Mineral Processing

HATCH

Mineral processing: your success is our top priority

Remote locations. Declining ore grades. Extraction metallurgy that's becoming increasingly complex. Our innovative solutions will help you overcome these challenges, and develop and exploit new orebodies profitably.

Your existing operations face similar challenges. The higher-grade, easy-to-process ores have already been mined. Older operations are often laboring with less efficient or outdated equipment. That can mean longer processing cycles and less-than-optimal recoveries.

Energy and water are two of the most important drivers of new mining projects—ones that often determine their feasibility. So the industry is constantly searching for better, more innovative solutions that make the most of these resources and use them wisely and cost-effectively.

We can help.

We're engineers and professionals with a wide variety of backgrounds and a broad range of skills. Experts with a world of experience, working in and serving the mining industry.

When you partner with us, you get targeted, innovative solutions that can enhance your operation and save you money. With today's best practices as a baseline, we take it to the next level. We'll help boost your capacity. Find new technologies and tools that we can help develop and adapt to your needs. Maybe even bring these to market.

You'll get knowledgeable, sound advice and full support with:

- Geometallurgy and ore testing
- Process modeling and studies
- Process intensification
- Mine-to-mill optimization
- Crushing and grinding
- Ore sorting and pre-concentration
- Beneficiation
- Flotation
- Gold processing
- Heap leach and in-situ leach
- Dewatering
- Materials handling
- Slurry pipeline design
- Operational support, asset management, and sustaining capital projects
- Project management and procurement services
- Construction management
- Commissioning and ramp-up
- Digital strategies

The Mina Ministro Hales mine is a strategic project to ensure Codelco's future position in the copper mining industry

Global presence, local focus

To meet the world's growing demand for minerals, your facilities need to be capable of full-out, best-of-class production. We can help you deliver the goods.

- Hatch offices
- Selected mineral processing projects

1 Meadowbank, Agnico-Eagle Mines Ltd.
Canada

With only seasonal access to the site, we provided EPCM services for the 8,500 tpd gold plant and shipped all materials and equipment by barge over three summers. More than 50,000 tons of material and equipment were transported to the site over the purpose-built, 115-kilometre-all-weather road from Baker Lake in Nunavut.

2 Pueblo Viejo, Barrick Gold Corporation and Goldcorp Inc.
Dominican Republic

For the site of one of the world's most complex gold ores, we provided a full EPCM program for the core of the refractory process. The air-separation unit was by far the largest-capacity oxygen facility built to date at any gold mine, and four of the largest autoclaves in the world by weight (2,178 tonnes) were also included.

3 Tocantinzinho, Eldorado Gold
Brazil

A feasibility phase study was provided for a 12,000-tpd mining and processing facility, incorporating gold recovery by gravity, flotation, and concentrate leach. The process selected was based on test work we had previously completed there.

4 Mina Ministro Hales
Chile

A 50,000 tpd open pit mine and flotation concentrator with a stand-alone roaster with acid plant and effluent treatment. This new mine construction is a strategic project to ensure Codelco's future position in the copper mining industry.

5 Dvoinoye project, Kinross
Russia

In this extreme subarctic climate with winter temperatures as low as 58° C, we provided both scoping and feasibility studies and basic engineering for the gold mine development, including mine design, cemented rock-fill, surface infrastructure, and an all-season road between Dvoinoye-Kupol and the Kupol mill, which was expanding from 3,000 to 4,500 tpd.

6 Ma’aden Bulgah gold project
Ma’aden, Saudi Arabia

In this hot, arid, remote environment, a gold heap-leach facility was constructed in two phases, each with leach pads of approximately 37 hectares. We provided detailed engineering design and documentation for the tie-in and seamless Stage 2 extension to the existing, operational Stage 1 heap-leach pad.

7 Tasiast expansion project, Tasiast Mauritanie Ltd. SA
Mauritania

A feasibility study was provided to expand this gold mine’s capacity to 38,000 tpd, saving almost US$400 million with a value improvement process during the study. New accommodations, distribution systems, and expanded power and water systems were constructed.

8 Sishen South mine, Kumba Iron Ore
South Africa

For the 9 Mtpy process plant portion of the Sishen South expansion, we provided a feasibility study, detailed engineering, and EPCM services for the iron ore mine operation, including crushing, screening, stacking, reclaiming, and adding a rail spur on to the Sishen/Saldahna rail line.

9 Cadia, Newcrest Mining Ltd.
Australia

A prefeasibility study was conducted regarding the expansion of the Cadia operation. A review and recommendations to maximize throughput on comminution circuit upgrades were also provided.

Essential services, sound strategies

New mine sites. Brownfield upgrades. Planning and implementing major integrated developments. Our objective is always the same: to address your most serious challenges, solve your toughest problems.

Geometallurgy and ore testing

To get the most value from the asset, we need to understand both the geology and metallurgy of the ore body. Using advanced technologies and drawing on wide-ranging expertise in test work, interpretation, and leading edge processing technologies, our geometallurgical specialists determine the metallurgical characteristics of ore deposits and create the best mineral-processing flow sheets. From there, they help you develop mine plans that integrate the very best mineral processing, geological, and resource models.

Process modeling and studies

Simulation and modeling help optimize both plant design and its operation with effective process designs and flow sheets. We analyze design capability, capital effectiveness, throughput capacity, process efficiency, and downtime. The most up to date process, engineering, and operational know-how are combined with modeling and simulation expertise to develop the best designs possible.

Process intensification

The key to enhancing value is to do more with less, both in terms of capital and operating costs. Our focus is on processing as early as possible in the value chain and pushing the boundaries on cost, energy, water, and labor efficiencies through employing innovative processing techniques. The plant of the future will be smaller, more agile.

Mine-to-mill optimization

You need total value-chain optimization with integrated services in modeling and simulation for geometallurgy, drill-and-blast, comminution, and downstream concentration processes. We have them. Opportunities for ore sorting or pre-concentration can be evaluated. You'll see process efficiency, cost savings, and improvements in energy and water efficiency. We'll work with you, developing site-specific operating strategies, incorporating them into operating practices and implementing technology transfers.

Crushing and grinding

Open pit or underground. Large or small. Hot or cold. We're experienced in all established and innovative methods of crushing and screening, and a wide range of grinding and classification technologies. Our comminution plant-design services include process flow sheet development, process modeling, equipment sizing and selection, layout, plant monitoring and optimization, blasting/milling optimization, and control systems.

Ore sorting and pre-concentration

Reducing the amount of an ore which needs to be milled to a fine size through the application of ore sorting or pre-concentration can significantly increase value by cutting processing costs and enabling mine cut-off grades to be lowered. We can help determine whether or not the profitability of your project or mine can benefit from these techniques and engineer the solutions whether smaller plant or increased production.

Beneficiation

Our process engineers are experienced in the beneficiation of iron ores, tin, and other minerals. We're experts in a wide variety of heavy media, gravity, jigs, spirals, centrifugal, and high- and low-intensity magnetic separation techniques.

More than 50,000 tonnes of material and equipment were mobilized to the site over a purpose-built, 115 km, all-weather road for the Meadowbank Gold project

Flotation

From testing, design, and modeling through to control and optimization, our specialists provide a comprehensive range of flotation circuit skills. Our experience incorporates all types of conventional, column, recently developed and novel flotation equipment, involving a full range of base and precious metals and minerals. We cover small projects and concentrators operating at 240,000 tpd or more; using flotation to produce mineral concentrates; and reverse flotation to remove impurities.

Gold processing

Our mineral processing group is experienced with the full range of gold-leaching and recovery technologies: heap leaching; bio-oxidation; CIP/CIL; carbon stripping and regeneration; gold electrowinning; and smelting. With many gold deposits now refractory in nature, we develop flow sheets for them, calling on our experts in roasting and pressure oxidation. We understand social license constraints and identify requirements to eliminate health and environmental hazards by removing mercury, recovering cyanide, and detoxifying.

Heap leaching and in-situ leaching

When you partner with us, you get a multidisciplinary team with experience in test work planning and interpretation, design, commissioning, and operation. Our engineers work with specialists who use a comprehensive heap-leach model that evaluates all the variables to find the best solutions. Flow modeling, reaction kinetics, and economic analysis are combined to maximize realized values for all stages of the project. We are at the leading edge of in-situ leaching technologies and executing projects to recover metals without the costly mine and process plant operations.

Dewatering

Dewatering and solid–liquid separation is an important part of any mineral processing plant, especially as more attention now focuses on making water use more efficient. This spans a range of stages, from feed preparation to concentrate handling and tailings disposal, slurry, paste and dry stacked. We're experienced in all processes and techniques, including all thickener and filter technologies, from testing to specification and control.

Hatch won, Kumba Iron Ore's Gold "Laurel" Safety Award in 2011 for the Sishen South Project

Hatch provided EPCM services for Freeport McMoRan's 300 l/s seawater desalination plant and conveyance system to supply process water to the Candelaria facilities.

Materials handling

The integration of strong process teams with proven systems and advanced technologies ensures quality design and the installation of state-of-the-art materials-handling facilities. This promotes quicker ramp-ups, and enhanced operability and maintainability. You benefit from our knowledge of resource operations, the flow of bulk solids, and our understanding of the crucial link between handling, processing, storage systems, and transport design to maximize efficiency and productivity.

Operational support, asset management, and sustaining capital projects

Capital investment and steady funding are must-haves if your operation is to remain viable and meet ongoing operational and maintenance requirements. We can help. We work with you, developing strategic operational-performance programs that can boost your bottom line. We find smarter, more efficient solutions for extraction and processing. Then follow up with support across the full business life cycle, from concept to closure, across the full value chain, from investment to product delivery.

Slurry pipeline design

To implement reliable slurry pipeline systems, all the involved parties need a sound understanding of the underlying slurry-flow mechanisms. Our specialists provide worldwide pit-to-port design, estimates, optimization, construction, and maintenance services for short- and long-distance conveyances. Our slurry design group also creates tailings, lime, and other slurry pumping applications in pipelines up to 42 inches in diameter.

Project management and procurement services

You need projects delivered reliably and efficiently. Our international knowledge, decades of experience, and technical expertise are your assurance. We can help you manage capital programs and process-area construction projects anywhere in the world. You'll have the full range of procurement services, provided competently and thoroughly. From the selection and management of contractors and suppliers, to the arrival of goods at the project site, we deliver. On schedule. Within budget.

Construction management

Using state-of-the-art technology and innovative construction methods, we build consistency and reliability across the entire range of your operations. The highest standards of safety, performance, quality, cost, and schedule are always top-of-mind. Our integrated approach to construction management makes the best use of people, places, and things.

Commissioning and ramp-up

Commissioning is the final phase in project execution and the first step to prepare the operation for a successful ramp-up. To be effective, commissioning requires a comprehensive strategy. It must be centered on an optimized sequence, driving engineering, procurement, and construction towards the quickest start of production. You need the right strategies to guide the transition from bulk progress to system completion in a process-based, logical order. Our experienced personnel will properly execute these commissioning strategies, helping to reduce start-up costs and maximize cash flow, getting a quicker return on your investment.

Digital strategies

The plant of the future. Digital and the internet of things (IoT) are enablers to reducing variation in a process, a key to optimizing and raising efficiencies. We are actively pursuing research, projects and partnerships in real time data, platforms, management systems and predictive control.

Hatch helped identify savings of almost US$400 million during the feasibility study for the Tasiast expansion project

About Hatch

Whatever our clients envision, our engineers can design and build. With over six decades of business and technical experience in the mining, energy, and infrastructure sectors, we know your business and understand that your challenges are changing rapidly.

We respond quickly with solutions that are smarter, more efficient, and innovative. We draw upon our 9,000 staff with experience in over 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

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