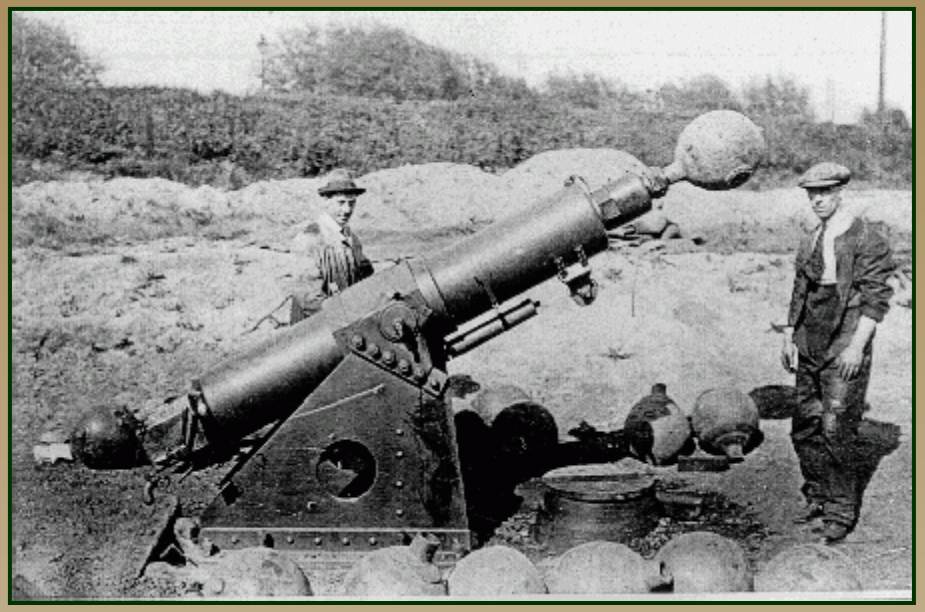
Meet the (Award-Winning) *Fastest* Drill in Town

An introduction to sonic drilling technology in a geothermal application.

SONIC **Drill Corporation**

A little history…

First wave transmission rock drill (1913)



Silent sonic gun using compressed liquid and an explosive charge.

The concept of sonic drilling technology was born nearly 100 years ago when Romanian civil engineer George Constantinesco wrote a treatise for the British Admiralty called the *Theory of Sonics*. In May 1918, the Admiralty decided to back sonic development by establishing a new research facility in West Drayton, England.

A little history…

In 1930, another Romanian engineer, Dr. Ion Basgan applied sonic vibrations to the drill pipe string of a conventional drilling rig.

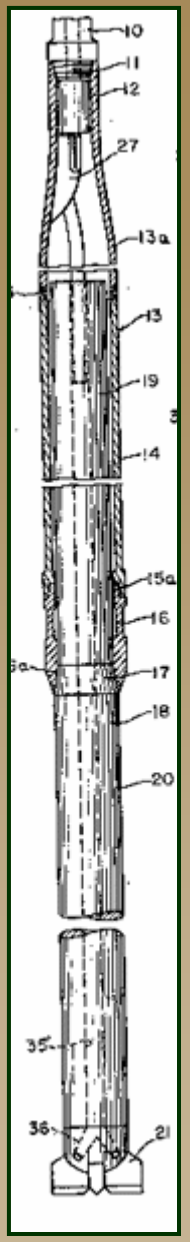
Amazingly, the result was increased drill depth and speed.

Basgan's sonic drill was used in the Moreni oil fields in 1938.

A little history…

The United States took up the torch of sonic research during the 1940's through the efforts of the Drilling Research Institute (DRI) which included American inventor Albert Bodine, supported by the Shell Oil company.

Eventually, Bodine sold his sonic equipment in the early 1970's to the British aerospace company, Hawker-Siddeley, who assigned the next generation of research to one of its Canadian offices.



Albert Bodine's sonic earth boring drill (1964)

In the last 30 years...

Roussy's first commercial sonic drill rig is still in active use today despite being more than 25 years old.

It was there that Ray Roussy became one of the first persons hired for the Hawker Siddeley sonic team and, in 1980, when the sonic project was abandoned during a recession, he left the company to become the only person to continue work on the sonic drill head.

After years of research and field-testing, Roussy's persistence resulted in a number of patents and in the successful commercialization of a revolutionary new drilling technology.

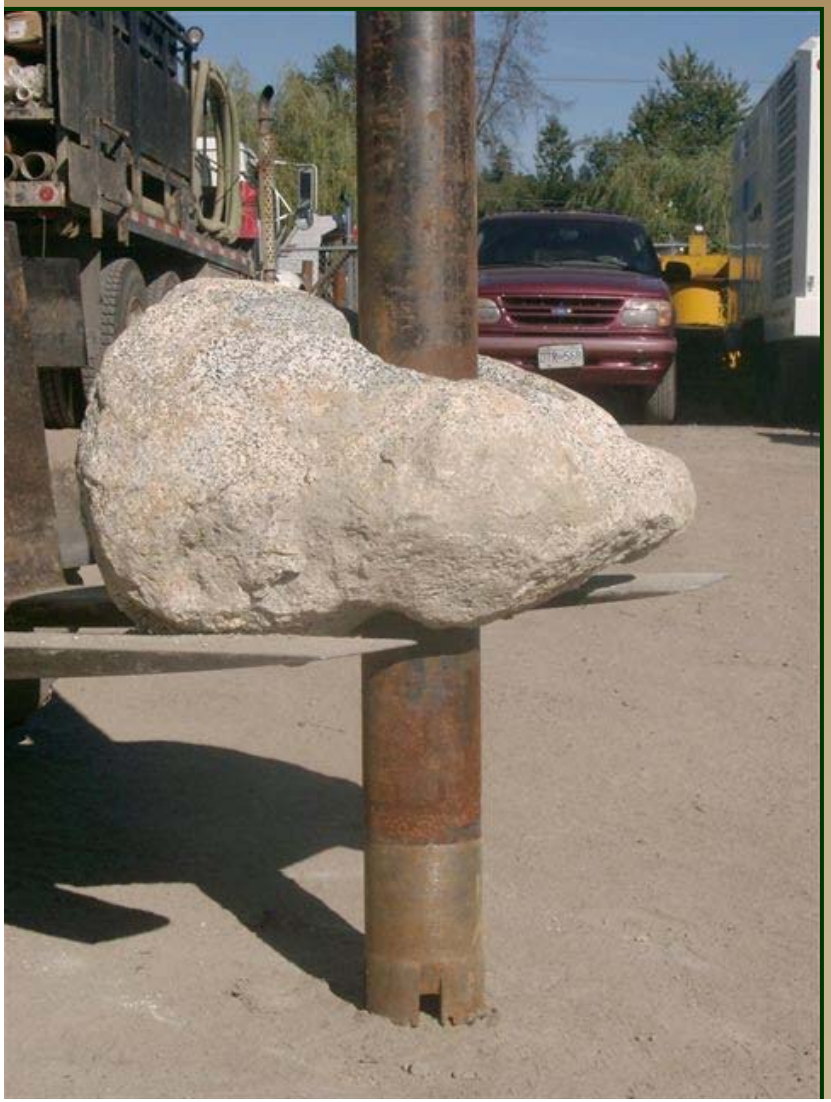
A technology 100 years in the making…

One month ago, Ray Roussy's achievement was formally recognized when his sonic drill was voted "best new drilling technology" in a national competition organized by the Canadian GeoExchange Coalition.

So what makes this technology so revolutionary? Simply put, it can:

- Drill 3-5X faster
- Provide undisturbed samples
- Drill only using water
- Drill to 300 ft. and beyond.

A technology 100 years in the making…



Most importantly, sonic drilling technology can bore quickly through mixed clays, sand, silt, gravel and boulders – all in the same drill hole.

A recent geothermal drilling project produced this boulder which the sonic drill easily "buzzed" through.

How it works...

Roussy's patented sonic drill head works by sending high frequency resonant vibrations down the drill string to the drill bit while the operator controls these frequencies to suit the specific conditions of the soil/rock geology.

Holes are drilled to the desired depth by rotating and vibrating the casing while keeping the bit face open with high-pressure fluid.

The profitable choice for geothermal...

Sonic drilling technology has proven to be an incredibly fast and efficient method for installing geothermal loops. It can quickly complete a geothermal installation due to its distinctive ability to drill, case, loop and grout in one step.

The profitable choice for geothermal...

The speed at which a sonic drill operates allows any geothermal project to proceed quickly and profitably due to lower drilling costs and reduced site clean-up costs.

The numbers say it all...

In 2006, a geothermal installation at Langara community college in Vancouver, Canada, became the setting for a duel between old and new technology. It was an exceptionally difficult battleground for both rigs due to the geology beneath the site.

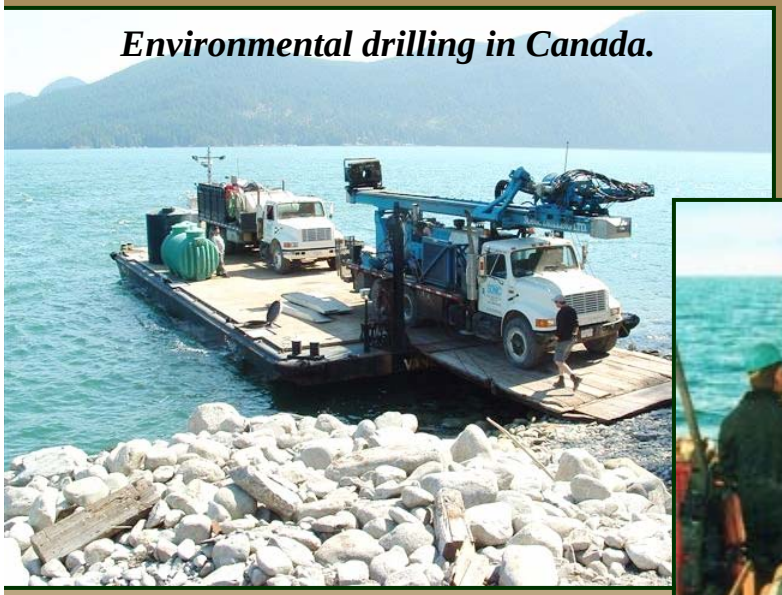
Conventional rig:

- ***Three rigs on site***
- ***Two months drilling***
- ***18 holes installed***

Sonic rig:

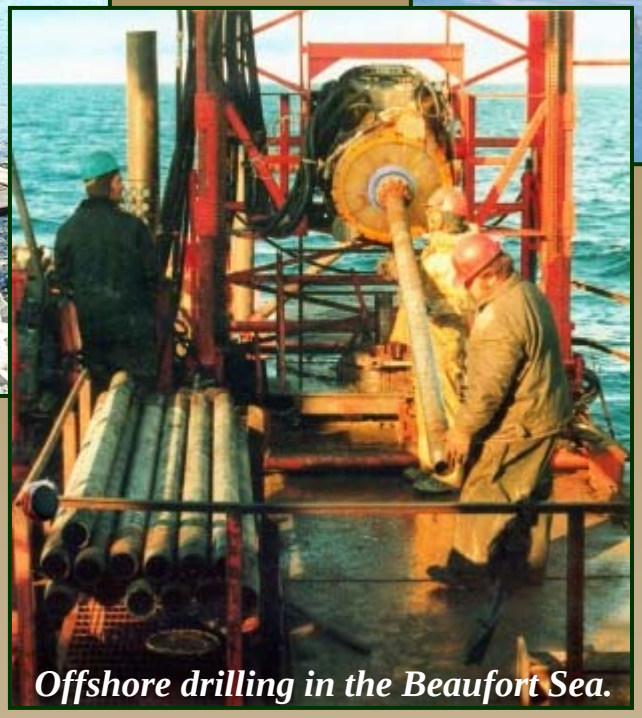
- ***One rig on site***
- ***Two weeks drilling***
- ***23 holes installed***

Worldwide use...



Environmental drilling in Canada.

Seismic drilling in the Arctic.



Offshore drilling in the Beaufort Sea.

Despite taking nearly 100 years to perfect, sonic drilling technology is now in use in countries all around the world including Japan, Africa, South America, Europe and, of course, North America.

And now today...

Today, after years of effort, sonic drilling technology is robust, reliable, profitable and award-winning.

Across the planet, it is quickly becoming the drilling method of choice for geothermal installations.

In that application, it is simply the fastest drill in town.

Thank you for your interest. May we answer any questions?