## Characteristics of Alternate Tailings Disposal Methods

<table>
<thead>
<tr>
<th>Factor</th>
<th>Conventional</th>
<th>Thickened</th>
<th>Paste</th>
<th>Filtered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical solids content (%)</td>
<td>35-55</td>
<td>55-70</td>
<td>70-75</td>
<td>&gt;80</td>
</tr>
<tr>
<td>Typical yield stress range on discharge (kPa)</td>
<td>0-20</td>
<td>20-150</td>
<td>150-400</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Delivery to impoundment</td>
<td>As a slurry by gravity or centrifugal pump</td>
<td>As a slurry by centrifugal pump</td>
<td>As a high slump paste by positive-displacement pumping</td>
<td>As a “cake” by truck or conveyor</td>
</tr>
<tr>
<td>Storage in impoundment</td>
<td>Requires embankment containment</td>
<td>Requires toe containment</td>
<td>Requires low toe containment</td>
<td>Containment not necessary</td>
</tr>
<tr>
<td>Disposal space</td>
<td>Capacity for low-density tailings and area for settlement of solids</td>
<td>Capacity for medium-density tailings and area for thin layer deposition and air drying</td>
<td>Capacity for high-slump tailings and area for drying of thicker layers</td>
<td>Capacity for cake tailings placement and compaction</td>
</tr>
<tr>
<td>Settled tailings characteristics</td>
<td>Consolidation and settlement necessary</td>
<td>Consolidation and air drying necessary</td>
<td>Near shrinkage limit</td>
<td>At shrinkage limit</td>
</tr>
<tr>
<td>Amenability for covering at closure</td>
<td>Removal of ponded water and consolidation necessary</td>
<td>Generally amenable if air dried</td>
<td>Generally amenable if air dried</td>
<td>Ready for covering</td>
</tr>
<tr>
<td>Water recovery</td>
<td>Reclaim from supernatant pool</td>
<td>Reclaim from thickener and run-off from collection pond</td>
<td>Recovery from paste thickener and run-off from collection pond</td>
<td>Recovery from thickeners and filtration equipment</td>
</tr>
<tr>
<td>Major energy requirements</td>
<td>Reclaim water pumpback</td>
<td>Reclaim water pumpback</td>
<td>Paste thickener and displacement pumping</td>
<td>Filtration equipment and tailings transport</td>
</tr>
</tbody>
</table>
Water Contents and Densities

- Water and solids content varies with disposal method.
- Decrease in slurry and entrained water to transition or solid behavior varies significantly with disposal method.
Tailings Water Requirements

- Water with tailings at discharge varies significantly with disposal method.
- Decrease in slurry and entrained water for closure varies significantly with disposal method.
Dam Height and Active/Inactive Facility*

*From Strachan and Van (2018)
Summary of Operational Information

Thickened or paste operations (41)
- Production rate range: 1,200 – 182,000 tonnes/day
- Solids content at discharge: 30 – 77 %
- Tailings fines content: 53 – 98 %
- Tailings clay content: 10 – 35 %

Filtered operations (18)
- Production rate range: 200 – 35,000 tonnes/day
- Median production rate: 4,000 tonnes/day
- Solids content at discharge: 80 – 88 % (one site at 60%)
- Tailings fines content: 55 – 80 %
- Tailings clay content: 3 – 18 %
Impacts of Ponded Water

- Slope instability
- Loss of dam freeboard
- No overtopping or dam breach
Conclusions

Selection from alternative tailings disposal methods is site-specific while being consistent with Mt. Polley ITRB report:

- Eliminate surface water from the impoundment.
- Promote unsaturated conditions in the tailings with drainage provisions.
- Achieve dilatant conditions throughout the tailings deposit by compaction.