

Development of a Lab-Scale Test for Pre-concentration Evaluation

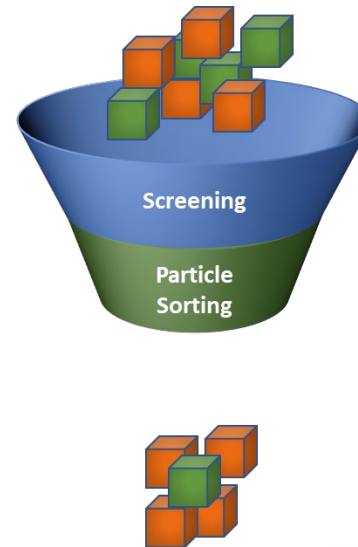
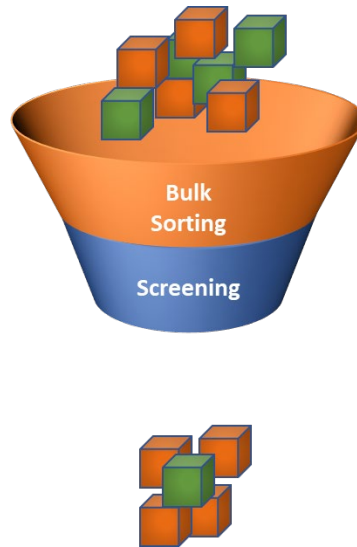
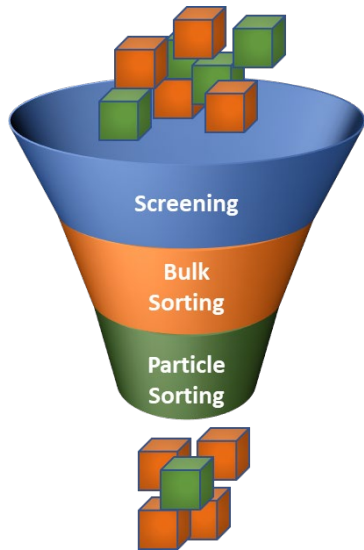
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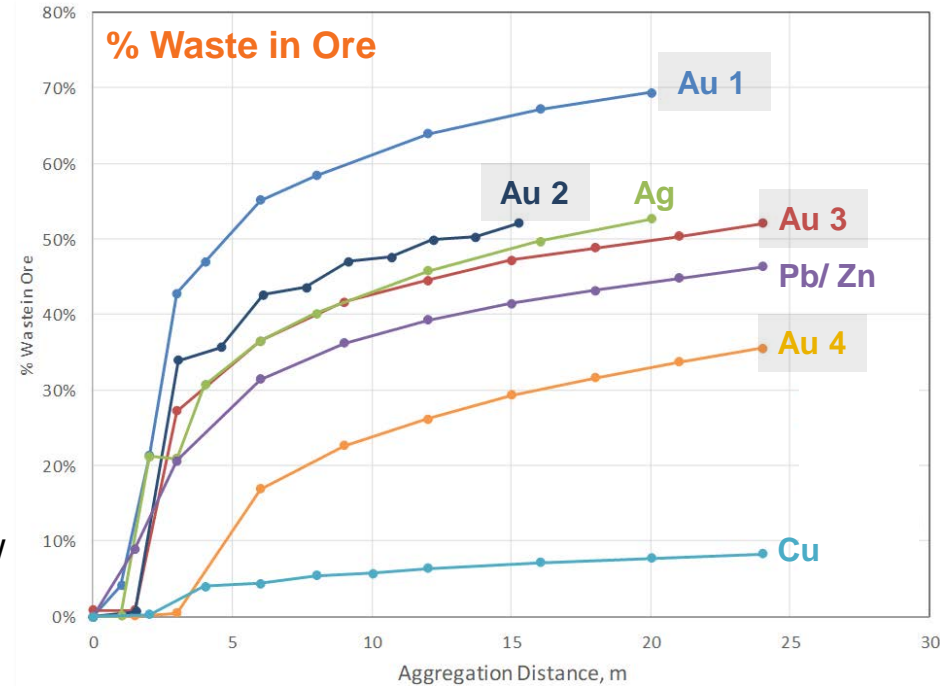
How define pre-concentration?

- Focus on methods to upgrade or reject waste when still **coarse**, **dry** and **transportable** (conveyor or truck)
 - **any combination** of screening + bulk + particle sorting



Heterogeneity analysis

- Based on exploration drill hole datasets
- Two methods
 - Heterogeneity and Scale
 - Composite-Sample Relationship
- Define “waste in ore” & “ore in waste”
 - can identify target areas for testing
 - sample collection follows heterogeneity review



Current testing

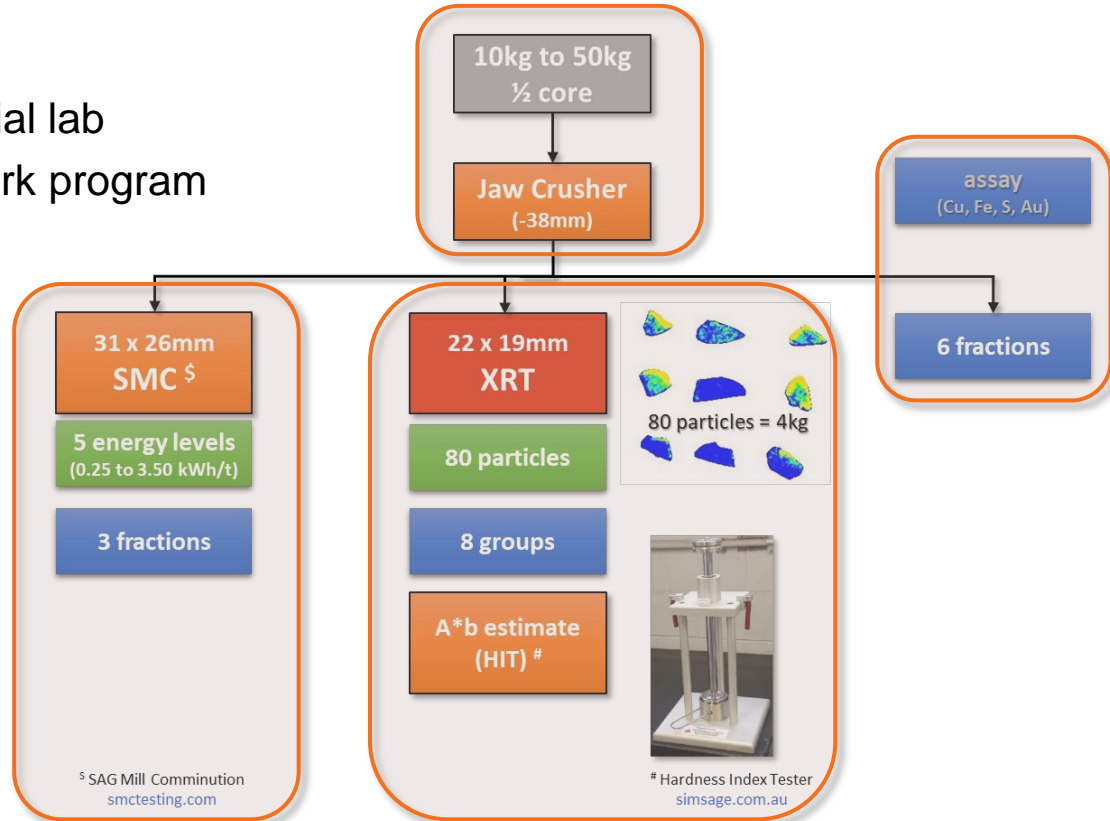
- Driven by equipment manufacturers
 - evaluates machine performance
 - large, composite samples
 - pre-sized to suit machine conditions
 - scalped fines, 3:1 size range, 10mm up to 70mm
- To meet these criteria
 - half barrels of drillcore
 - limited characterisation of feed and/ or products
- Testing is **NOT** independently done
 - like other metallurgical test procedures



SRK protocol

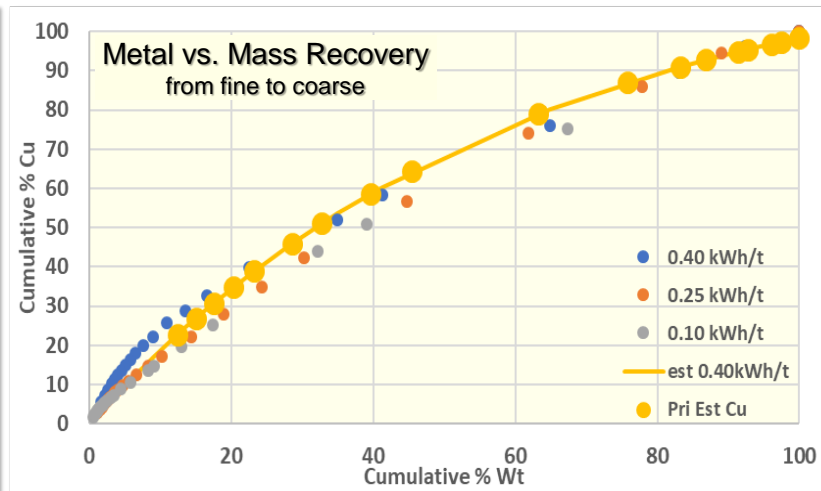
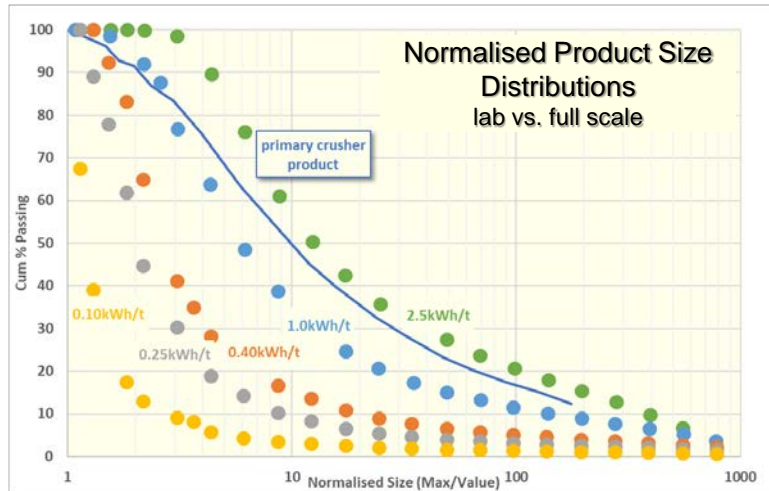
- Objectives
 - done at independent, commercial lab
 - inserted into current met testwork program
 - ½ core samples of 10kg to 50kg each
- Relative ranking of amenability
 - measure of ‘intrinsic sortability’

- Use sensor(s) to rank particles
- assays will determine if metal deports preferentially

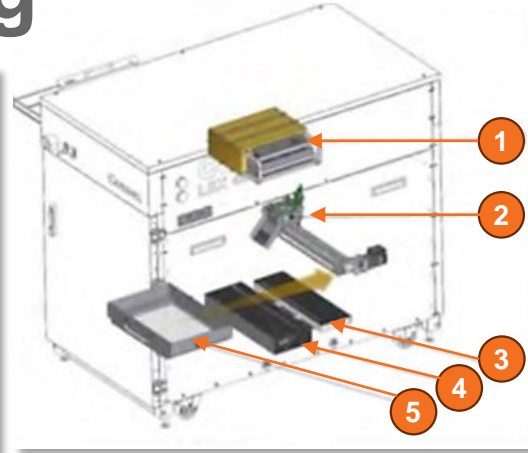


Screen upgrading

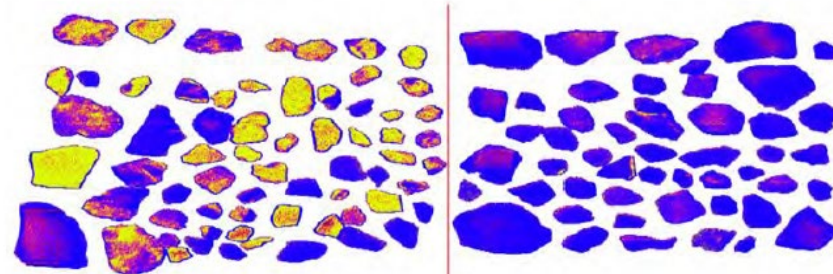
- Normalised product size
 - mapped to actual blasting and crusher product distributions
 - can generate metal vs. mass recoveries **from screening alone**
 - add sensor performance on coarse particle stream after screening



XRT sensor testing

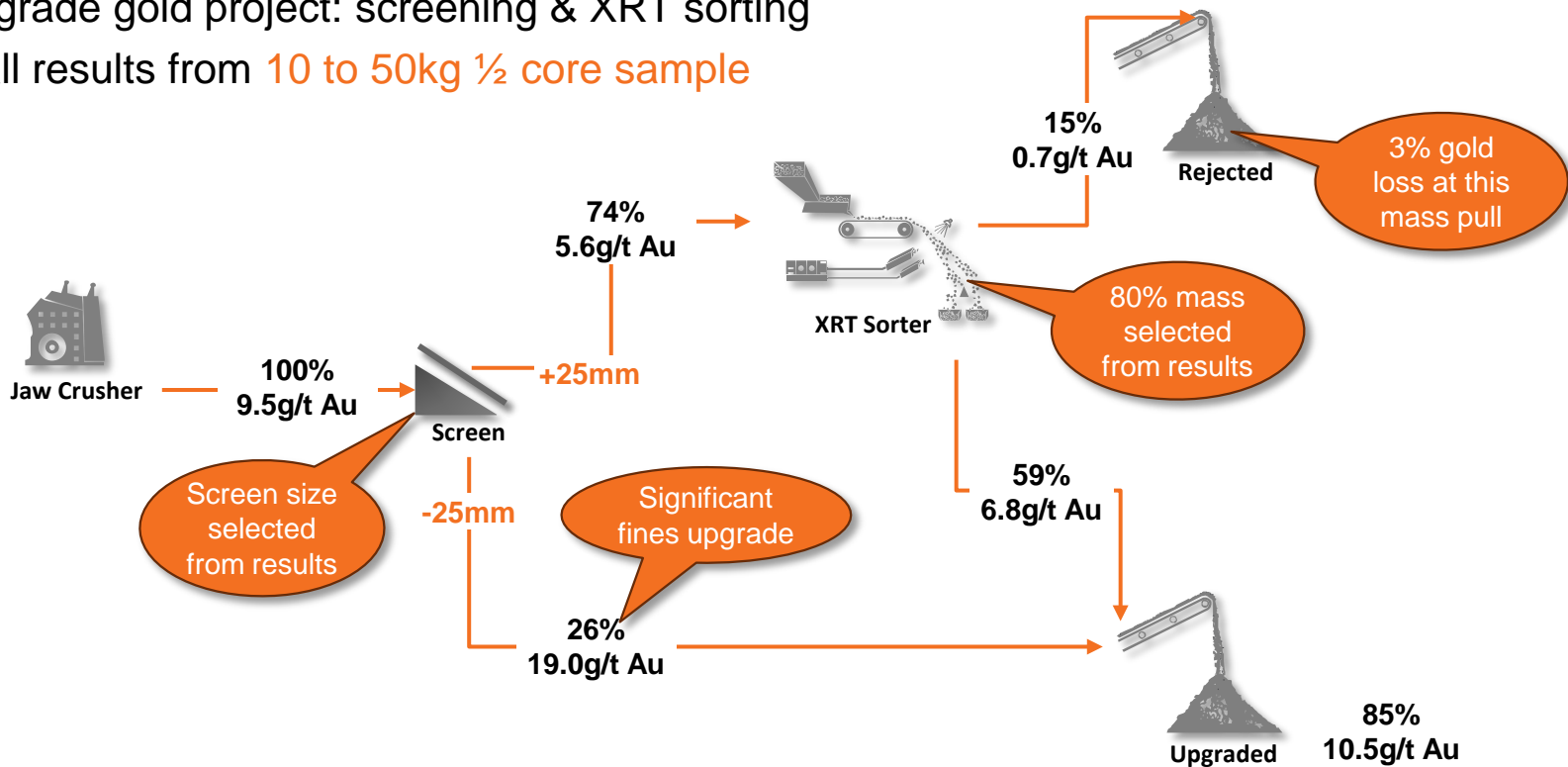


1. X-ray source
2. XRF detectors
3. XRT HD detectors
4. XRT DE detectors
5. Sample tray



Case study simulation

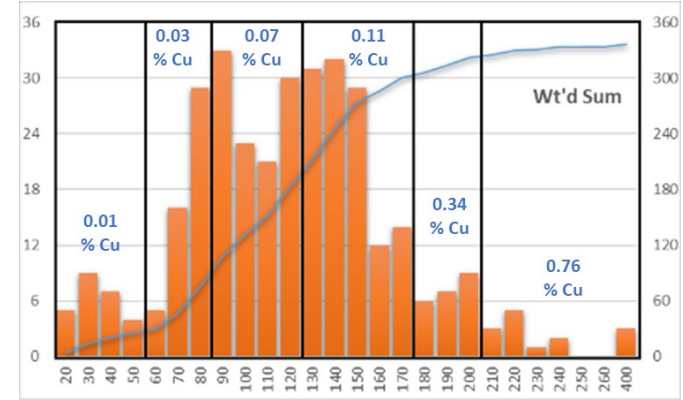
- high-grade gold project: screening & XRT sorting
 - all results from 10 to 50kg ½ core sample



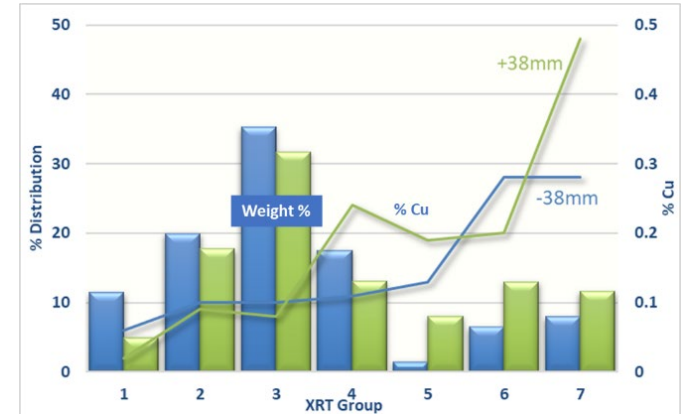
Test applications

- Drillcore samples
 - early-stage studies
- Coarse crushing/ grinding streams
 - multistage crushing screen oversize
 - **SAG mill pebbles**
- Low-grade stockpiles
 - screen upgrading ± bulk/ particle sorting

Pebbles: XRT Group Cu Distribution



Stockpile: XRT Group Cu Distribution



Closing remarks

- Need for **industry standard**
 - allow comparison
- **Small mass**, cost savings
 - for early-stage studies
 - allow variability testing
- **Independently** tested
 - focus on characterisation and not demonstration
- ‘Intrinsic sortability’
 - show amenability only
 - ore type differences
 - compositing with confidence
- Precursor to performance testing
 - “sort out” the poor performers
 - keep the manufacturers evaluating likely projects

Thank You



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SRK Consulting Canada Inc.

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