"I approach geophysics not just as something grey, but something that is rich and colourful."

An interview with Andy Williamson

Andy Williamson is one of Calgary's more experienced geophysicists. With over 26 years of geosciences experience under his belt, he spent the first 10 years in seismic data processing with Western Geophysical, advancing to Processing Supervisor in Buenos Aires. He then switched over to seismic interpretation and has since worked for Boyd Petrosearch, AEC, EnCana, Galleon Energy, Africa Oil and is now a consultant.

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Andy has a well-rounded exposure to a variety of structural/stratigraphic plays, clastics and carbonates for both exploration and development in domestic and international basins. His early grounding in seismic data processing has held him in good stead. He has drilled over 500 horizontal and vertical wells and has received several company awards for his work.

Outside of work also Andy has been honoured with the Paul Shoemaker leadership Award in 2009, Social Venture Partners International for non-profit work.

The RECORDER approached Andy for an interview, which he sportingly agreed to. Following are excerpts from the interview.

(Photos courtesy: Joyce Au)

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

A: I graduated from Queen's University, Kingston, in 1985 with a B.Sc. Honours degree in Geological Engineering majoring in Geophysics. I was always interested in geology, so the program at Queen's provided the opportunity to merge that with my aptitude for engineering and applied science.

Finding employment in 1985 was certainly challenging, on the cusp of a global economic decline that bottomed-out in the famous Black Monday stock market crash in October 1987. My early ambition was to work for a major E&P company but in retrospect my decision to start my career with Western Geophysical in Calgary as a seismic data processor proved to be a good one. By 1987 many new graduates hired into the major companies were given 'early retirement' packages while I was able to remain employed in the industry. Nearly 27 years later I look back at how the first 10 years at Western was critical in shaping my skills as a geophysicist. I gained rich hands-on experience in seismic data processing and field acquisition, and by being in the geophysical service sector I was able to build a wide personal network that has served me well throughout my career.

Due to economic conditions Western Geophysical closed their office in Calgary in 1992 and I was transferred to the Latin America division and worked for one year in Bogotá, Colombia and two and a half years in Buenos Aires, which gave me valuable international experience.

S: ***So you got a firm grounding in processing of seismic data?***

A: Absolutely, and I think it is a fundamental part of my skill set that has defined the way I interpret seismic data today. It's one thing to take a short course in seismic processing, but you see a lot of data from all over the globe as a processing geophysicist for ten years. I was also lucky enough at Western to be a liaison between the processing and acquisition departments, so I had the opportunity to work extensively in the field which was experience that today I value as priceless.

In 1995, ten years into my career and still at Western Geophysical, the economy was rebounding so I felt it was time to make the transition from processing to interpretation.

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Considering I was living in Argentina, this was a bit tricky but the job search was easier because of the contacts I had made working for a service company. John Boyd and Larry Herd at Boyd Exploration Consultants hired me as a seismic interpreter back in Calgary partly because I was able to secure an anchor contract with Alberta Energy Company (now EnCana). After just one year consulting for AEC they offered me a full-time position, and it was a very difficult decision to leave Boyd, but it really fulfilled my career ambitions as a young geophysicist.

I remained at EnCana for 11 years, sharpening my technical and leadership skills in a variety of project areas in the WCSB and in Ecuador, and then I progressively moved to more junior companies: 3 years at Galleon (now Guide) as Manager of Geophysics, 1 year as Chief Geophysicist at Africa Oil, and for the past year as a consultant.

S: ***Very nice. So let's go back a little bit. What inspired you to take up geophysics as a career?***

A: When I was a grade 8 student my family moved to Calgary, and I will never forget my science teacher who taught a wonderful unit in earth sciences, which really opened my eyes to geology. I really enjoy back-country hiking and camping. Coming from Ontario I was enchanted by the mountains, and it's hard to live in Calgary and not be enticed by the oil and gas industry.

My father was an engineer, so that inspired me to enroll in engineering at Queen's, but I still had the bug of geology in me. Originally I thought I might study geotechnical engineering but I had a close friend at Queen's who urged me to think about geophysics. I discovered a really interesting combination of math, physics of the earth, geology and an element of art that really spoke to me, and that became my inspiration and passion.

S: ***During your building years who were your mentors and why did you admire them?***

A: I think I can divide my career so far into three phases each with its distinct group of influences: the initial years in processing with Western Geophysical, the transition to a seismic interpreter at a major oil company, and the past 5 years in smaller companies.

The late 80's and early 90's was such an active period of growth in our Industry, especially with the advent of 3D seismic, so there was a lot of research happening in seismic processing and acquisition. Western Geophysical was a leading company in the world at the time. There was a wonderful research department and in particular I had exposure to three people that really influenced me: Craig Beasley, Chuck Diggins, and Scott McKay. Craig, a past-SEG president, was a leader in DMO and migration research, Chuck Diggins is a world expert in refraction statics and near-surface modeling, and Scott McKay is renowned for his research in complex structural imaging. They all have such inspirational creativity and innovation. It was through them that I really began to appreciate the technical complexity

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of seismic data and the need to strive for continuous learning.

S: ***You missed Scott the other day he was here.***

A: I wish he had called me!

In the second phase my key mentors were without a doubt John Boyd and Larry Herd who remain today as tremendous role models. Not only did I learn a lot about seismic interpretation from them, they stand out as examples of the highest standard of ethics. I can't say enough about John and the kind of person that he is, and Larry who is a solid technical specialist and a real pragmatist as well.

When I joined Alberta Energy Company, Keith Young was a very strong mentor. We had a wonderful two-way street where he shared insight into seismic interpretation while I shared my experience in data processing and acquisition, so we had many in-depth technical discussions. Lastly, I would be remiss not to mention an icon in our industry, Easton Wren, a past CSEG President, who was a consistent source of inspiration and encouragement.

S: ***Yes, a well-known name.***

A: And lastly, I would say I have met people who have simply been inspirational and aspirational. One of them is Dr. Grant Bartlett who I've had the pleasure to get to know, a former Geology Professor from Queen's University and successful entrepreneur in oil and gas, from whom I've learned many life lessons. Similarly, I had the pleasure to meet the late Harley Hotchkiss who I found to be a true humanitarian figure and the best example of what it means to give back.

S: ***Okay, now you have mentioned that after your graduation you joined Western Geophysical and then you worked for different oil companies, tell us what caused you to make those changes?***

A: I think one should have a short, medium and long-term career plan which is dynamic, and the career changes have to be guided with that in mind. I've found that opportunities don't occur just by chance but tend to be steered loosely by that plan. For each one of my job changes there was a combination of my technical aspirations and what interests and challenges I was pursuing in the science, which had to be balanced with what I felt in my heart, and what was important to my family. I think as you grow along with your family you always have to be thinking that you are not the only part of this equation. No matter how

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careful the plan you are always confronted by difficult and unexpected career decisions, so the right decision is the one where all aspects of the fit are right for you. I have been lucky that each career move I have made has fit nicely within a long-term plan that in hindsight has worked out better than I could have imagined. For instance, after about 10 years in the seismic industry, it felt like I was getting close to the last opportunity to recreate myself as an interpreter, so I made the move back to Canada. Later, the challenges and rewards of being part of a smaller team appealed to me, so I moved to a junior outfit.

S: ***Tell us about the different styles of functioning at EnCana, Galleon, Africa Oil and now Amulet.***

A: In the larger companies like EnCana, there is a lot of structure and process, while at the same time there are more resources available. Early in my career working for a larger company was quite advantageous because of the training and development available, the access to mentors, and the ability to see how each department functioned. I found many opportunities for advancement and movement to a variety of projects during my tenure there.

Junior oil and gas companies tend to have flat management structures so decision-making can be fast and aggressive, and in turn you have a much higher degree of responsibility and accountability, and your technical expertise carries much more influence and importance. However, there can be fewer resources and a smaller variety of projects in fewer geographic areas.

A pure frontier exploration company like Africa Oil operating internationally typically has a small number of employees working in many different locations, so the job can be challenging on several levels. Companies of this size can be very aggressive and tolerate very high risk.

The final step for me was to become an independent consultant. I founded my own consulting corporation but I also have an association with Karen Brawley-Rogers and her company Amulet Exploration Ltd. As a consultant you sacrifice some job-security in exchange for greater flexibility and the advantages of owning your own business. With Karen, it is a partnership where we can work independently but also have the ability to collaborate on larger projects together. There is a benefit to having a consultant team whereby resources, fixed costs and ideas can be shared. In the long-term there are options to build the company and this is something we're looking at because the demand for geophysical interpretation services is clearly growing.

S: ***What strategies have you employed to pursue the career options you have made?***

A: I can expand on the idea of having a career plan where you weave the fit between the technical challenges and interests you want to pursue with the company structure appropriate for that stage of your career. I think the other key element is the fit with the people that you're working with. Let's face it, in our working lives we spend almost as much time with our work colleagues as our families, so having healthy working relationships is crucial. Using your network is the best strategy because that will allow you to find the best fit with like-minded individuals and the company style as a whole. I have been fortunate as a consultant to be able to find great teams and projects that by and large come from my network of friends and former colleagues. It is also important to be self-aware – do you really want to work in management or are you in love with the science? This can also dictate when the time to move on has arrived.

S: ***All right, looking back at your geophysical career what were some of the successful landmarks that put you on a firm footing?***

A: There have been many pivotal moments but I can cite four key landmarks in my career. The first was the international move to South America in data processing, which gave me foreign job experience and solidified my understanding of seismic data. Next was the transition to interpretation and the chance to learn from experts like Larry Herd, John Boyd and Keith Young, and to be part of drilling literally hundreds of wells in southern Alberta. The third was gaining international exploration and development experience as part of EnCan-Ecuador, and the last was to venture out as an entrepreneur forming my own company and building a consulting practice.

S: ***What personal qualities did you draw upon when you made each of these different changes?***

A: I think one very important quality is to remain committed and focused in your pursuit, but with patience. There is always a tendency to give up on something too soon, but sometimes sticking to it can have its benefits and rewards. Determination is a key and an example is how I continued with geophysics and data processing through a bad economy despite the fact I had a goal to be a seismic interpreter. In hindsight I believe my success, as an interpreter would not have been possible without a thorough knowledge of field acquisition and signal processing.

S: ***So, what is your personal and professional vision that you are working towards now?***

A: I really want to remain challenged technically, I want to continue to learn about our science and try new things, and be open to new technologies and new strategies. In my consulting business I have opportunities to seek out projects that really interest me and also make use of the skill-set I have.

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With the flexibility I have as a consultant I'm open to change and opportunity, something you don't necessarily get especially if you are tied to a full-time job at a large company. That freedom fuels my vision to capitalize on great new opportunities within or outside my own company and enables me to move quickly enough to take advantage of them. And personally I have many projects outside of geophysics for which I intend to carve out time.

S: ***How do you like your life as a geophysical consultant?***

A: It has always been an ambition. I thought maybe it would come a little bit later in my career, but now that I have taken the step and taken the risk it really feels like absolutely the perfect thing for me in my professional and personal life. I think it has allowed me to attain a really good balance.

S: ***What do you think is required to be a successful geophysical consultant? I am sure there are people in the industry that would like to go on their own and they would like to hear your comments.***

A: You can't forget the fact that you are in a position of service. I spent the first 11 years of my career on the service side so it is part of my DNA and I'm comfortable in that role. To be successful you need to remember that you are providing a service and you need to bring all that you have and exceptional value to your client.

I think the other angle is that you need to fit into your client's team; you need to be part of their organization. You can't just parachute in, do your work and parachute out. You need to immerse yourself in that organization's culture and become a part of the team as if you were a full-time employee. Since the manner in which we work is as integrated geoscience and engineering teams, this is critical.

S: ***Do you believe that new geophysical technologies hold the promise of extracting more information for characterizing hydrocarbon reservoirs?***

A: I think there are two scales of innovation at work: at one end are historic game-changers in the scientific field and at the other are small advancements that affect specialized niches. It is interesting to look back over the last 30 years and observe that the only real game-changer in my profession has been the advent of 3D seismic. Granted there have been countless developments in every aspect of seismology but nothing like 3D, which accomplished for geophysics what horizontal multi-stage fracturing has done for engineering and completions.

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S: But there have been incremental advancements…

A: I think those incremental advancements are synchronous with computer hardware development, which allows us greater throughput of larger data volumes and subsequently inspires innovation in research and software development. Name any new geophysical technology and without exception I believe it is borne out of this interplay between computer science and geoscience, and all those new technologies allow us to extract more information and characterize reservoirs in more accurate detail. We constantly add new techniques to our toolbox which are often specialized and site-specific and not necessarily universally applied, like microseismic or 3C seismic. Will we see another game-changer in our field? – Of course! I believe our continued research into rock physics will lead us to new geophysical technologies which will bring engineering and geophysics even closer. Our vast resources in the oil sands will drive new innovation in geophysics for the complex imaging of oil sands stratigraphy and extraction. I have always tried to be an early adopter of new technology, a first-follower, and I look forward to what is on the horizon in the next decade.

S: What has been your most challenging project?

A: The most challenging thing that I have tackled was probably the project in Ecuador for EnCana. The reason is that it was challenging from absolutely every aspect of the business, not only scientifically or geophysically but also because of the cross-cultural issues. There were difficult environmental challenges in acquiring 3D seismic data in such a sensitive area, organizing and coordinating all aspects of the project, and managing diverse stake holders in a remote area. All of this had as a backdrop the economic targets that came from management as part of a high impact investment in an international arena. All those things put together made that four-year project stand out. Also, when you ask – what's your most challenging project – you remember one that left you feeling a real sense of accomplishment. A challenge where you didn't taste success tends to be something you want to forget about.

And I should mention the political challenges working in Ecuador and naturally there can be factors that go beyond the control of the organization, and that is certainly what we came up against in 2005. Simply put there was a political instability that affected the project economics that were unsustainable for the corporation, so we had to sell it off.

S: You have done exploration in the foothills. It is considered to be difficult, everyone knows that, so how do you tackle that and what makes you confident to go ahead and drill?

A: When we talk about the foothills I can be more general and add in frontier and offshore exploration. They can be grouped in the sense of thinking about reducing the element of risk. When we move into the frontier we get further away from hard well data and our ability to ground truth our rather `fuzzy` seismic data is reduced. The exploration problem requires greater due diligence. It requires that we stick to the fundamentals, and we need to really examine every piece of data that we have. If we interrogate the data enough they will confess! Sometimes the more scrutiny you put things under the more pessimistic you can become and the more reasons you can find not to drill a well. It sounds like a contradiction but you need to keep an open mind, you need to be optimistic, weigh your risk factors and keep a close eye on the economics of the prospect that you are drilling. At the end of the day, you can't invest more money than you can afford to lose so a balanced portfolio of risk and reward within the company is paramount.

S: What areas of geoscience interest you more than others and why?

A: From my background you know I have always been keenly interested in field acquisition, processing and building the best seismic image. I am intrigued by signal preservation within the seismic wavelet and much of my work crosses over into an area of your expertise, Satinder, and that is attributes and waveform classification. As geophysicists we're counted on to produce the best image between discrete well data points, so I find that entire process fascinating: removing noise, preserving signal, then deriving meaningful attributes that unlock the geology, and I have been excited by that since grade 8!

S: What are some of the new technology ideas that you have tried to put into practice lately?

A: As an interpreter I'm really fond of the developments in 3D visualization software and I'm excited, especially as a consultant, to see the power and affordability of the latest software and hardware. I have been easily running full 3D-viz software for a large offshore dataset using my laptop, unthinkable 5 years ago. The idea isn't new but true 3D interpretation in 2012 looks nothing like EarthCube in 2001. On the field acquisition side, perhaps it can't be called new technology but I stay current with improvements in vibroseis equipment and electronics, which does result in better data. The fidelity of the low frequencies is considerably higher than it used to be. As another example, I have had some exposure to the use of full-tensor gravity (FTG) for reconnaissance exploration and given the right geological setting, the resolution of the results is spectacular. On a daily basis I'm always willing to test new data processing applications, or beta test the latest version of an interpretation package; they are small ways to move forward but they allow me to apply my experience to advise software companies and perhaps bring a new idea that adds value for my clients.

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S: ***What particular challenges does a consulting company like Amulet face from the market place?***

A: You might think I would answer that by saying "competition" but at the moment there is a lot of work out there, particularly for geophysicists with 25+ years of experience. I think that there is a good deal of cooperation amongst everyone in our industry so competition is not a challenge that we face currently.

I think the real challenge is that you are putting yourself out there as an individual and you need to always strive to maintain your reputation and your integrity. As a consultant you have to have your game face on every day because you need to maximize the value of your time for your client – always bring your energy and your enthusiasm to the job. Time management is definitely a challenge and always a bit of a struggle. Our geophysical community is understaffed, so the demand for geophysical expertise is a real pull on your time because it's hard to say no to friends.

S: ***Andy you have won many awards for your achievements, tell us which award means the most to you?***

A: This may come as a surprise, but rather than an award for technical achievement in geophysics, the award that I am most proud of is one that my wife and I received as a couple. We are involved in a global charitable organization called Social Venture Partners (SVP) and about three years ago we were selected amongst two thousand people worldwide in the organization to be honoured with the "Paul Shoemaker Leadership Award". This was for the work that we have done in the non-profit world specifically for SVP. To us it came completely unexpectedly and I guess I am really proud of that particular award because it was an acknowledgement or an affirmation of all that work that we had done that obviously made a difference. And you do that work voluntarily and gladly expect nothing in return, so that recognition was unlooked for and very much appreciated.

S: ***What about your professional society activities?***

A: Over the years I have made a number of technical presentations at the SEG and the CSEG conventions. In the past I have been involved with the SEG Development and Production Forum as a presenter and on the organizing committee, the Member Services Director on the CSEG Executive, and part of the U of C CREWES Industry Advisory Board.

Lately I have been called upon to present some talks, one at the Junior

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Geophysicists Forum, which I found to be a truly rewarding, and fun experience. I've also been giving some lectures back at Queen's University in the Geology Department and as part of their 'Oil and Gas Speakers Series'. That has been really fun and again something I have a little bit more flexibility to do as a consultant.

S: ***So what are your other interests apart from the science that you practice?***

A: If my wife answered this she would tell you that I live a very kinetic life, always involved in one sport or another: squash, hockey, skiing and so on. You probably know that music has always been a big part of my life, beginning with the trombone and then as a drummer since the age of 15. The drums are a huge passion for me and I'm still actively playing in many different musical situations including my own band, and still studying, practicing, and learning.

S: ***Do you practice at home? In the basement?***

A: There are few quiet moments in our household!

S: ***All right. What would be your message for young entrants to our profession?***

A: This is an easy question to answer because of the talk I recently gave at the Junior Geophysicists Forum. I gave them six key points for building a legacy in their career:

1) Be passionate,

2) Take calculated risks,

3) Communicate by listening,

4) Focus on family,

5) Lead with vision, and

6) Give back.

S: ***Those are big points that everybody should follow. All right, that was easy. Finally, what elusive question would you have asked Andy Williamson if you were in my place?***

A: What's your secret spice? In other words, what makes you different from other seismic interpreters, from other geophysicists?

A piano player can learn all the chords and effortlessly play notes all over the keyboard, but what can they do creatively with those fundamentals, beyond just playing the notes? The same can be said for our science. Earlier I mentioned "art" as part of our field. Each of us has a storehouse of fundamentals and knowledge, but what can be done with it? I reiterate our goal to build the best seismic image that represents geology. I think my combination of acquisition and processing knowledge has been a secret spice to achieve seismic data images that make interpretation easier – it's difficult to interpret seismic data that has been poorly designed and

acquired in the field, or that has been over-filtered and smeared, or where the whitening of the wavelet spectrum has overdriven the noise in processing. I tend to approach geophysics not just as something grey involving only math and physics, but something that is rich and colourful requiring as much art as it does science. When you consider we need to have a 'gut feel', the heart comes into it too.

S: ***Andy, thank you very much for giving us this time to sit down and chat with you – we appreciate it.***

A: It has been an absolute pleasure. Thank you. ***R***

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