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BENEFITS OF GTL G80 MINING DILUENT IN COPPER SX FOR LOW- AND HIGH- GRADE COPPER ORE

By

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ABSTRACT

Shell GTL G80 is a synthetic, aliphatic mining diluent supplied by Shell into copper solvent extraction (CuSX) operations which represents the 4th generation of SX Diluents. G80 is produced from natural gas via the gas-to-liquids (GTL) process, resulting in a mixture of hydrocarbon distillate different from common market diluents.

In this work, we present the benefits of using G80 as the organic phase with various extractants of the LIX® and ACORGA® brands. Among others, good phase disengagement, copper loading and extraction/stripping kinetics were observed in laboratory tests carried out under common operating SX conditions. This was associated to the hydrocarbon composition of GTL G80, which consists almost exclusively of linear and lightly (methyl, ethyl) branched iso-paraffins, as opposed to other diluents which may contain naphthenes and aromatics.

Furthermore, the effects of high extractant concentration, commonly used for the recovery in Sub-Saharan oxidic deposits, were also studied. Specifically, we evaluated the impact of ~30%v/v concentration of various oximes in viscosity at different temperatures. Despite the low aromatic content of GTL G80 (< 300 ppm), the range of viscosities determined by standard methods was acceptable for most SX operations. In addition, different lab tests showed that the evaporation rate was lower than common aromatic and dearomatized diluents, likely resulting in less top-up necessary. These different parameters were benchmarked against an aromatic (20%) diluent, as well as aliphatic diluents produced from mineral oil.

Keywords: 4th Generation SX diluent, Copper, Synthetic Aliphatic, Iso-paraffins, Low Aromatic, Low Evaporation