

**BORAX ARGENTINA S.A.**



## Scoping study and Capex analysis for the Tincalayu expansion project



BORAX ARGENTINA S.A., a company of the GRUPO OROCOBRE LIMITED, is developing an expansion project for the Borax Plant at the Yacimiento Tincalayu, Province of Salta, Argentina.

Currently, BORAX has an operating site called Tincalayu Field, at the Salar del Hombre Muerto, Salta Province, about 370 km away from Campo Quijano city. Tincalayu is one of the areas in the world with the highest concentration of tincal (sodium borate), from where BORAX extracts the raw material. After a first concentration, the tincal is processed in the BORAX plant to obtain Borax 10 (final product) and Borax 5 (intermediate product) for the manufacture of Borax

Anhidro. The current capacity of this plant is 100 TPD.

The purpose of the planned expansion project by BORAX is to increase the production capacity of its borax and boric acid plants and to transfer the latter product to the Tincalayu Field. In this way, the plant will reach a production capacity of 400 TPD of borax and 120 TPD of boric acid. Regarding this Expansion Project, SAXUM was awarded by BORAX the development of the Scoping Study and CapEx (+/- 20%), based on the process and reserves analysis made by BORAX.

In the framework of this assistance service, SAXUM developed the concep-

tual engineering designs related to the mechanical, pipeline, electrical, instrumentation/control, civil and structural specialties, maintaining a permanent communication with BORAX staff. SAXUM designs were then considered as a basis for the CapEx analysis.

SAXUM's vast experience in engineering, procurement and construction management services for the mineral processing industries in Argentina and, particularly, in the Northwestern region of the country has strongly contributed for a quick and accurate evaluation of the complexities and related costs of the expansion project of BORAX in Argentina. ■

**LAFARGE-HOLCIM USA**



## Project Management support for the Ravena, New York plant upgrade project

The Lafarge-Holcim cement plant in Ravena, New York completed a modernization project in 2017 installing a 5-stage preheater, vertical roller mill and cooler. The existing raw material handling system was tied in to the new roller mill, but an internal Lafarge Holcim study indicated that there were opportunities to reduce material hand-

ling reliability and clean-up issues. Belt conveyor modifications were planned and an equipment installation plan was scheduled for a plant shutdown period in the winter/spring of 2018.

Lafarge-Holcim Ravena contacted SAXUM Engineering and requested project management support for the belt

conveyor project. SAXUM provided a Project Manager who performed oversight of equipment deliveries, project timeline, and contractor activities prior to and during the conveyor shutdown work. The SAXUM manager was onsite for 3 months until the new equipment was commissioned and the punch list was successfully reviewed. ■

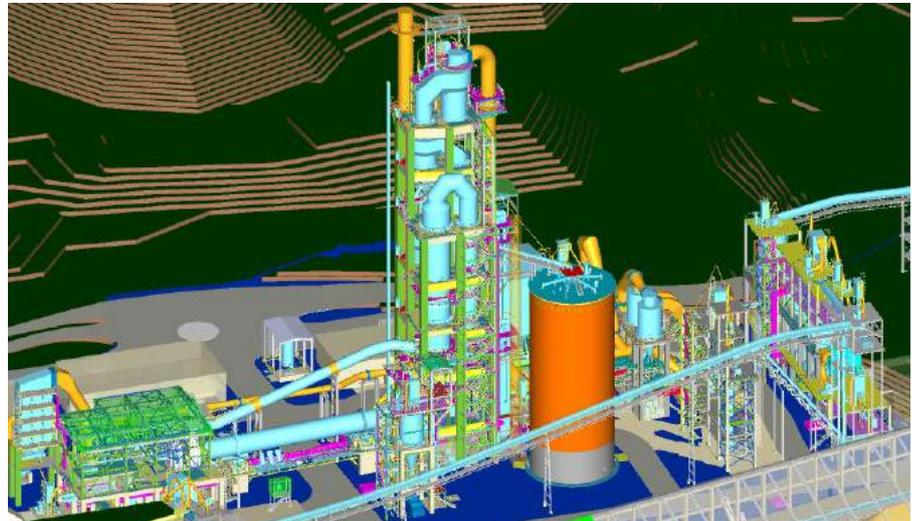


# Civil/Structural Engineering for the New Cement Line of FANCESA in Sucre

FLSmith Inc. (FLS) is a global and recognized equipment provider for the cement and minerals industries. In the context of the new clinker and cement production line of FANCESA in Sucre, Bolivia, FLS has requested from SAXUM specialized and experienced technical assistance for the civil and structural engineering designs.

Particularly, the designs requested by FLS to SAXUM involved the most complex and relevant facilities of the new cement and clinker line, including, among others, the following areas and facilities:

- RAW MILL FEED AREA: Raw Mill Feed, Belt Conveyor, Transfer Tower
- RAW MILL AREA: Recirculation Building, Raw Mill – Duct, Cyclon Building, Fan
- EXHAUST GAS CONDITIONING AREA: Filter Building, Fan
- RAW MEAL SILO AREA: Silo, Silo Feeding
- PREHEATER TOWER: Preheater Tower, Fan ID
- KILN: kiln piers and tertiary air supports
- CLINKER COOLER AREA: Clinker Cooler And Heat Exchanger, Filter &



- Fan By Pass
- CLINKER TRANSPORT AREA
- CLINKER STORAGE AND TRANSPORT TO CEMENT MILL FEED AREA

To accomplish these project requirements by FLS regarding the new clinker and cement production lines of FANCESA in Bolivia, SAXUM assigned a highly experienced team composed of designers, engineers and a project manager who was seconded by an assistant project manager and a document

controller. In addition, the team had extensive knowledge of the cement industry and of the Bolivian standards, where SAXUM has already developed many engineering designs for industrial facilities.

In this project, SAXUM has already completed all foundation forms & rebars, anchor & embedment plate drawings and details, steel structure details and connections, concrete structure designs and all related calculation notes. ■



# Technical Assistance for CapEx Analysis. Execution Plan for the Diablillos Project

The Diablillos property is located in the Puna region of Argentina, in the Province of Salta, approximately 160 km southwest of the city of Salta, 250 km south of Pirquita.

The property is comprised of nine mineral leases acquired by AbraPlata (formerly known as Angel Bioventures Inc.) in 2016 from Silver Standard Resources Inc., with several known occurrences of epithermal gold-silver mineralization. Exploration work, conducted by a number of operators over the history of the Project, includes

84,562 m of diamond and reverse circulation (RC) drilling in 448 holes. This drilling has delineated the Oculito deposit, a weathered high-sulphidation epithermal gold-silver deposit hosted primarily in Tertiary volcanic and sedimentary rocks.

Principal mineralized zones outside of Oculito that have been the most recent targets of exploration work are Fantasma, Laderas, Cerro Viejo, Pederuales, Cerro del Medio, and Yolanda. All encompass epithermal silver-gold targets, and one, Cerro Viejo, shows

potential for porphyry mineralization. AbraPlata consider Fantasma to be the highest priority target area because it is closest to Oculito and has good potential for near-surface mineralization of a high-silver style most similar to that of Oculito.

SAXUM scope of work included the calculation of Mobilisation & demobilisation costs and Domestic freight costs. Also, the estimation of construction labour costs and construction indirect costs, as well as the capital cost estimate. ■

**Giant Cement Company**



# Engineering services & Construction Supervision for a Grinding Circuit Improvements Project

Giant Cement Company operates a dry process cement plant at Harleyville, South Carolina, USA with a clinker production of 3000 tpd. In 2017, Giant purchased equipment in order to upgrade its finish grinding operation including a 3rd generation separator and finish mill internals. Clinker handling improvements to eliminate a bridge crane and cement loadout equipment for a new loadout bay was also in the project scope to be completed with the commissioning of the grinding system.

Though Giant was in an EPC contract agreement, SAXUM Engineering was hired to provide project support and oversight management of contractor activities and the project schedule. Included in SAXUM's scope was a ge-

neral review of all project engineering and designs and a review and coordination of the engineering required for tie-in to existing equipment and structures not in the main project scope.

SAXUM's initial work on this project started in October 2017. SAXUM's Senior Mechanical Engineer, civil/structural engineers, and electrical engineers reviewed the general concepts and design criteria of the project engineering. Then a site survey was performed by Senior SAXUM professionals to identify any concerns related to existing equipment interfacing with the new material handling, grinding, and loadout equipment.

Site management of contractor activities began in November 2017. SAXUM

provided at the Giant Plant site a Project Manager for project coordination, a civil engineer for review of structural drawing and field review, a mechanical engineer for equipment specs and installation review, and an electrical engineer for substation review and electrical installation oversight. This SAXUM team operated continuously onsite on Giant's behalf and provided valuable insight to ensure the quality of the construction and installation work and to help keep costs under control.

The commissioning of the grinding system is scheduled for late May 2018 and SAXUM is expected to maintain its onsite staff until early July 2018 with the commissioning of the new loadout system ■

**THE COMPANY**



## Mr. Kevin Blankenship, SAXUM Project Director in North America and Global VP Technology

Kevin earned his B.S. Chemical Engineering Degree at Mississippi State University, and holds a M.S. Chemical Engineering Degree from the University of Tennessee.

He has over 20 years of engineering, management, process/operations and leadership experience with extensive project management background in the cement industry and chemical engineering/technology.

During his 17 years in the cement industry, Kevin has acquired a wide experience, including process control and optimization as well as develop-

ping and maintaining quality standards and plant technical, safety, and engineering support programs. In management roles, Kevin facilitated production optimization as a production manager and led overall plant operations as a plant manager.

Kevin is a highly experienced team player who works closely with SAXUM's project managers, discipline engineers and designers and is seconded by assistant project managers and full support from SAXUM's project controls group ■



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