

## The Seismic Industry - A New Year's Resolution

It has become a tradition as the New Year begins, to wish everyone happiness and prosperity, so in keeping with that sentiment, the CAGC extends best wishes to everyone in the CSEG family. It is also a time for New Year Resolutions, perhaps Canada should resolve to get some pipelines built, attract investment and compete for business in a meaningful way for the prosperity of all Canadians...

The New Year also marks a new beginning for everyone on Earth as the planet cycles on its elliptical journey through space around the Sun. In the northern hemisphere our days will be getting longer as more light and heat reaches the surface, starting the process of regrowth for the plants and crops that are vital to sustain life. Energy is particularly important to those living in northern climes as evidenced by the winter weather's early arrival this year in late September.

Even though the Sun provides all of the energy that we end up using in one form or another, unfortunately we can't simply plug into it on demand. According to the "Earth Policy Institute", proponents of solar energy, whose website slogan claims they are "Providing a Plan to save Civilization"; the amount of sunlight striking the surface of the Earth in one hour delivers enough energy to power the World's economy for an entire year.

But even if we had the technology to capture all of the Sun's energy for that hour to meet our annual economic requirements, there would still be the need throughout the year for "on-demand" storage and delivery when and where it was needed, which seems to be the problem we already face in Canada today.

It also seems to me that the Earth, all by itself, using natural processes over time, has successfully managed to collect energy, transform it and store it away in the form of fossil fuels, (coal, oil, gas) for billions of years. I for one put my trust and faith into a proven form of energy created by Mother Earth as opposed to the alternative forms proposed by "underwhelming" scientists and politicians that are swayed by their arguments and for their own political gain. Human "civilization" and "technology" still has a long way to go to compete with natural processes and natural resources.

This past October the CAGC convened a strategy session for its Board of Directors, facilitated by Dave Yager, who is a renowned writer, presenter, energy policy analyst, executive, consultant and political activist who has been actively involved in the Alberta oil & gas industry for over 47 years. Dave was a keynote speaker at the annual CAGC / Government conference held in Red Deer in September 2018.

Dave is also a recognized source of expert advice on the upstream oil and gas industry in Canada and around the world, so he was the perfect choice to lead this strategy session and he followed up by interviewing other industry experts. As a product of this work, the CAGC has developed a "white paper" on the state of the industry with implications related to the decline in the seismic sector and how it should position itself to remain viable in providing technologies and services that are beneficial to clients.

Some of the following are highlights from the white paper, which is available on the CAGC website at [www.cagc.ca](http://www.cagc.ca)

We are all very aware that the demand for seismic services in the WCSB has declined in the past decade to the point of the near-collapse of its historic business model.

Identified factors include:

- The collapse of natural gas prices and natural gas exploration
- The 2014 oil price collapse which has caused E&P companies to review all expenditures for cost, efficiency and necessity
- The move to "resource plays", which exploit the laterally extensive source rock directly, making the identification of local conventional targets essentially obsolete

- The availability of public well data from the many thousands of wells. (the data, in some cases, is used as a cheap alternative to new seismic data acquisition).
- The availability of large non-exclusive 3D surveys that were sparsely acquired and under sampled (today these are of little use to identify rock properties essential for resource plays)
- The significant reduction of the economic viability of all oil and gas operations in the WCSB due to commodity prices, market access issues, “made in Canada” prices (the lowest market-set oil and gas prices in the world), increased taxes, increased regulations, and growing public opposition to the existence of this industry
- The lack of Industry understanding and appreciation of seismic technological advancements, resulting in a false perception (including by the financial decision makers), that seismic is purely an exploration tool with limited value in exploitation and production operations
- Supply Chain Management processes that prevent open project discussions with clients and contractors to optimize the best equipment and technology to suit projects
- Contractor investments in technology that have increased recording productivity to the point where crews shoot low quality projects faster (reduced costs) while unable to leverage the technology to improve subsurface imaging through higher density projects.

There is also a realization that using seismic:-

- is the best/only tool available to analyse and understand how a reservoir and the formations above, below and nearby it will react to high pressure during exploration and production.
- is already required to ensure caprock integrity for thermal bitumen recovery operations at shallow depths.
- Is beneficial by using recorders to monitor and analyse hydraulic fracturing operations as they take place during horizontal drilling, fracturing, well completions and geosteering in shale plays
- improves analysis of the characteristics within a known reservoir before high pressure, high volume fracturing or fault mapping
- can improve recovery in SAGD operations, improve horizontal wellbore placement and completion, help in understanding secondary production
- can identify risks of induced seismicity from hydraulic fracturing.
- is exceptionally cost-effective on a per-acre basis – seismic surveys can be recorded for \$50 to \$100 an acre on land that is being leased for \$30,000 or \$40,000 per acre, and that are completed for another \$20,000 or \$30,000 per acre. That \$50 to \$100 per acre is a small fraction of the \$50,000 to \$70,000 per acre total cost to lease and develop it. (20 years ago we were recording 20,000 or 30,000 traces per square mile compared with the high technology and exceptional logistic execution now being used to record surveys with many millions of traces per square mile)

## Conclusions

- Seismic is as relevant as it has ever been, a key component of cost-effective oil and gas recovery.
- Because of advancements in technology, seismic has moved beyond exploration into exploitation, production, recovery and the mitigation of unintended consequences with caprock or adjacent formations
- New technology has rendered old 2D and 3D seismic all but obsolete. In the era of 4K HD television, old seismic is the equivalent of a black-and-white cathode ray tube television

- Relative to cost of major exploitation projects, such as a horizontal well pad, the cost of seismic is minor for the ability to achieve a higher return on investment and higher production and recovery levels, by using high density seismic to deliver incredible value
- Modern seismic techniques and technology can now deliver far superior information with a much lower environmental footprint
- Government regulations, while well-intentioned, have become material obstacles to conducting cost-effective seismic operations and no longer meet the criteria of an objective cost/benefit analysis
- The Alberta Government is concerned about the health and future of the upstream oil and gas industry and the door is open for suggestions on how they can provide assistance.
- Industry trade associations are increasingly relevant to represent the interests of members and the oil and gas industry with regulators, politicians, other trade associations, and clients. CAGC has been effectively fulfilling this important role since 1977 and now, more than ever, deserves continued support by all stakeholders including customers.

In closing we need a New Year's resolution of the obstacles preventing Canada from taking its rightful place as a leading supplier of clean, ethical, affordable resources for World consumption.

*"We shall not cease from exploration. And the end of all our exploring will be to arrive where we started and know the place for the first time." TS Elliot*