CHPP Waste Pumped Co-Disposal – Some Myths and Truths

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ABSTRACT

Pumped co-disposal was promoted in the 1990-2000s as a low-cost high performance alternative to tailings dams. In particular it would avoid high up front capital for rejects trucks and dam embankments, and would produce a combined waste deposit with better geotechnical properties than either coarse rejects or tailings. Overall the promise was not delivered but those initial expectations persisted.

More than two decades experience with Co-Disposal Areas (CDAs) in central Queensland, has shown that pumped combined coal waste:

- Does not deposit as a homogeneous drained frictional material, but rather includes zones of soft saturated potentially liquefiable fine waste;
- Does realise a lower average water content than settled pumped tailings but entrains greater water volume because the waste volume is much greater than for just tailings;
- Should not be analysed for stability using material properties and pore pressures inconsistent with field evidence; and
- Cannot be rehabilitated with slopes steeper than dictated by erosional stability of the necessary capping material.

Despite their challenging characteristics, the high cost of changing CHPP waste circuits means that most mines with pumped co-disposal will continue to deposit in CDAs. Aspects relevant to their successful design and operation include:

- Seepage is inevitable and generally favourable, as long as the flow is not sufficient to dislodge wall material;
- Long term water content depends much more on the inherent waste properties than on the pumped slurry concentration;
- In low CDAs, stability is dominated by the strength of the coarse waste forming the containing walls. When the height exceeds 30-40m, critical slip circles move into the foundation soils, so that their strength becomes more important.

In essence, CDAs are upstream-constructed tailings storage facilities that obey normal geomechanical principles. The challenge is to understand which of those principles dictate performance.