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# State of the art potash production

Erection and installation of a SOP crystallisation plant at Lake Way, Western Australia.

PHOTO: SALT LAKE POTASH

## EBNER TECHNOLOGIES

### Family-owned crystallisation and evaporation specialist

Germany's Ebner GmbH & Co KG is a family-owned specialist designer and manufacturer of evaporation and crystallisation plants. The company develops tailor-made plants completely in-house, from the customer's first enquiry to final delivery, having expertise that encompasses plant design, fabrication, erection, and start-up. Ebner has extensive experience in the design and manufacture of evaporators and crystallisers for the potash industry. Two recent case studies are provided below.

#### German technology for Australian SOP project

In October 2019, Ebner and K-UTEC Salt Technologies were jointly awarded a potash engineering contract by the Australian, ASX-listed mining company Kalium Lakes Limited (KLL).

The contract covered the engineering, supply, erection, supervision and start-up of a 90,000 t/a capacity production plant for KLL's flagship Beyondie SOP (sulphate of potash) project. Ebner and K-UTEC joined together to form a special consortium, EBTEC, to deliver this contract.

Kalium Lakes' vision was clear from the moment it first contacted K-UTEC in 2015. It wanted to be the first Australian company to bring domestically-produced SOP to market. Because all the SOP currently consumed in Australia is 100 percent imported, there was a unique, ground-



Construction at the Beyondie SOP project in Pilbara, Western Australia.

PHOTO: EBNER



PHOTO: EBNER

*Fabrication of a condenser in Germany for the Nezhinsky potash project in Belarus.*

breaking opportunity for a local producer to supply the domestic agricultural industry with SOP for the first time.

The proposed Beyondie SOP plant was located in the remote Pilbara region of Western Australia, about 1,400 kilometres north of Perth and 240 kilometres by road from the nearest town. The plant was designed to produce high-purity SOP by selectively precipitating salts present in a saline brine. This was to be extracted from nearby salt lakes and underground aquifers using a network of trenches and wells.

K-UTEC's main project expertise is in geophysical exploration, process development, design engineering and basic engineering. This includes the technical and economic assessment of full-scale industrial plants and the piloting of complete process routes. The company developed a suitable SOP production process for the Beyondie project in 2018. This involved initial test drilling, preliminary studies, feasibility studies and practical test work – to demonstrate the most commercially-viable production route. In the production process selected for the SOP project by K-UTEC, salt is firstly generated by concentrating a brine solution in large solar evaporation ponds, each with a surface area of around 400 hectares. This salt is then refined in a processing plant to obtain a high-purity SOP fertilizer product.

The Beyondie project reached financial close in December 2019. The financing included AUD 102 million of senior debt funding from KfW IPEX-Bank, with approximately half of this amount supported by a guarantee from Euler Hermes, the German government's export credit agency. Once project finance had been secured, EBTEC went ahead and designed and delivered the processing plant.

The EBTEC consortium was able to ship the main equipment, including dissolution, flotation and crystallisation apparatus, to Australia on schedule, despite Covid-19 restrictions. Backed by 50 years of plant manufacturing experience, Ebner was able to handle everything in-house, including the fabrication of individual components in its own workshops and the overall completion of the plant. The company's engineering know-how, capabilities and experience were vital for the successful completion of the contract.

The Beyondie SOP project is currently in the assembly phase. This is being carried out by an Australian contractor under the joint supervision of EBTEC and Kalium Lakes. Site infrastructure has already been completed and the process plant is in the process of being built. SOP production is scheduled to start-up in September 2021.

## Large-scale MOP crystallisation plant for Slavkaliy

In February 2020, Famako Anlagenexport GmbH, with Ebner as subcontractor, were awarded a major engineering contract by Slavkaliy for its Nezhinsky potash project in Belarus. The contract encompassed complete project design, manufacturing, delivery and start-up of a large-scale crystallisation plant for the production of MOP (muriate of potash).

In the Nezhinsky processing plant, potassium chloride will be obtained from hot-saturated brine by vacuum cooling crystallisation using the classic hot leaching process. In total, two production lines at the plant will produce around two million tonnes of MOP annually. Both lines are designed to operate as independent seven-stage vacuum crystallisation plants.

For Slavkaliy, the design and delivery of the crystallisation plant will be critical for the overall success of the Nezhinsky min-

ing and production complex.

To ensure the vacuum crystallisation plant operates efficiently, vapour generated during the expansion of the hot solution will be used to reheat the cold circulation-brine obtained from the salt separation. This minimises steam consumption requirements during hot leaching. At the same time, this process configuration also reduces the plant's cooling water consumption to the lowest level possible.

Most of the individual components of the crystallisation plant were made of high-quality special materials. Due to their size, these were prefabricated in Germany for onward transport to Belarus (see photo). The project's schedule necessitated just-in-time delivery and the careful choreography of logistics for such a large plant. Ensuring individual components were available on time and ready for transport was a particular challenge, especially against the backdrop of a global pandemic.

As a contractor, Famako is responsible for project financing, coordination with suppliers and project logistics. The company, which is active in the former Soviet Union (FSU), specialises in the planning, delivery and commissioning of conveyors and other systems for processing fertilizers and other bulk materials. Ebner, meanwhile, provides project know-how and is responsible for plant design. This expertise is delivered by in-house staff, from the initial design computations through to the final design specification.

Thanks to the relevant experience of both companies, and closely coordinated project management, the project remains on-track with the processing plant scheduled to be fully assembled in 2023. Ebner and Famako are proud to have successfully completed their project work for Slavkaliy, given the challenging global conditions currently, especially as the contract with Slavkaliy is the largest ever undertaken by both companies in financial terms. ■