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DETAIL DESIGN OF A NOVEL LEACH CIRCUIT FOR THE TECH PROJECT

By

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ABSTRACT

A good product idea is a good start. In order to bring an innovative process idea to production scale quickly and safely, a lab-developed ore leaching process must be examined and optimized in pilot scale. This is especially true for hydrometallurgical processing plants due to the project specific - unique - raw material 'ore'. Extensive test programs on a pilot scale are therefore usually required for this type of process engineering project. The subsequent implementation of the individual process steps on an industrial scale must already be considered during this development phases in the laboratory and pilot plant. Close co-operation between the process owner and technology providers are key to success.

QPM and EKATO entered therefore into a Joint Development Agreement to develop and commercialize an innovative laterite leach process based on the DNi Process™ (Altilium Group) to produce critical metals for the emerging lithium-ion battery and electric vehicle sector.

This paper describes the leaching process and the metallurgical testwork, and discusses how expertise and know-how of both partners was successfully applied during concept engineering to assess the pilot test results and to develop the correct scale-up correlations, then to scale-up the process to production size, all with the aim to specify the production-sized reactor systems by end of the concept phase. In addition to the technically sound implementation of the project, commercial aspects also play an important role to get the project realized. EKATO as an equipment manufacturer contributed with expertise in very early project phases to evaluate and optimize economics of the leach reactors. Due to the corrosive operating conditions, it was decided together with QPM and their assigned engineering company to manufacture product wetted parts in this part of the plant from titanium which resulted in additional technical and commercial challenges. Numerical simulations were carried out for tailored and problem-specific dimensioning of the reactor vessel and its internals such as heat exchangers, dip pipes and baffles.

After the concept study was successfully completed by the end of 2022, EKATO was assigned to execute the basic engineering for the nitric acid leach circuit.

Keywords: TECH project, QPM, Altilium, DNi Process™, EKATO process plants, agitator design, nickel laterite, nitric acid leach, battery materials, electric vehicle