HydroFloat™ Case Study: Copper Recovery from Tailings at Newcrest’s Cadia Valley Operations
Industry Challenges

- 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)

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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.

Opportunity at Cadia

• The HydroFloat™
• 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

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


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 cases\(^1\)
- Energy savings by coarser processing enabled by scavenging coarse flotation tail using HydroFloat\(^2\)
- Shift in the economic optimum grind size resulting in increased cash flow\(^1\)

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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 FY22\(^1\)

**Further Recovery Improvement Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Innovative Coarse Ore Flotation</th>
<th>Traditional Ball Mill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Additional Recovery</td>
<td>~2%</td>
<td>~2%</td>
</tr>
<tr>
<td>Indicative Capital Cost</td>
<td>~$70M</td>
<td>~$70M</td>
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<tr>
<td>Operating Cost</td>
<td>Low</td>
<td>High</td>
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<tr>
<td>Advantages</td>
<td>Energy efficient, low operating cost, small footprint</td>
<td>Proven technology, operational synergies</td>
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<tr>
<td>Challenges</td>
<td>New to gold industry, limited operational history</td>
<td>High operating cost, increased power demand</td>
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\(^1\) Newcrest Mining Ltd., Investor and Analyst Presentation – Cadia and Lihir, Published by the Newcrest Investor Relations Department, November 2019, [www.newcrest.com](http://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](http://www.newcrest.com), pp. 59.