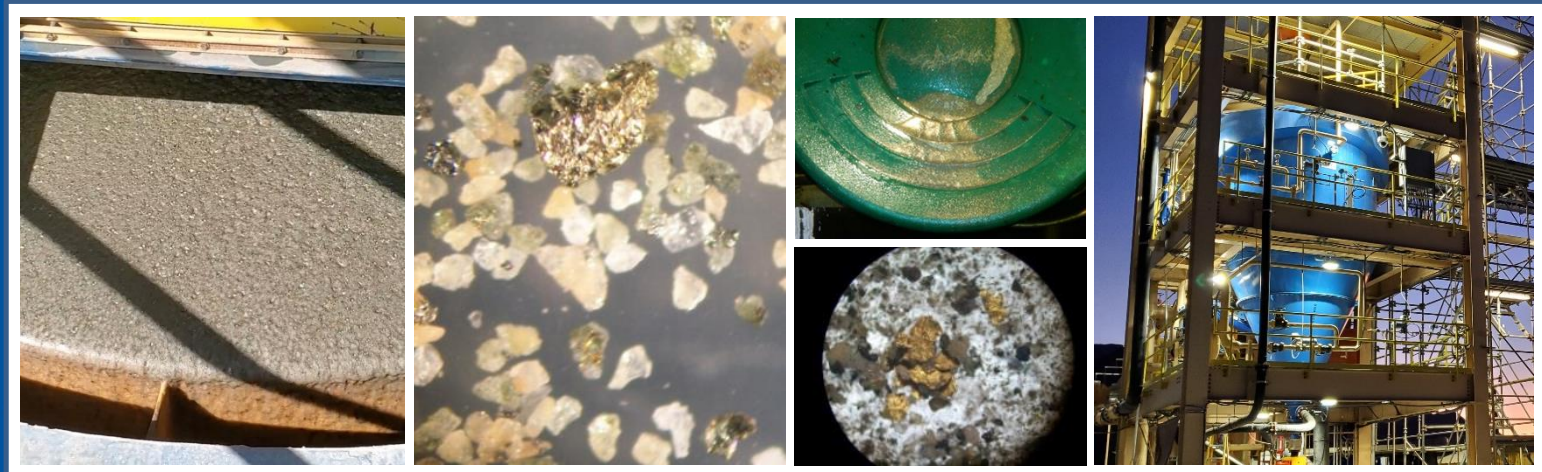


HydroFloat™ Case Study: Copper Recovery from Tailings at Newcrest's Cadia Valley Operations



- On average, 36% of energy utilized by copper and gold producing mines is consumed by comminution processes.¹
- Industry head grades continue to decline and exploration is unlikely to reverse the trend.²
- Lower grades means majority of that 36% is consumed imparting size reduction on gangue rock, which then needs to be stored in wet tailings dam.
- The regulatory environment around the use of wet tailings dams is tightening in the wake of recent disasters. (Brazilian government elected to impose a ban on all upstream tailings dams by 2021.³)

1. Ballantyne, G., Powell, M., Tiang, M., 2012. Proportion of energy attributable to comminution. In: 11th AusIMM Mill Operators' Conference 2012, AusIMM, Hobart, Tasmania.
2. Batterham, R., 2019, 'Accelerating Impact'. CRCORE Symposium, Brisbane, Australia.
3. CNBC <http://www.cnbc.com/2019/03/01/reuters-america-brazil-to-launch-corruption-probe-into-vale-dam-disaster.html>

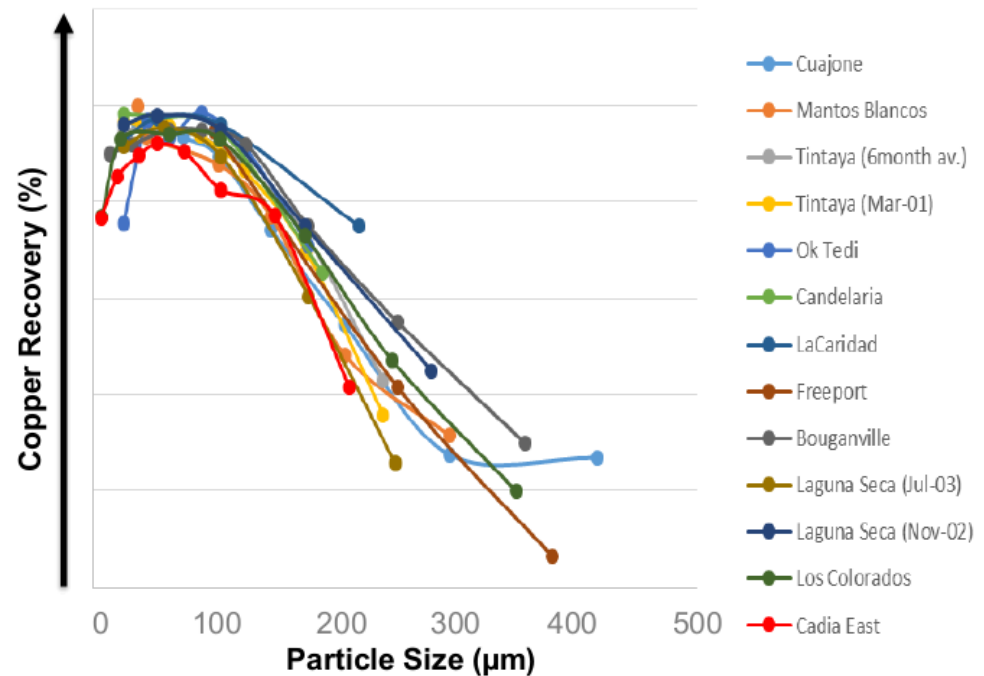
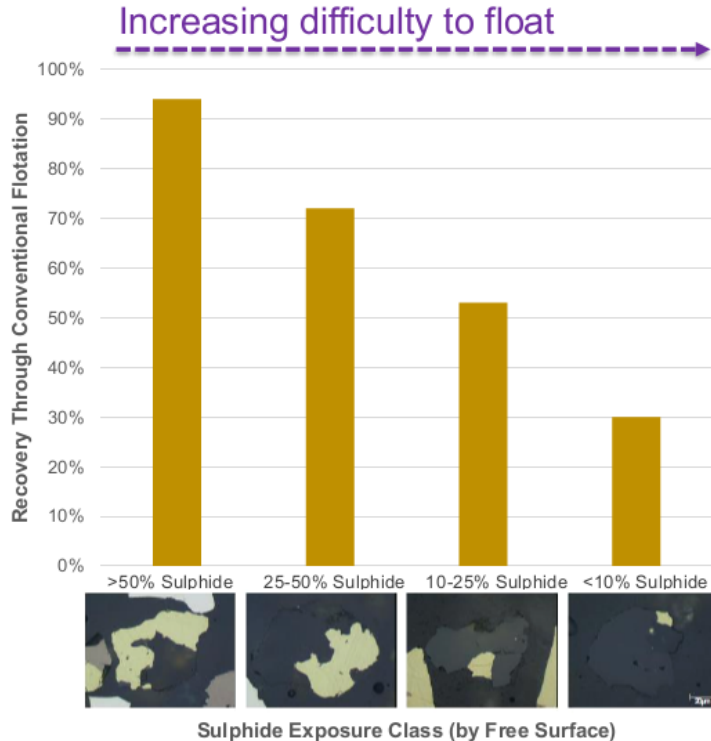
Newcrest Cadia Valley Operations

- Ownership
 - 100% Newcrest
- Metals
 - Gold and copper
- Ore
 - Porphyry copper-gold-moly
- Location
 - New South Wales, Australia
- FY19 Gold Production
 - 913 koz
- FY19 Copper Production
 - 91kt
- Concentrator Throughput
 - 30 Mtpa



Opportunity at Cadia

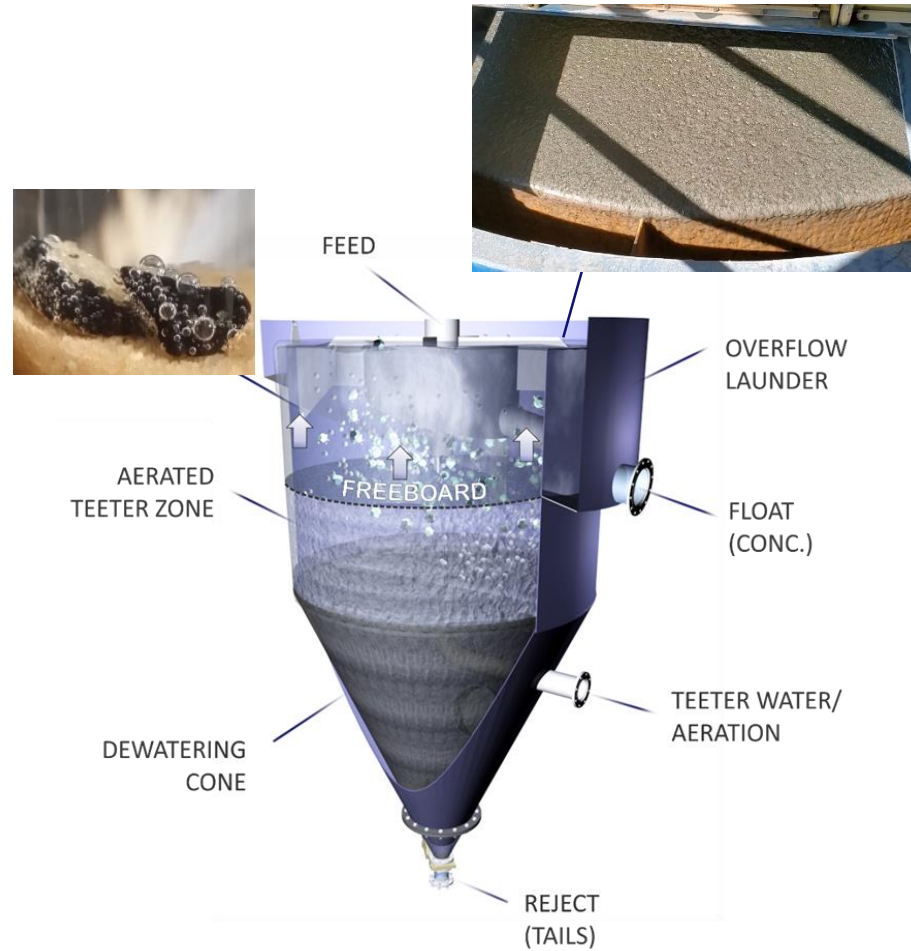
- Roughly 75% of copper in flotation tailings exists as unliberated fine-grained copper sulfides in gangue-mineral composite particles



Figures: Vollert, L., Akerstrom, B., Seaman, B., and Kohmuench, J., 2019. Newcrest's industry first application of Eriez HydroFloat™ technology for copper recovery from tailings at Cadia Valley Operations. In: Proceedings of the 58th Conference of Metallurgists Hosting the International Copper Conference 2019, CIM, Vancouver, British Columbia.

Opportunity at Cadia

- The HydroFloat™



Opportunity at Cadia

- Install a HydroFloat™ circuit to treat the full flotation tailings stream from Train 3 (T3) of the Concentrator 1 flotation circuit (~9Mtpa)
- Primary objective to recover gold and copper previously lost to T3 tailings in coarse composite particles (+150 μm), without additional power input for particle size reduction

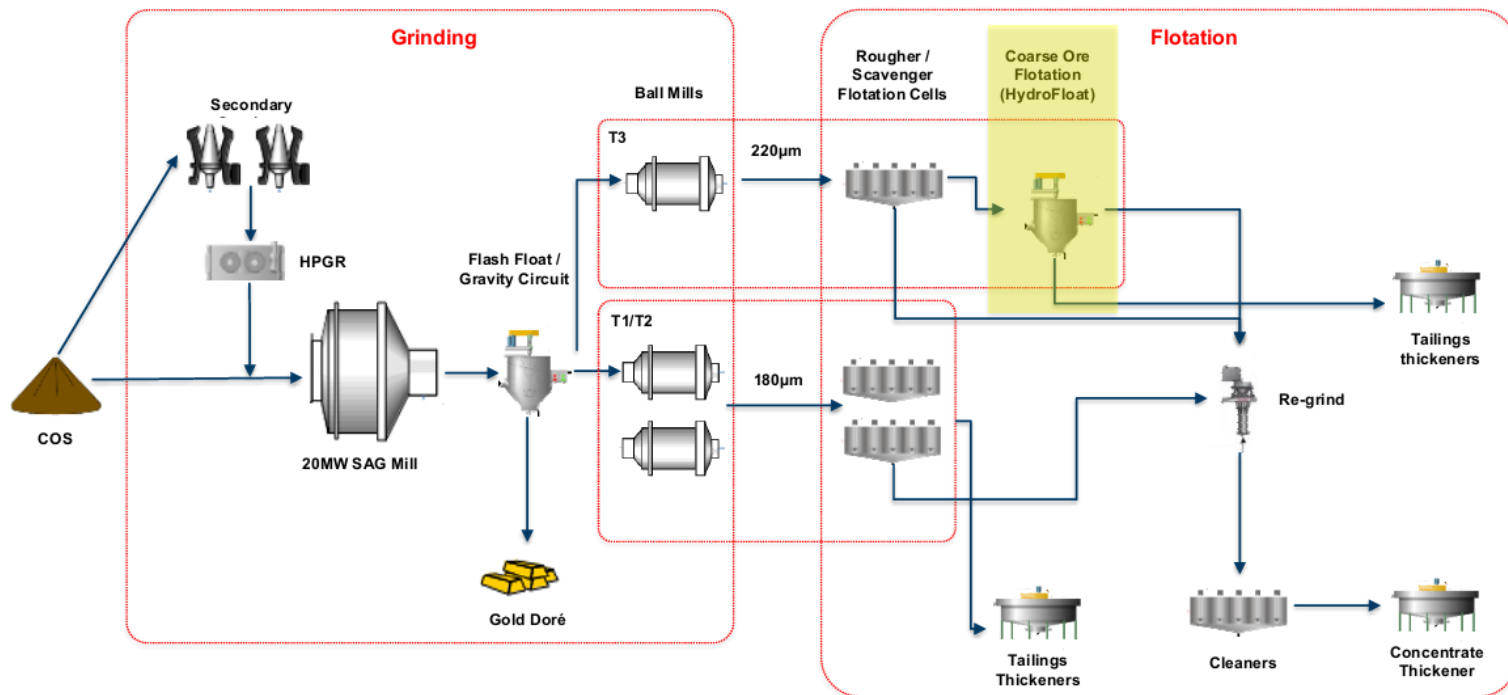
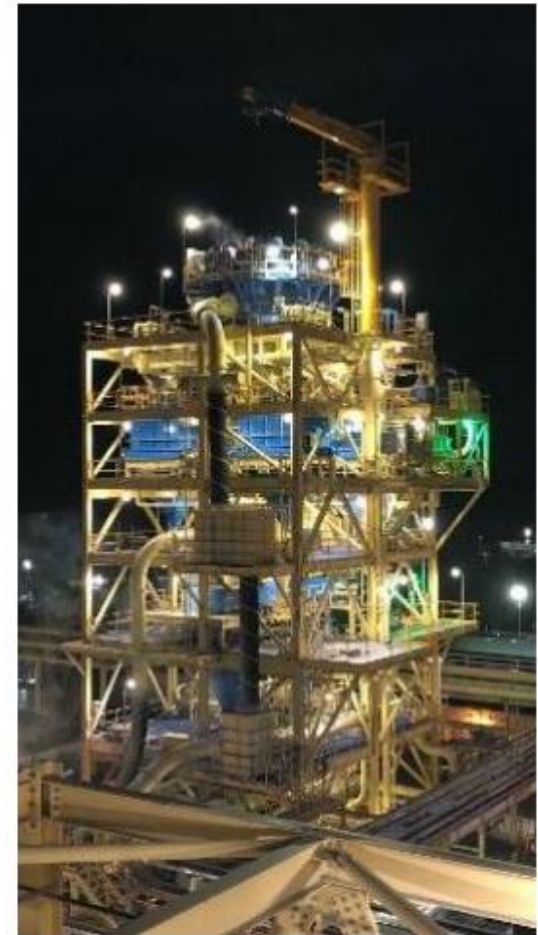


Figure: Vollert, L., Akerstrom, B., Seaman, B., and Kohmuench, J., 2019. Newcrest's industry first application of Eriez HydroFloat™ technology for copper recovery from tailings at Cadia Valley Operations. In: Proceedings of the 58th Conference of Metallurgists Hosting the International Copper Conference 2019, CIM, Vancouver, British Columbia.

Cadia T3 HydroFloat™ Circuit

- HydroFloat™ Coarse ore flotation circuit
 - Cyclone cluster and four (4) Eriez CrossFlow™ classifiers to remove fines
 - Two (2) 3.4m diameter HydroFloat™ cells
 - Concentrate dewatering cyclone and screen for removal of entrained fines
 - Chemical and teeter water supply systems
- Design 1250 t/h solids at 80% passing 150 µm
- Cost ~\$30M¹
- Operation began July 2018



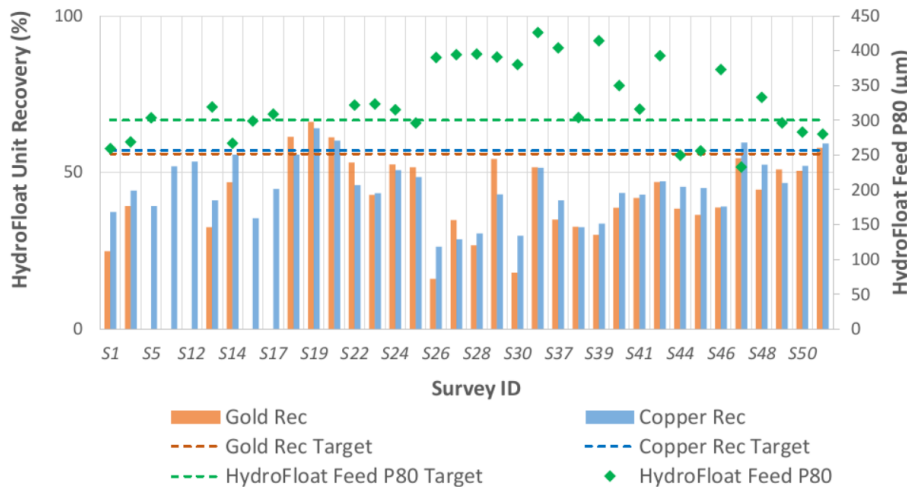
Coarse ore flotation plant, Cadia

1. Newcrest Mining Ltd., 2018 Newcrest Investor Day Briefing Book published by the Newcrest Investor Relations Department, October 2018, www.newcrest.com, pp. 61.

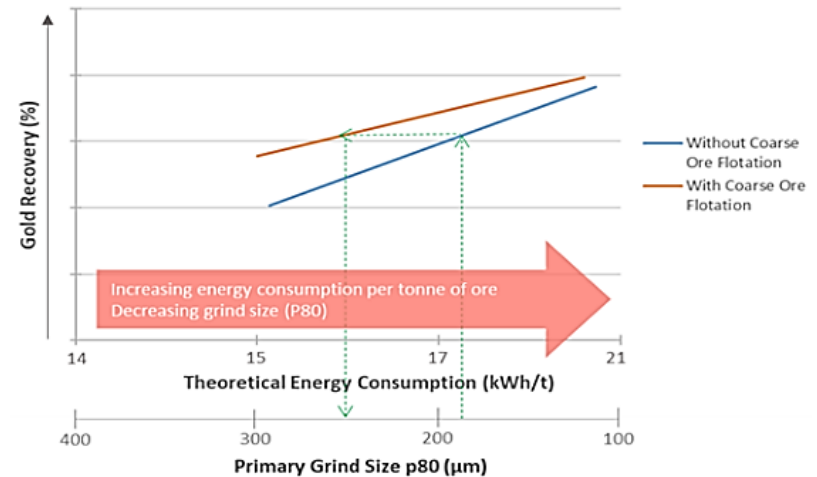
Picture: Vollert, L., Akerstrom, B., Seaman, B., and Kohmuench, J., 2019. Newcrest's industry first application of Eriez HydroFloat™ technology for copper recovery from tailings at Cadia Valley Operations. In: Proceedings of the 58th Conference of Metallurgists Hosting the International Copper Conference 2019, CIM, Vancouver, British Columbia.

Outcomes

- HydroFloat throughput increased by 43% relative to design due to coarsening of circuit feed to 80% passing 210 μm ¹
- Circuit recovery targets have been met and even exceeded in some cases¹
- Energy savings by coarser processing enabled by scavenging coarse flotation tail using HydroFloat²
- Shift in the economic optimum grind size resulting in increased cash flow¹



(Reference 1)


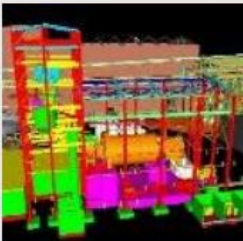


(Reference 2)

1. Vollert, L., Akerstrom, B., Seaman, B., and Kohmuench, J., 2019. Newcrest's industry first application of Eriez HydroFloat™ technology for copper recovery from tailings at Cadia Valley Operations. In: Proceedings of the 58th Conference of Metallurgists Hosting the International Copper Conference 2019, CIM, Vancouver, British Columbia.
2. Newcrest Mining Ltd., 2018 Newcrest Investor Day Briefing Book published by the Newcrest Investor Relations Department, October 2018, www.newcrest.com, pp. 61, 65.

Cadia T1/T2 HydroFloat™ Study

- Installation of additional coarse ore flotation capacity on Train 1 and Train 2 of Concentrator 1, complementing the existing circuit on Train 3.
- Goal to increase concentrator throughput and improve Life of Mine gold recoveries
- Feasibility study underway, finalization expected middle of CY20, targeting completion in late FY22¹

Further Recovery Improvement Options		
Option	Innovative Coarse Ore Flotation	or Traditional Ball Mill
		
Estimated Additional Recovery	~2%	~2%
Indicative Capital Cost	~\$70M	~\$70M
Operating Cost	Low	High
Advantages	Energy efficient Low operating cost Small footprint	Proven technology Operational synergies
Challenges	New to gold industry, limited operational history	High operating cost Increased power demand

1. Newcrest Mining Ltd., Investor and Analyst Presentation – Cadia and Lihir, Published by the Newcrest Investor Relations Department, November 2019, www.newcrest.com, pp. 22.

Table: Newcrest Mining Ltd., 2018 Newcrest Investor Day Briefing Book, Published by the Newcrest Investor Relations Department, October 2018, www.newcrest.com, pp. 59.