical sampling techniques. We collected an excess of 40,000 stream sediment and soil samples, I'm reading from a page here obviously, and over 195 square kilometers of area. So, then we did large areas in the Yukon as well as the Territories. This was fairly successful for about 12 years.

Again, then the major companies started to take their... after a couple of years we did do some follow-up work, but then the companies who were interested in mining, they then formed their own divisions, a number of the major oil companies then had their own mining divisions. But this was an aspect that GeoPhoto did get into, is into minerals. They also had a minerals division, quite a minerals activity in Brisbane in Australia. There they did a lot of minerals work as well and actually filed claims and so forth for their various clients. Well, I think that's what... you got any questions here?

RE: Yeah, I was going to go back to the [unintelligible]

PF: Yes, I would say we did. Blanchette was one of the pioneers, he wrote a couple of articles on fracture analysis, and then suddenly he moved to Vancouver and I guess primarily in mining. The drainage analysis, I think in many cases showed up very well over, draping over reefs for example, the Pine Point, the Elk Point, for example in the northeast B.C shows up, like in Clark Lake and Kotcho Lake and so forth. The draping many times will show quite striking so that drainage analysis will, in many instances, show up the areas of draping or in the reverse, in sinkholes. Coming back to liniments, again there's a very definite liniment pattern that does show up in all of western Canada. You have a very decided, definite orthogonal relationship of liniments. One set generally parallels the Foothills and the other one is normal to it and many of the fields are, again, that will follow the trend of the Foothills, and that is outside of the non-outcrop areas. There are many, the, I think the liniments do indicate that many times that they do show fracture porosity by virtue of the density of fractures; again I must emphasize here that the liniments are not as definitive as outcrop geology. They are primarily to be used as leads for further exploration or ideas to go with, they give you structural framework of an area. They will have definite, many times, they will be definitely associated with fields that there obviously are... there in the basement would indicate possible faulting or possible changes in the topography or sub crops to the Paleozoic sub crops, will indicate, the liniments will indicate disturbances in the subsurface, which do require additional work, like seismic and to indicate what is actually there.

In other words, this is the reason I guess, because, the reason why non-outcrop photo geology has not had a response because it's not as definitive. It is just one piece of a puzzle that suggests places to go. Of course, the one aspect of liniments is that when you're planning a seismic program, all things being equal, if we have some anomalies on the surface, we suggest you shoot the anomalies, so if any of those prove out you get more mileage out of your seismic. In addition, after the fact when you have a seismic line and you have liniment map and if there is a correlation between the liniment and a fracture or a fault in your seismic line, this then indicates the liniment can assist you in showing you perhaps the possible orientation of that fault, or the length of it, or if you're trying to tie two lines fairly close together which disturbances are, which faults are more apt to tie in. So, it is a tool that can be used in many aspects.

With the advent of satellite imagery, because you can, much of our GeoPhoto stuff was done with air photos, this, primarily, because much of it was achieved before '72. Now since '72, of course, we have the satellite imagery and we see much larger areas, 13,000 square miles at a time with say with Landsat, with thematic mapper type thing. It isn't as good resolution but you don't have the individual air photo shown for one thing. You can cover larger areas and it lends itself perhaps better to liniment work because you see the whole area at a time so that Geo Photo didn't really get into this business of Landsat per se, because that was near its demise. I personally am into it myself. I continued as in addition, as an agent, I still do interpretation work with all kinds of imagery, be it air photo spot, which is the French imagery, or Landsat, which is the U.S. or radar, radar courses is great for areas of jungle or there's a lot of clouds.

Also, radar has its worth by the fact that it can accentuate liniments in certain directions by virtue of the look angle or, which gives you shadows. In other words, for example with Landsat imagery, we always look for imagery in the fall time of the year to give us a low sun angle, September, October before the snow. So this accentuates the topography because of the cloud, of the shadows of typography. Radar achieves the same thing, they can control the look direction or the angle, but to do it properly you have to fly it both in two directions because first of all you look in one direction, make shadows in one direction you have to go back and do it the other way, which is perhaps the bad thing about low sun angle, you can't just reverse yourself, but radar has again its... if you fly it only one direction, you're

going to accentuate liniments only in one direction not the other. I've done a lot of radar work in Malaysia. I've done work in Sumatra, actually outcrop geology, and of course that lends itself beautifully in those areas because of the heavy clouds and difficult to do good coverage on a uniform basis of a particular basin, or the look angle again will accentuate the structure. Because normally if you have air photos in a place like Papua or Malaysia you're looking straight down, so your photography, your structures tend to be rather flat, whereas with a radar you really can make it stand out. So, I've had experience in that area doing actual outcrop geology in places like Sabah, Sabah, Malaysia and Sumatra. Anything else Bob, can you think of anything else?

RE: [unintelligible]

PF: Yes, I would say a number of the... there will be cross trends coming across, like your antecedent streams, they show of course always on the topo maps but they show it more strikingly on the Landsat imagery, particularly where you can project the liniments coming off the plains into the Foothills. The cross trends in the Foothills, they've always been apparent but not as apparent as they are say on Landsat imagery, they are there. Landsat imagery hasn't been too effective in the Foothills except for this aspect because you don't have stereo coverage except the French, the French have it, the spot and even that is, you can't compare with the resolution of air photos.

[00:33:17] Now speaking of a resolution, the earliest one came out was MSS in '72. The Landsat, the U.S one, that is a resolution designated as being 80 meters. Along came... in '85, there came along a new version of Landsat or the U.S one called thematic mapper, that had resolution of 30 meters. Now, this had more bands, this had higher bands, this was done primarily for rock discrimination, which was excellent for, particular for mining people, for alteration zones and for rock discrimination. It could also be done, it was also very useful for petroleum, particularly in Third World countries. Third world countries where little formation was available, but you could roughly discriminate where you had different types of sediments. But then we go from, continuing on the vein of resolution, then we go into the French one, which is 20 color and 10 for black and white. There they had, they did have stereo, they do have stereo. The Foothills have all been mapped with air photos and you might say the stereo, the resolution of air photos, at maybe five or four. So, we have much better resolution still with air photos. And we looked at, of course good stereo in the Foothills, so by the time satellite came along, all of the Foothills had been mapped stereoscopically as well as all the outcrop areas, so there wasn't much that Landsat contributed to outcrop areas in western Canada per se, except for some of these cross trends.

Geo Photo wasn't the only photogeologic mapping company in western Canada. Many offshoots from the original Geo Photo occurred. After 10 years, one of the principles of Geo Photo formed his own company, Lissae?? Smith and associates. They also had a company in Denver, as well as here in Calgary. The manager up here was George Collins and still is the manager as far as I know. They also did much the same thing as Geo Photo except they weren't quite as heavy in minerals. They did not do the mineral surveys, they did also, did mapping, they had Kalshes ???, they did stereoscopic mapping, they had extensive field parties, they also had non-exclusive photogeologic maps of the Arctic as well as all of western Canada as well. A third company that had photo geology and also did quite a bit of that was Sproule, J.C. Sproule & Associates. And they had a division of photogeology and they also mapped particular... they were quite strong in the Arctic, they did a lot of, Sproule was very active in the Arctic, and they did a lot of photogeologic mapping as well as actually a lot of field work up there. They did a lot of sampling. So basically, these were the three major companies in western Canada.

RE: ??? do you remember what your starting salary was there at GeoPhoto? When you started?

[00:36:49] Well, when I first started in '46, I think I was making \$275 a month, and I thought this was neat. And then I remember in a couple of years I was making \$400 a week, that was tremendous in those days. So that was really good. So actually, I think I'm making more with my pensions and old-age pensions, the pensions I'm making now, put it all together and I'm making more now than I ever did with straight salaries, which is probably the case with most of us.

RE: Do you have any highlights or low lights of your years there?

PF: Well, I think the highlight was when I went on my own. when I look back on it that I thought that was one of the best things I've ever done, was to go on my own. And back in '75 things were still, the boom was quite active, so I enjoyed being on my own, I didn't really develop a staff, I guess I'd had enough of staff, so I did it all myself, so I always kept busy, continually busy. So I think that I've really enjoyed... after all it's been 16 years now, so I've been able to keep quite busy since that time. Both from the standpoint of doing exclusive work as well as still marketing the non-exclusive, that was just a smaller portion of what I was doing.

I think the low point was when Texas Instruments decided to do away with GeoPhoto, which I thought was very ill advised, I didn't think that, I thought this was just the advent of satellite imagery. To me I always thought that they should have gotten into processing and satellite imagery, so that we could never convince management of doing this, so they basically phased out GeoPhoto which was, I thought was quite sad. But the way it turned out, turned out good for me because then there was a vacuum, so I had no problem just continuing in my particular field, so I guess in the long run it was just as well.

RE: ??? so your current interest, as you've described, is still doing...

PF: Is still doing photogeology for whatever imagery is available. So as long as there's an image to interpret, you can interpret just an ordinary topographic map for, from the standpoint of linear drainage or escarpments or changes of elevation, so as long as there's an image to interpret, so this is, the field of remote sensing is continually changing, this is the interesting aspect of it, they're coming up with better resolution, becoming better with different bands for different purposes. In 1993, I think it is, Canada will come up with what you call a Radarsat, coming up with a satellite of radar, so that means that you'll have continual coverage because clouds won't make any difference because they shoot right through the clouds. So, this the interesting part of photogeology, perhaps is the satellites, and continually evolving and what you can do with it, so that makes the field interesting that is constantly changing, constantly improving.

RE: Do you see much... do you think the main future is going to be in mining???

PF: Well, it has a it has a good application for mining, but I think there's still a future for satellite imagery in oil, particularly for structure or particularly in Third World countries. This is ideal, Third World countries, I've worked, all worked all sorts of Third World countries, in Yemen, Burma, Paraguay, and Pakistan, and it's a quick way of working a Third World country because of the difficulty of getting information of the Third World country. If they have photographs, most Third World are countries are very sensitive about releasing your photos of their... but so far Third World countries haven't screamed about releasing of the satellite image over their area, which is great. So, I think there's still a good future for satellite imagery for petroleum. And that it's a quick way of getting a good feel for the country for standpoint, not only geology but so many things like the changing coastlines, or the rivers or access into

an area where there are, or your mountainous areas, where there's your heavy jungle. It's a real aid for anybody working in Third World countries.

RE: So you did all this work in these Third World countries, ??? did you have some other consultants that ???

PF: You must remember, third, you're looking at pretty small-scale stuff. You're looking at one or two hundred fifty thousand images and it really doesn't take that long to interpret. Generally, most clients only have two or three images, their, they don't have that large a permit block, so that you may have two or three images or four images which can be easily done by one individual. I do everything, I do my own drafting. I had a professor in college that made us all practice lettering, that was one of his main emphasis. We had practiced lettering. He was never satisfied, whenever we turned in a report he would always say improve lettering. So, I can always tell for example, when I go back to school, when I go to reunions, University of Nebraska has a reunion say at the APG conventions, I can tell which ones were with my professor and which weren't, because all their all their names will be beautifully lettered, freehand lettering, the one subsequent was a scribble.

So, this has really been a good thing to have because I feel that I could make good legible maps freehand. So, when I would work something up, if the guy was to make fancy drafting, go take it to your own draft, but I'll give him a good readable map and information. For a fancy map you can always go to some fancy map company, that now with, of course now with drafting, has now become computerized and all they do all sorts of wonderful things with their computers. So, I do my own reports and all that, I have a word processor and all that jazz for writing reports. So, I've kept my own work as just myself, so I guess as a manager of GeoPhoto, I guess I'd do every excuse in the book as far as personnel was concerned, so it felt a lot easier to do it all myself and it's worked out fine that way. So, I could come and go as I wished and I worked at home. I took over one of the bedrooms when the kids were gone, the kids moved out, so it worked out fine just to do work at home. This way, oh my gosh, I could get up at 7:30 in the morning and be work at 8:00, of course I might just be my bathrobe, but I was working. So, it worked out fine just to work out of your house because it didn't require support facilities per se. Once I had all the information there, the photos, I have a light table and all that and that was self-sufficient, I could do it all at the house and it turned out that I was a fairly tolerant landlord. But I didn't really take advantage of myself too much.

Side 2- 18:55

RE: This is Side 2 with Paul Fuenning.

PF: My personal interests, I enjoy playing golf, I play golf at Canyon Meadows, I enjoy playing badminton down the Glencoe and also swimming down at the Glencoe. I used to sing in a Barbershop local chapter here, but found it very... although it was very interesting, I enjoyed it, it just consumed too much time, so it was a case of, once you join anything like that of course you find yourself spending a lot of time doing rehearsals and so forth. But I do enjoy singing.

RE: ??? parties always had lots of singing.

PF: Well, we always liked to, have a little songfest.



RE: You go to the Ballet, Theatre, Orchestra?

PF: Oh, yeah, we enjoy the symphonies. My wife plays golf so we enjoy, we have something in common that we do. We have three kids, three children, one is a doctor in Ohio and he used to treat children, his specialty is pulmonary medicine. And my daughter lives here in Calgary, she has two little boys, very beautiful children, and she works for Nova part-time, Nova Corporation, my grandsons are really lively little kids. And then my son, my other son, he works for Texaco Corporation, the new Texaco Corporation. He has two degrees, one in geology and one in geophysics. So, he's, that is essentially is my family...anything else you can think of, Bob?

RE: Well, the politics, how about your politics, are you a political animal, or are you...

PF: Well, I'm very disenchanted, I was pretty much always a Liberal, a Tory, but I'm really quite disenchanted with what is going on. I'm leaning towards the Reform Party. I see what they're doing and liking what they're... particularly my riding here we have Preston Manning opposing Bobby Sparrow, so I go to these Reform Party meetings, and I see all my old buddies. So, I have to say that I'm looking at... I am disenchanted with what has happened. So far, I think the Reform Party has some very good ideas. So, we'll see what happens.

RE: And, religious background, are you strongly, are you a strongly religious person?

PF: Well, I am still a member of the St. Andrews United and perhaps not as strong and religious as my dad was, we do subscribe, as I say we are still members of the church. We are not as active in the church as I, I used to sing in the choir in the early days back in the 50s, the late 50s and early 60s, I did participate in the St. Andrews and sing in the choir for a number of years. My wife was active in the Sunday School when the kids were growing up.

RE: What about your Navy career?

[00:04:12] PF: Well, I was asked, Bob asked me about my Navy career. Actually, I went into the Navy before the War, I went in and took in flight training and washed out a week before the war started, so a week before December 7th. So, I was trying to decide what to do and along came this, this flyer came out saying they were looking for geologists, artists and architects to form the photo-interpretation school at Anacostia. So, anybody with degrees in this were, could apply, so I immediately applied for that and went to the Navy photo-interpretation school in Anacostia, Washington. So, a third of these people were geologists, many of these geologists here wound up in the oil industry, for example up here, people like Max Cappen, George Dunlop with his son, a couple other guys, the name escapes me, I'll think of the name later on.

RE: [unintelligible]

Another one is Ken Germon. So, there were a number of people here in town who were also part of this Navy, who went through this Navy photo-interpretation school. So, following the course, and they were all, we were all commissioned then as Ensigns in the Navy. I was the fifth class and most of us were sent out to the Aleutians. This was in the latter part of '42 before the, the Japanese were still there. So we did go out to ??? and our purpose there was to assess bomb damage, the flights over ??? to see how many bombs fell in the ocean and what damage been done, as well as to keep track on what they doing as far

as building runways, as well as to estimate how many people were there by virtue of the... that why the architects were there for, to figure out how many people could be housed in their units. And we would map ??? And for the landing we would map all the bays and so forth, which were good bays to come into, where was the protruding rocks, as landing ships come in what routes to take. And then following, when I came back from the Aleutians, I didn't go back and we had a photo interpretation centre at Anacostia, which we, did, made reports. I went briefly through the Navy photo school in Pensacola. And for, this was just straight photography. So, I was all set to be sent out again, to be sent to Guam and this was just the day before VJ?? Day. So, luckily I hadn't had left yet because if I'd gotten out there I'd be there a couple years. So, that worked out very nicely.

So, following that, this was in late '45, then of course, then I went to, for two semesters, I went to the University of Chicago to do graduate work in geology. I took a summer field course from the University of Chicago in the Black Hills. So, then at the end of that I got an offer from Dick Watson to join them in August of '46 in Denver, which I did.

RE: You had known Dick in the Service?

PF: Yeah, I had known Dick Watson, he was with, he was up at the Aleutians with me. So, I was with Dick and he was in my class. He was also in my class there at Anacostia, so I knew Dick from way back. So, when these guys formed this company he called and asked me to join, so that pretty much explains how I got there.

[00:08:57] Well, I think I look back at my career, it's been very specialized, it's been interesting, it's been a good living, but I really don't recommend this for anybody else. I think, like I told my son, I said, get as much experience as possible, don't specialize just in one area. I sort of rode the crest of the wave so to speak and it's still giving me a good living and so forth, but, the thing is, it's a lot better to be an Explorationist type of thing and have a wide range of experience than just narrow specialty. Although this has been interesting, but I don't think I... if I look back on it now, I don't think I would do it again.

RE: [unintelligible]

PF: Well, I look at some of my contemporaries and they are pretty well off. They got hit at the right place at the right time, which I could never achieve with photogeology. Not that that's important, but I think it would have been more interesting, perhaps more gratifying to have a wider range of experience.

RE: I think we all end up astonished sometimes, at ???

PF: When I look back, we could have done it different.

RE: Well you made your decisions, did you study this ???

PF: Do I do this or do I stay on at school, do I get a PhD, what do you do? So, you really don't know, which has turned out fine, turned out good. So, it's been it's been very enjoyable and a lot of good people there in GeoPhoto. We had a very fine group of people there, so I enjoyed working with them. It was a fine calibre of people to be associated with it, so that's been a high point.

RE: [unintelligible]

PF: Well, Jerry Allager (???) is retired. He's living in Tucson, Arizona. Fred Brectal spends half his time in Denver and part of his time here in Calgary. The principals like Larry Brundle, he's in Santa Barbara, California. Dick Watson is retired, he is in California in the San Diego area. Lissae Smith, he's also in the California area. Bob McMillen, he's retired also of course, and he stayed in Denver, he's still in Denver. The people up here, any number have retired or still living here. Of the personnel... some of the key personnel are, well like Don Shifter for example, he's with the ERCB, still working for them, he was our photogrammetrist, so he's working with them doing work, not particularly photogrammetry, but doing very well with them. Well they're spread out all over actually, so it's been a pretty wide alumni. A number of the companies in Denver that came out of GeoPhoto, like ??? and Ivy, that's still an operational company down there, they both came from GeoPhoto. The Knox Bergman Share came from GeoPhoto. They have subsequently retired. Interest Search is the outgrowth of that company. So there are a number of smaller companies. I guess Denver was sort of the hotbed of photogeology because it was centrally located in an area that... a lot of outcrop there and it was an ideal spot because particularly in western U.S... So, we had a lot of people who left GeoPhoto and formed their own companies and stayed right there in Denver. And the other one of course I mentioned Lissae Smith coming up here.

RE: If you want to say how you got into geology. Question one, was there a conflict in the family [unintelligible]?

PF: I don't think there was a conflict there between my father and myself on geology per se. I always make the story that, we happened to live right next to the campus there in Nebraska. In fact, we lived only a block away from the geology department and I always like to say that I chose geology because that was the closest to the house, I didn't have to walk far. I'm just glad it wasn't animal husbandry or something like that.

No, I was always fascinated because right there was the museum and as a youth I was always fascinated by the museum and looking at all the displays. So, I think that's pretty much, what my interest in geology was the proximity of a first-class museum right next to where we lived. And they'd have children's things, for kids when I was growing up on Sunday afternoon... all these various displays of minerals or rocks. Nebraska was a very great place for fossils and tertiary, many mammoths and they weren't so great on dinosaurs, they were more on mammals, particular the tertiary. So, I spent summers with, when I was with the University of Nebraska, spent several summers actually on the... digging fossils for the museums in Western Nebraska, Brockwater and Bridgeport and through there. I've enjoyed geology. Not only did it give me a good grounding, a good basic fundamentals of geology but a keen love for geology. That made it real interesting, so it was very inspiring.

RE: [unintelligible]

PF: Such a wide field.

RE: Was there any one professor?

PF: Well the head man there at that time was a guy named Prof Shram. He was a bachelor man. He claimed he had 52 ranches. He was one of these wealthy boys, ??? he all sorts of property, but he was a real good, he was a very practical guy. He was the guy that insisted that we all learn how to letter, that's just one aspect of him. But he was, he had a keen, he was very, as far as the economic aspect of it. So, I

think we all sort of imitated him. He smoked cigars so we smoked cigars. But he was quite a guy on particular field trips. We always had spring field trips to the Black Hills. And he knew exactly where to go. I remember on the way, near the hills, he knew exactly where to stop and in the ??? of shale there was this outcrop, we ran and got out there and there were these ??? broke them open, beautiful ammonites. So, of course we didn't realize that, we brought some back but didn't keep them. But he knew exactly where you go to get these beautiful ammonites. So, he was one of my key professors along with a number of other good ones.

[00:17:34] RE: You stayed in Chicago. How long were you there?

PF: Two semesters there, it was interesting there because the old giants...

RE: [unintelligible]

PF: My stay in Chicago was most interesting because many of the old giants, their last years were generally there or moved on, like, Pettijohn was there when I was there, he we moved on to Northwestern. Marvin Weller, Jerry Fisher, Harlan Bretz, the one ??? he did a lot of work in the scablands of the Spokane area and then as well as, one of the Chamberlains, his last year was there. So, we had some very interesting professors the one year I was there. So, in no way did I ever regret going there. I thought maybe, I always wonder maybe I should have kept going, but in the end, we always have second guesses what decisions we made.

RE: This is the end of the Paul Fuenning interview.