

“With today’s technological advances, interpretation is becoming easier...”

– An interview with Kathleen Dorey



Kathleen and Satinder (Photos courtesy: Penny Colton)

Kathleen Dorey is a well-known and experienced geophysicist in the Canadian oil patch. She works as a geophysical consultant and has dedicated more than 20 years to her profession, which spans exploration activities mostly in Alberta. Kathleen graciously agreed to our request for an interview and was quite enthusiastic in answering our questions that led to the recording of this interview. Penny Colton helped us with the photos and occasionally joined in in the discussion with a question. Following are excerpts from the interview:

S: *Kathleen, let's begin by asking you about your educational background and your employment experience.*

K: I graduated from University of Western Ontario in 1983 with an Honour's Bachelor of Science in Geophysics. I began working in the oil industry with Texaco Canada and I was there for 5 years. That's where I got my foot in the door. It was the time of the NEP so things were a little bit lean. I was in their North East B.C. group and I was interpreting in the Foothills and some Plains work there as well. Things were pretty quiet in the early 80's in that area and to think back now how active it has become is quite interesting to see. After that I spent 4 years at Conoco in Calgary working in Central Alberta and, as it turns out, the Foothills again as a senior geophysicist. After that I spent 3 years at Ulster Petroleum and I was basically in Alberta, Northern, Central and Southern Alberta for those three years. There was a bit of a pattern developing there, 5 years, 4 years, 3 years. I wasn't cut out for the company thing I think and so in 1997 I started my own geophysical consulting company, Sheehan Energy.

S: *So how did you think of getting into the oil industry?*

K: I worked for a summer, after second year university, for an American mining company. I was prospecting for gold and tungsten in North B.C. and the Yukon. I was flying out daily in helicopters, jumping across streams and carrying

back packs etc. I got a bit of a picture of that side of things and it was interesting, but I didn't like the isolation associated with the mining business. So the next summer I accepted a job in the oil industry. That was 1982. The industry was starting to wind down but there were still summer jobs for those students coming from Ontario. The larger corporations would come and recruit for summer students. I don't even know if they do much of that any more, for undergraduates from Ontario. I worked for Petro-Canada for a summer and I liked Calgary. I liked the oil industry, the pay was good, the hours were reasonable, all those aspects that draw a lot of people here. When I graduated it was certainly an easier decision to make having tried both the mining and oil and gas industries as summer jobs. I wanted to get out and ply my trade at that point after graduation.

S: *You said you were not cut out for Ulster Petroleum and you started your own consulting company, could you elaborate on that? What made you decide that?*

K: Yes, not just Ulster. It was the whole pattern of companies I guess. At that point I must have had 12 years experience. That's a long time to just do the same thing, for me, and I wanted to pursue some of my own ideas. I wanted to get away from the office routine and not be a cog in the wheel. Doing your little piece and then the geologist does a little

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piece and then the engineer does their little piece, that sort of scenario. I had made some money off of my stock options with the company so I started the consulting company with that money. I actually consulted to pay the bills, keep things going and I started prospect generating at the same time. Finding geologists as I needed them, pull in an engineer occasionally; I

started out selling exploration plays. I thought that I'd want to do that for a long period of time and the geophysical consulting was just going to be something that would help me afford to do that. If you know people who have prospect generated before - it's not an easy path, but it's very exciting. I did that for three years and then my son was born. It was a little difficult to keep all of that going at once. Juggling a new baby, prospect generating, and consulting at the same time. I stuck to the thing that actually paid consistently, which is consulting. I cut my hours down considerably with a new baby at home. With the prospect generating I got a lot of exposure to various aspects of the industry that you just wouldn't normally do, in a bigger company. I was my own land person and I was dealing with lawyers, accountants, contracts and AMIs, so it certainly was more challenging. Financially it can be lucrative, as a lot of people have done it successfully, but the price of oil dropped somewhere in there to about \$12.00 a barrel, so it got even tougher.

Was it 98? Yes, so it kind of fell into place that consulting was where I was going to pick up things after my son was born.

- S: *You have been in the industry for more than 20 years now; what changes have you witnessed during this period in terms of job prospects, the work environment or other aspects you would like to tell us?*
- K: I think the job opportunities are better than ever. I've got a lot of experience, so that's a little bit different than maybe someone new to the industry. I am at the tail end of the baby boomer wave that came to the industry and there is this huge gap of people and experience behind me. The possibility of job prospects and work is really good and just keeps getting better. I can address things quickly and the niche that I am in, the consulting niche, doesn't have that many people in it. There are a lot of consultants around but a lot of them are eventually pulled into companies as a full-time employee. There is certainly a niche for consultants with a lot of experience because you can go in and give a good assessment fairly quickly without costing your client a fortune. They are paying for the experience, but only little bits at a time. They don't have to put out a huge salary.

The work environment can really be what you want it to be. In my case I work out of my own office. The reason I can do that mainly is the Internet. With the development of the Internet plus the PC, it's just light-years different than what I and you started out with. I remember starting out with cards.

- S: *I know I have seen that—*
- K: I was doing modeling with cards and we'd bring in a deck of 400 cards and you'd get a model out a week later. You'd just

hope you didn't forget something. The work environment for me is so different now than in the past. I can do so much more all from my own office now. I get data on the Internet, I do all my banking on the Internet, my courier is even on the Internet, just everything. In addition, the development of the PC and advancements in hardware have been incredible. I remember there used to be half a floor of hardware and software to deal with, and now I can do a full interpretation on my laptop better than I can on my desktop. Plus the wireless aspect of the Internet has really changed things. When I come downtown and bring my laptop into the client's office, I can either do a wireless connection, depending on if there is a hot spot around or I can plug into their Internet. I've got a lot of the Western Canadian data base on my laptop now, so I can pull up wells, production information etc. as well as the seismic and work interactively with the client. That work environment can be quite advantageous for me.

- S: *Is there anything else that you would like to comment on?*
- K: The other aspect is that because of the software developments and the technology developments, I think some software packages are better integrated now than they have ever been.
- S: *Better than some software working in isolation from another software package?*
- K: Yes, it doesn't mean it's always done, but the geology, geophysics and engineering can be integrated better now than ever. Because they are better integrated, there doesn't have to be as much of a lag time between the time you look at the seismic and the time you look at the wells or the production history. You have it all at your fingertips now, if you want to. Also the software is now more user friendly in that the interpreter can use it as opposed to some third party company five blocks away in another building. I think it had to come to that anyway to get the better technical solution. You have to start integrating the engineering aspects with the geology and the geophysics as a minimum solution.
- S: *So what career accomplishments are you most proud of?*
- K: Some of the wells I've drilled in Western Canada. I look back now and I can see the hydrocarbons that they've produced, in particular one Foothills well that I was involved with. It was rank exploration, a new concept at the time and people thought we were crazy. You know, 'you've got to be kidding, you are going to actually drill that?' For the well to come in at tremendous rates and to look back now on the production it's made within the new field, I am quite proud of that. There is quite a bit of satisfaction in that and it points to the fact that you have to be open-minded. Anything is possible. Until you do it, you are never really going to know. Another well that comes to mind was drilled after another company had gone in and drilled 5 dry holes. They were farming it out and there was a 3D. I can't remember when 3D was done relative to the dry holes, but the first well we drilled was a discovery. It was interesting to see how our interpretation and data integration was different than theirs and how that led to success. To see that success and the possibility of it is always quite exciting.
- S: *Apart from these accomplishments, what has been your most challenging project?*

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K: That’s a hard one. I remember Foothills projects at the time as being really challenging. I haven’t interpreted in the Foothills in a while, but when I was doing it, we were using mainly 2D. That was really challenging because you may have had 3 wells in a township, you had 2D data, and some of it was from 1975, say. So back then it was quite challenging. The advent of 3D was almost like a big light bulb had gone on in these structurally complex areas.

S: *Our industry is dominated by males. Have you experienced any sort of disparity in terms of say a promotion or an assignment or something like “this job is for a man”,?*

K: Nothing that blatant. But that’s not to say it wasn’t there. I remember one manager in my past openly saying that “Well that job is not for a woman”. It wasn’t directed at me, it was a comment that was made in a room and I was there at the time. It wasn’t blatant for me but it certainly was there. I think it would do a disservice to ignore those kinds of things. I do remember at another company the issue came up again and someone came by and said “Is it true, is it true?” and I said, “Well, yes”. There was a reality to it and you just had to rise above it. Don’t bury your head in the sand, be aware of it and move on. And now, to a certain extent, I get to work with whom I want to work with. Clients are not calling me because there are some issues with my gender. If there is an issue that way, they shouldn’t be calling me. I certainly don’t see as much of it as I used to.

S: *Right, but maybe it will improve gradually.*

K: We can hope.

S: *So how do you like your life as a geophysical consultant now? You are the boss.*

K: Yes, it’s good. It’s challenging, and sometimes it’s a bit overwhelming in terms of the workload because you don’t know when it’s all coming. There is no guarantee it’s coming all at convenient times. I’ve got my own office set up and it’s at my home so if there is work to do at night it’s easy to do. It’s right there and your not having to come to the office downtown at night were all the lights are off and you are the only one here. That’s not much fun. You get to know a lot of self-motivated people, a lot of entrepreneurial people because I deal with a lot of smaller companies. Most are motivated for the right reasons. Not all are and maybe those are the clients you want to avoid. It’s an interesting group of people; it’s an interesting industry. I’ve got clients that are private companies and public companies, some independent people, even a lawyer who

does this mainly as a hobby. It keeps it fresh and the projects are always changing. You can challenge yourself as much as you want to.

S: *What do you think is required to be a successful geophysical consultant? What qualities in a personality are needed?*

K: You have to be really organized. It depends on how many clients you have but organization is a big thing, keeping track of data being processed, data coming, data going. I am on my own; I don’t hire people generally, like I have in the past. If you had an office staff with more people in it then it gets more complicated, but organization is a necessity.

Keeping an open mind to new ideas is essential. I see, in any given week, five or six different plays all over Western Canada. You have to take the information in first and not be judgmental because it’s a lot of information. You are still, at that point, where you are getting glimpses of things; so you have to take that glimpse, get the information and put it into context of the bigger picture. Sometimes they don’t have that bigger or regional picture. They’ve got to give it to you, or you got to find it, and then make some conclusions. So it is essential, at first, to keep an open mind. Eventually you might say, “oh, it’s not going to work”, or ‘maybe it will’, but not until all aspects are more integrated.

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The other quality is good communications skills. I think that's a big one. That is essential anywhere, whether you are a consultant or not. But because my clients change a lot, or the projects change a lot, that is even more of a challenge. My client might be the same but it now might be a different geologist in that company. Trying to communicate with that person, and everyone communicates differently, and get the

information you need to be successful can be more challenging at times than others. If you are not communicating well with that person to start out with you might still be successful, but it makes it a tough start. A lot of your success depends on having to integrate information now more so than ever and if you are not communicating properly, it makes things quite difficult. There is also a need to communicate the basic status of different aspects of a project to your client because you are quite often working remotely from their office.

P: *I just looked at your business card and I noticed the company name. Is there a story there?*

K: Yes when I started my consulting business and went to incorporate, I went through about six names before I could find one that wasn't already taken. I just wanted to get on with it, so I thought I had to come up with a name that's not going to be the obvious oil company name. I chose my great-grandmother's maiden name.

Bridget Sheehan was her name and I always liked it. I get asked a lot about that. It's actually been a conversation icebreaker at times. It isn't a name that automatically associates with the oil industry but it hasn't seemed to have held me back either.

P: *It is a very dignified name, it seems like there is more of a story behind it,*

K: It's an Irish name, a very Irish name.

S: *Since the early 1990s 3-D seismic has become the norm for oil companies and it has helped get clearer pictures and more detail of the reservoirs. Conventional seismic interpretation methods as applicable to 3D seismic volumes make use of 2-D inlines, crosslines and time slices. Visualization and volume interpretation of 3-D seismic data has been suggested since many years. However, it has been observed that the adoption or the regular use of these techniques has not spread to the geoscientists, who are still engaged in doing section-based interpretation even for 3-D volumes. This is true even for those companies where all the data used is 3-D seismic. In your expert opinion, what are the reasons for this lack of adoption of such newer techniques?*

K: I don't have any personal experience with it because I haven't done any 3D sort of visualization. I have seen packages, but I was actually talking to a few people about it, so this is coming second hand. Their comment was that they find interpretation on that 3D volume very difficult. They still go back to the inline and xline view to do their interpretation, or time slices.

They say mechanically they can sit there and spin it every which way and that's fine, but they aren't using it much for the interpretation side of things. I haven't had any experience with it to say one way or the other.

Yes, maybe it is just a comfort level in that eventually people will have to get used to. It's like geologists that still interpret on paper even though they can do it on screen now. Maybe it's the screen size too that is an issue. If it's not big enough people will be reluctant to use the tool if they can't see comfortably.

P: *That probably means that most — geologists have a colored pencil on their desk.*

K: A lot of them do still. It's like a security thing, like a blanket when you are a kid; you still want to hold on to that stuff.

S: *Many in the industry regard visualization as computer gimmicks that look nice and are a good way to please the management. How do you respond to that?*

K: Well, I agree that there is that perception there. Again I haven't had a lot of experience with it myself.

I can certainly see the benefit. Maybe not so much management of the company but the geologist that you are working with would be quite interested in that. Channels, for example, are so complex. If you can see the volume and how the channels are cross cutting each other in 3D as opposed to just viewing the slices, that would be of great benefit. If the geophysicists aren't using it, the geologists are less likely to see it as a product that's out there, available to use.

S: *How often do you use seismic attributes in your interpretation? Is it just interpret inlines, crosslines and get your structure maps and that kind of a game or would you like to go in a little more detail and extract more information and, make it more accurate?*

K: For the 3Ds that I do interpret I like to use as many attributes as possible. My workstation has the capability to calculate the instantaneous frequency, amplitude, phase, etc plus spectral decomposition and coherence, to name a few. To calculate any further attributes like you are referring to I would use other industry packages available on a 3rd party basis. I have had some experience with them and the difficulty with them can be as a result of them being such complex packages to use and understand. The difficulty seems to be to get the information over to that third party. It's not difficult physically getting it over but conveying across, say the business unit, the importance of using these packages and demonstrating tangible results. In some of these software packages there are over a hundred attributes, from what I remember. If you get into the neural-network scenario, many of which are quite interesting, at the end of the day people are still wondering what does it all mean? If geophysicists can show that their efforts can translate into successful wells or well programs then that's when you start getting more companies using these systems. That is one issue.

The other issue is not having it as a third party package, having it with the interpreter in their office, with the geologist and also a user-friendly package. I know there are some that are more user friendly than others and maybe user friendly

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isn't the only issue. It's also having someone who understands how are these attributes calculated, what do they actually mean, how meaningful are they, which ones are the most useful etc. I found that the easiest approach may be to run as many of the attributes as possible and start looking for patterns. As long as you are not spinning your wheels and people are rolling their eyes and saying 'oh, they're at it again'.

You also have to be in a position where you or your client can afford to do this. It's not inexpensive and there also has to be a need for it and the time to do it properly. The input into these packages in terms of interpretation and well information has to be meaningful. Otherwise people will get turned off. They will say "We did that, it didn't work". I don't think that's necessarily true. "Didn't work" what does that mean? But I have heard that and I don't think that is necessarily correct in all cases. Maybe because it's not being used properly for the right applications.

S: *Talking about the cost part, compared with the cost of drilling, the cost of running attributes or something like that is minimal.*

K: Yes.

S: *And I think that should not be a hindrance or —*

K: No, you are right, and I should clarify that. There is also a cost in resources, time and staff. That is more of the cost that I'm talking about. When you have management saying, "We've got 150 wells, we've got to survey them, you've got a month", where are your priorities?

S: *Yes, well that's the thing, the time that is available —*

K: Actually that's a good point. For smaller companies, the cost may be more of an issue and if they are at the 3D stage, are you drilling one well or are you drilling 150? Everyone's situation is a little bit different. The cost is more those resources, and people and what you have on your plate versus what needs to be done. I don't think people give enough lead time to a lot of these aspects. We just see things happening faster and faster.

S: *Okay, well, you mentioned you have experience doing seismic interpretation in the Foothills and it does seem to be a difficult area, so how do you tackle it and what makes you so sure to go ahead and do it?*

K: As I mentioned before, 3D has been an incredible advancement for the Foothills. I have seen the difference between 2D and 3D seismic control in these complex terrains. If you can use 3D you certainly are at an advantage.

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How you tackle it? You use every bit of information you can possibly get. Well information, dip information, outcrop information, core information, sample information. Quite often it's a lot of sample information because you are dealing with wells that were drilled back in the 1970's and there is little or no core. There have been a lot of advancements with 3D processing in the Foothills in the pre-stack domain as well, over the years. Get as involved as you can with the processing, particularly in the Foothills, as it's not simple. Find someone who is quite adept at it, a processor who is quite good at it. There are certain people in town that definitely have the expertise and there are others that would have less experience or capable software. I remember going and picking the velocities years ago on 2D seismic data and saying, "This isn't right", or "That's right".

S: *I think that has become more common now, picking velocities with the processor.*

K: Yes, because companies are exploring the Foothills and the sub-thrust plays as well. It gets complicated to image. The geophysicist also needs to give direction to the design of the seismic acquisition in order to get the best results from the final 3D image.

S: *Have you had to deal with anisotropy effects in the Foothills?*

K: No, I haven't, more so because I haven't done a lot of Foothills recently.

S: *The WCSB is maturing. So do you think there is enough potential here in Alberta to remain employed?*

K: That's a good question. I tend to think month-to-month, year-to-year, in terms of my projects. I don't really think of 10 years down the road too often. I like to be optimistic and say "yes". There are still tremendous opportunities in the Oil Sands certainly from the seismic point of view, for example. There is so much that can be done there geophysically and companies are just starting to tap into that and figure it out. There is also coal bed methane. I don't have any experience with it but that's a whole other burgeoning field.

S: *Yes, that's alternative energy sources they provide the hydrocarbon that you need, may not be on the oil and gas.*

K: We've all seen the larger multi-national companies slowly pulling out of conventional exploration in Western Canada. It is almost prolonging opportunities for the smaller companies because they are not going to be coming in with the larger dollar expenditures, as they use to. But that's a good question. I am quite optimistic, but I don't know that in 10 years I'll be working in the Western Canadian Basin. I might still be doing geophysical exploration from my office in Calgary but it might be for a project in Morocco or China. With today's technological advances, that is becoming easier and easier to do.

S: *Well, that also brings me to the next one, the advancement of technology is probably good to re-visit old fields and you know, try and extract more and more information out of that*

and then let that also help in increasing production in some of the basins. So do you think that is – do you agree with that?

K: Oh, yes. Visiting older fields or, for example, thinking about the Oil Sands, there is still a lot more to come in terms of new advancements or even applying the advancements we have today in a more proper and efficient way.

S: *Let's talk to you about your other interests.*

K: I enjoy cooking but I don't do enough of it. I love gardening in the summer and I quite like art. When I can I take art classes I enjoy watercolor, drawing, clay classes, that sort of thing. To really get enjoyment out drawing and watercolour I need more time than I have right now to devote to it. So I dabble in a variety of arts and try to get my mind into that kind of space as often as possible.

S: *Are you basically an indoor person?*

K: Yes, not so much into say, hiking and mountain climbing.

S: *What would be your message for young people who are about to join our industry? What would you like to say based on your experience?*

K: I've come across young people in the industry who have a job and then there are those who want to be in the industry and can't get a job.

For those that have a job already, try to get as much training as you can in your current company. Most of them are in major companies, not always, and these are the companies that can provide you with tremendous amounts of training and exposure to all aspects of the industry quite easily and are quite willing to do it. Keep in touch with the industry always, as a matter of course. Those employed in a major company may be a little more insulated and they tend to stay within the company for all their socializing and interacting. That has its benefits but also make an effort, three times a year, six times a year, to get out and see the technical luncheons, talk to people, stay in contact with the industry as a whole. That's likely their next step, outside of that major company. There is a lot happening in a global industry so it's best to keep in touch. Let people know that you are there, you are interested and you are up and coming. Anything can happen that way.

For those that want to get into the industry but haven't yet, they need to get out there and let people know they are here, in Calgary, and available to work. Keep in touch with the industry in as many ways as possible. They may have to take a job in the interim that they're over qualified for or less interested in but eventually opportunities may arise as long as companies know they are out there and available.

S: *Kathleen are there any questions that you thought I would ask and I didn't?*

K: No, no.

S: *Well Kathleen, thank you very much for giving us this opportunity to interview you.*

K: Oh you are welcome, my pleasure. **R**