Leveraging Orebody Knowledge to Reduce Investment Risk and Protect Returns

The Strategic Value of Orebody Knowledge (Value of Information, VoI) in Mine Development Finance

May 21st

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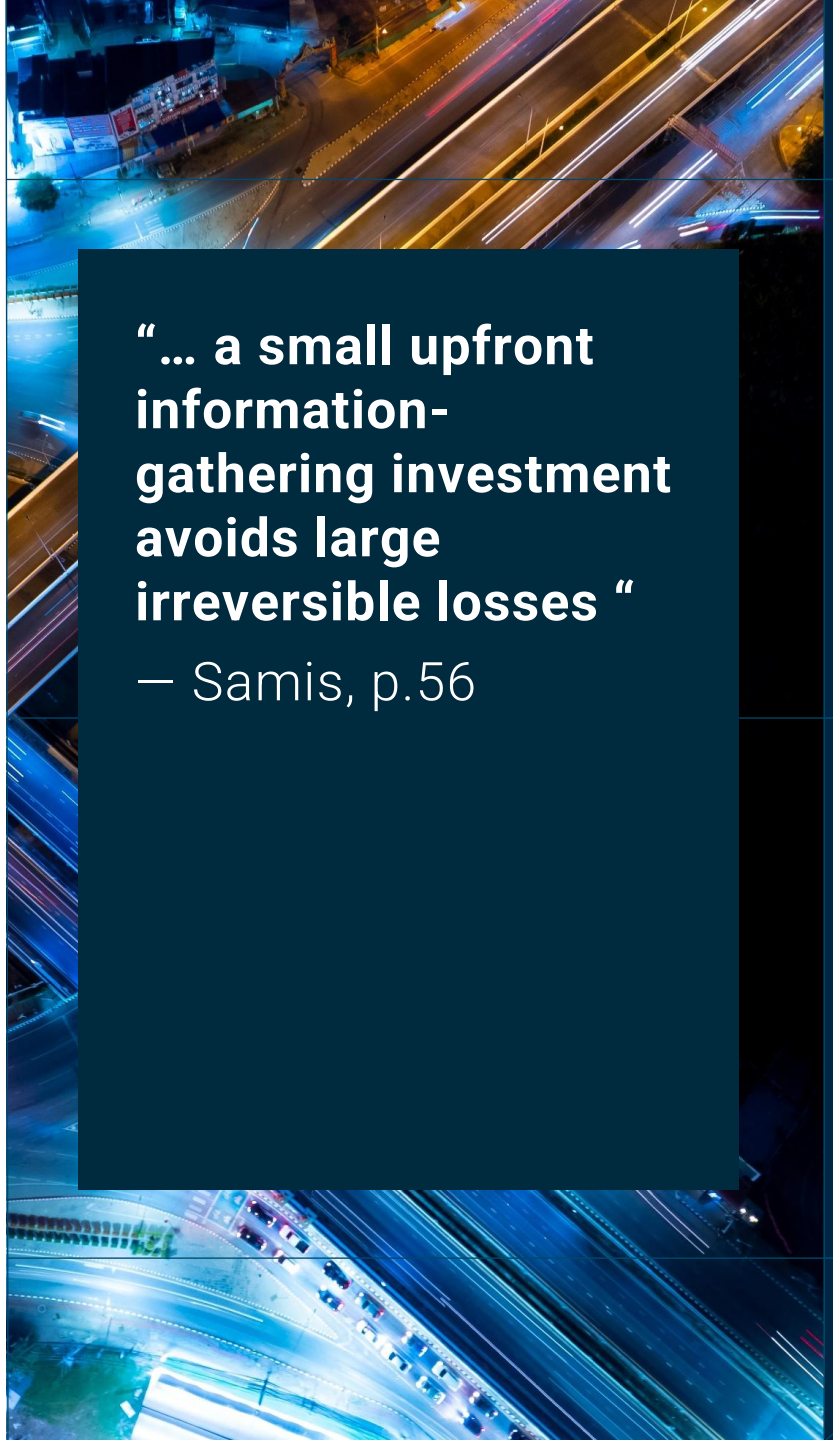

“… a small upfront information-gathering investment avoids large irreversible losses “

— Samis, p.56

Value of Information (VoI) **quantifies financial upside from investing upfront in orebody knowledge to prevent costly impairments.”**

Orebody Knowledge is the detailed insights into what a mineral deposit contains, where it is, and how it behaves — can guide safe, efficient, and profitable mining

Orebody Knowledge (OBK) **+** **Value of Information (VoI)** **=** **Strategic Risk Mitigation**

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What is the value of avoiding loss and extending gains?

What is the Value of Information in a Context Where There is a Long Tail Distribution of Frequent and Significant Downside Risk". Steen, Samis and Gillis – UBC, Norman B. Keevil Institute of Mining Engineering

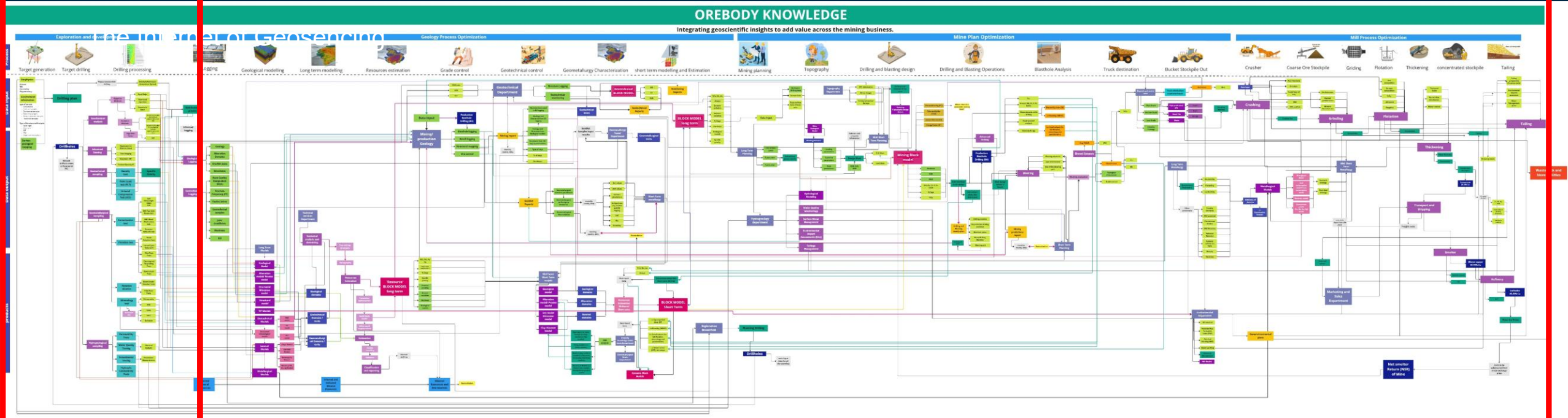
Asset impairments driven by OBK issues typically cost companies hundreds of millions of dollars."

OBK issues drive ~ 50% of asset impairments

Internet of Geosensing – IoG not IoT

Geology

Engineering



Real-World Examples: Major Financial Impacts from OBK

OBK issues = poor risk management due to insufficient rock knowledge

- Problem: missing the right information.
- Solution: placing a high value on having the right information at the right time (**this is a VoI problem**).

IGO shows how to dust $1b on a mining deal as M&A cycle ramps up

M&A took IGO from a small cap gold and copper play to a big cap battery metals miner. But buying assets is not without risk, and almost $1 billion in value has vanished.

*IGO expects to record a non-cash, pre-tax impairment expense of **between A$880M and A$980M…** (relating) to the reassessment of the accounting value at Cosmos and Forrestania to **reflect higher capital and operating costs, challenges to the mine production schedule and delays in development at Cosmos.***

*South32 told shareholders on Monday that since the acquisition of the Hermosa project, in 2018, **a number of factors** had negatively impacted the value of the Taylor deposit, including…**significant dewatering requirements** to allow safe access to the orebody further **delayed the timeline to first production** and **required an investment of $365-million for critical path orebody dewatering.***

South32 warns of massive impairment at Arizona project

PERTH (miningweekly.com) – Diversified miner South32 on Monday warned of a near $1.3-billion non-cash impairment expense in relation to the Taylor zinc/silver/lead deposit, at its Hermosa project in Arizona, in its 2023 financial results.

Hidden Costs: Financial Risks of Insufficient OBK

“It has been recognised for some time that many mining operations do not meet their forecast production or realize their projected financial value. In many (most?) cases this is due to technical failures during feasibility studies—i.e., insufficient orebody knowledge.”

— Barker et al., p.1

Development risk is fundamentally driven by deposit uncertainties, which can remain even after a Definitive Feasibility Study, critical uncertainties can remain.

This risk **compounds** and is often only fully realized at mine startup and production.

- Unplanned outcomes (Resource/Grade reconciliation failures)
- Delays (Capex blowouts)
- Rework (Metallurgical surprises, geo-technical failures)

Materially affect , LTV and IRR of these assets

The real cost of insufficient OBK

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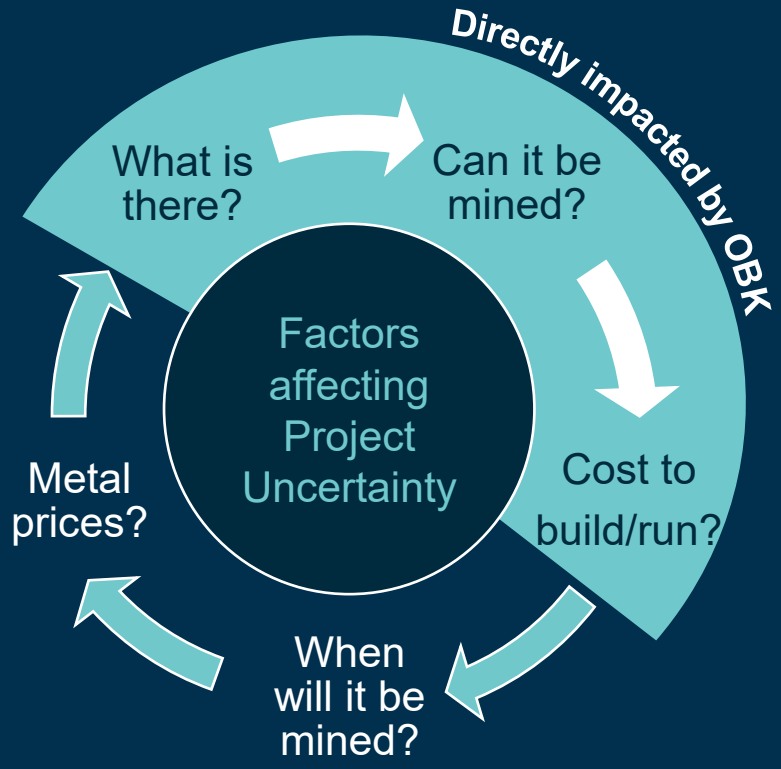
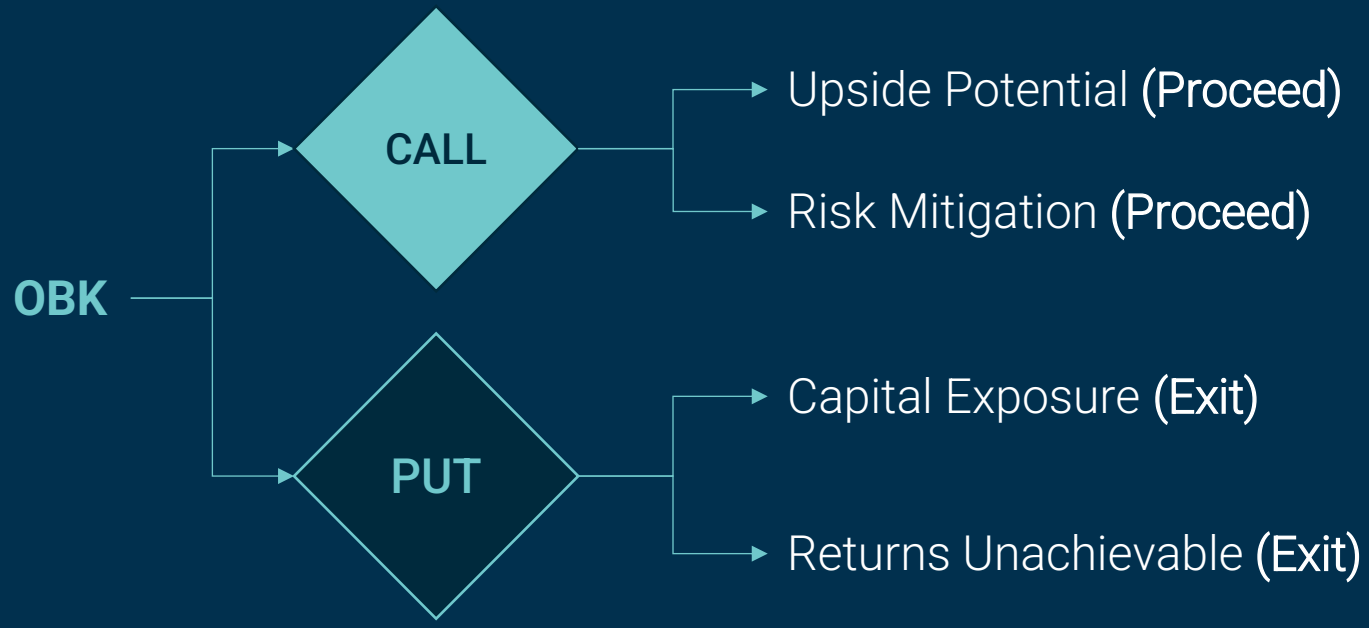


OBK as a Financial Option: When to Invest or Walk Away

CALL: Invest on OBK positive (High upside)

PUT: Exit on OBK negative (Limit downside risk).



"The learning option provides the ability to avoid a large irreversible investment in an uneconomic deposit…."

— Samis, p.14–15

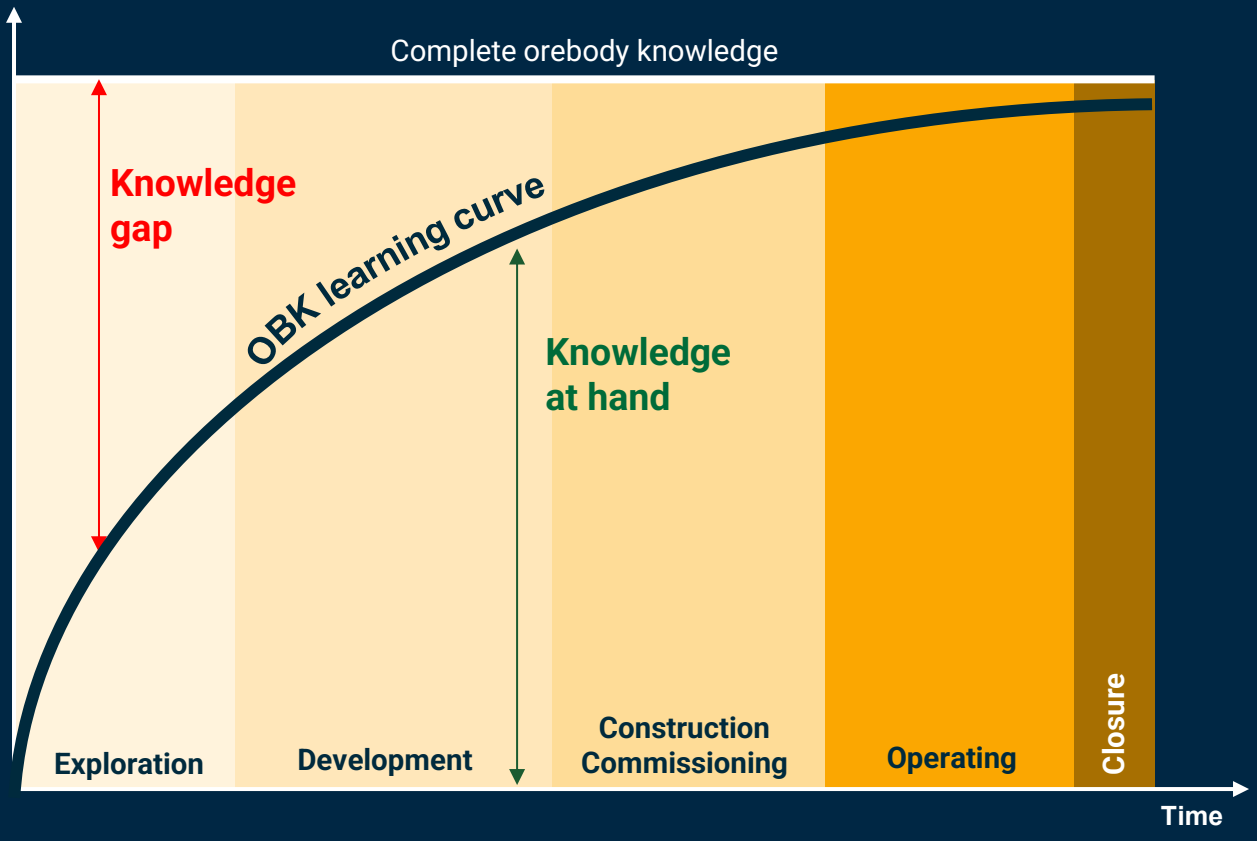
Optimizing OBK Investments Across the Mining Cycle

At any project stage, there always exists a **knowledge gap** between what information you have and complete orebody knowledge.

This knowledge gap varies over different stages of a mining project.

"The cost of OBK must always be less than the financial risk reduction it provides."

Cost of collecting OBK + **Value** provided by any additional information = **Return** on Investment Decision



Mike Samis

Financial Benefits of Integrating Vol into Mine Finance

cost of collecting OBK information and what the **benefit** of exercising the (call/put) options will be.

Increased lender confidence
in repayment stability.

Higher DSCR certainty

Reduced loan distress risk

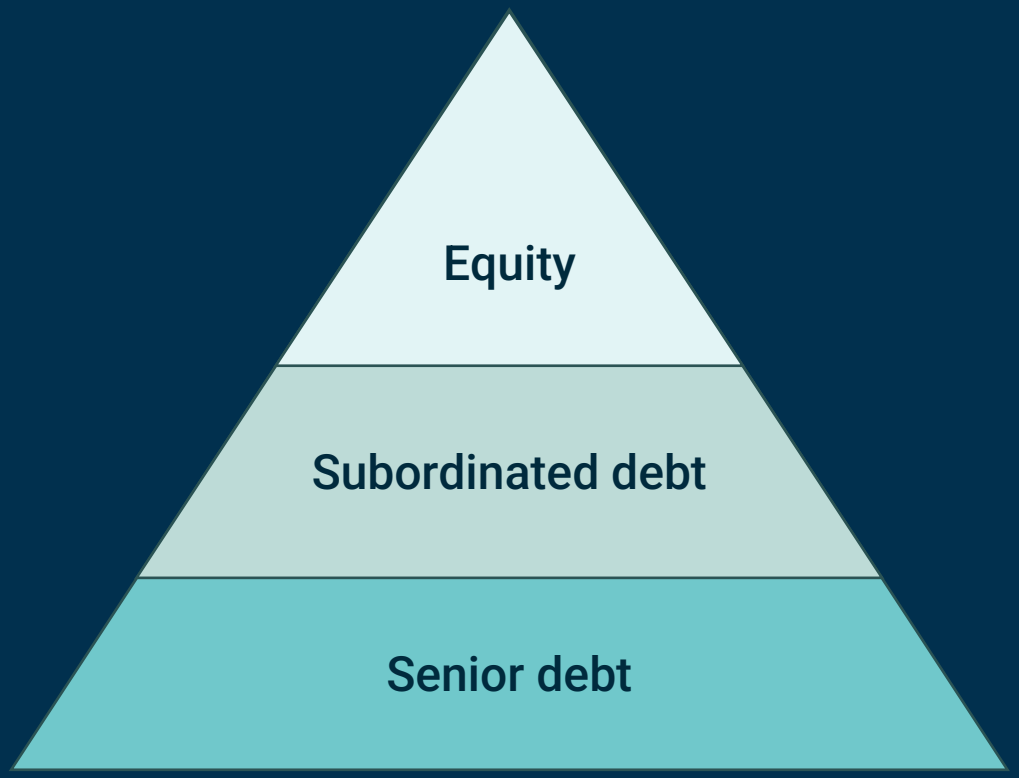
Improved IRR predictability

VoI and the Capital Stack: Enhancing Debt and Equity Outcomes

Making the entire stack more bankable

"Improved ore body knowledge reduces operating, community, environmental and financial risks while optimising financial performance."

— Barker et al., p.3



- Reduced Dilution from impairments
- Better risk-adjusted returns
- Improved Coverage Ratios

Embedding VoI into Structured Mining Finance Deals[1]

"VoI is not just a **research** concept. It can be embedded into how investment decisions are structured and staged, to minimise the risk of impairment and rework."

— Paraphrased from Samis learning model (p.10–12)

Capex tied directly to OBK milestones

Pricing adjusted on OBK confidence

Built-in flexibility for information-triggered repricing

Proactive Investment: Why Insisting on OBK Pays Off

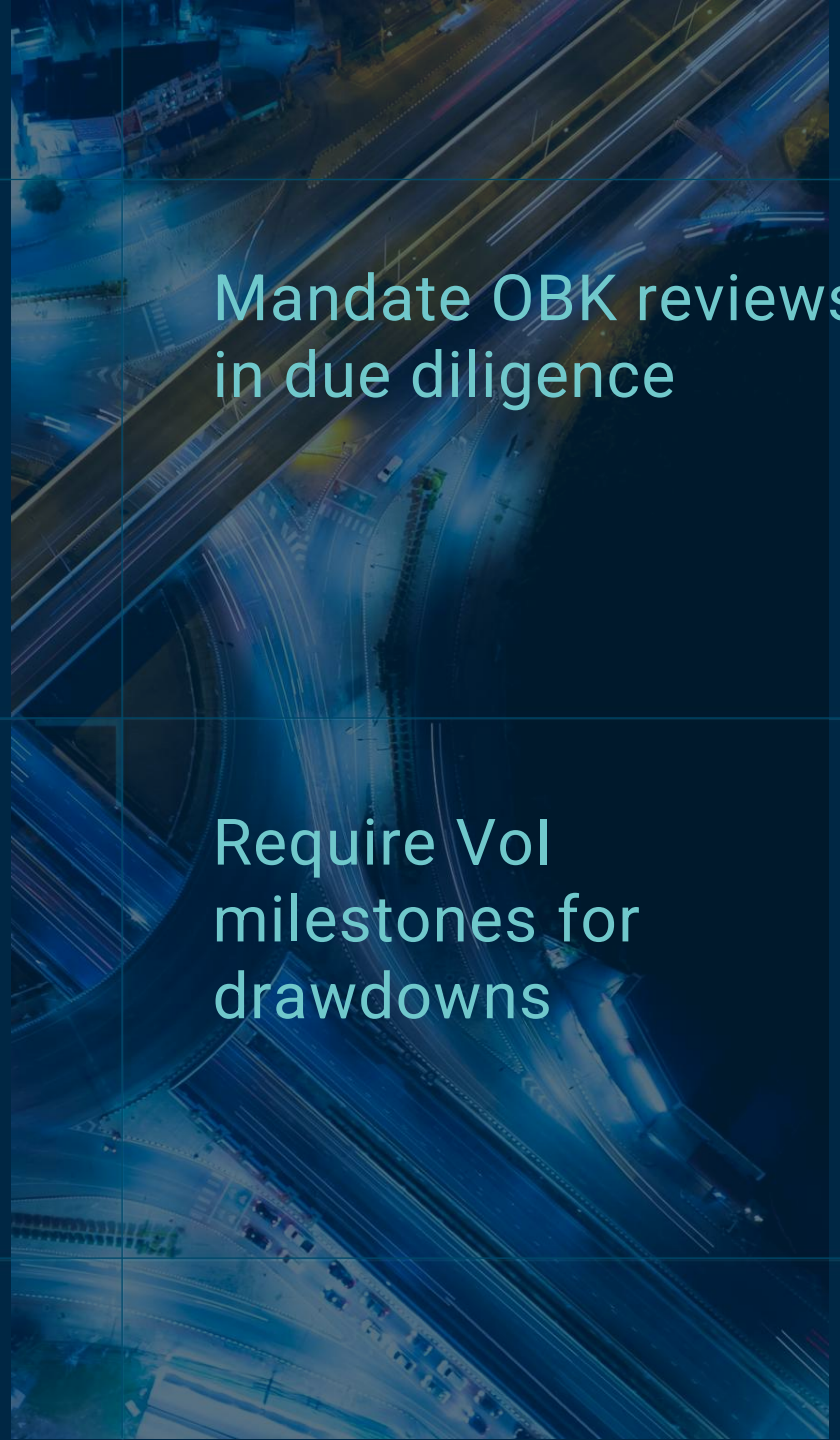
"If you wait until problems occur, you're already downstream. **Prevention is upstream**—it costs less, performs better, and protects the entire system."

— Upstream, Dan Heath

Upstream OBK investment prevents downstream covenant renegotiations and protects investor returns.

- Reduced need for covenant renegotiation
- Better interest rate setting
- Fiduciary responsibility aligned to reduce principal risk

Practical Steps: Operationalizing VoI in Finance Agreements



Mandate OBK reviews in due diligence

Require VoI milestones for drawdowns

Adjust financing terms dynamically on OBK

"With evidence demonstrating that OBK leads to better project outcomes… the research findings will promote adoption of these new technologies and help define future investment standards."

— NSERC OBK Proposal, p.3

Potential IMDEX advisory: quantify OBK risks, enhance predictability, improve structured finance outcomes. Seeking partner feedback for pilot discussions.

The IMDEX as a Product (IaaP) ‘Option’

De-risking Investments Through OBK

IMDEX Managed Service

Eliminate drilling strategy unknown unknowns. Strategic management from planning through execution using industry-leading technology

Systematic Geotechnical Data Generation

Early, systematic identification and mitigation of a key geological risk

Internet of Geosensing (Measurement Systems)

Sensing systems advice (answer the right question, with the correct system, to reduce the most risk).

Advisory And Aggregator

Provide strategic OBK advisory services integrated with critical financial and technical milestones.
Aggregate and interpret complex geological data into clear investment signals.

Rosetta Stone

We Make ‘The Rocks Speak’

IMDEX™

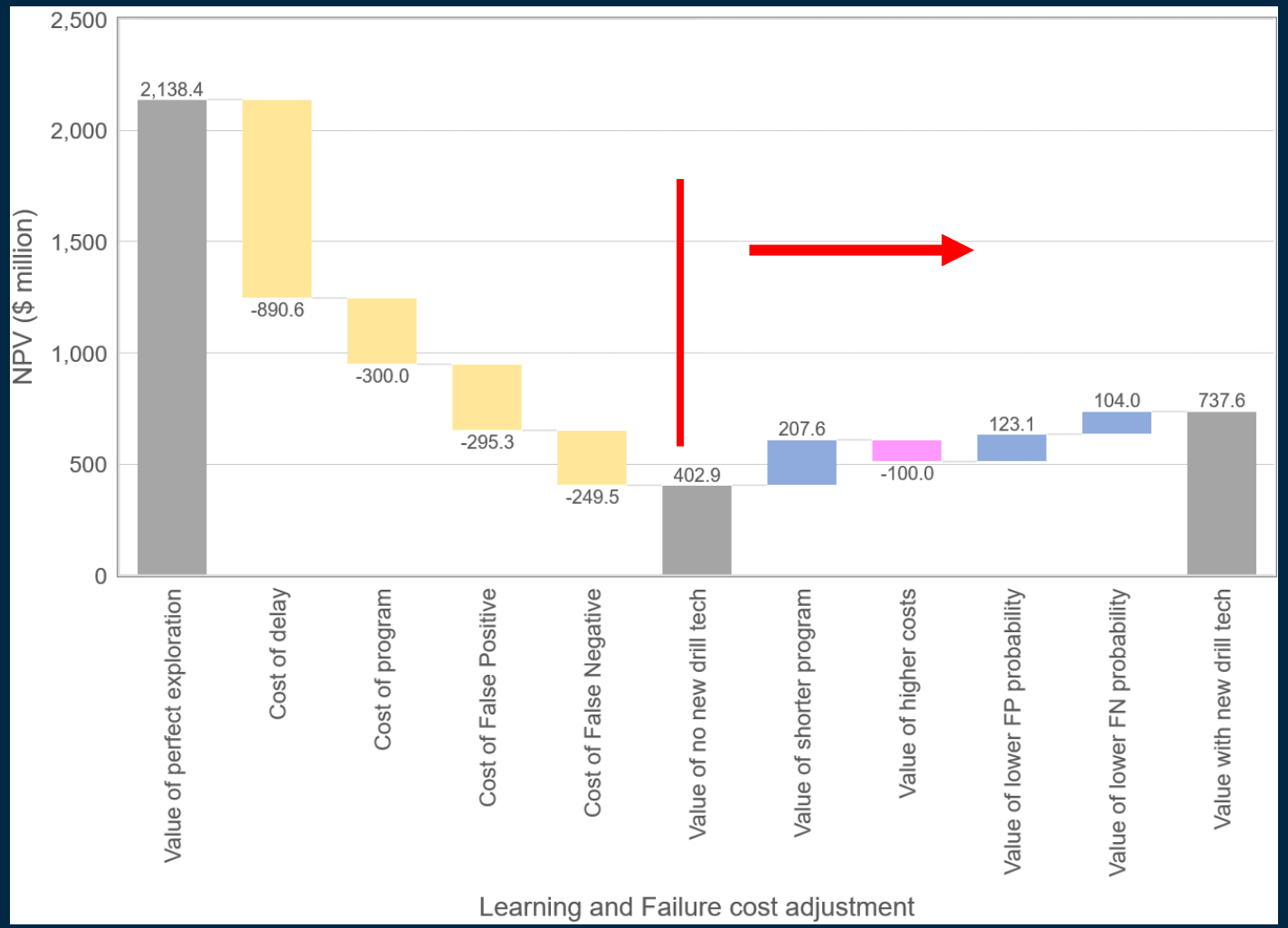
IMDEX™

Case Examples: Boosting Project Value Through Improved OBK

Case Studies: Real Financial Impacts of OBK

Value impact of a new approach to resource development encompassing drill technology, & enhanced sensors.

Reduced program timeline to 5 years from 7 years and improved information quality by 50% increases NPV by $335m USD .



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Case Study: Snowy Hydro – Billion-Dollar OBK Lesson

Lack of OBK caused $7 Bn AUD Impairment (over 5 years)

One Major Reason: Ignored adive to drill to obtain more information

*We …**wanted more drilling to understand the complex geology**. It feared a tunnel boring machine might get stuck. Snowy Hydro rejected that advice.*

*…that **there wasn't enough information available** on the geological integrity of the tunnel path. And there wasn't enough testing done to say anything solid about the costs…*

Deep Resource Conversion Drilling: Strategic OBK in Action

Resource Conversion – Gold Project (1,000–1,600m depth)

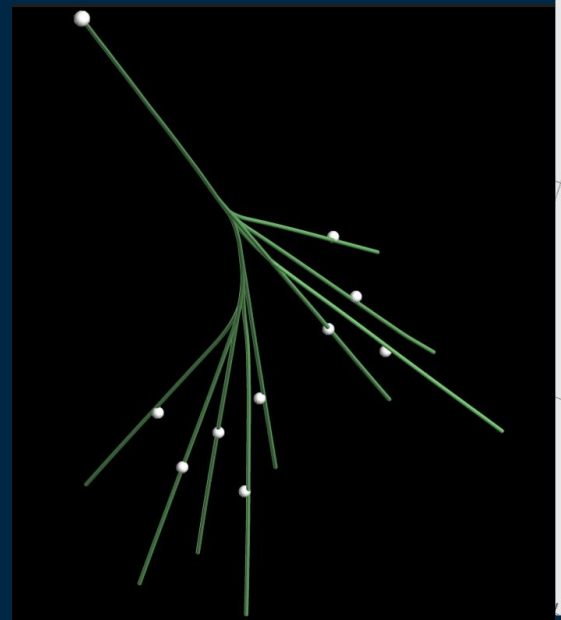
IMDEX Advanced Directional Drilling:
Accurately defined deep resources (±5m) significantly reducing drilling uncertainty.

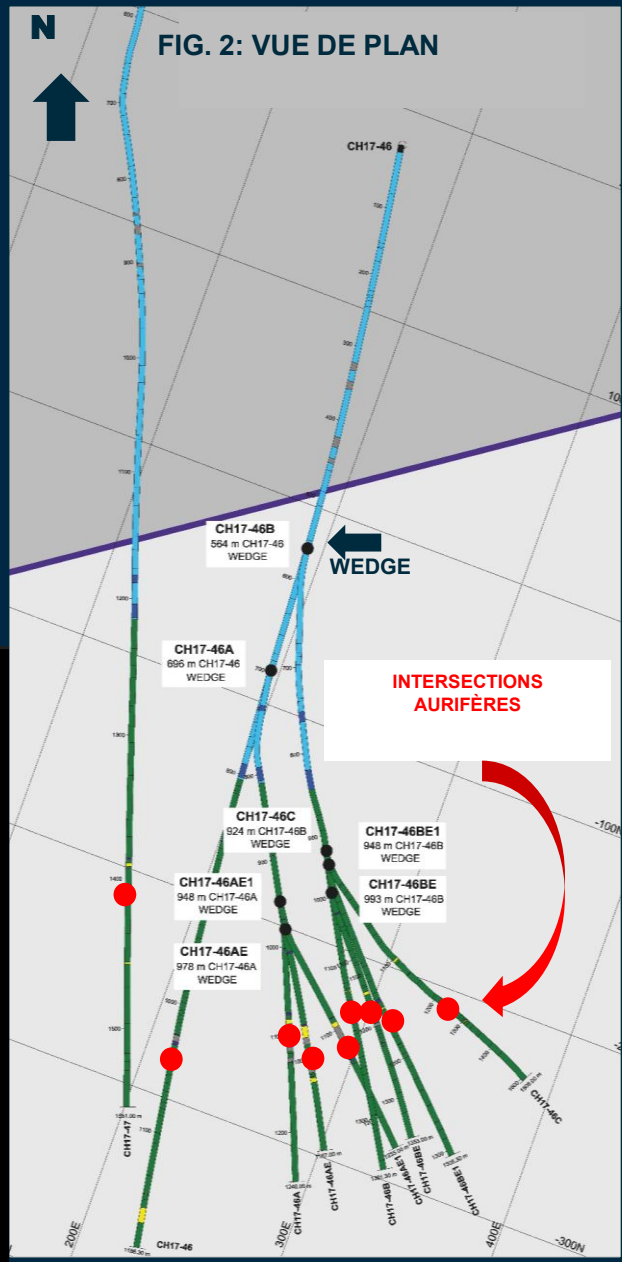
Reduced Drilling Required:
Saved **31,500 metres** of drilling (from original 54,000m), directly reducing upfront Capex by circa **$10M CAD**.

Accelerated Timeline:
Project completion timeline cut by **50%**, materially improving NPV 60mCAD.

Resource Upgrade Ahead of Schedule:
Added **350,000 oz Gold** to Measured category two years earlier, further increasing early-stage valuation and financing certainty.

"Strategic OBK delivered substantial upfront savings, accelerated project timelines, and increased early-stage valuation—significantly reducing investment risk."





Case Study: Copper Recovery Optimisation

Understanding the cost/benefit of applying a new technology to better IDENTIFY and SPATIALLY MODEL CU RECOVERY (oxides vs sulphides) which improves the chances of the project being successful.

Initial Investment:

- **$150M** spent on initial resource delineation.

Strategic OBK Investment:

- Additional **$5M** spent on targeted OBK (sulphide vs oxide distribution mapping).

Financial Outcomes:

- NPV uplift: **+20–25% ($80–90M)**
- IRR improved: **+2%**
- Reduced investment decision risk: **-5%**

Bottom Line:

$5M targeted OBK spend delivered **$80–90M NPV uplift.**

IMDEX™ Datarock

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Known knowns, known unknowns, unknown unknowns — OBK transforms uncertainties into quantified investment decisions."

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