

CLEAN INNOVATION IN FOCUS

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THIS ISSUE FEATURING

Roke Technologies Ltd.



Company Vitals

Incorporated:	<i>1967 (purchased in 2009)</i>
President:	<i>Hermann Kramer</i>
Products/Services:	<i>Measurement technology & services</i>
Market Niche:	<i>Upstream oil and gas</i>
Geographic Market:	<i>Canada, USA, Malaysia, Azerbaijan, Russia, Thailand, Georgia, Colombia, China and Nigeria</i>
Current Number of Employees:	<i>28</i>
Estimated Annual Revenue:	<i>\$5M</i>



A small fish in a very large pond.

Hermann Kramer is a tall, understated man. When asked what sparked his drive to acquire Roke Technologies Ltd. in 2008, he simply says, “I stumbled upon it.” When you dive further into the question you quickly learn how understated that response is.

| 2005 |

In 2005, Hermann was looking to purchase a truck for his then company, Hotwell Canada Inc. (Hotwell). He was advised that the trucks at Roke Technologies Ltd. (Roke) were exactly what he was looking for. Hermann had an interest in nuclear measurement tools and a customer suggested to him that the owner of Roke shared that interest. The opportunity to look at a truck at Roke proved to be a fortuitous opportunity.

Tracking down the company proved challenging. Roke was essentially a one man operation run by a reclusive owner who would often be at work in the back with the doors locked and the lights off. A colleague of Hermann’s had a business card that gave him a phone number. To make a long story short, Hermann set up an appointment to view the truck and after a four-hour lunch with Roke’s founder he was asked if he would like to purchase the company. Hermann immediately toured the facilities of Roke and the technol-

ogy peaked his technical curiosity. Three years later Hermann closed the deal.

Hermann has stumbled upon technology in the past. In 2004, he “stumbled” upon the technology of Hotwell Handels Ges m.b.H. (Hotwell Austria). This technology addressed a regulatory concern in Alberta. The technology proved instrumental in both detecting and locating gas leaks in abandoned wells. Together Hermann and Hotwell Austria formed Hotwell Canada Inc. (Hotwell). The company was profitable almost immediately, and as chief salesman, Hermann helped lead the company to \$3 million in annual revenues by 2007.



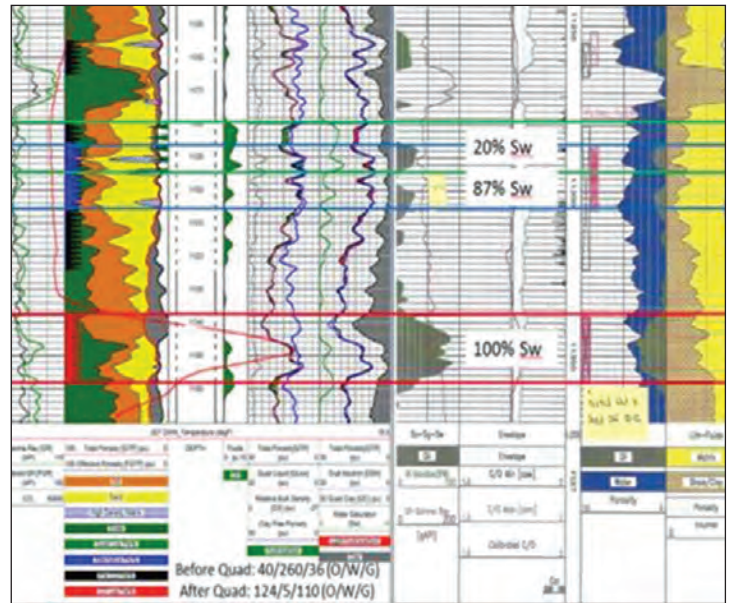
Hermann Kramer, “The Quad Neutron Expert”

Hermann, an electrical engineer by education, had a proclivity for everything involving physics. He would often devour physics textbooks over a weekend out of pure interest. He immediately saw both the technical superiority of Roke's technology over the competition and its market potential in the oil and gas sector. His plan was to acquire the technology, develop it for the oil and gas needs, grow the company through international opportunities and exit in five years.

Hermann had first sought to acquire Roke through Hotwell. During the three-year negotiation, the deal was almost lost several times and different partners repeatedly approached Roke's owner to keep the negotiations alive. He wanted to sell but at the same time did not want to sell. The deal came to a complete impasse when he learned that the partners at Hotwell intended to take production overseas to China. Roke was no longer for sale. Ultimately, with the blessings of the Hotwell Austria partners, Hermann purchased Roke independently with new equity partners and some bank debt. The idea was to eventually bring Roke and Hotwell together under one company.

Hermann continued to promote the Hotwell technology but it became evident quickly that **the Roke technology was superior and much more cost effective to operate**. When it was time to merge Hotwell and Roke together as one entity, the Hotwell Austrian shareholders were deep in a legal battle and chose not to convert their shares to Roke shares, while the remaining Hotwell Canada shareholders did. They never did do the conversion and eventually lost the opportunity to do so.

Roke was able to keep the business of detecting gas leaks in abandoned wells due to the **relationships** Hermann had developed with Hotwell's customers. Roke now had a base business working with abandoned wells but also had the upside of opening



With Petro-Physical Analysis “data is everything”

new market segments in the exploration and production side of the industry with the quad neutron technology.

In the oil and gas industry, data is everything. Data – downhole pressure, and temperature, flow rates, porosity, clay volume, density and saturation levels, viscosities as well as fluid composition – are among the key pieces of information that oil and gas producers need to optimize recovery to get the most out of their wells, marginal or otherwise. In today's volatile price environment, producers are always looking to maximize production and reduce operating costs. Designing the best well optimization system requires capturing relevant and quality data. Additionally, data collected from logs is used along with other factors to determine the **valuation of reserves**.

The oil and gas industry uses many different measurement technologies to collect data on their wells. The technologies are classed based on their source of energy and the energy detected. In open hole wells (wells that have not been cemented or cased for production), it is common to use neutron thermal neutron and gamma gamma devices, commonly referred to as neutron and density devices, to

determine parameters such as porosity, lithology and clay volumes. The combination of the two different physics helps reduce uncertainty when interpreting the data. This can be likened to trying to solve for variables with two equations as oppose to just one equation. In cased wells the gamma gamma density devices become unreliable. Instead the industry will typically use just the neutron devices or they will



The Quad Neutron improves interpretation quality in a cased hole or through pipe environment.

use pulsed neutron gamma devices. The challenge encountered in trying to do quality analysis is that typically only a single physics device is used in cased holes and there are more variables to deal with than in open holes.

Roke's Quad Neutron device combines neutron thermal neutron with neutron gamma physics. It is the **only device of its kind** to truly combine these two physics by utilizing a common neutron source. By combining the two physics, the Quad Neutron improves interpretation quality in a cased hole or through pipe environment. This opened up new markets to enable improved production from marginal wells, as well as during explora-

tion, in addition to abandoned wells, resulting in better well management and investment decisions.

With Hermann's industry experience he thought companies would adopt the technology immediately after learning of its superior qualities, increased accuracy and reliability. His understanding of both local and international markets would enable him to pursue these opportunities and grow the company.

| 2009 |

After seven years Roke has yet to gain a significant position in the exploration side of the industry. In 2009, shortly after purchasing the company, the mar-

“ Hermann offered employees shares of the company in lieu of wages. ”

ket collapsed forcing Hermann to reduce salaries by as much as 50%. He tracked lost wages and offered employees shares of the company in lieu of wages. This resulted in a team of dedicated employees who helped him survive until the industry started to pick up again in 2010.

During the downturn in 2009, Hermann formed the Canadian Society for Gas Migration. This allowed him to contribute to the industry while being actively involved with existing and potential clients. The Society now has grown to 140 members and includes Hermann's competitors. Hermann had been speaking internationally on the issue of gas migration since 2002. Due to his extensive work experience Hermann was seen in the industry as **“the expert.”** This resulted in sales for analyzing abandoned wells in Canada.

“ By diversifying his sources of revenue internationally, Hermann hoped to even out his cash flow. ”

| 2011 |

The Canadian market is seasonal. During the spring, there is a period known as ‘spring break-up’ when the ground is too wet to access, and most work stops. Cash reserves built up over the course of the year are quickly drained during this period. **By diversifying** his sources of revenue internationally, Hermann hoped to offset his cash flow issue. In 2011, a Russian colleague of Hermann’s, who had worked for Halliburton, was looking for work and contacted him. Hermann offered him a job as business development manager. He introduced Hermann to a Russian company that would become a champion for the company. Roke was able to enter the Russian market and immediately began providing Quad Neutron services. Since Roke would be working in Russia, Hermann contacted a colleague in Azerbaijan who also committed to work. Roke now had two international offices.

| 2012 |

In 2012, the business development manager made a business case to start operating in Malaysia. At the same time the company started selling in earnest in the US. Sales increased to over \$5 million in 2012 and over \$7 million in 2013 and 2014. In 2015 sales fell to under \$4 million but are expected to increase to \$5 million in 2016. Currently the bulk of revenue is generated doing well optimization work followed by well abandonments.

“Most new work is focused on experimental or difficult wells. In each case, Roke has repeatedly proven the technology; the results mirror the production data.”

Today Roke has offices in Canada, USA, Russia, Azerbaijan, and Colombia. They also have licenced partners in Thailand, Nigeria and China. Despite having four international offices and completing some



Testing for leaks with the Quad Neutron is “easy to use and saves time”

large contracts at home and abroad, there has yet to be widespread acceptance of the technology. Most new work is focused on experimental or difficult wells. In each case Roke has repeatedly **proved the technology** and the reservoir and production engineers often will say that the results mirror the production data for all wells.

Drillers handling the product love it; it is easy to use and saves time. For exploration work, Hermann is continually faced with selling his process to a petro-physicist. The sales pitch is essentially asking the petro-physicist to abandon practices that his boss and his boss’s boss have used for years with a company they know and trust. Roke is competing against well-respected, well-known industry players who use

conventional products and analysis techniques such as Halliburton, Schlumberger, Baker Hughes, and Weatherford International. Together they have essentially written the book in the industry. The resistance to adopting Roke's technology remains high.

| 2015 |

With the downturn in the industry in 2015, Roke faced increasing competition in its base business of analyzing abandoned wells. All operators who own a downhole tool have turned into experts, making the field extremely competitive. The downturn has also opened up opportunities on the production side. Most petro-physicists have lost their jobs and consequently are not involved in the decision making process. Roke is seeing an upswing in companies looking to optimize their production in existing wells. Consequently revenue for 2016 is expected to increase.

One unexpected outcome of using Roke's technology is that they are becoming known as "the bad news bears." Reserves using traditional technology can be significantly downgraded using the more accurate Quad Neutron. This has significant implications for oil and gas companies. Imagine if, as a company, you had to inform your shareholders or banks that the reserves that they have invested in are significantly lower than originally thought.

In 2015 Roke's long term bank decided to get out of financing companies such as Roke's. They gave Hermann 90 days to refinance. Hermann was able to

negotiate a favorable settlement offer. The refinancing took over six months to complete and happened at a time when the company was facing a dramatic drop in revenue. Hermann was able to pull the financing together, and refocus the company on profitable projects.

“Your reputation is your passport for life.”
– Hermann Kramer

Roke has survived many catastrophes since 2008, ranging from two economic downturns, a lack of market acceptance and a financial crisis.

The company is looking to position itself for a reboot from this downturn. Hermann knows the barriers to accepting the technology.

Options he is currently considering:

- Looking at how to gain market acceptance,
- Starting his own oil company to use technology to buy and sell reserves,
- Looking at partnering with competitors to offer a well-rounded full product line for projects,
- Partnering with international service firms to promote the technology internationally.

As in 2008, Hermann is still looking at a five-year plan to rebuild the company and develop an exit strategy.



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