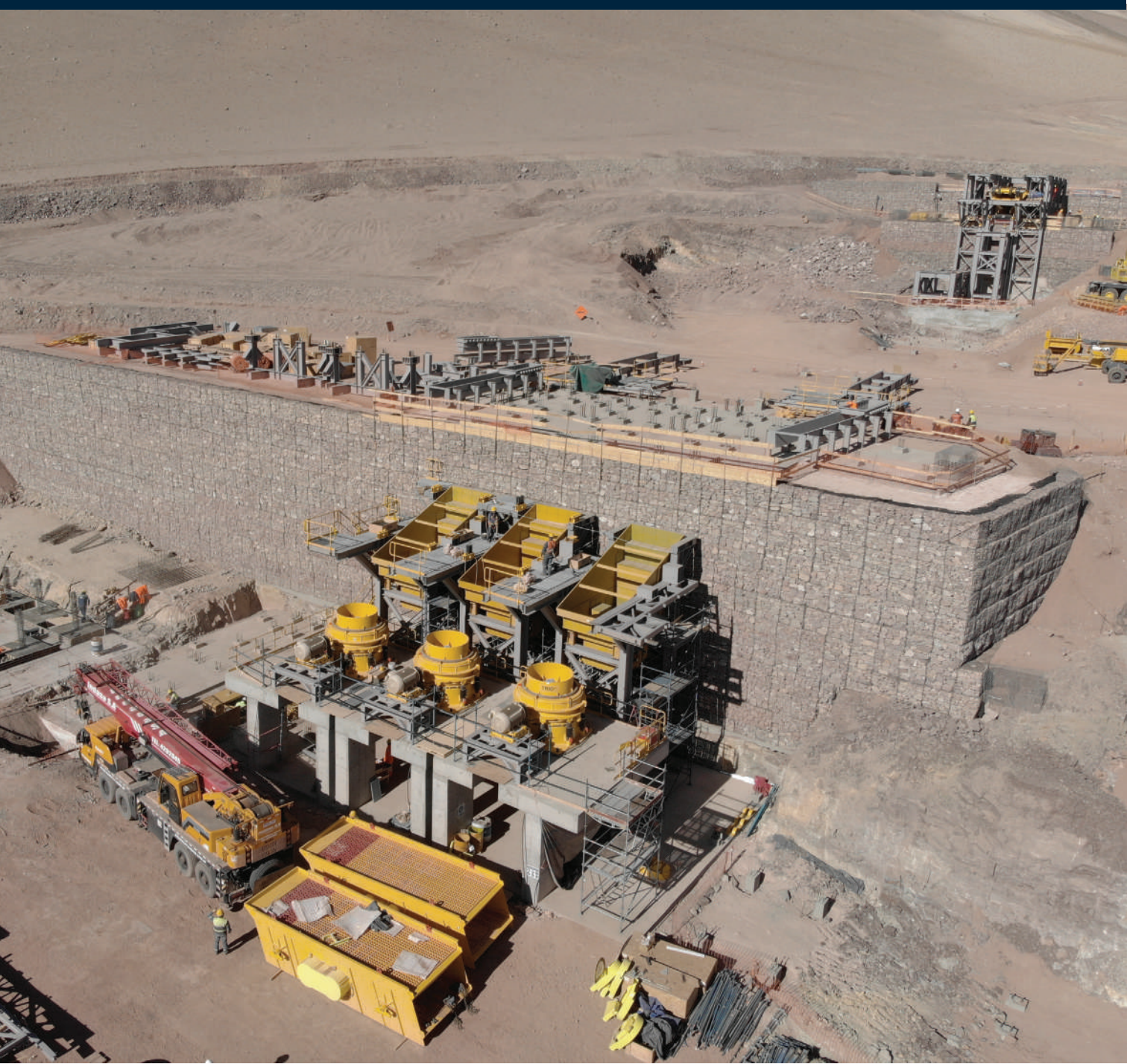


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SAXUM
Engineered Solutions



MINING QUALIFICATIONS
PROJECTS & EXPERIENCE

ABOUT US

IN ENGINEERING, WE OFFER KEY DISCIPLINES FOR PLANT DESIGN

PROCESS ENGINEERING FOR THE MINERAL PROCESSING INDUSTRIES

MECHANICAL ENGINEERING (PLANT DESIGN, PIPING, PROCESS GAS HANDLING, ENVIRONMENTAL CONTROLS, NUISANCE DUST COLLECTION AND MATERIALS HANDLING, CRUSHING AND GRINDING SYSTEMS)

CIVIL AND STRUCTURAL ENGINEERING (EARTH WORKS AND SLOPES, PONDS, TAILING DAM STABILITY, DRAINAGE, ROADS, FOUNDATIONS, STRUCTURES, CONNECTIONS DETAILING, SEISMIC ANALYSIS, ETC.)

ELECTRICAL, INSTRUMENTATION AND CONTROL ENGINEERING



OFFICES

ENGINEERING AND EPCM CAPABILITIES ALL AROUND THE WORLD



ARGENTINA
TUCUMAN
BUENOS AIRES

BRAZIL
BELO HORIZONTE

UNITED STATES
DALLAS, TX

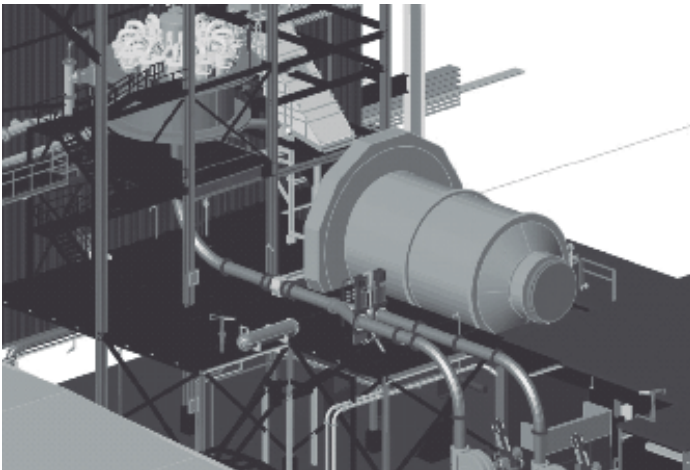
AUSTRALIA
PERTH



SAXUM in its continuous improvement process has adapted all the procedures to the highest international requirements with the ISO 9001:2015 quality certification.

ENGINEERING

WE PROVIDE ENGINEERING SERVICES FROM CONCEPT TO REALITY



SCOPING STUDIES AND TRADE OFF ANALYSIS

CAPEX AND OPEX STUDIES

PREFEASIBILITY AND FEASIBILITY STUDIES BASED ON NI43-101 STANDARDS

COMPLETE ENGINEERING: CONCEPTUAL, BASIC AND DETAILED

PROCESS, MECHANICAL/PIPING/DUCT, CIVIL/STRUCTURAL, ELECTRICAL, I&C ENGINEERING

SCHEDULE DEVELOPMENT

MAIN PROCESS EQUIPMENT BID DOCUMENT PREPARATION

AUXILIARY EQUIPMENT SELECTION ASSISTANCE

CONSTRUCTION BID DOCUMENT PREPARATION

PROCUREMENT

CONSTRUCTION MANAGEMENT

SITE SUPERVISION

ENGINEERING

PROCESS ENGINEERING & PLANT OPTIMIZATION



PROCESS AUDITING, CAPACITY UPGRADES

TROUBLESHOOTING

OPERATIONS ANALYSIS

MASS AND ENERGY BALANCES

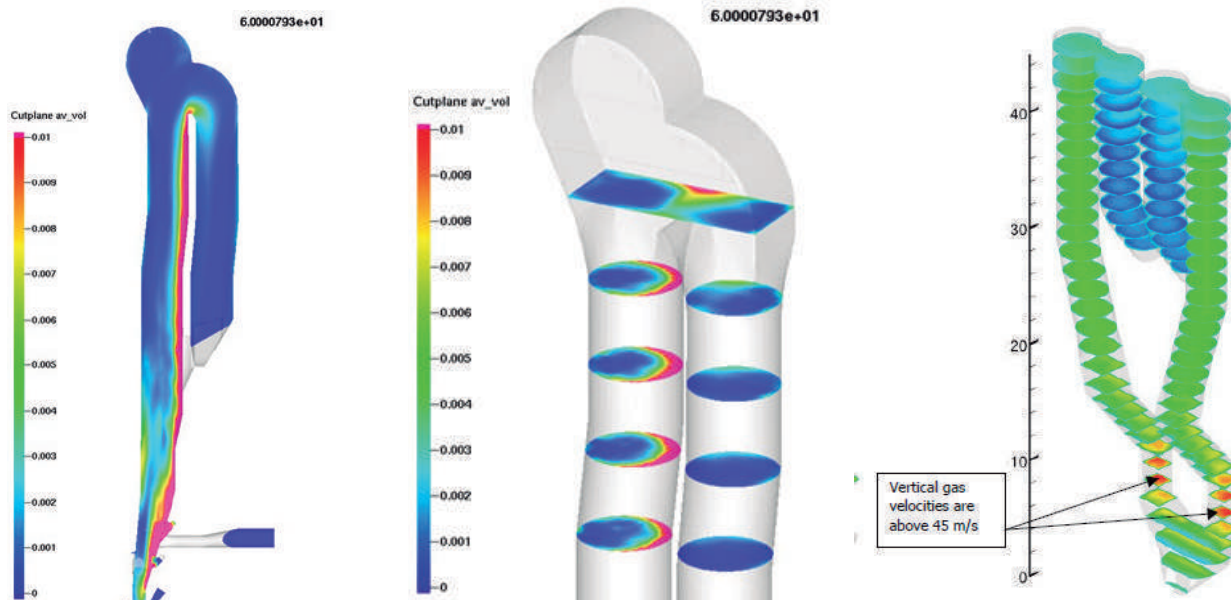
PROCESS CALCULATIONS AND FLOW DIAGRAMS

ANALYSIS OF OPTIMUM MATERIAL STORAGE REQUIREMENTS

DEVELOPMENT OF COST-EFFECTIVE ENGINEERING SOLUTIONS

COMMISSIONING

CFD FOR ALTERNATIVE FUELS ASSESSMENT



Computational Fluid Dynamics Analysis (CFD) are performed at SAXUM at the highest level of quality, in the following industrial problems:

SOILS SLOPE STABILITY ANALYSIS FOR THE MINING INDUSTRY

CFD analysis with fluid-solid interaction is considered for the evaluation of infiltration lines in porous media like soils in the slopes of tailing dams and their consequences in the overall slope stability.

STRESS ANALYSIS IN PIPING SYSTEMS

CFD analysis with fluid-solid interaction is also used by SAXUM to evaluate resulting stress distributions in piping systems under consideration of the real hydraulic properties of the fluid, its pressure, and the temperature conditions. These analyses give rise to the selection of the optimal designs of piping systems in industrial applications.

ENGINEERING

MECHANICAL ENGINEERING & PLANT DESIGN



SYSTEMS INTEGRATION WITH MULTIPLE VENDORS

PLANT LAYOUTS

GENERAL ARRANGEMENTS

FULL 3D MODELLING

EQUIPMENT TECHNICAL EVALUATIONS

EQUIPMENT SIZING AND CAPACITY DETERMINATION

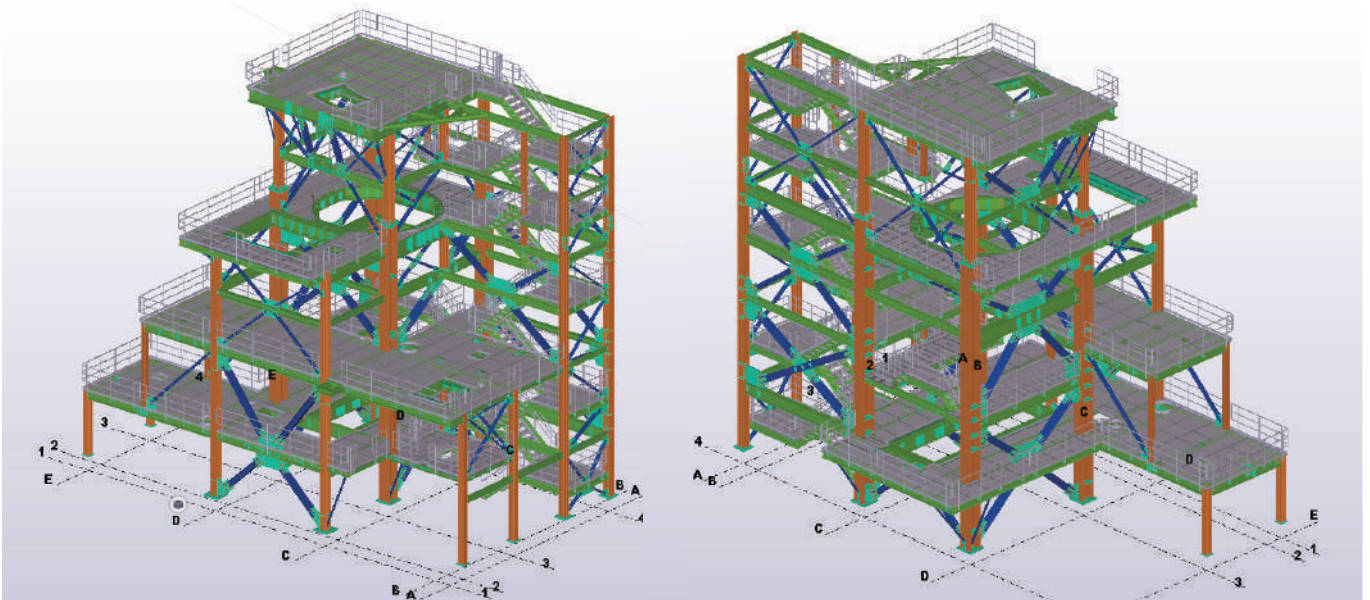
EQUIPMENT AND INSTALLATION SPECIFICATIONS

DUCTWORKS

ENGINEERING DESIGN: PIPING SYSTEMS - MATERIAL HANDLING SYSTEMS
PROCESS EQUIPMENT LAYOUTS

ENGINEERING

CIVIL & STRUCTURAL ENGINEERING



STRUCTURAL ANALYSIS & DESIGNS (INCLUDING HIGH SEISMIC & HURRICANE ZONES) FOR INDUSTRIAL PLANTS

EVALUATION AND IMPLEMENTATION OF GEOTECHNICAL REPORTS

STRUCTURAL DESIGN BASED ON VIBRATION MITIGATION

DYNAMIC FOUNDATION ANALYSIS

DESIGN OF REINFORCED CONCRETE AND STEEL STRUCTURES

CONCRETE SILOS AND BUNKERS

STEEL BINS AND HOPPERS

TUNNELS AND UNDERGROUND STRUCTURES

DESIGN OF ROADS, EARTHWORKS, AND SLOPES.

DESIGN OF PONDS AND TAILING DAMS.

STABILITY ASSESSMENT OF SOIL/ROCK SLOPES.

ENGINEERING

ELECTRICAL ENGINEERING



POWER DISTRIBUTION SYSTEMS

INSTRUMENTATION AND CONTROLS

HMI INTERFACE COORDINATION

PLC PROGRAMMING

MOTORS (MEDIUM VOLTAGE AND LOW VOLTAGE)

MEDIUM VOLTAGE STARTERS AND BREAKERS

TRANSFORMERS

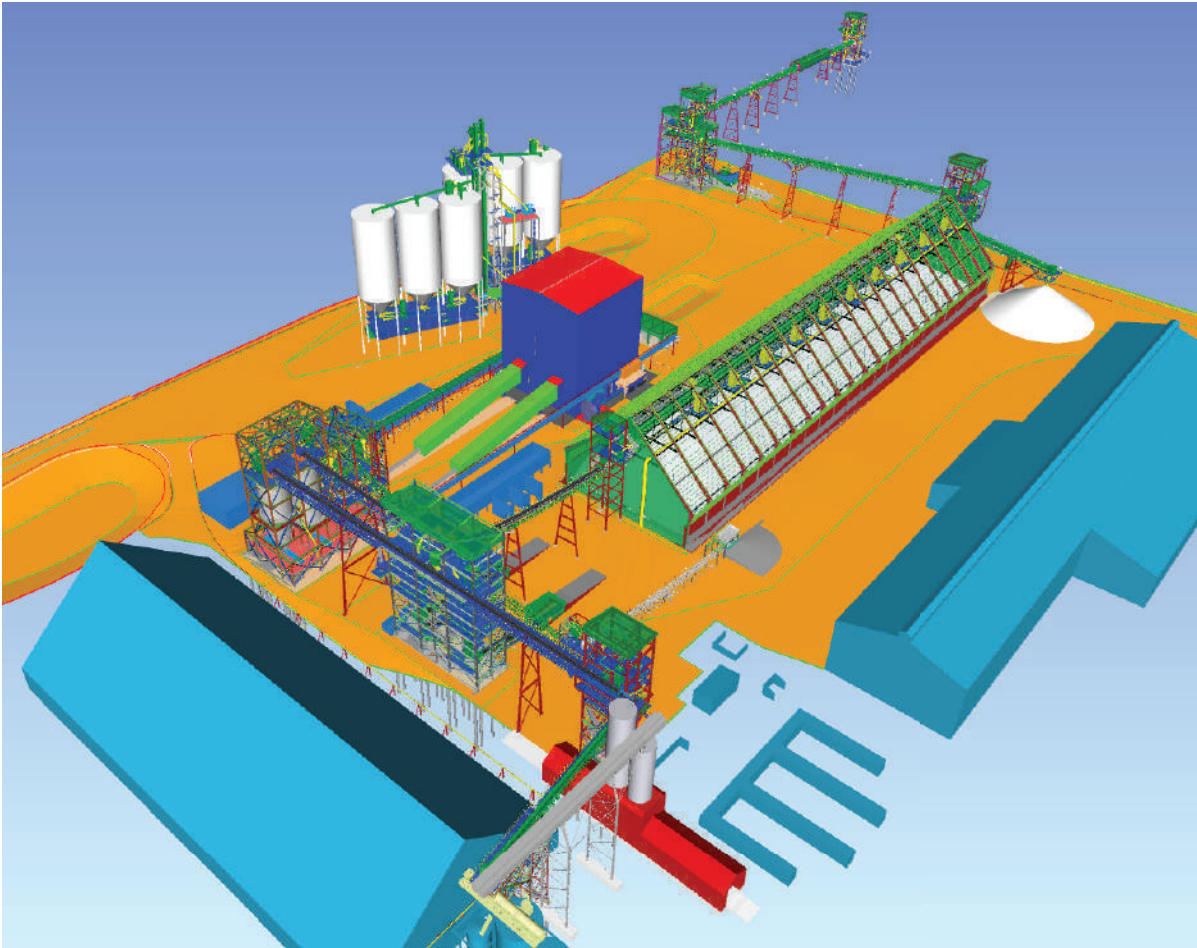
MOTOR CONTROL CENTERS

SHORT CIRCUIT ANALYSIS

POWER STUDIES

ENGINEERING

3D MODELLING FOR FULL PROJECT INTEGRATION



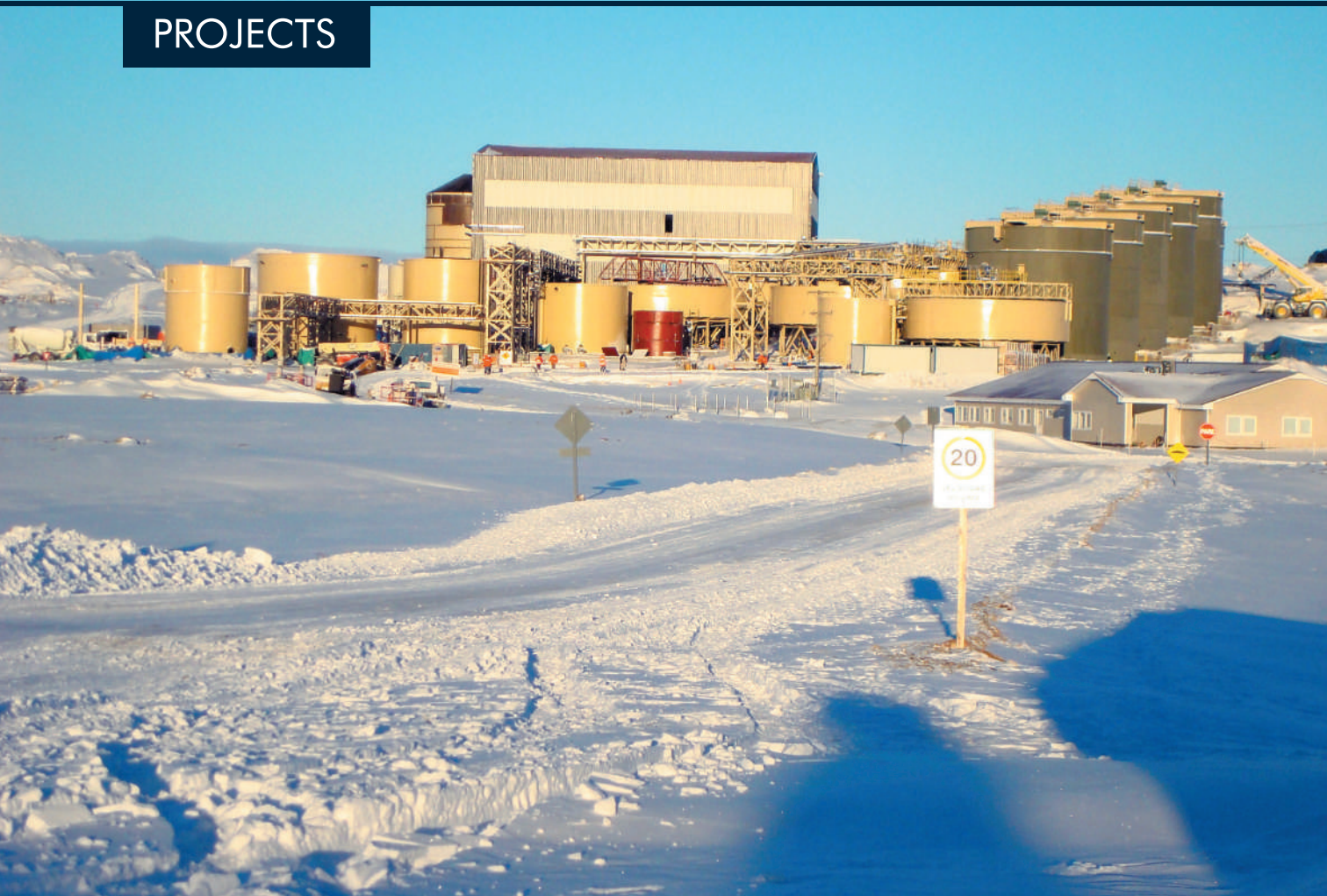
INTEGRATION OF EQUIPMENT ENGINEERING WITH THE CIVIL, MECHANICAL FABRICATION AND ELECTRICAL ENGINEERING

SHOP DRAWING REVIEWS

FABRICATION SHOP INSPECTIONS

COORDINATION OF MATERIALS FABRICATION FOR CONSTRUCTION AND DELIVERIES TO THE JOB SITES

PROJECTS



Pan American Silver – Argentina – Manantial Espejo

Project Budget: USD 350 M

SAXUM scope of work: Detailed mechanical, electrical and civil/structural engineering, as well as construction management assistance for Gold and silver extraction project. 2000 tpd processing plant comprising primary crushing, grinding, gravity concentration and leaching, CCD and Merrill Crowe.

PROJECTS



Intrepid Mines Ltd. – Argentina – Casposo Project

Project Budget: USD 90 M

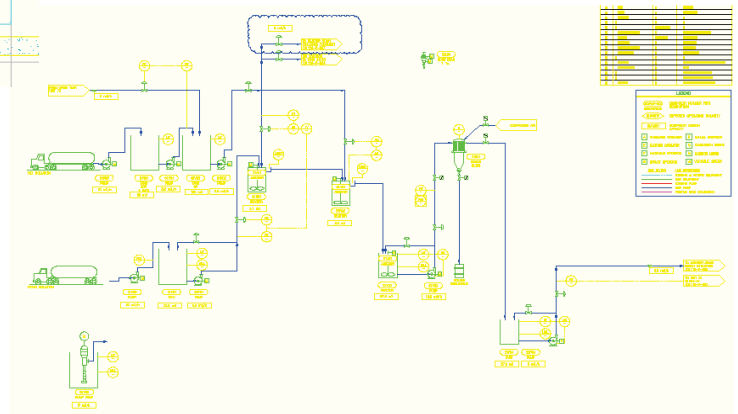
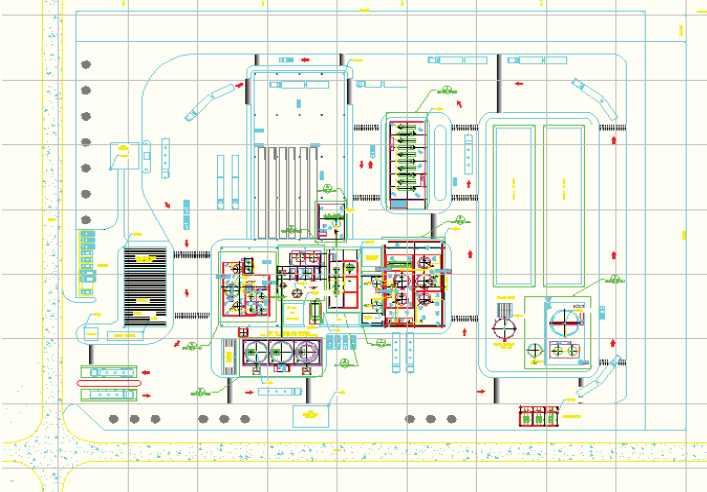
SAXUM scope of work: EP & CM services, starting from basic engineering. Our services include metallurgical process, mechanical, civil/structural, electrical, instrumentation and control engineering, as well as procurement and construction management. Gold mine project in the province of San Juan, Argentina.



SAXUM scope of work: Complete conceptual and basic engineering for low sodium lithium chloride brine plant. Process, Civil & Structural, Mechanical & Piping, Electrical, Instrumentation & Control Engineering.

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PROJECTS

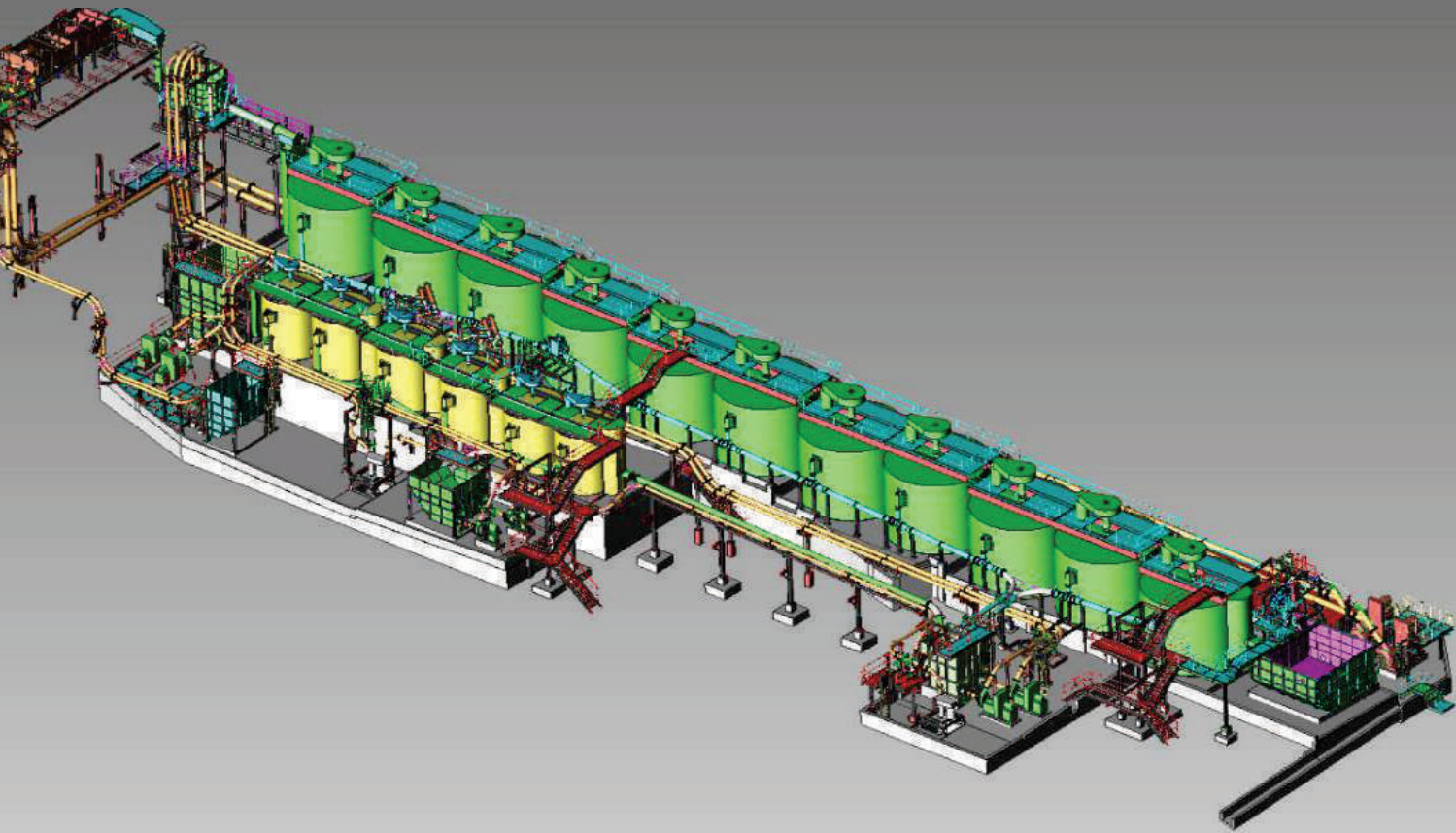


Eramet Ingenierie – Argentina – Salinas Grandes

Project Budget: USD 160M

SAXUM scope of work: Full conceptual and basic engineering (including process, civil/structural, mechanical/piping, and electrical, I/C) for CapEx and OpEx evaluation. Lithium carbonate and potassium chloride production plant in the province of Salta, Argentina.

PROJECTS



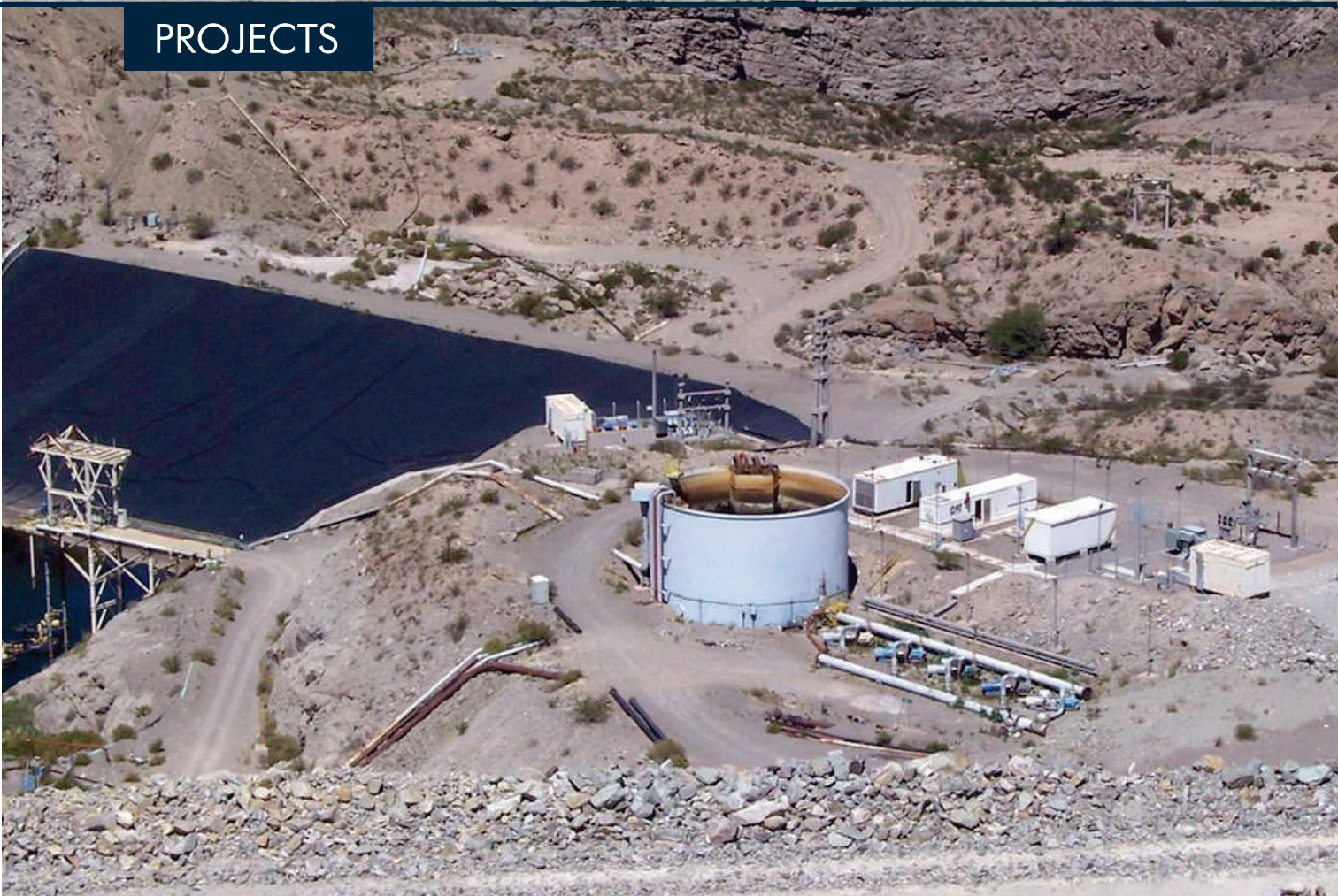
Minera Alumbrera Ltd - Copper and Gold Mine - Glencore Argentina

Project Budget: USD 48 M - **New Cleaning Cells Project**

SAXUM scope of work: Complete conceptual, basic and detailed engineering as well as CapEx analysis.

Project related to the new cleaning cells in Minera Alumbrera Ltd.
Catamarca Province, Argentina.

PROJECTS



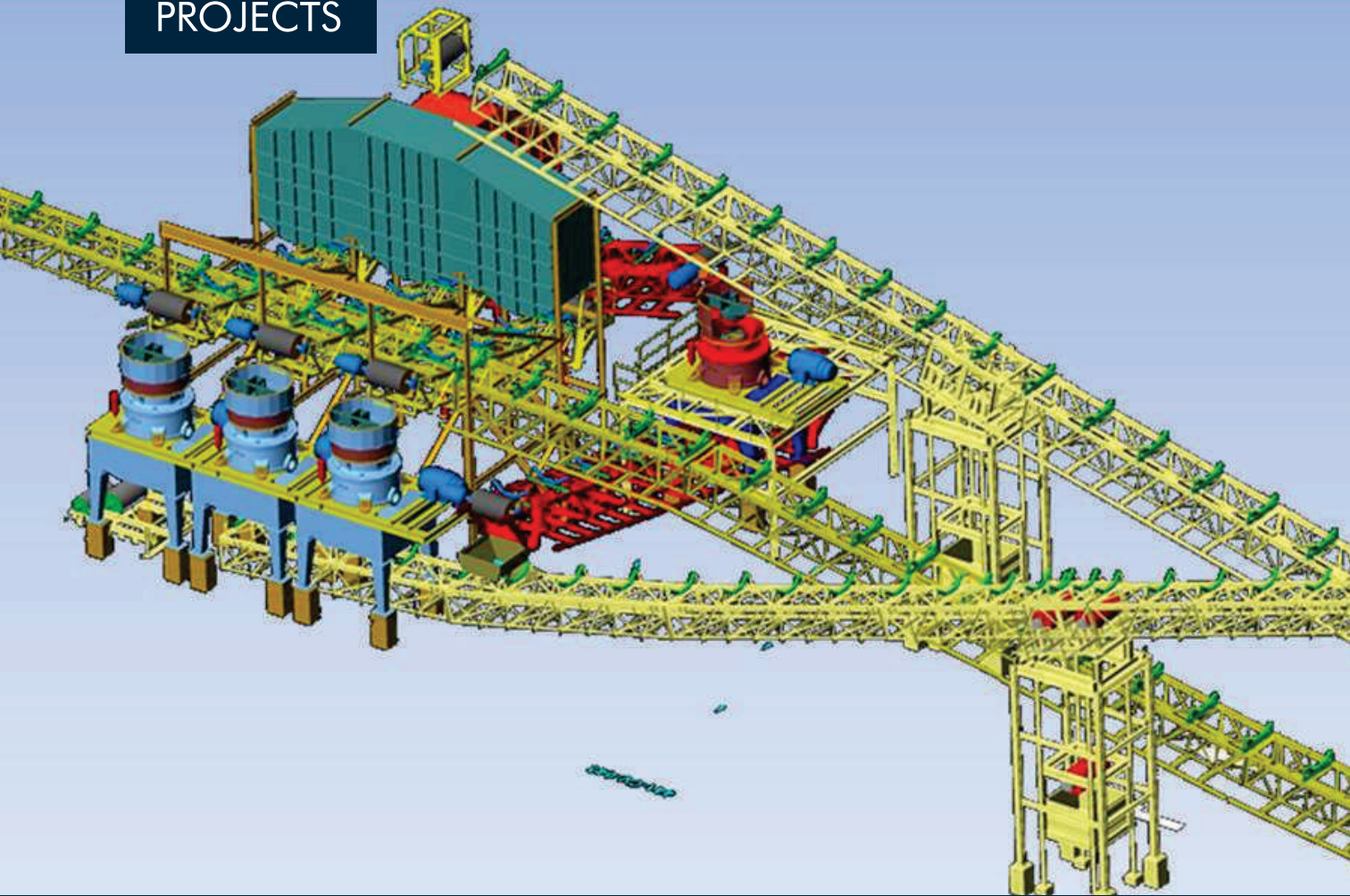
Minera Alumbrera Ltd - Copper and Gold Mine - Glencore Argentina

Project Budget: USD 8 M - **TAILING DAM WATER RECOVERY PROJECT**

SAXUM scope of work: Technical/economic analysis for different layout and equipment arrangement alternatives, Conceptual and detailed engineering.

Tailing dam water recovery system at Minera Alumbrera Ltd.
Province of Catamarca, Argentina.

PROJECTS

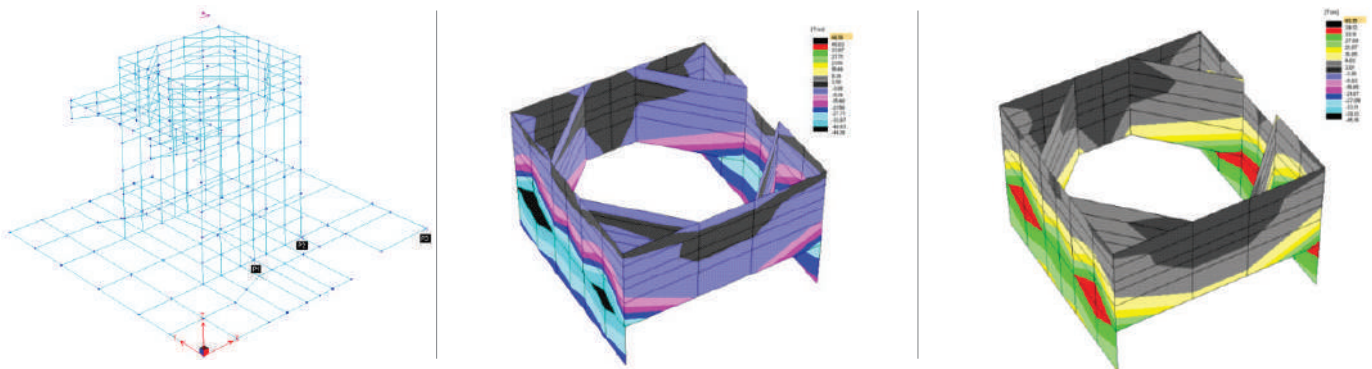
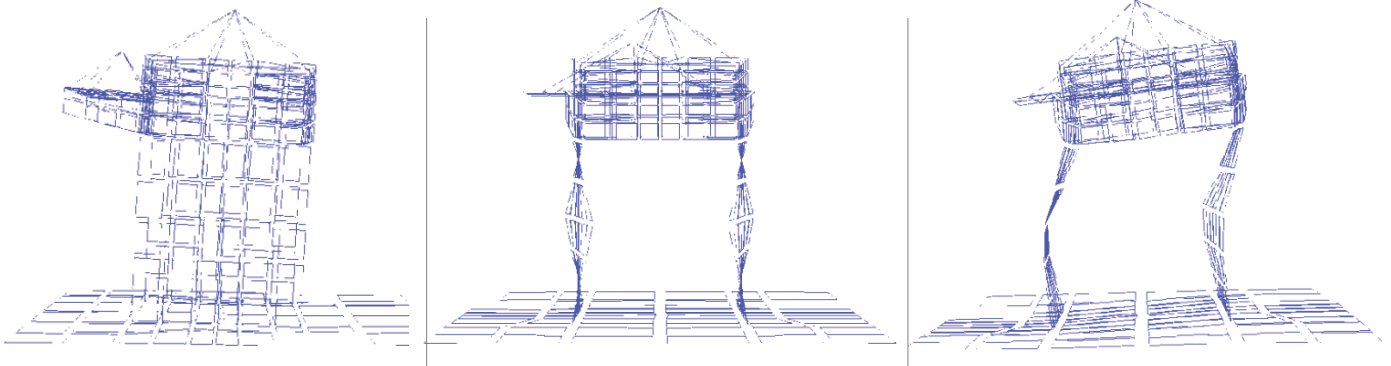


Minera Alumbrera Ltd - Copper and Gold Mine - Glencore Argentina

Project Budget: USD 28 M - **PEBBLES PROJECT**

SAXUM scope of work: Conceptual and detailed mechanical and structural engineering. Site supervision and RFI services during construction phase. Pebbles crushing plant expansion at Minera Alumbrera Ltd. Province of Catamarca, Argentina.

PROJECTS



VELADERO - GOLD MINE - BARRICK GOLD ARGENTINA

Project Budget: US\$ 1.8 B - PRIMARY AND SECONDARY CRUSHING SYSTEM PROJECT

SAXUM scope of work: Detailed mechanical and structural engineering for primary and secondary crushing systems.

Veladero green field project of Barrick in the province of San Juan, Argentina.

PROJECTS



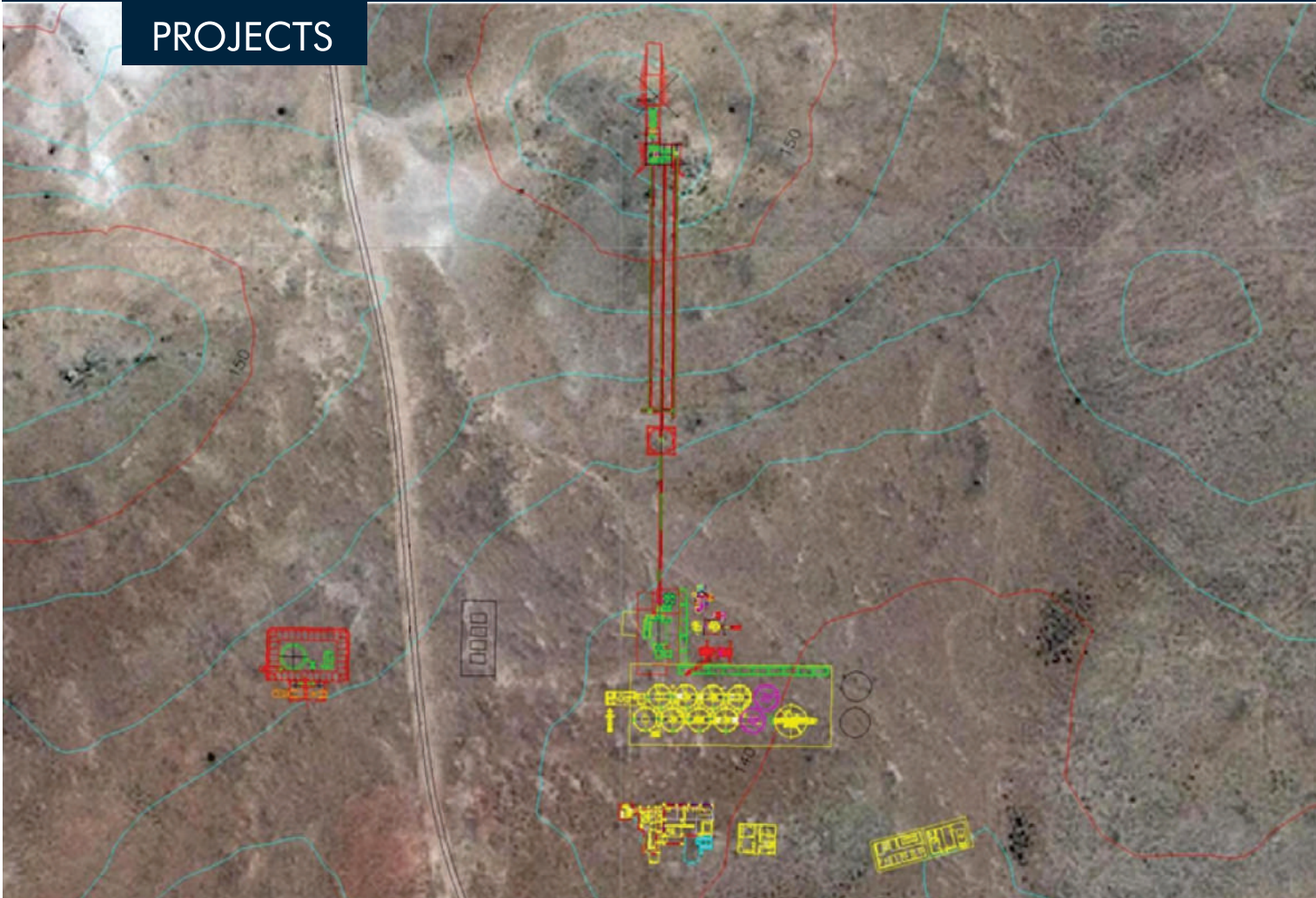
CODELCO – Chile – Chuquicamata

Project Budget: US \$24 M.

SAXUM scope of work: Detailed engineering and construction assistance.

Value recovery from fresh tails generated in the Chuquicamata Concentrate Plant, Chile.

PROJECTS

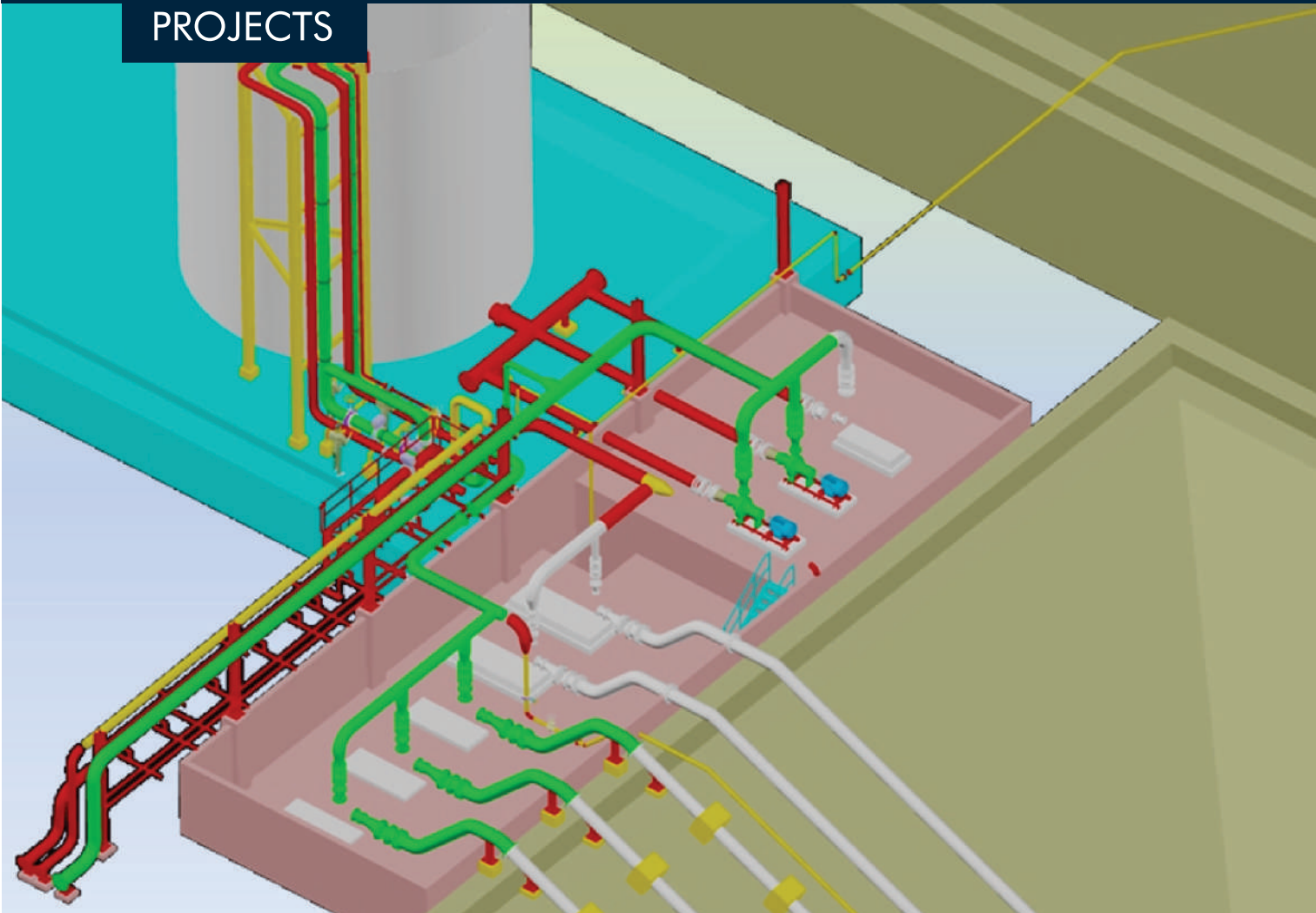


Minera IRL – Argentina – Don Nicolás project

Project Budget: US\$ 87 M

SAXUM scope of work: Pre-Feasibility and Feasibility studies. Preliminary process design criteria, plot plan and facilities layout. Tailings management design, Hydrological campaign/Water development campaign. Green field project related to a Gold Mine. Santa Cruz province, Argentina.

PROJECTS



AngloGold Ashanti – Argentina – Cerro Vanguardia

Project Budget: US\$ 8 M.

SAXUM scope of work: Basic and detailed engineering as well as construction assistance services.

Crushing/agglomerating plant and heap leach pumping station.
Cerro Vanguardia plant of AngloGold Ashanti. Santa Cruz province, Argentina.

PROJECTS



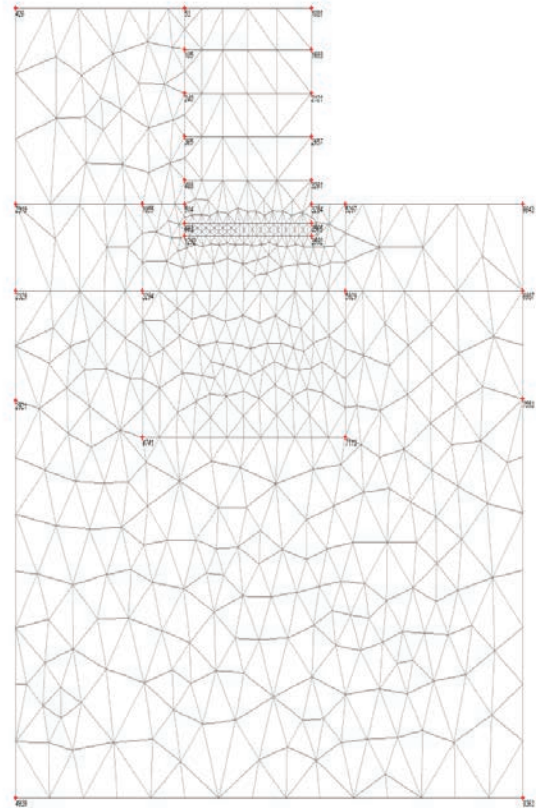
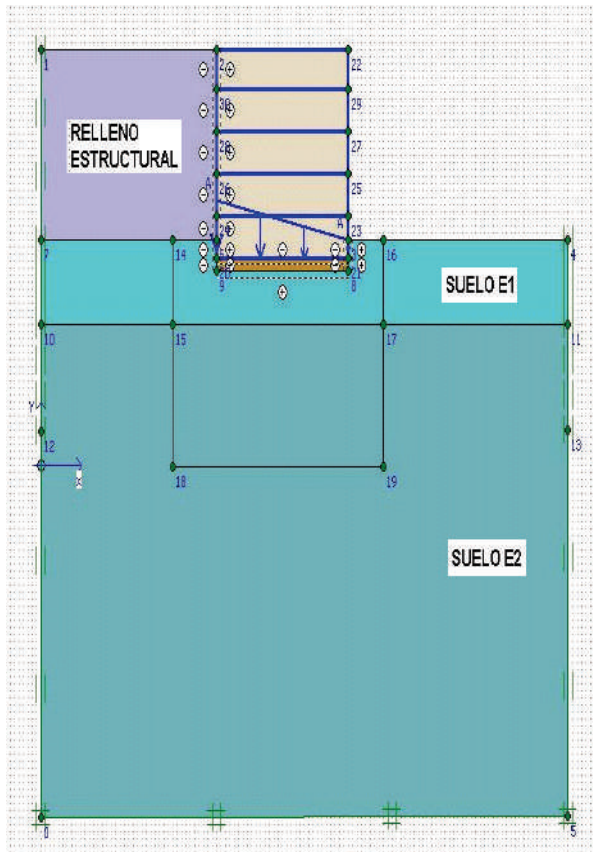
ANTAPACCAY PROJECT - COPPER AND GOLD MINE - GLENCORE PERU

Project Budget: US\$ 124 B - BROWNFIELD PROJECT RELATED TO THE TINTAYA PLANT EXPANSION

SAXUM scope of work: Review and verification analysis of the Stacker design made by Thyssen-Krupp and design of its foundation system.

Tintaya Copper Mine, Expansion Antapaccay, Glencore (ex Xstrata Copper), Peru.

PROJECTS

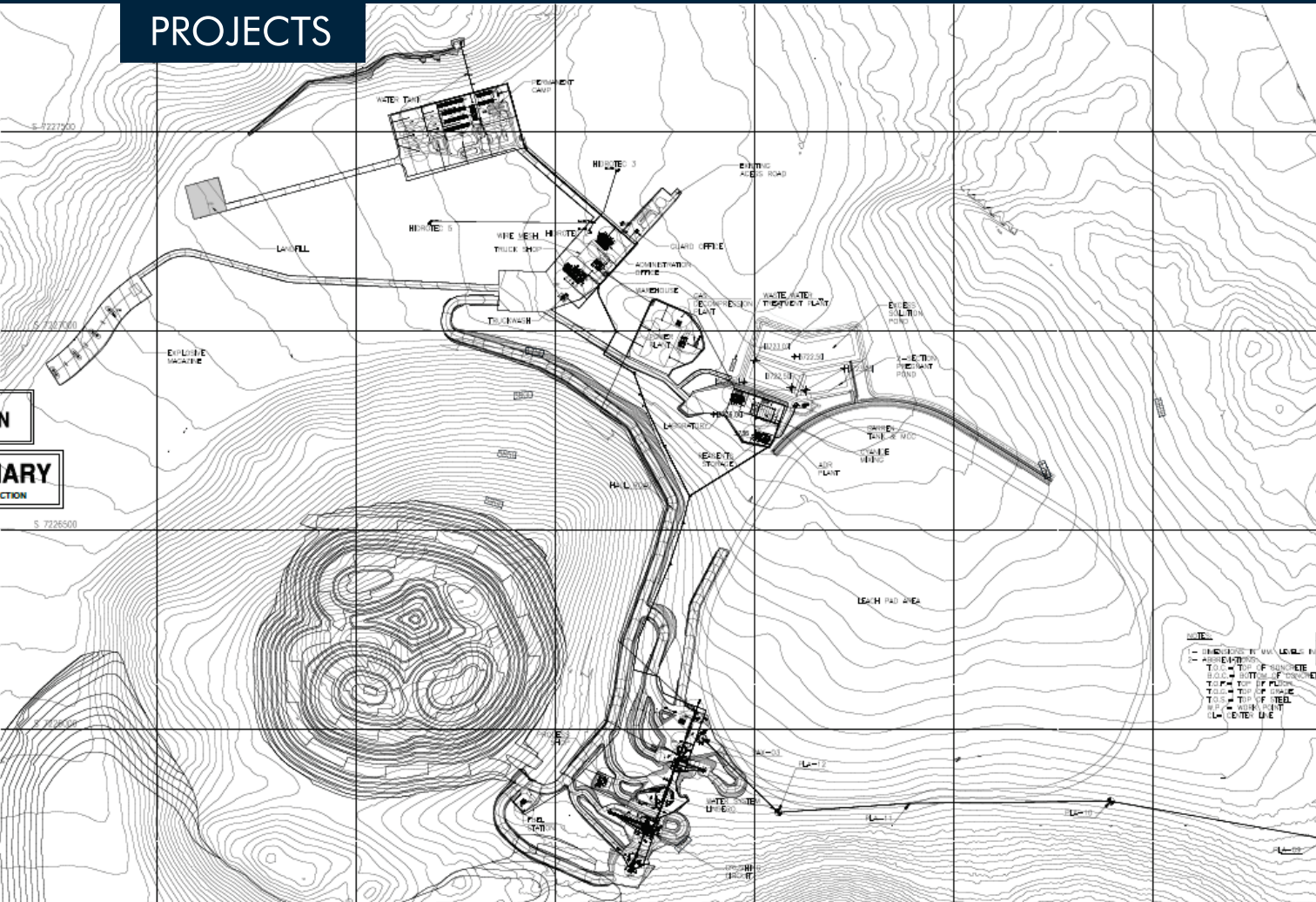


ANTAPACCAY PROJECT - COPPER AND GOLD MINE - GLENCORE PERU

Project Budget: US\$ 2.2 B - BROWNFIELD PROJECT RELATED TO THE TINTAYA PLANT EXPANSION

SAXUM scope of work: Value added engineering services for the CapEx optimization related to the SAG and Ball Mill foundations, and to the structures and foundations of the secondary crushing system.

PROJECTS



Goldrock Mines Corp. - Argentina - Lindero Project

Project Budget: US\$ 360M

SAXUM scope of work: Prefeasibility and Feasibility studies, then Basic Engineering of the Lindero gold mine project including all engineering disciplines. CapEx and OpEx estimates. Trade off studies for energy supply.

PROJECTS



Sales de Jujuy S.A. - Argentina - Olaroz Project

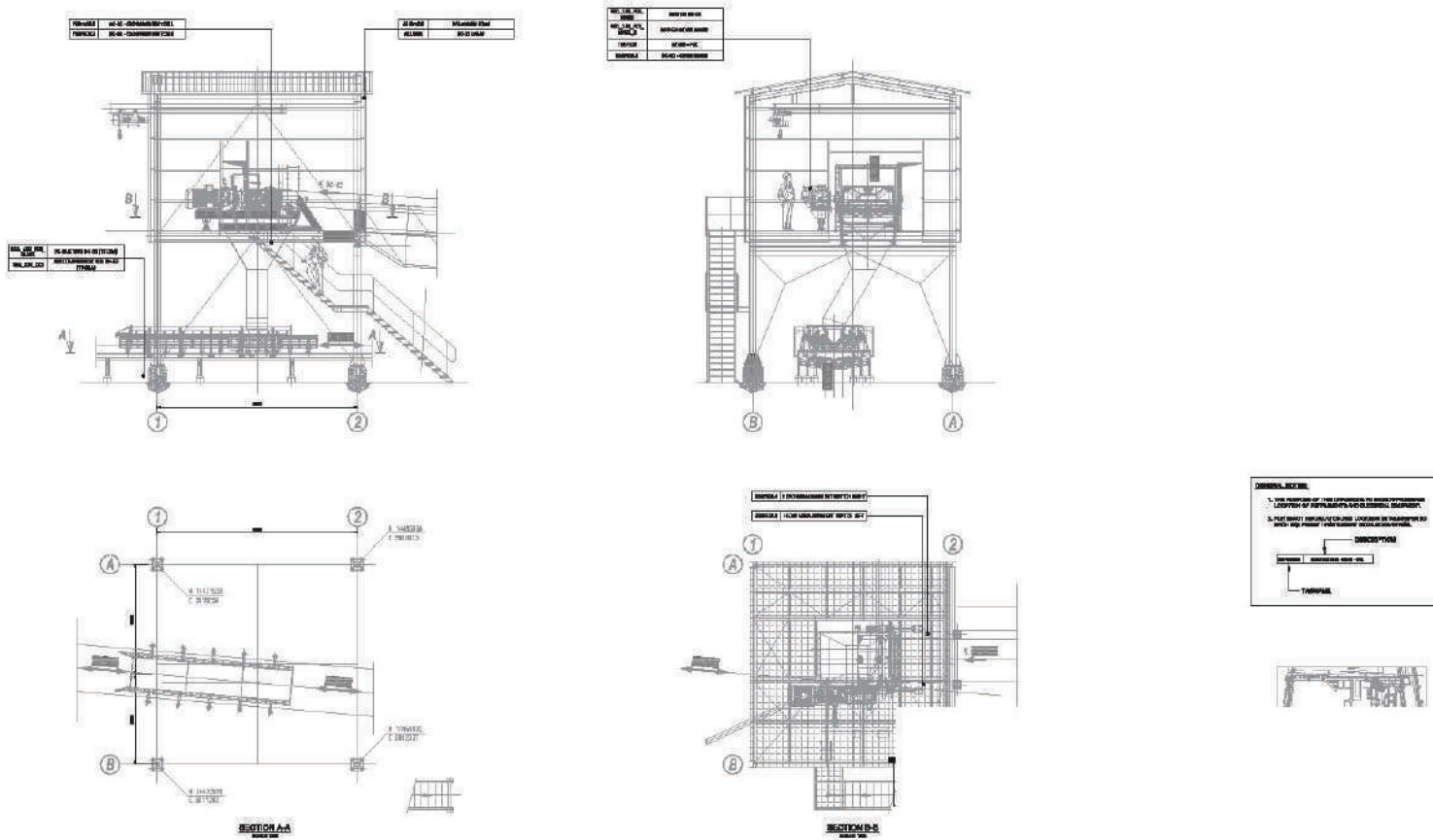
Project Budget: US\$ 240 M

SAXUM scope of work:

DEVELOPMENT OF CONCEPTUAL AND DETAILED ENGINEERING FOR CO2 RECOVERY: Complete engineering for gas recovery and re-injection. Dimensioning of all involved equipment. Evaluation of gas consumption.

STEAM SYSTEM OPTIMIZATION: Definition of the thermal energy balance. Evaluation of the most appropriate procedure for incorporating the new steam generator to the system.

PROJECTS



PHB Wesserhütte US - USA - Gowest Voestalpine Project

SAXUM scope of work: PE STAMP ELECTRICAL DRAWINGS.

Internal checking, US codes verification and sign and seal of all electrical engineering documents by a Texas Registered Professional Engineer.

Electrical engineering for medium and small voltage installations at basic and detailed levels.

PROJECTS



LINDERO PROJECT FOR GOLD & COPPER MINE - FORTUNA SILVER MINES INC.

Project Budget: US\$ 340 MM - FULL EPCM SERVICES FOR THE GREENFIELD PROJECT - FROM PRECONSTRUCTION WORKS TO START UP

SAXUM scope of work: Complete EPCM services of the Lindero gold mine Project:

- Detailed Engineering for the construction of the entire project (Civil, Structural, Mechanical, Piping, Electrical and Instrumentation and Architectural).
- Procurement services to develop the specifications, bidding process and the purchase of all equipment and services necessary.
- Construction Management services at different stages with the objective of ensuring the coordination and correct execution plan in accordance with the Master Schedule, CAPEX and updates.
- Pre-Commissioning and Commissioning services for project main areas and equipment

PROJECTS



Goldcorp Inc. - Argentina - Cerro Negro Project

Project Budget: US\$ 1.05 M

SAXUM scope of work: developement of the engineering designs and the project control during the construction phase of these projects. Perform the designs (from conceptual to detailed solutions) in all different disciplines, including Mechanical, Civil, Structural, Electrical and Instrumentation engineering. In parallel, SAXUM is developing/defining all needed data sheets and specifications for purchasing the required equipment and construction/erection works.

PROJECTS



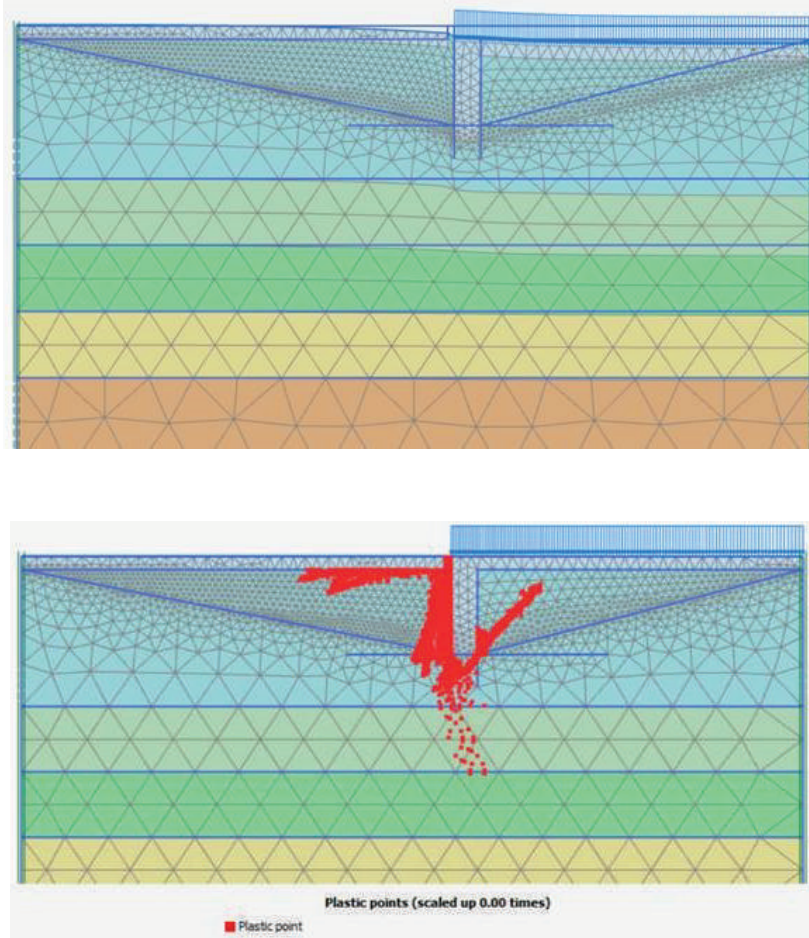
NEWMONT GOLDCORP ARGENTINA - CERRO NEGRO GOLD MINE

ENGINEERING SERVICES FOR EXPANSION PROJECTS IN THE MINE

SAXUM Scope of Work: Engineering support for the development of Mining Projects in several plant locations, including the designs of tunnel portals/doors, general facility installation, mining auxiliary services and infrastructure site works. SAXUM's services include CapEx Estimate.

SAXUM onsite Project Control Services and Field Support for Cerro Negro, working together with Cerro Negro's staff aiming the planning and monitoring of the construction execution through a work schedule.

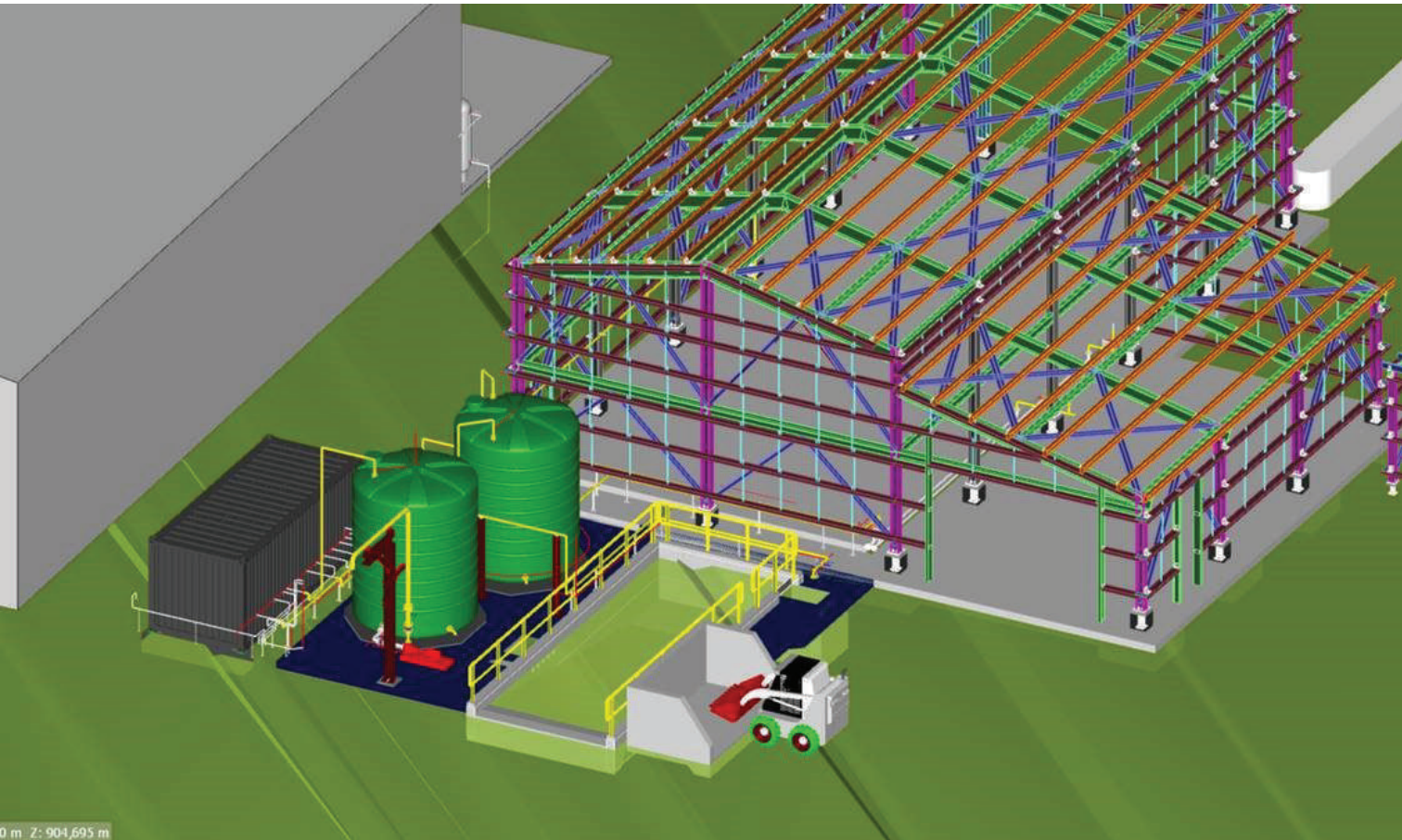
PROJECTS



YAMANA - Cerro Moro - Argentina

SAXUM Scope of Work: SAXUM performed soils investigations to determine the static and dynamic features of the subsoils in the sector where the lixiviation tanks are localized. The purpose of this investigations was the assessment of the eventual need of soils injection procedures to improve soils mechanical conditions and avoid further tank foundations' settlements.

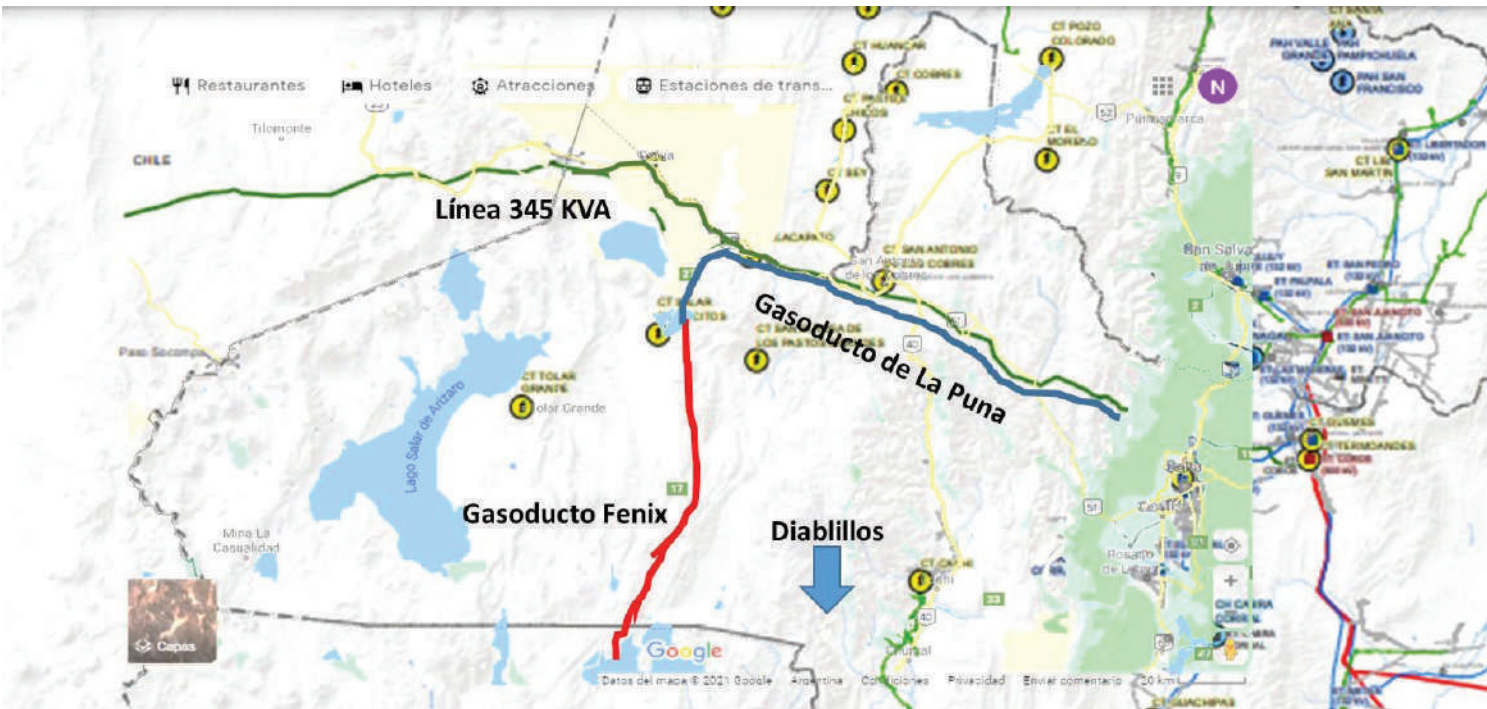
PROJECTS



NEWMONT Goldcorp - East District Project

SAXUM Scope of Work: SAXUM performed the engineering of the Mechanical, Civil/Structural and Electrical and Instrumentation & Control disciplines, with the target of an early stage Capital Estimate. Also the development of several plans, drawings and specs for the San Marcos Portal as well as basic and detail engineering for the Bajo Negro and Silica Cap locations.

PROJECTS

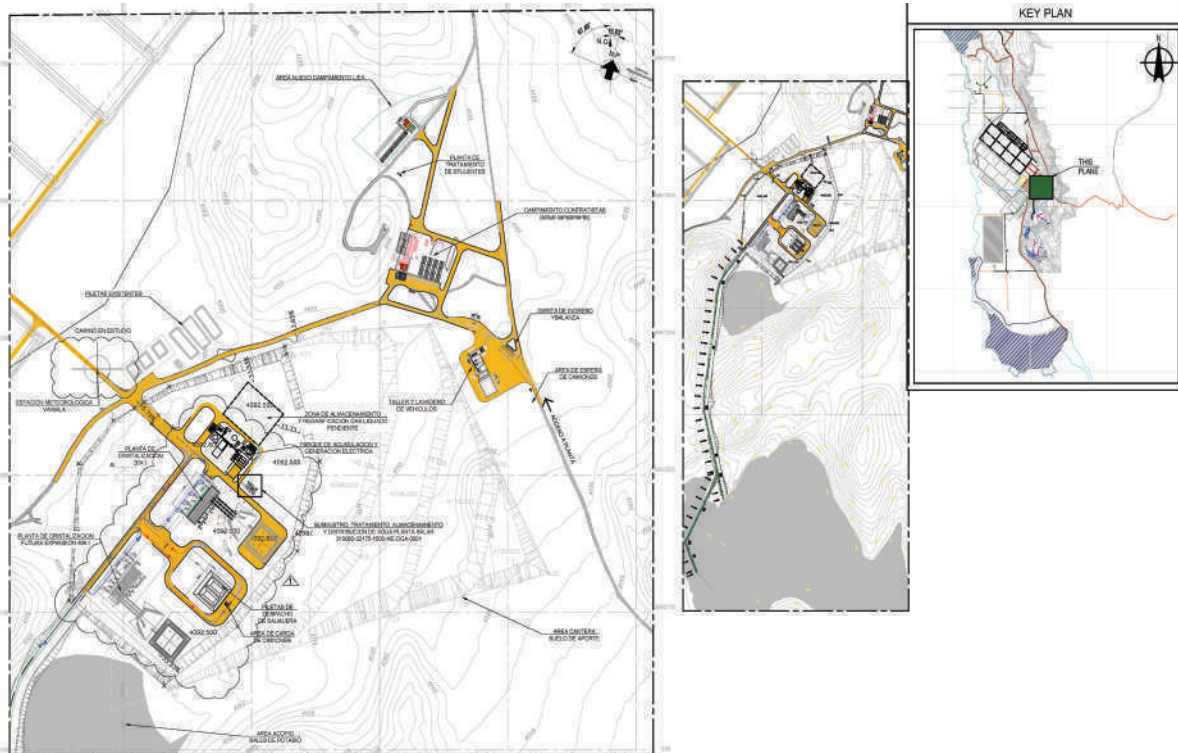


Abrasilver Resources - Diablillos Gold Mine Project - Argentina

UPDATE OF PROJECT ECONOMICAL ASSESSMENT & TRADE OFF STUDY FOR ENERGY SUPPLY.

SAXUM Scope of Work: Five different options were considered. The Trade-off report by SAXUM included a comparative analysis of the CapEx and OpEx of the different energy alternatives and the recommendation on the optimal one for the Diablillos project.

PROJECTS

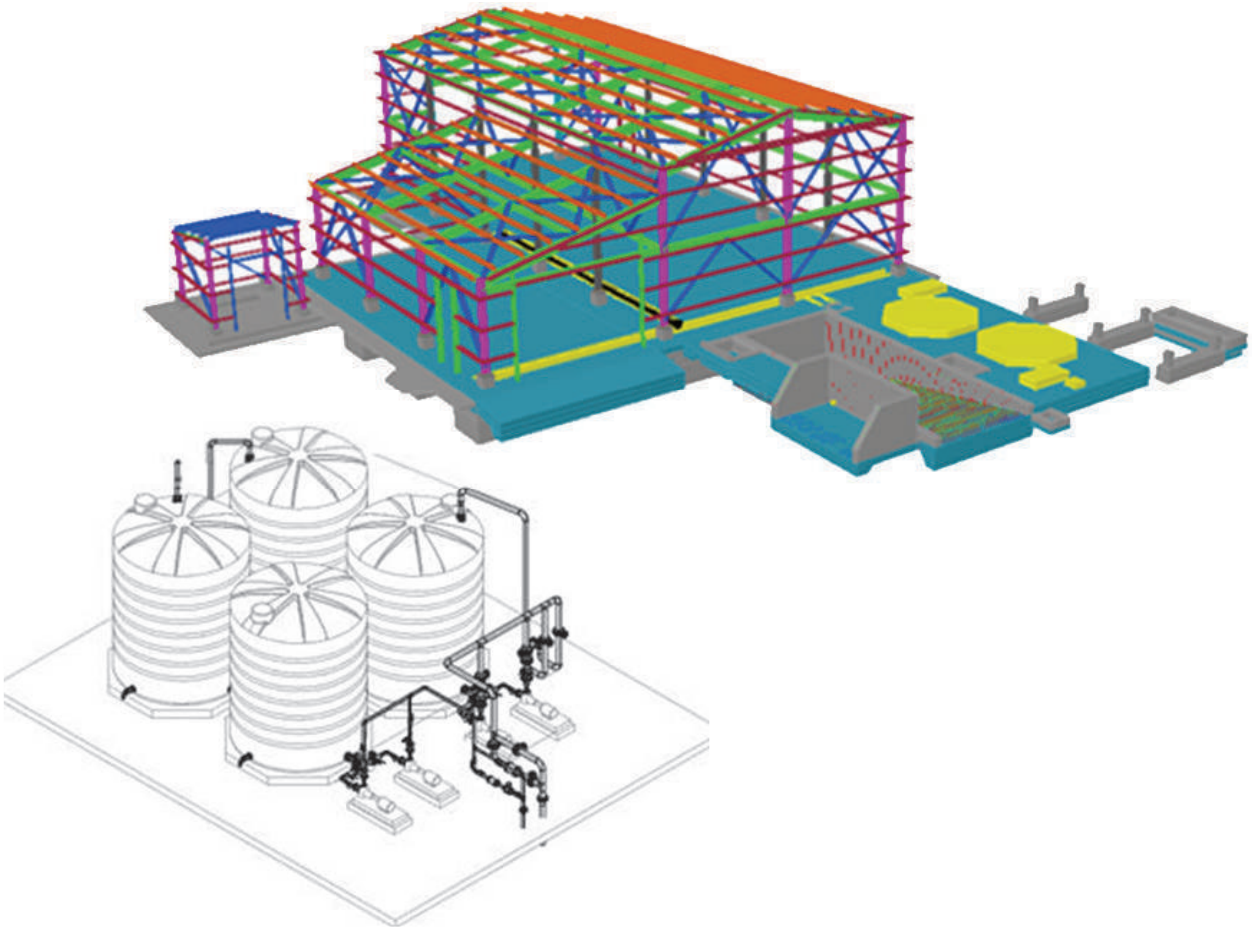


Liex - 3 Quebradas Lithium Carbonate Project - Argentina

OWNER'S ENGINEERS FOR THE REVIEW OF FEASIBILITY STUDY FOR THE GREENFIELD PROJECT.

SAXUM Scope of Work: Review of the feasibility study and engineering designs developed by third parties for the greenfield lithium plant carbonate in Catamarca, Argentina. SAXUM's review included all engineering disciplines and the CapEx estimate.

PROJECTS

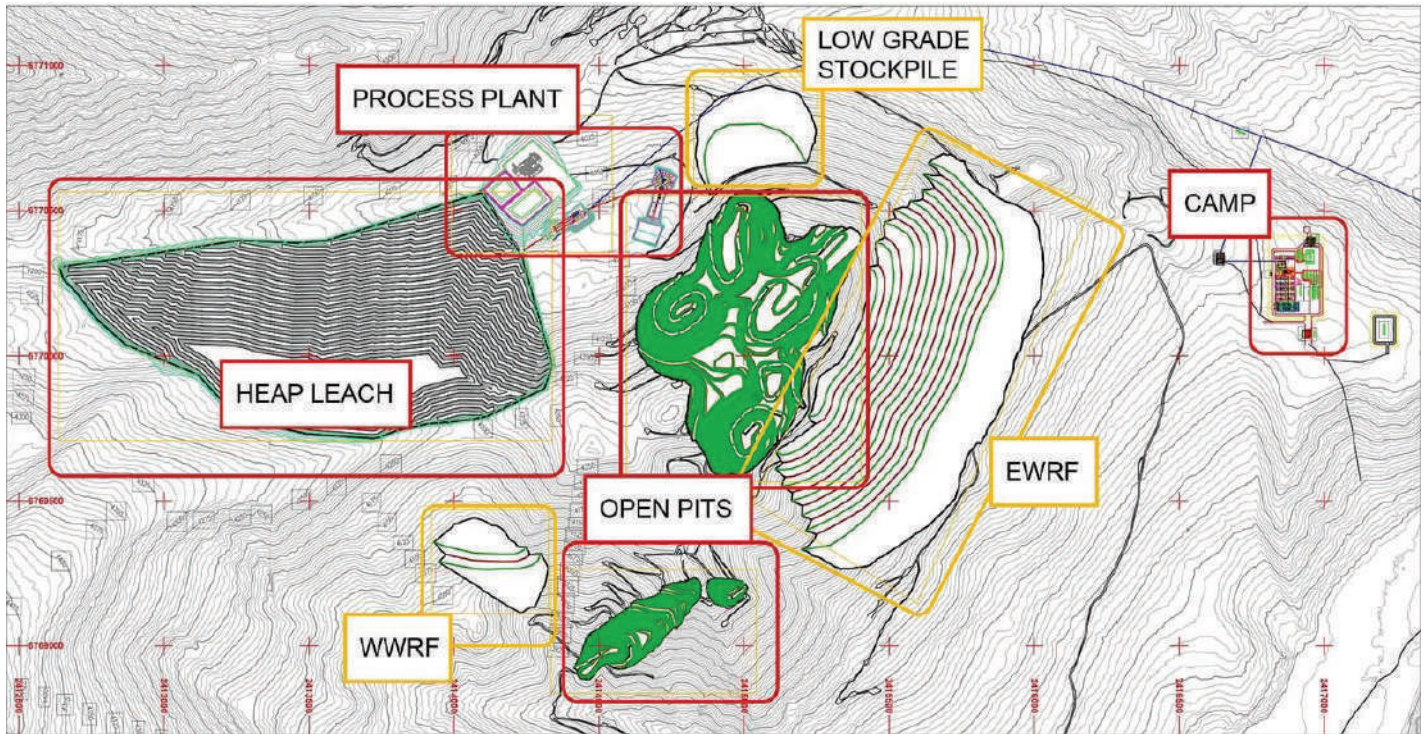


NEWMONT GOLDCORP ARGENTINA - CERRO NEGRO GOLD MINE

NEW TRUCKSHOP PROJECT.

SAXUM Scope of Work: Engineering for the update of the Trackshop and Truck Wash Bay of Cerro Negro gold mine. FEL II & FEL III (Conceptual & Basic Engineering and CAPEX) and detailed mechanical and piping engineering for New Truck Ship and Truck Wash

PROJECTS



Orvana Minerals - Taguas project - Argentina

SAXUM Scope of Work: SAXUM performed the Project Economical Assessment (PEA) of the Taguas gold mine project of ORVANA in the province of San Juan, Argentina. SAXUM was the main responsible of this PEA report which was issued according to the NI43-101 standards.



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