Great Success: Now Let’s Talk About the Elephant in the Room

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Why the Environmental Stewardship Initiative?

• Complex and rapidly-evolving stakeholder requirements / expectations

• Key balance sheet expenses (i.e. Capex, Opex, and long-term provisions)

• Classic innovation conundrum → risks and costs too high to undertake alone
Why the Environmental Stewardship Initiative?

• Consortia approach
  – Leverage risks and costs associated with innovation
  – Vastly enhance investment upside for participants
  – Significantly accelerate solution development and deployment
Why the Environmental Stewardship Initiative?

• CMIC as innovation coordinator
  – Bring together all stakeholders and often disparate groups
  – Consolidate the fragmented approach across Canada
  – Develop industry-relevant project and programs
Why the Environmental Stewardship Initiative?

CMIC’s Towards Zero Waste strategy addresses the pressing issues that are keeping executives up at night...

- Ability to reach ore bodies that are further away faster and in a safe manner
- Environmental footprint reduction and more effective operations
- Making continuous mining more economical and efficient
- Water usage, availability, and efficiency is a challenge
- Improvements in safety to benefit employees
- Access to real time data – strong drive to improve the ability to make decisions and monitor operations from large data sets in real time
- Mine planning and better understanding of ore bodies to allow for efficient mining
Project Development Process

1. Step change for environmental management
2. Establish Environmental Stewardship Initiative (ESI)
3. Scoping Report (Hatch)
4. Review of Scoping Report by ESI
5. Selection of Key Initiatives
6. Incororporation of Tailings Group
7. Establish Initiatives Working Groups
8. Start work on Key Initiatives
9. Initiatives Suitable?
   - Yes
   - No
10. Selection of Key Initiatives:
    - Tailings Working Group
    - Water Working Group
    - Closure Working Group
Tailings Working Group – Background

Tailings Working Group

Define Tailings Initiatives

Interest in re-starting Tailings Working Group

No

Yes

Working Group Suspended
Closure Working Group – Background

Closure Working Group → Define Closure Initiatives → Pre-Feasibility Study → Feasibility Study → Project awaiting sponsorship
Water Working Group – Background (i)

- Water management is a **top stakeholder issue**
- Significant **financial requirement** for companies
- **In-perpetuity management?**
- **Data / knowledge losses** over time
Mining Industry Knowledge Hub (i)

• **Data loss**
  – Huge cost to reproduce
  – Big temporal gaps in data

• **Data available**
  – Data preservation over time
  – Reduced duplication of effort
  – Improved water management strategies (more relevant permits, regulations, *etc.*)
  – Strengthened social license through “open data” / transparency
Mining Industry Knowledge Hub (ii)

- Partnership with Geoscience BC to develop pilot project in British Columbia
- Interface development
  [https://gis.geosciencebc.com/esv/?viewer=waterquality](https://gis.geosciencebc.com/esv/?viewer=waterquality)
- Opportunity to expand to other provinces
- Data available “as is, where is”……initially
- Database is more time and money
Mining Industry Knowledge Hub – Interface (i)
Mining Industry Knowledge Hub – Interface (ii)
## Appendix A2. Laboratory Water Quality Data, Harper Creek Project, 2007 to 2014

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### Notes
* See method for discussion on included species.
Tailings (i)

• Quick internet search:
  – From: Ty Mawr in the UK in 1961 (and again in 1965)
  – To: Hpakant, Kachin state, Myanmar with 113 people killed
  – Four failures in 2014 and two in 2015 including the Samarco Mineração S.A. mine in Brazil with 32Mm³ released
Tailings (ii)

• So what do we need to do?
• Look at the properties
  – Environment
  – Structural
  – Chemical
  – Other site specific?
Tailings (ii)

- **Environment**
  - Local resources
  - Seismic risk
  - Local community downstream

- **Structural**
  - Foundation conditions
  - Tailings impoundment / wet tailings
Tailings (iv)

• Chemical
  – Look upstream
  – Treat before place
  – Make dirt not tailings
Tailings Example: Torex Gold

- High seismic risk
- CN destruction
  - (upstream assessment of contamination)
- Filtered tailings (14 kt/day)
- Dry stack
- **Aim:** Build dirt and eliminate long-term management
Investing in a Sustainable Mining Future

• Great progress to date
  – First project in place; second on the horizon
  – Closure project awaiting sponsorship

• Next phase of work …
  – How to best support Towards Zero Waste in Mining™?
  – Tailings? Water?

It is in our hands ...
If you were in the middle of the room the whole time, why can we not find a single witness to corroborate your testimony?

Thank you!