Case Study

SX plant optimization through organic clay treatment

Progress beyond

Problem Statement

- Poor organic quality at a large-scale operation in Chile was leading to significant variability in copper recovery of the SX plant. Recovery decreased 3 – 5 percentage points and was especially apparent during the winter months (Figure 1).
- Likewise, the organic generated operational instability with a decrease in Cu:Fe selectivity, increased entrainments, electrolyte contamination and an increase in extractant and diluent consumption.

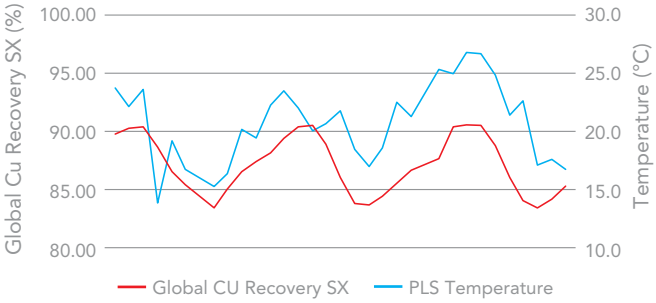

Figure 1. Impact of Cu recovery in SX plant

Solvay's Approach

- Solvay carried out a series of evaluations and analysis to explain the behavior of the SX plant.
- The variations in ambient temperature generated an impact on the stage efficiency (SE), negatively affecting copper recovery. This effect, natural to the process, is intensified by the low quality of the organic phase (contamination with surfactants). Likewise, the temperature effect further impacted coalescing and resulted in increased A/O and O/A entrainments.
- In order to reduce the negative effects, a side-by-side pilot was carried out to quantify the effect of improving the quality of the organic phase by removing the surfactants through clay treatment.
- The pilot demonstrated the benefits, decreasing O/A entrainment by 22% and A/O entrainment by 50% after an improvement in the organic quality by 4.15 dynes/cm, which led to a 47% reduction in phase disengagement times (Figure 2).
- Solvay presented the results of the pilot to the Plant Management, who approved the work program to be carried out at the industrial plant, which would generate significant economic benefits related to the decrease in the variability of copper recovery in SX and reagent consumption savings.

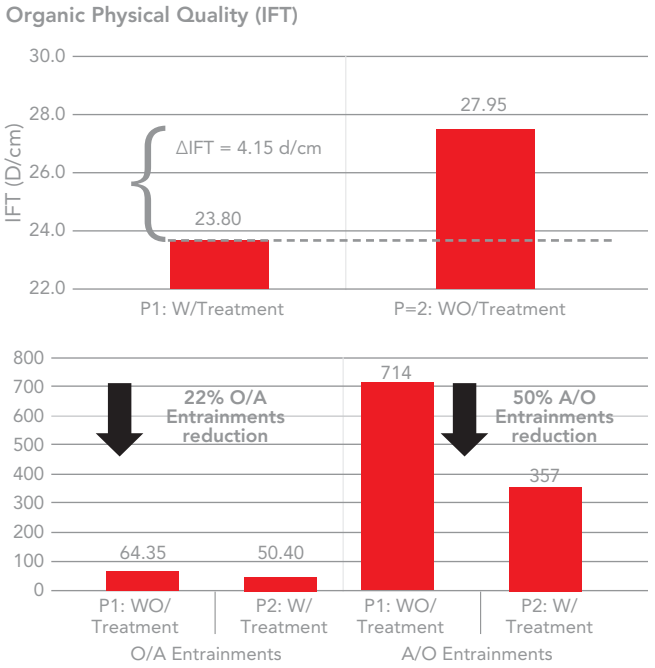

Figure 2. Impact of organic clay treatment on entrainments - Pilot scale

Results

- In the industrial plant, clay treatment was implemented in accordance with Solvay's recommendations, reducing the variability of copper recovery, from a negative impact of between 3 and 5%, to only 1 or 2%. As a result, the SX plant maintained high performance, even during the winter period (overall SX recovery > 90%) (Figure 3).
- The physical quality of the organic increased by 45%, decreasing the level of contamination from 5.8 to 3.2 dynes/cm.
- Organic consumption (extractant and diluent make-up) reduced by 43%, with a benefit equivalent to 7.06M USD/year.

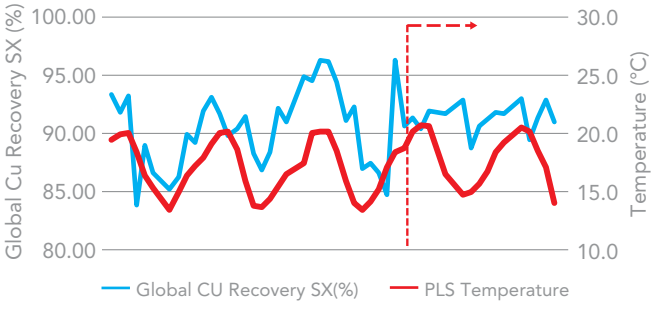

Figure 3. Cu recovery variability decrease

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