

# Innovation in Minerals Processing

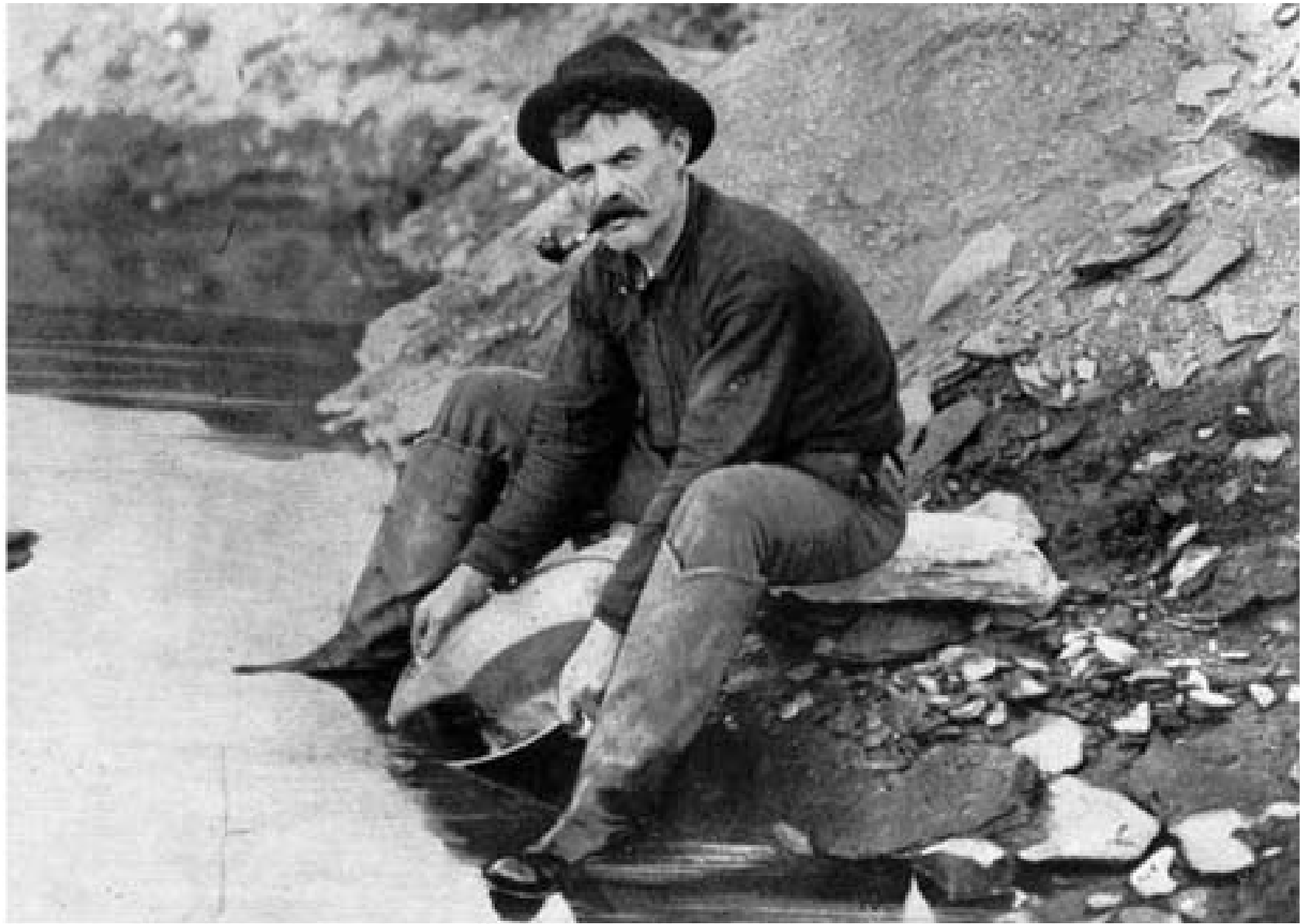
Joe Pease

CEO – CRC ORE

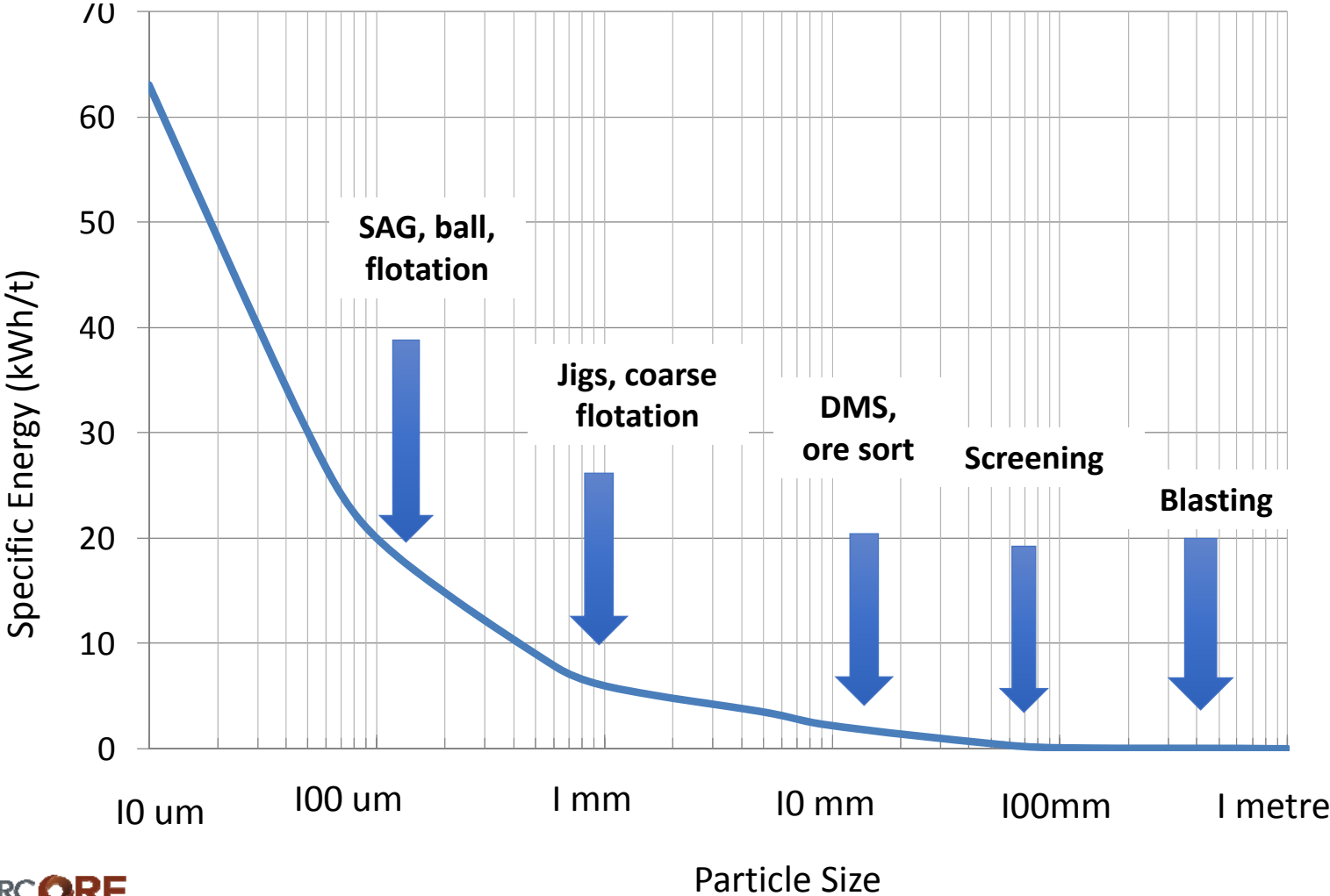
Chairman - CEEC

Minerals Industry Consultant

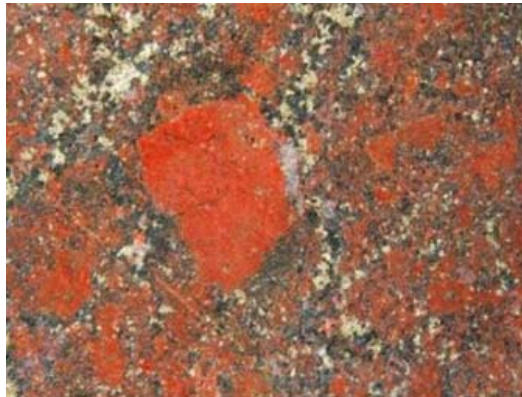
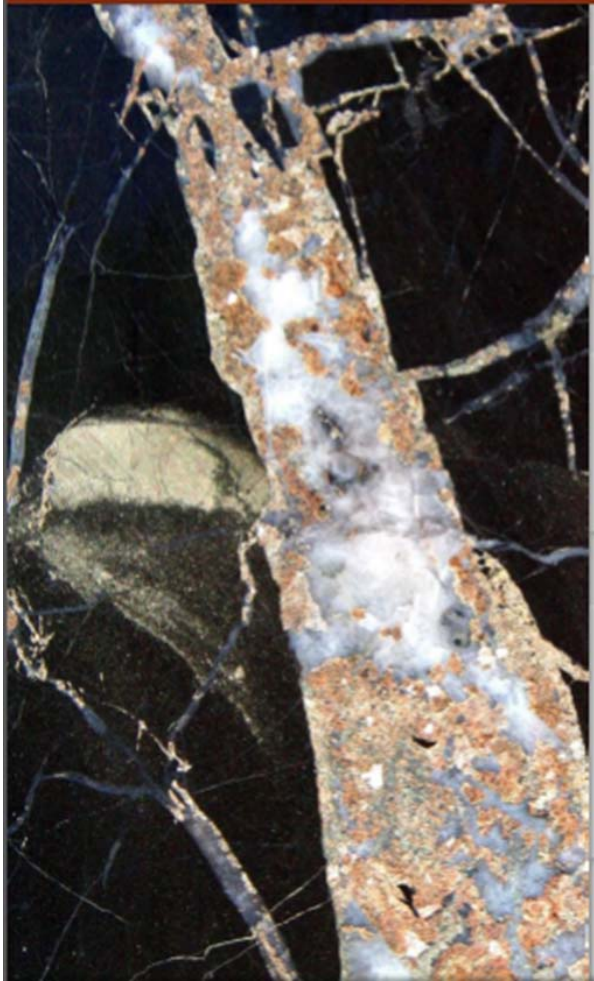
[peaseminerals@bigpond.com](mailto:peaseminerals@bigpond.com)



# Exploiting Coarse Liberation



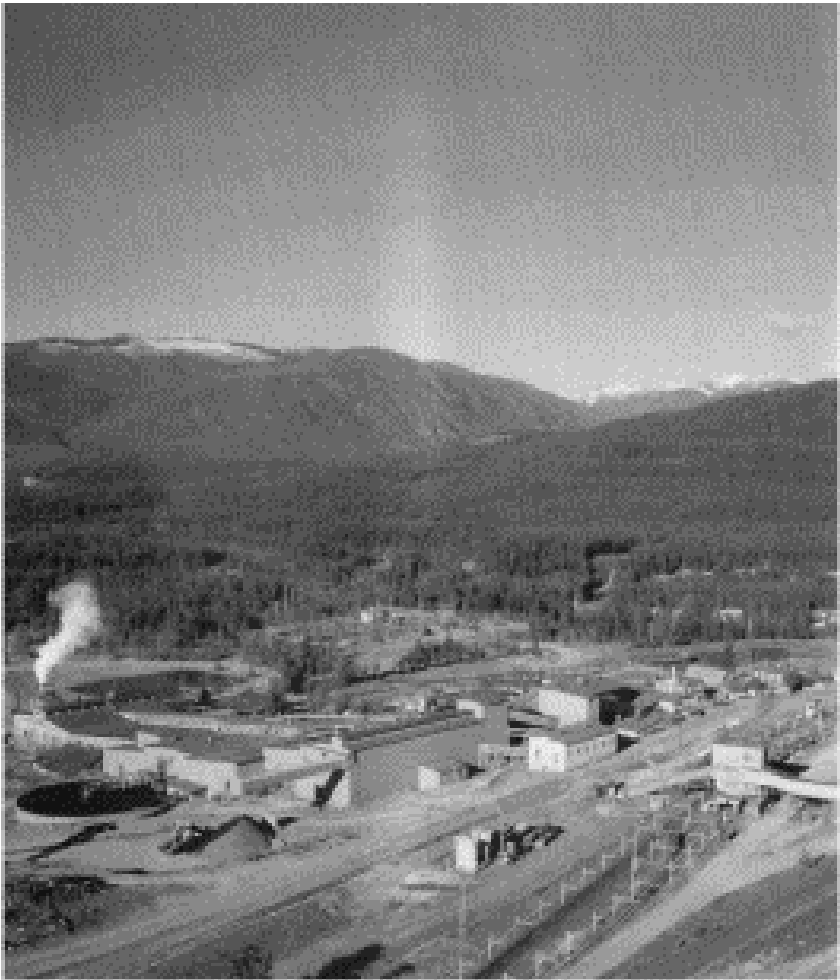
# Ore Heterogeneity – *Friend or Foe?*





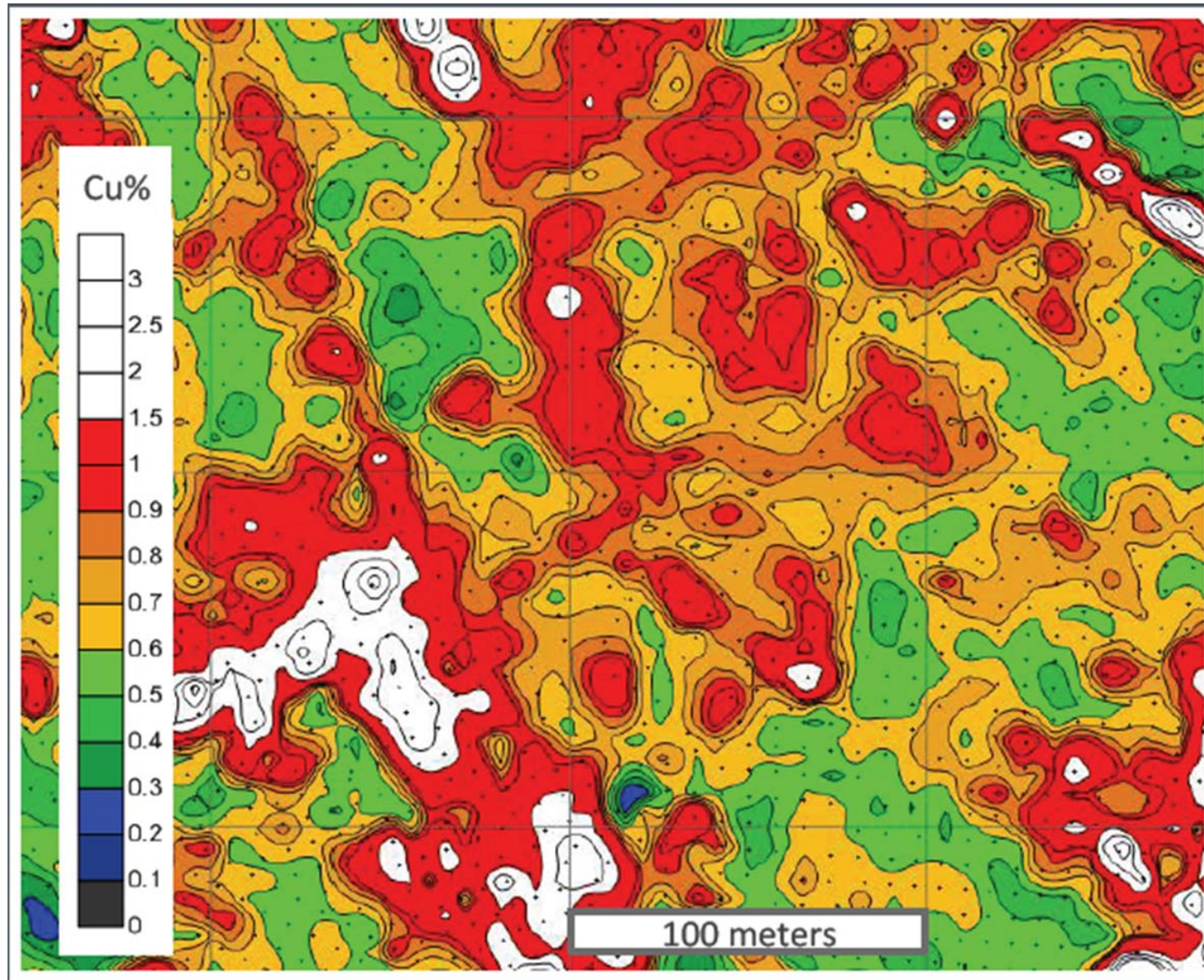
# Exploiting Ore Heterogeneity... *... A New Idea?*







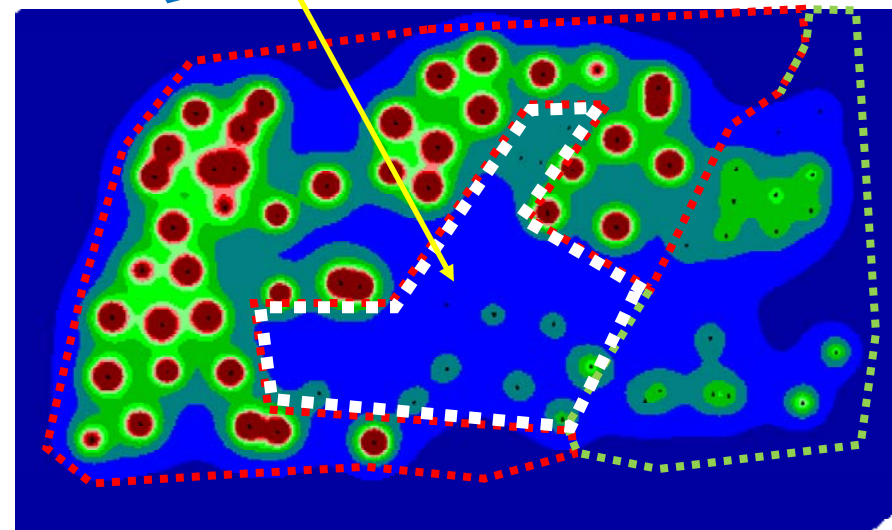
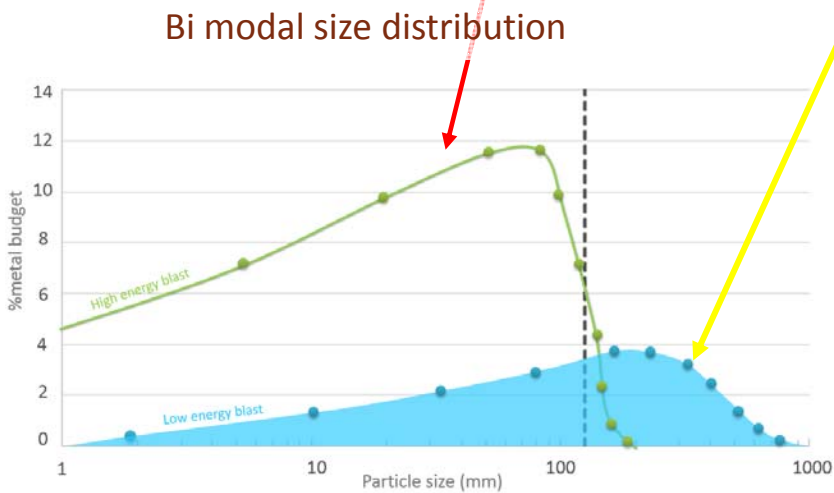
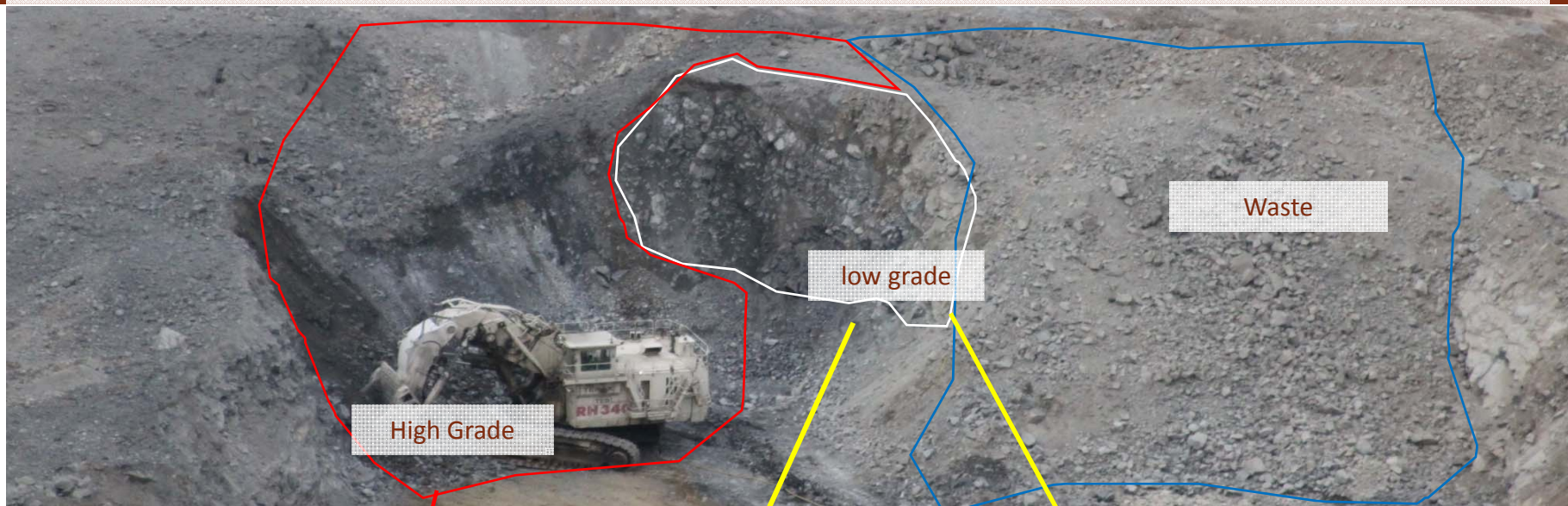
# Induced Size Department by Blasting – Copper Porphyry





# Induced size separation by differential blasting

Overall block above cut off – with low grade pockets





# Required Technology



# Mining as Manufacturing ...



...allowing for mining realities.



# Measurements

Over 200 performance attributes are continuously displayed/relayed from this truck



Not one of them measures the quality of the payload !



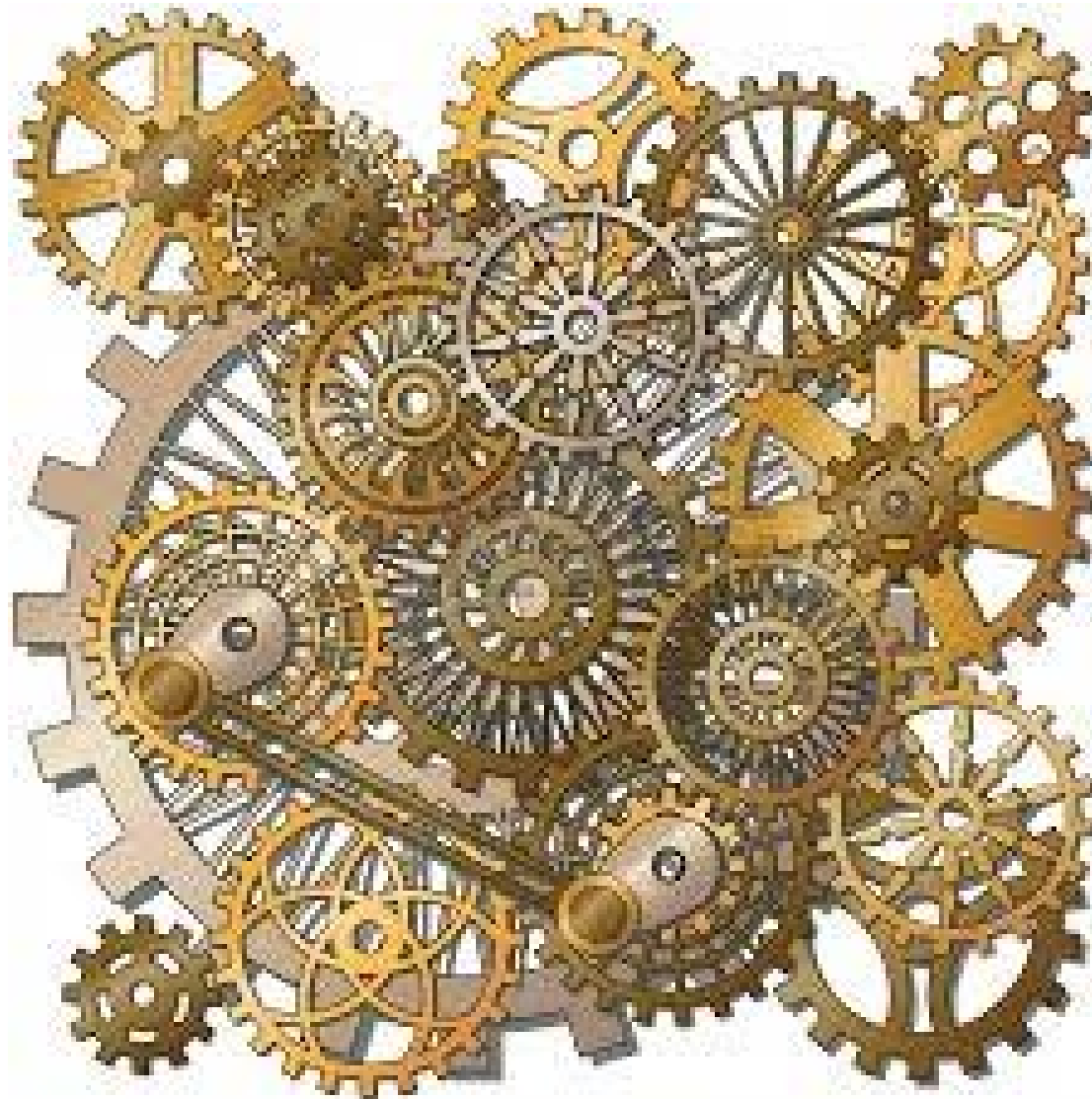
# A Whole System Approach to Innovation

- Embrace macro heterogeneity
  - *Design for coarse separation*
    - *Blasting, conveying, ore handling...*
    - *Crushing, grinding, flotation*
  - *Simulate and optimise whole-of-stream*
- **And** design for microtexture
- Develop measurements
  - *and accept measurement shortfalls*
- Supporting management systems
  - *Align culture, KPIs*

Simple technology ?

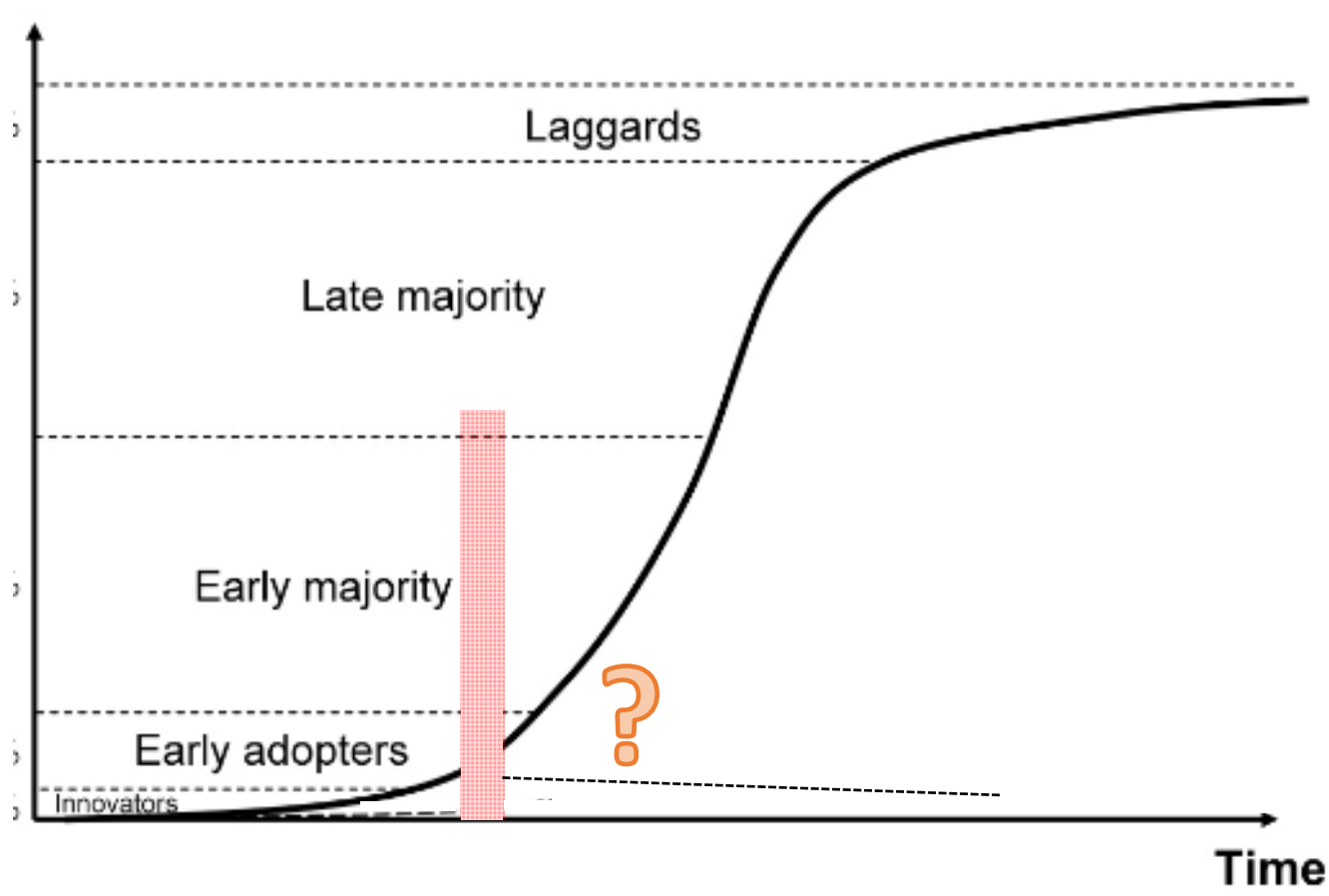


# A Conservative Industry?





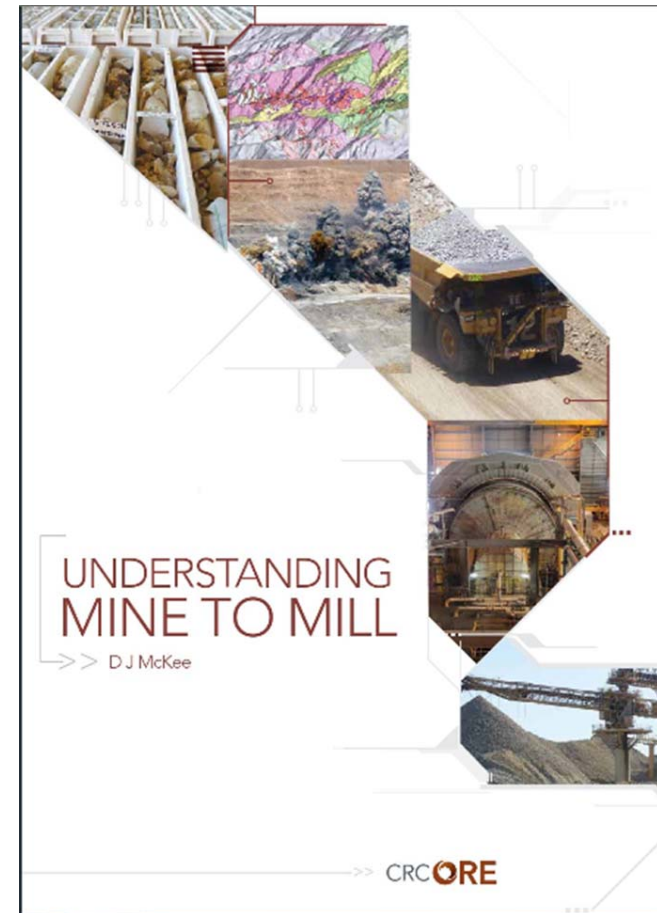
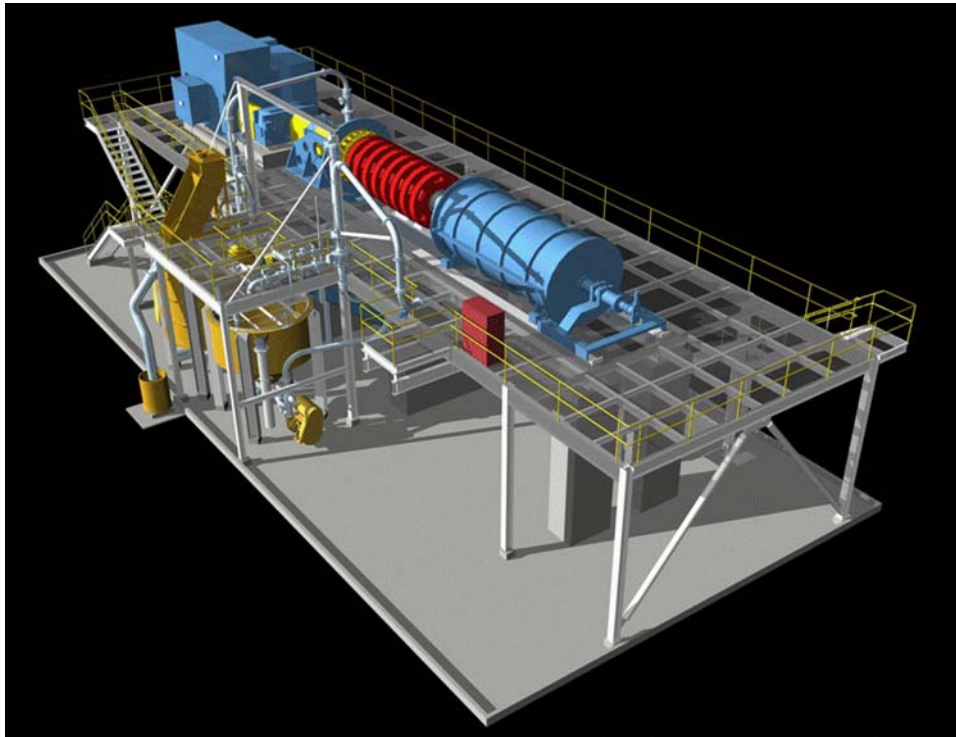
# Crossing The Innovation Chasm ?



# A Tale of Two Innovations

INNOVATION 1	INNOVATION 2
Concept from unrelated industry	Concepts and references from mining
50 times scale up, batch to continuous	No new equipment
Enthusiasts over-ruled conventional theory	Strong theoretical base
Complex piloting	No piloting or capital
Significant capital	Reduce operating cost, simplified operations
Increased operating cost and complexity	Use existing site skills
No pre-existing site or supplier skills	<i>Would add significant value if delivered</i>
<i>Would add significant value if delivered.</i>	

# A Tale of Two Innovations





# Seven necessary conditions

1. A driving need
2. Designed for **your** ore
3. Passionate champions
4. Bite-sized implementation
5. Simple IP rights
6. High quality ongoing support
7. Enabling organisation

# Aligning the conditions for innovation

