

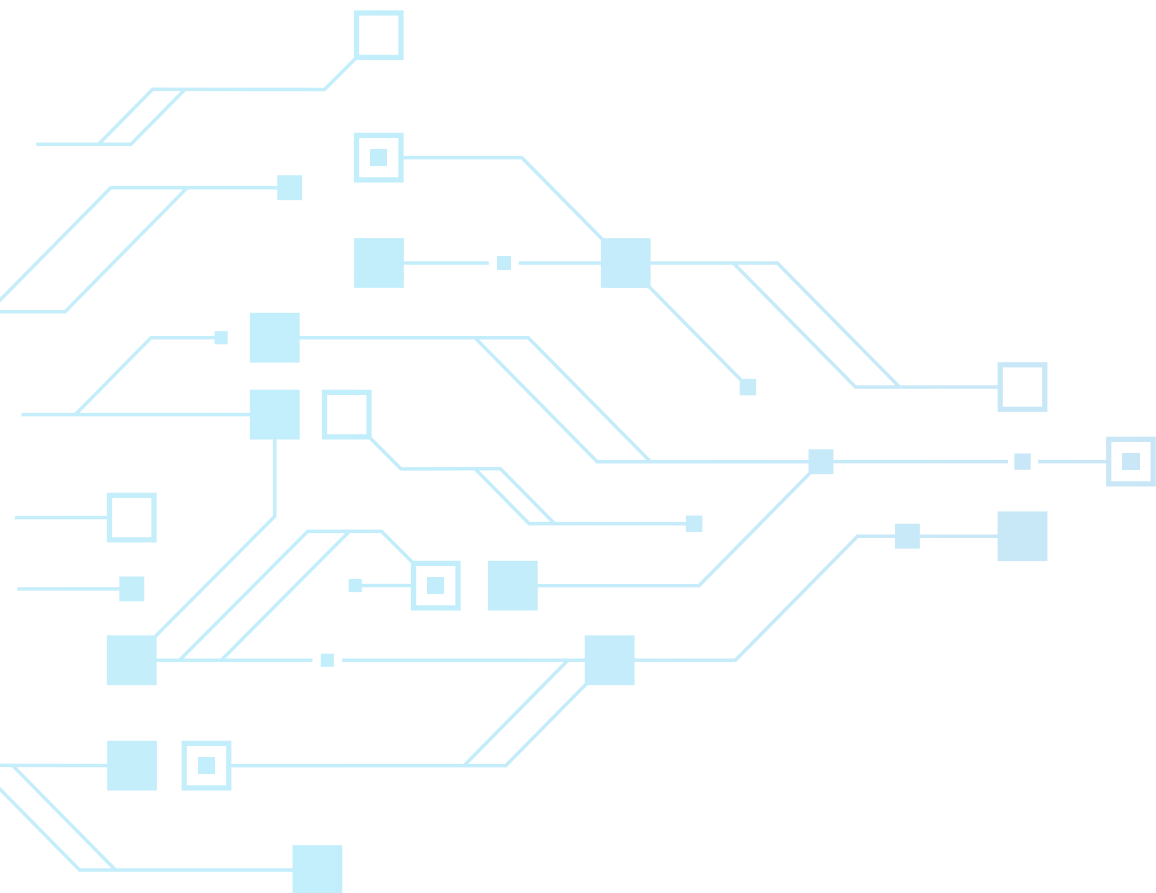


AI CASE STUDY

## From Rock to ROI

How Calgary's GeologicAI Turns Core Samples into Knowledge





**Artificial Intelligence is poised to reshape how value is created across Canada’s economy.** To understand that shift, RBC Thought Leadership interviewed more than two dozen firms that are on the frontlines of building or deploying AI for [Bridging the Imagination Gap: How Canadian Companies Can Become Global Leaders in AI Adoption](#). The report distilled the patterns that emerged from those conversations.

Building on that report, the series of case studies go a level deeper: following one company’s journey through specific problems, pivots and opportunities, helps illustrate the strategic choices and policy conditions that turn technical promise into economic and societal value.

## In summary

In mining, the most important board-level decisions still hinge on results from distant lab tests—where core samples are cut and analyzed to measure mineral content. These tests are often slow, costly, and logistically risky, taking 6–10 weeks at precisely the stage when capital is most at risk.

GeologicAI moves the lab to the drill pad. Its AI-enabled sensors compress the sense–think–act loop to under 48 hours, turning scans into grade and NPV metrics that drive next-shift drilling decisions and reduce idle capital.

Adoption depends on trusted translators—domain experts fluent in both geology and AI—who can champion the shift and explain results in terms colleagues believe. Scaling that expertise along continued integration of new tools will be critical to scaling the technology within the industry

For Canada, the lesson is clear: world-class AI research only becomes industrial leadership if policy incentives also target deployment and scale, not just R&D—funding field-ready teams, adoption support, and speed-to-scale in critical minerals.

## From Rock to ROI: How Calgary’s GeologicAI Turns Core Samples into Knowledge

Picture this. It’s nearly 40°C as a pair of geologists carefully extract two deep core samples from the 40,000-pound drill rig towering above them—the highest point for miles in Australia’s scorching Pilbara desert. Sent from Sydney, the team’s task was straightforward: retrieve the cores and escort them safely to geological assay lab 1,400 kilometres away in Perth. The tests would reveal whether the deposit has the potential to become a mine.

Battling oppressive heat and the clock, the window to act is short. The next phase requires loading the cores onto a Land Cruiser before navigating 200 kilometres of treacherous desert roads to a remote airfield and a waiting plane. These cores represented the final testing round for a proposed lithium mine, a pivotal step standing between their junior mining company and nearly AUD \$500 million in funding should the core sample yield positive results.

The pair of geologists, along with a handful of others staking their careers on the two-year-old mining venture, understand the thinning patience of their financiers. Each day spent

waiting on core results equates to well over AUD \$110,000 in foregone returns—capital that an established mine could easily generate. The financiers know the stakes, but patience wanes with prolonged uncertainty. This was their eighth round-trip in five months, each journey a tense race against fading trust and tightening budgets. A dropped core, a missed flight, or another lengthy lab delay could shatter the fragile confidence holding this venture together.

GeologicAI flips the script by bringing its AI-powered core scanning technology to the deposit—eliminating many of the trips between assay lab and drill site and speeding up assessment processes.

Exploration is a relentless triangle of geology, capital, and time—often played out in the planet’s remotest corners. For Grant Sanden, Calgary-based founder and CEO of GeologicAI, it’s more than a logistical headache—it’s the central problem of mining: how to turn rock into reliable knowledge fast enough to guide investment. That’s the problem GeologicAI set out to solve.

A veteran of Canada’s resource sector, Sanden had watched scores of projects like the scene outlined above stall on the same bottleneck: the time it took to turn rock into knowledge. He knew the issue was not about pulling more

# Numbers

- **6-10 days**

**Typical number of days delay** for lab results to arrive from core samples, which determine how much metal is in the rock. Until then, multi-million-dollar drilling and investment decisions are on hold.

- **24 – 48 hours**

**How long** it takes GeologicAI to deliver the same results using its on-site, AI-enabled sensors.

- **\$US 13b**

Annual global non-ferrous **exploration budgets** (2023)

- **\$US 60m**

Geologic AI’s **July 2025 raise** to scale globally amid the data centre/energy transition mineral crunch; headcount ~220, ~80% in Canada.

- **5**

**Number** of continents GeologicAI is active in.

- **16**

**Median years** from discovery to first production globally.

- **6**

**Per cent** of firms in the mining sector that currently use AI.

samples—at 300 metres down you can drill forever and still miss the truth. The real cost lay in the slow, fragmented data loop that leaves geologists guessing, financiers fretting, and drill rigs burning cash in limbo. What if, he asked, the industry stopped treating assays as an after-the-fact report card and started treating them as a the key to a real-time decision engine?

Sanden’s hypothesis was straightforward: if core samples could be scanned where they’re drilled, mining exploration and development decisions would no longer hinge on assay lab results that could take several weeks. In practice, this involved a truck-towed trailer fitted with hyperspectral, X-Ray Fluorescence (XRF) and visual sensors, connected to machine-learning models that classify rock type, estimate grade and assign a preliminary dollar value. The trailer could also be lifted by [helicopter](#) to a mining project.

After building the prototype and conducting some initial field tests, Sanden and his team proved the AI-powered system could return a usable dataset in roughly 48 hours—compressing what had been an eight-to-twelve-week cycle and giving geologists enough confidence to refine drill plans before the next shift.

## Lesson #1: The 24-Hour Decision Loop

In mining exploration, GeologicAI shows that the real power of industrial AI is not only in accurate prediction, but also in compressing the sense–think–act cycle so it keeps pace with daily operations. By placing a multi-sensor lab at the drill pad, GeologicAI cuts the turnaround time for critical data from weeks to hours. Routing those scans through AI models that output economic metrics—grade, tonnage, NPV deltas—GeologicAI can turn enhanced data into better decisions before the next two-week shift even begins.

AI models that generate economic metrics—grade, tonnage, net present value (NPV) deltas—allow its mobile labs to deliver the analysis needed for better decisions before the next site shift begins.

- **Sense**

Hyperspectral, XRF and visual sensors capture gigabytes of rock data on site.

- **Think**

Cloud models classify lithology, estimate grade and recalculate NPV in near real-time.

- **Act**

Before the next shift, geologists see a refreshed analysis that answers the pivotal financial questions: Where do we drill next? How deep? When do we stop?

GeologicAI’s “High Resolution Decision Engineering” made decision-making faster and more dynamic. What had once been a linear sequence of costly bets became an agile sprint cycle—each hole informed by the last, each dollar tied to a fresh decision metric. In short, data stopped being a retrospective audit trail and became the steering wheel of the program.

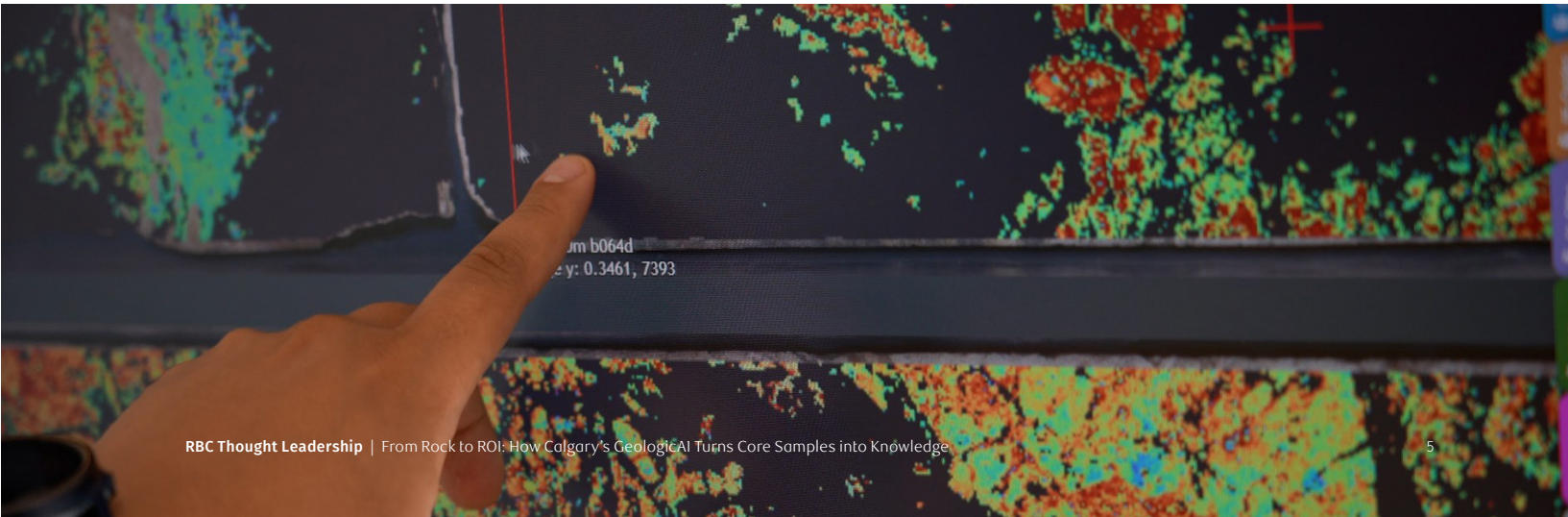
Pitching GeologicAI’s solution also carried the challenge all first-movers face: no competitive heat. Early adopters could not point to rival mines already reaping the benefits. In a business where margins hinge on proven processes, being first could feel like volunteering for a metallurgical science experiment. Without “follow-or-fall-behind” pressure to fuel later-stage diffusion, GeologicAI had to sell both the vision and the urgency of change—one champion at a time.

Fortunately, within months of the first 24-hour data loop, GeologicAI secured its first set of pilot programs—including a [high-profile engagement](#) with Agnico Eagle Mines, one of Canada’s largest mining companies. According to Executive Vice President of Exploration [Guy Gosselin](#), “this core scanning revolution places Agnico Eagle on the frontline of innovation and improves our critical decision-making capacity.”

## For Agnico, the attraction was threefold:

1. GeologicAI’s system was faster and more accurate than traditional assays—compressing weeks of data-crunching into hours.
2. The richer datasets complemented, rather than replaced, existing geological information, giving decision-makers a complete and more reliable picture of deposits.
3. Adopting cutting-edge AI technology bolstered Agnico’s reputation as an employer of choice in a sector competing fiercely for talent.

That willingness to innovate created the opening for an internal champion. At Agnico Eagle, Gosselin, with purview over exploration, recognized the opportunity, translated the value for colleagues, and bridged skepticism with proof.



## Lesson #2: The Champion Effect

Sanden recognized the power of an internal champion early on. At Agnico Eagle, a forward-looking geoscience lead could see the opportunity and translate it for colleagues.

The business development lesson crystallized quickly: decision-makers who grasp both geology and data science are rare—but indispensable. Rather than cold-calling every mine CFO, Sanden focused on searching deliberately for strong leaders—cultivating their interest with pilot data and shared credit. Once an internal champion within a target client firm validated the technology, resistance melted away and adoption rippled across additional sites.

With persistence—and a few early wins—GeologicAI found its stride abroad. GeologicAI’s core value proposition is characteristically Canadian: a fusion of Calgary’s world-class natural resources expertise with national leadership in AI. Export Development Canada and the Bill Gates-backed Breakthrough Energy Ventures recognized that potential, backing an initial [US\\$30 million Series A](#) to turn the concept into field-ready hardware. Still, as Sanden would later reflect, building the technology was only half the battle; getting it deployed at home proved harder.

Today, there are more than two dozen trailer labs around the globe, from the Yukon to Pilbara and Chile’s Atacama Desert. The company’s Canadian pedigree quickly became a stamp of legitimacy in foreign jurisdictions.

GeologicAI’s workforce has grown to more than 200 across five continents, giving the company a front-row seat to how AI talent meets real industrial problems. One contrast is striking: Canada is a recognized AI research powerhouse—home to pioneers like Richard Sutton, Geoffrey Hinton, and Yoshua Bengio—yet the pool of production-grade, domain-savvy engineers is thin. The missing

piece is not brainpower, but the applied expertise to turn world-class research into field-ready solutions. That gap—between invention and application—set the stage for GeologicAI’s third lesson: the need to cultivate “translators” who are articulate in both technology and geology.

## Lesson #3: Mind the Translator Talent Gap

GeologicAI’s answer has been twofold: hire translators—midcareer specialists who already know ML Ops, sensor fusion and drilling economics—wherever they live, and run an internal upskilling program that pairs Canadian researchers with field-seasoned geologists until both languages—rock and code—are fluent with each other.

In effect, the company’s journey has come full circle. What began as a Calgary startup solving a logistics headache now sits at the first link of North America’s electrification supply chain—mapping orebodies that will feed battery factories in Ontario and EV assembly lines across the continent. At the same time, its building out its CO<sub>2</sub>-reduction analytics capabilities—helping miners blend ore and run smelters more efficiently, turning sustainability from a compliance cost into a competitive lever. GeologicAI is both innovator and enabler: a showcase of Canadian AI deployed at scale and a tool for unlocking the critical minerals Canada needs to cement its place in the next wave of advanced manufacturing.

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## Looking Ahead — GeologicAI’s Role in Canada’s Critical Minerals Moment

GeologicAI’s experience shows the limits of Canada’s current policy toolkit. One structural reason is the Scientific Research and Experimental Development (SR&ED), a tax credit which reimburses firms after they invest in development and can take months in reviews and approval processes. While SR&ED is useful for prototypes, it’s not equipped to underwrite the riskier leap to first deployment. GeologicAI learned this firsthand: its Canadian pilot languished in grant limbo while the same scanner, shipped to a U.S. customer under a performance-linked voucher, reached fleet rollout in just six months.

**If SR&ED looks backward, international programs look forward.** Australia’s [METS Ignited](#) and the U.S. Department of Energy’s [US\\$6.3 billion Industrial Demonstrations Program](#) tie funding to milestones or proven

outcomes—effectively paying for results, not receipts. That structure de-risks adoption for buyers and accelerates diffusion. GeologicAI’s own progress highlights both sides of the equation: despite slower support at home, the company has continued to expand, proving what Canadian innovation can achieve when paired with the right conditions.

For Canada, the lesson is clear. Redirecting even a portion of SR&ED spending toward outcome-based deployment incentives—field vouchers, first-deployment guarantees, and measurable performance targets—would shorten the path from lab to loader. Done right, Canada could position itself not just as the birthplace of AI breakthroughs, but as the place where heavy-industry AI actually runs. That’s how Canada can turn its AI breakthroughs into lasting industrial advantage.





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