

# BEHRE DOLBEAR ENGINEERING SERVICES

## Ideas into Reality

Behre Dolbear is one of the oldest, continuously operating, mineral industry consultancy firms in the world. Since 1911 the firm has specialised in studies for commercial and multi-lateral financial institutions, mining companies, governments and governmental agencies, legal firms and other parties with interests in the mineral industry.

Since its founding, the company has spanned the industry from the primitive pick and shovel days of mining to the computer age of geostatistics. The company specializes in performing studies and consulting for a wide range of businesses with interests in the minerals industry

Behre Dolbear Engineering Services Ltd (BDES) is an company established to focus on a comprehensive range of services which can deliver a project from mine to metal through conceptual engineering, pre-feasibility phase, final bankable study phase, following on to detailed engineering design, procurement, construction management, training and maintenance planning.

### Customised Service

BDES evaluates, designs, plans and manages projects in a broad range of commodities including base and precious metals, coal, industrial minerals, fertilizer minerals, diamonds and gemstones, ferrous metals, and construction materials together with associated infrastructure. BDES specialists and engineers interpret clients' ideas and concepts into viable operations. BDES will respond to the particular requirements of the client. According to project needs, BDES may work alongside in-house capability, process licensors, specialist groups, or on a total technical and project management basis.



### Impartiality

BDES has no affiliation with specific suppliers and consequently its choice of process, technology and equipment is entirely impartial.

### Professional Skills

BDES has a wide range of qualified professionals, many of whom are international leaders within their specialisation. This wealth of expertise and experience is structured so as to enable us to play a balanced, multi-disciplined role, which is fully supportive of and entirely complementary to the studies and engineering project work carried out by the Behre Dolbear group.



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## Technical and Management Expertise

The range of technical and management services provided by engineers, consultants and other professionals available to BDES covers every aspect of the mining and metallurgical industries from mine to metal.



### Geology and Mining

BDES offers technical expertise and proven experience in the fields of geology and mining engineering. This experience covers all types of metalliferous and industrial mineral deposits and includes all aspects from initial economic appraisal through to orebody evaluation and the management of production, including mine design and equipping, mine planning, mine development and operational management and consultancy.

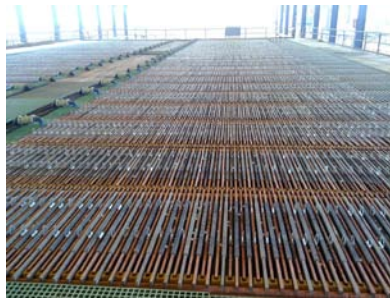
### Metallurgy

A complete range of services is offered by BDES embracing all aspects of mineral processing for both base and precious metals – including mineral dressing, extractive metallurgy, refining and secondary processing. Specific expertise covers concentrating, roasting, smelting, gas treatment, secondary metal recovery, hydrometallurgical processing, solvent extraction, electrowinning, electrolytic refining, casting and finishing. Where required, BDES services include the organisation of laboratory

and pilot-scale testing and extend through to the design, commissioning and operation of full-scale processing installations.

### Engineering

BDES's design capability covers the major engineering disciplines, civil, structural, mechanical fluids, electrical and instrumentation. BDES engineers have extensive experience in the mining, metallurgical and infrastructural fields. The scope of activities ranges from conceptual engineering to feasibility studies and "bankable documents" through to detailed engineering for procurement and construction management.



### Project Management

BDES provides an integrated project management service to direct and co-ordinate the major activities of study work through engineering, procurement and construction management common to major projects. The service covers all aspects of financial, commercial, technical and administrative controls and is directed to ensuring that projects are completed on programme, within budget and meet all the necessary standards of technical fitness for purpose.

Continuous liaison is maintained with clients to ensure that their requirements and directives are clearly understood, correctly interpreted and fully implemented.

Estimating, Cost Control and Planning Engineers provide detailed and ongoing analyses of project costs and progress reports. The latest software is utilised to ensure that the information provided is presented in a clear and informative manner.

Site Management Services are provided to suit the project requirements and range from the provision of advisory or liaison personnel through to the establishment of a full site-supervisory team with complete responsibility for managing construction. In all cases site personnel are fully experienced professionals totally supported by head-office personnel.

### Personnel

BDES personnel have unrivalled experience gained in the major international mining houses and international contracting companies, and this invaluable experience is translated into the designs, start-up and commissioning services for mines and metallurgical plants provided by BDES.

### Finance

The range of services BDES offers its clients is further enhanced by the provision of finance-related project services. In addition to preparing reliable financial evaluations and asset management services, BDES has considerable experience of working with international financing institutions, banks and other sources of finance.

# Engineering, Consultancy and Project Management Resources

Consultancy	Mining	Metallurgy	Engineering	Project Services	Finance & Evaluation
Geology	Geology	Mineral Processing	Civil	Project Management	Financial
Mining	Mine Design	Hydrometallurgy	Structural	Estimating	Commercial
Metallurgy	Geotechnology	Pyrometallurgy	Mechanical	Cost Control	Legal
	Hydrology	Metallurgical Commissioning	Fluids	Planning	Asset Evaluation
	Mining Engineering		Electrical	Procurement	
			Instrumentation	Construction Management	
			Computer Aided Design	Commissioning	
				Training	
				Maintenance Planning	

## Project Implementation

Within BDES is the ability to use our vast global group resources to create teams of personnel, whose individual skills and experience are precisely matched to meet the demands and disciplines required for a particular project. Team members report directly to the Project Manager and remain dedicated to the project for as long as their services are required. The Project Manager reports to a Project Sponsor who is a Director of the company.



# TECHNOLOGIES AND SERVICES

Exploration, Geology and Mining	Mineral Dressing	Hydrometallurgy	Pyrometallurgy
Development programmes	Comminution	Reclamation of tailings	Drying
Geological mapping	Concentration	CCD and Pachuca leaching	Roasting
Property evaluations	Solids/liquids separation	Solvent extraction (S-X)	Smelting
Feasibility studies	Long distance solids pumping	S-X fire protection	Converting
Ore reserve assessment	Tailings disposal and reclamation	Electrowinning and refining tankhouses	Slag cleaning
Mineral economics studies	Feed storage and preparation	Direct electric electrolyte heating	Gas collection/cleaning
Shaft sinking/equipping		Belt filtration	
Winding machinery		Thickening and clarification	
Underground pump stations		Ion exchange	
Underground crushing		Effluent disposal	
Open pit operations and maintenance systems		Bioleach technology	
Transport systems		CIL/CIP technology	

Related Technologies	Process Design	Engineering Design	Project Management
Sulphuric acid	Process definition	Engineering Studies	Project implementation plans
Lime production	Testwork	Plant layout	Feasibilities studies and bankable documents
Environmental management and research	Flowsheets	Civil design	Retrofit/rehabilitation assessment
Infrastructure	Detailed process design	Structural design	Tender preparation and contract negotiation
	Operating manuals	Pipework design	Estimating and cost control
	Commissioning	Mechanical equipment	Planning and progress reporting
	Plant technical audits	Electrical design	Material control
		High voltage transmission and distribution	Training
		Instrumentation and control	Maintenance planning
		Technical specification and adjudication	
		Material Control services	
		Inspection and testing	
		Design and safety audit	
		Procurement services	
		Site management	
		Contract administration	
		Quality control systems	
		Materials and stores-control systems	
		Cost control	
		Planning and progress reporting	
		Commissioning and start-up	

Computer Services	Finance and Evaluation	Asset Valuation
Process modelling	Financial analysis of projects	Insurance
Production scheduling	Project financing assistance	Asset management
Statistical analysis	Commercial/Marketing	Financial statements
Technical programming		Asset transfer
Computer-aided design		