

First Kainite Solution Mining

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1. ABSTRACT

Yara International is currently developing the first ever sulphate of potash solution mine based on a Kainite deposit, located in the Dallol region, the Danakil Depression of northeastern Ethiopia, namely Yara Dallol Potash Project (The Project). The Danakil depression is a flat basin up to 120 meters below sea level. The area is dominated by a very hot climate; the annual average temperature is 45°C during day and 25°C at night, with 52°C peak. The Danakil Depression is bounded on the west by the Ethiopian Highlands, on the east by the up thrust Danakil horst, and on the south by the Somali Plateau.

In September of 2013, a Definitive Feasibility Study was initiated by Yara mandated through Novopro Projects Inc. in cooperation with Agapito and Associates, with the study completed in January 2015. The study included the construction and operation of 3 pilot wells, which were successfully run. The potash members are located within the Houston Formation; including the target layers Sylvinite Member, Upper and Lower Carnallite Member and the Kainite Member. The Kainite member is the main target of mining as it provides the bulk of the potash. The Carnallite members contain a high percentage of Kieserite, and therefore are also to be mined for SOP production. The Sylvinite member will also be mined to produce SOP by incorporating the excess sulphate from Kainite mining.

In May 2014 the first of three pilot wells started up, following the concept of sump and undercut leaching and finally production brine recovery. The successful mining concept together with grade and composition of the production brine confirmed the feasibility of solution mining, including confirming the brine estimates produced earlier by core dissolution testing.

This paper provides general information about the project including pilot well activities for the solution mining of Kainite.

Key words: Kainite, Ethiopia, Potash Solution Mining, Cavern Operation, Brine Processing, Sulphate of Potash