

SOLUTION MINING RESEARCH INSTITUTE

679 Plank Road
Clifton Park, NY 12065, USA

Telephone: +1 518-579-6587
www.solutionmining.org

**Technical
Conference
Paper**



**THE DALLOL POTASH PROJECT IN ETHIOPIA - KAINITE
SOLUTION MINING AND PROCESSING**

Robert Asch, Sedgman Novopro Projects Inc., Montreal, Canada

Mazi Rejaee, Sedgman Novopro Projects Inc., Montreal, Canada

Sanjay Singh Rathore, Ethiopotash B.V., New Delhi, India

Gebreegziabher Mekonen, Ethiopotash B.V., Addis Ababa, Ethiopia

**SMRI Fall 2025 Technical Conference
29-30 September 2025
Wichita, Kansas, United States**

THE DALLOL POTASH PROJECT IN ETHIOPIA - KAINITE SOLUTION MINING AND PROCESSING

Robert Asch, Sedgman Novopro Projects Inc., Montreal, Canada

Mazi Rejaee, Sedgman Novopro Projects Inc., Montreal, Canada

Sanjay Singh Rathore, Ethiopotash B.V., New Delhi, India

Gebreegziabher Mekonen, Ethiopotash B.V., Addis Ababa, Ethiopia

1. Abstract

Sedgman Novopro has finalized the FEED for the Dallol Potash Project for Ethiopotash B.V., planned to produce fertilizer grade Sulfate of Potash (SOP) located in the Danakil Depression of northeastern Ethiopia. This project shall be the first ever solution mining project based on a kainite deposit, with an extensive piloting program of cavern operation, evaporation pond operation and processing tests completed in the development of this project.

The local deposit geology shows a unique rock composition of the mining horizon called the Houston formation; mainly consisting of rock salt, sylvite, carnallite, bischofite, kieserite and kainite. The kainite member is the main target of mining as it provides the bulk of potash.

The project development went through prefeasibility study, feasibility study and front-end engineering stages (FEED) since 2010. The main project development phases including pilot cavern and pond operations and processing tests and in 2025 the latest FEED studies were carried out by Sedgman Novopro with the assistance of Ethiopotash, and Agapito Associates. The processing technology used is covered by the patent owned by Sedgman Novopro (No. US 10815130B2). Piloting included the construction and operation of 3 pilot caverns from 2014 to 2016. The cavern operation was accompanied by a simultaneous solar evaporation pond program with pilot salt production at Dallol, followed by process testing of these salts to form saleable sulfate of potash (SOP) product.

The commercial mine plans for a Phase 1 capacity with 300,000 mtpa (330,700 stpa) SOP production, operating about 20 caverns in parallel to feed the evaporation ponds. Phase 2 of the project which follows soon after startup of Phase 1 doubles the capacity to 600,000 mtpa (661,400 stpa) SOP production.

It is expected that the combined brine from multiple caverns at different stages of development will be at a relatively constant composition, feeding the solar evaporation ponds. Therefore, it is possible to design the ponds for precipitating the target mineral composition, which is sent to the adjacent processing plant by the steps of conversion of all potash bearing salts to schoenite and further conversion of schoenite to SOP product.

The evaporation ponds will be started up with $MgCl_2$ enriched brine recovered from a separate wellfield mining of the bischofite horizon, which occurs locally in layers up to 80 m (260 ft) thickness. $MgCl_2$ is required for the pond operation to enable purification of the raw salts and its solution mining and supply is performed to accelerate startup of the ponds. The project is currently engaged in financing activities which when completed will allow project implementation with timeline expected to take 3 years from start to finish.

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