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Drawing down the remaining copper inventory in a leach pad by way of subsurface leaching

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Abstract

A significant amount of metal inventory can reside in a leach pad due to unfavorable metallurgical and hydraulic conditions. Continued leaching using surface irrigation will likely be unsuccessful at recovery in any reasonable time frame. In this work, we investigate how subsurface leaching (SSL), using wells to facilitate the delivery of barren solution, could potentially increase recovery and drawdown the inventory in a shorter period of time. An initial characterization campaign of the leach pad using drilling and assaying along with geophysical methods showed that inventory was high because the ore remained dry from compaction. Other areas were also shown to have preferential flow paths as a means to drain solution out of the leach pad. Assaying results taken from sonic coring and auger cuttings, and extrapolated across the leach pad, revealed a potential of 37×10^6 kg of acid soluble copper.

Our investigation covers the first 1000 days of SSL, with 110 PVC wells distributed across five main areas. During this time, we estimate production at 2.26×10^6 kg of copper based on the amount of solution introduced through the wells multiplied by the average copper grade from a number of sources, including monitoring wells and newly formed side slope seeps. Some areas performed better than others, especially where assays revealed that acid soluble copper was greater than 50% of total copper. The SSL program is expected to continue for at least another 1000 days, and we expect an additional 7×10^6 to 15×10^6 kg will be withdrawn from inventory.