

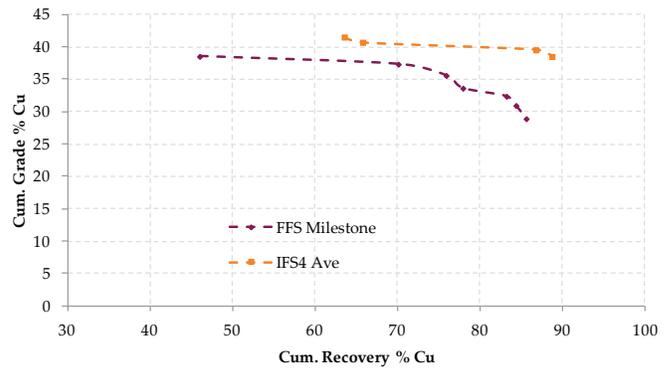
# XPS Flowsheet Development Using Process Mineralogy

XPS have been performing flowsheet development testwork in 2014 on a copper project in Africa. The specific objective was to design a flowsheet with improved metallurgical performance, reduced capital cost and therefore a more robust business case for years 0-5 at startup and 6-15 thereafter.

The investigation used our state-of-the art Process Mineralogy toolbox, including high-confidence flotation testing, ultrafine sizing of flotation test products, and qualitative and quantitative mineralogy. A series of rougher kinetic flotation tests was performed across a range of grinds, considerably supported by detailed mineralogy on the drill core and flotation test products, to develop the simpler flowsheet. The full flowsheet was then prototyped and adjusted with further flotation tests, resulting in a 3% gain in copper recovery as well as a 9% gain in copper concentrate grade as compared to the previous flowsheet. The grade of silica in the final concentrate was also reduced from 26 to 14%, a significant change that will improve marketability of the concentrate or make smelter technology selection easier.

The details of this new flowsheet developed at XPS will be used for designing the 3Mtpa concentrator which will treat ore from the first five years of mining. The change in copper grade-recovery curves from the old to the new flowsheet figure (right).

This project demonstrated the value of Process Mineralogy in flowsheet development and is one example of how XPS can improve business performance in either greenfields projects or plant optimisation.



Old (FFS Milestone) and New (IFS4) Copper Grade-Recovery curves to saleable Concentrate

*“It has been a pleasure managing this test work program over the last year, working with the XPS team who have made the execution of our test work roadmap seamless. The professionalism, attention to detail and outstanding quality of work is appreciated from our metallurgical team without which the optimised circuit we have now would not have been possible”.*

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two sets of interstage screens, one on the circulating load and the other on final crusher product. The plant can process up to 150 kg/hr of -100 mm feed to -2mm top size with a normal size distribution. The plant is designed for easy cleaning to avoid any contamination and has the required dust collection to ensure safety of the operators.

Once the sample is crushed, blending devices are used to homogenize and distribute the samples into individual and identical 2, 5 or 10 kg charges. The conical Vreico-Nauta blending technology used at XPS comes from the pharmaceutical industry and has been applied to mineral processing. The Vreico-Nauta blenders ensure the same consistency expected in pharmaceuticals to ore samples for testing and assaying. Homogenized

solids from the blenders is distributed into representative sample aliquots by means of spin riffles. Using this technology XPS has prepared samples for multiple projects and ore types including nickel, porphyry copper, rare earth, lead-zinc, chromite, in quantities ranging from 150 kg to 8000 kg. Using the same equipment, XPS has also prepared meticulously blended ore samples that serve as standards for metallurgical accounting.

(top) Typical size reduction for flotation testwork involves crushing drillcore down to 100% passing 100 mesh; however, other feed and product sizes can be accommodated.

(bottom) XPS Crushing Plant (Primary Jaw)

Please contact Gregg Hill at [gregg.hill@xps.ca](mailto:gregg.hill@xps.ca) to discuss your crushing, blending and sample preparation needs.

