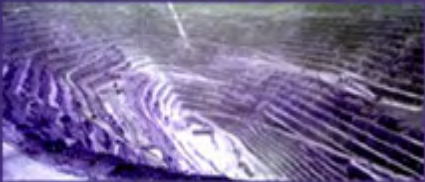


# Core Mining Studies





## Our Mission

Add value to the projects of our customers in natural resources and mining areas; delivering solid, expert and comprehensive solutions in an ongoing renewal technical environment.



## Our Vision

Be a guideline to our customers by adding value to their projects. And, be owners of their confidence bringing them profitability according to their real needs.





## THE COMPANY

CORE MINING STUDIES is an Australian owned company established in Chile in January 2010. We are changing the way to do consulting business for companies and professionals of the geologic and mining areas.

Supported by an expert network in the area, we are focused on providing comprehensive answers and tailored solutions to all our customers' requirements.

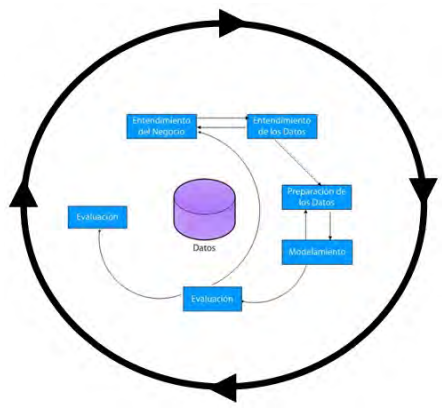
Our offices are located in Viña del Mar, Antofagasta and Santiago, Chile.

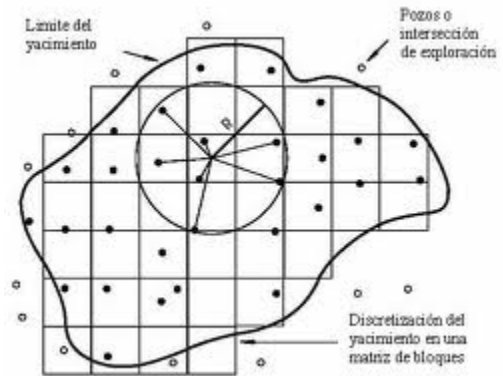


## WHAT WE DO



- 👉 Studies and Support to Exploration
- 👉 Data Base Management
- 👉 Development and Update of Geological Models
- 👉 Mining Resources Estimations





Stock Calculations

Engineering Phases Studies

- Conceptual
- Pre-Feasibility
- Feasibility

Due Diligences and Processes

Mining Audits and Processes

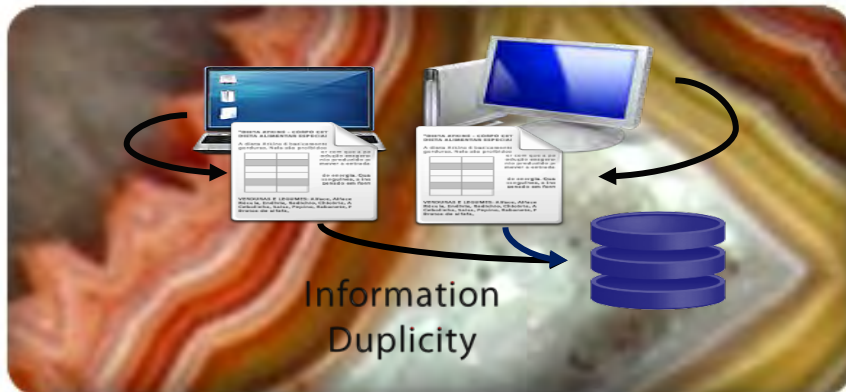
Certifications



## STUDIES AND EXPLORATION SUPPORT

- 👣 Geological Mapping and Logging
- 👣 Sampling
- 👣 Exploration Drilling Programs
- 👣 Sampling and Laboratory QA/QC Management
- 👣 Reliability and Assurance of Geological Information
- 👣 Chain of Custody





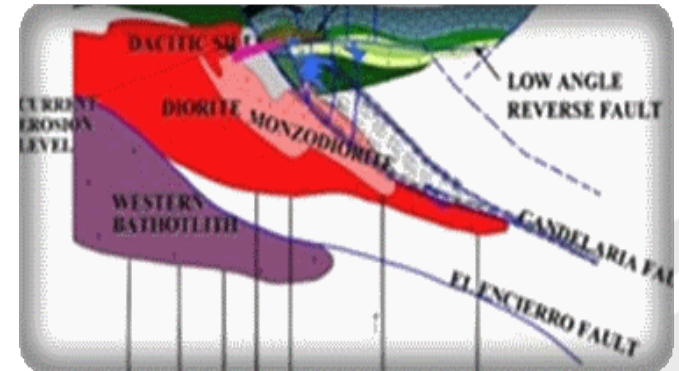
## DATA BASE MANAGEMENT

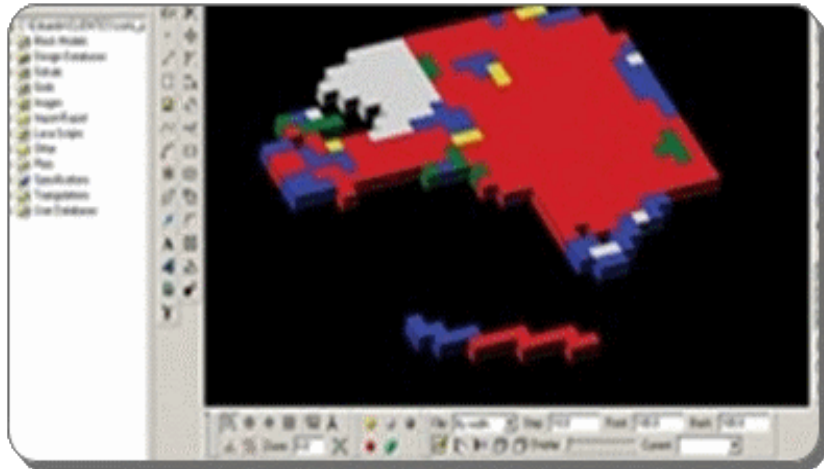
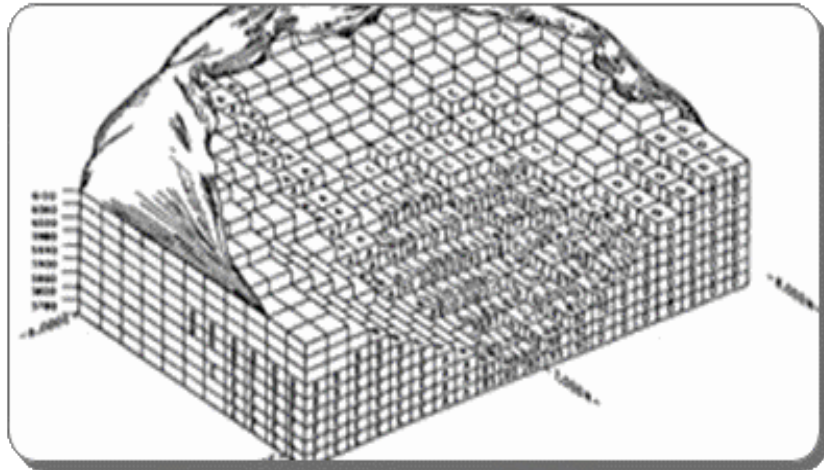
- Management Procedures
- Administration , Updating and Maintenance of DB
- Validation by Certificates, Protocols and Supports
- DB Audits According to CRIRSCO Standards








## DEVELOPMENT AND UPDATING OF GEOLOGICAL MODELS

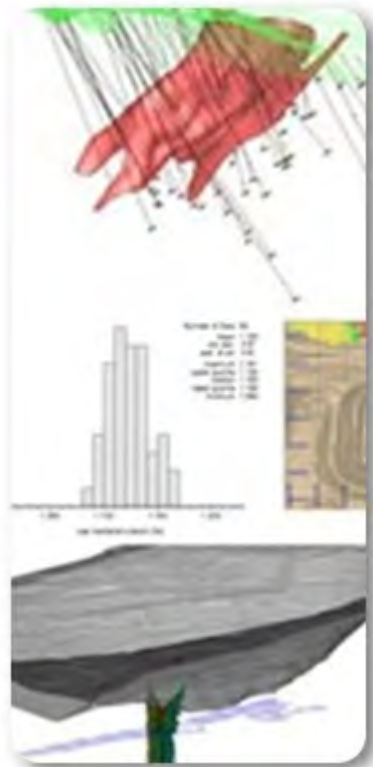
- Deposit Geology and Conceptualization
- Structural Analysis and Structural Scope
- Geological Characterization (Lithological, Alteration, Mineralization and Mineral Areas)
- Modelling and Updatings (Plans and Sections, Numeric Models, 3D Models)
- Definition, Validation and Updating of Reach Parameters and/or Estimation Units
- Geometallurgical Characterization . UGs and UGMs








## MINING RESOURCES ESTIMATION

-  Exploration/Evaluation Data Analysis (EDA)
-  Variographic Models
-  Resources Estimations
-  Models by Blocks, Grades, Densities,  
Geology, Geometallurgy and Geomechanic
-  Categorization of Resources







## STOCKS CALCULATION

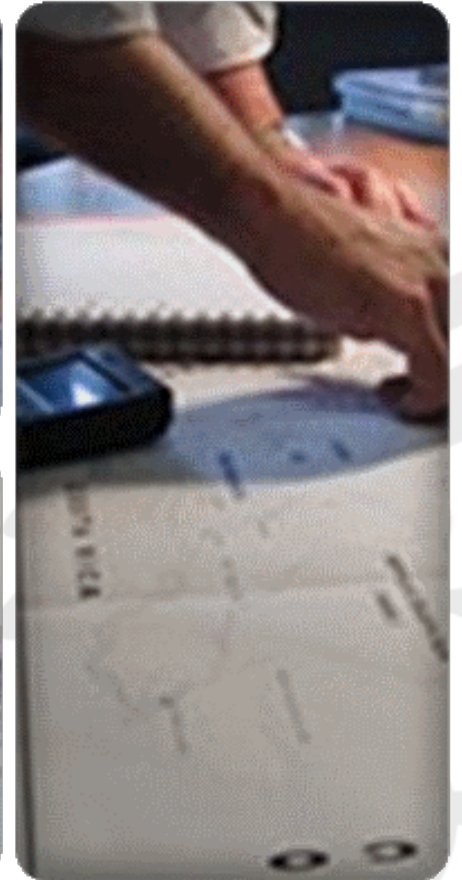
-  Maximum Economic Envelope Definition
-  Mining Designs and Extractive Sequences
-  Definition of the Removable Reserves

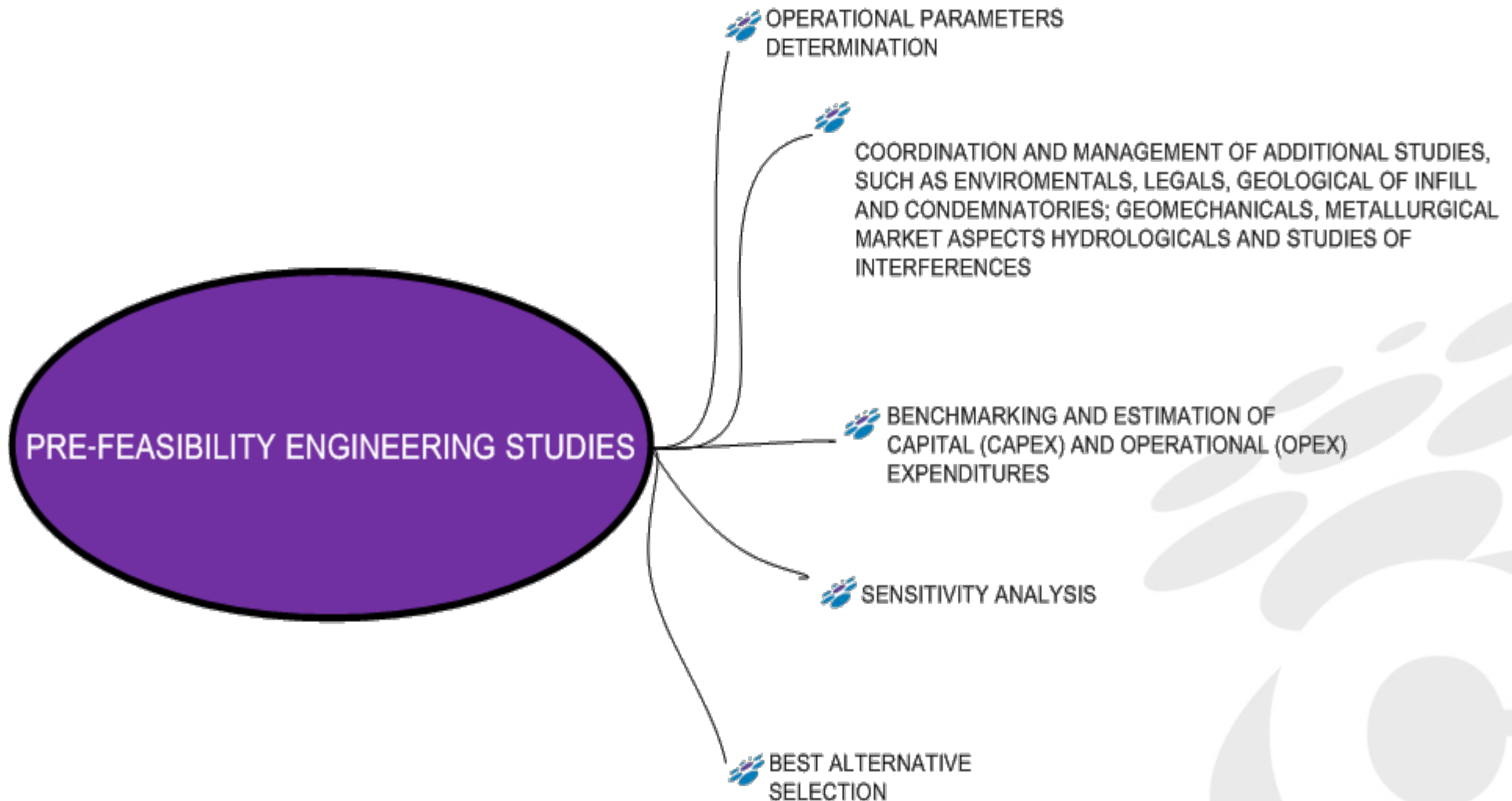




## CONCEPTUAL ENGINEERING STUDIES

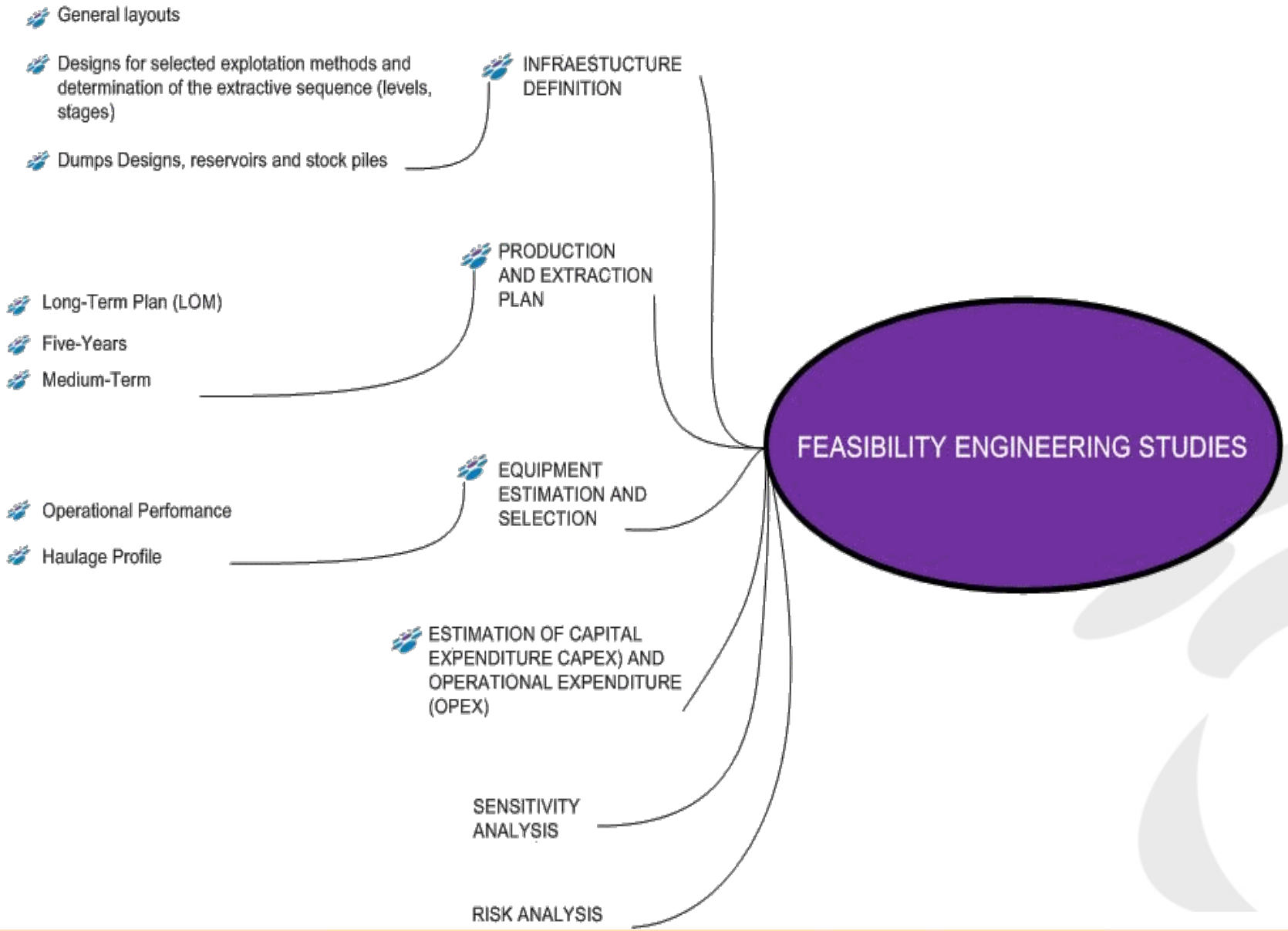
-  Benchmarking. Design Parameters, Economy and Geometallurgy
-  Evaluation of the Extraction Methodology
-  Ore Benefit Processes
-  Production Chain Alternatives







## Company Profile





## SPECIFIC STUDIES

- Numerical Modeling of Regionalized Variables as geological units, grades.
  - Conditional Simulation
  - Non Conditional Simulation
  - Direct Sequential Simulation
- Short-Term Geologic Modeling
- Re-conciliation
- Short-Term Planning
- Operativity of Medium – Term Plans
- Optimization of the Dump Filling Sequence






## DUE DILIGENCES AND PROCESSES







- ❖ **CORE MINING STUDIES** with its multidisciplinary technical team could advise you to make the best business decision in the case of a Due Diligence.
- ❖ Regarding processes, precise diagnosis and recommendations based on strong analysis will help to make the best productive decision, thus resulting in an increase of your business appreciation. All this in order to ensure the accurate identification of the variables that must be optimized to confirm and assure the Project value.

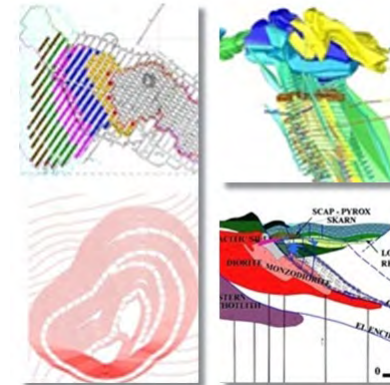





## MINING AUDITS

 **CORE MINING STUDIES** through its technical staff will review and validate processes, procedures and protocols associated to the value chain of the Mining business, Mining Projects and Operations. Among other aspects, we are able to advise in:

-  Data Base
-  Quality Control and Assurance
-  Geological Models
-  Metallurgical and Geotechnical Models
-  Resources and Stocks Models
-  Mining Design and Plans



 **CORE MINING STUDIES** carries out its Audit Processes under standards demanded by international regulatory organizations, such as JORC, NI 43-101, SAMREC and, Comisión Calificadora de Competencias en Recursos y Reservas Mineras (Chile)



## STAFF PERMANENT TECHNICAL

Core Mining Studies' Permanent Staff is formed by the following professionals:

NAME	POSITION	EXPERIENCE, ACCREDITATION, PROFESSIONAL DEVELOPMENT
Claudia Monreal López	General Manager	<p>Civil Mining Engineer with 15 years of professional experience. Executive Director of Core Mining Studies in charge of the senior mining consultant team.</p> <p>Within her vast experience, she has work as Senior Manager in Maptek for Services of Resource Evaluation and Geological Modeling, as well as Reserve Engineer in Chuquicamata for Long and Short –Term Projects.</p> <p>Her experience includes International and National Consulting, both in South America and Australia.</p> <p>She worked in the area of modeling and resource estimation, where she carried out consultants and courses to different mining companies. Also, she provided technical support to users of VULCAN 3D software.</p> <p>3D modeling in different projects as Spence, Chuquicamata, C. Michila, Tesoro, Mansa Mina, among other.</p> <p>In charge of a team of 10 geologist and engineers, she developed the Service Business for the biggest client group of Maptek in WA.</p>



## STAFF PERMANENT TECHNICAL

NAME	POSITION	EXPERIENCE, ACCREDITATION, PROFESSIONAL DEVELOPMENT
Arthur Harwardt Schneider	Data Base and QA/QC	<p>Senior Engineer in resource estimate with a Master in Mining Resource Valuation and complementary related courses. The most relevant experience accumulated in 35 years of working performance, is developed in the mining industry of copper (sulphurs and oxides), gold, uranium and, coal in topics applied to exploration, open pit and underground mining industry, such as:</p> <p>Development, support and, operation of geological information systems (data base). Support in geological 3D model construction. Geostatistical studies for short and long term resource estimation. Categorization of resources.</p> <p>He has advanced knowledge in softwares and mining-geologic systems that support the development of works: Vulcan, Gemcom and Minesight.</p> <p>He is accredited as a competent person by the Comisión Calificadora de Competencias en Recursos y Reservas (Law of the Republic of Chile N°20.235) with the registration number 0066.-</p>



## STAFF PERMANENT TECHNICAL

NAME	POSITION	EXPERIENCE, ACCREDITATION, PROFESSIONAL DEVELOPMENT
Ricardo Muñoz González	Senior Geoestatistician	<p>Mr. Muñoz has 30 years of professional experience associated with the complete chain of geological mining value.</p> <p>He has performed activities related to geological exploration, construction and handling of databases, data processing, statistics, geo-statistics, and estimation of geological resources. In the area of production, he has estimated resources in the long, medium and short term, skills which he has acquired working in several geological environments and ore bodies.</p> <p>Copper ore bodies included Chuquicamata, Carmen de Andacollo, and Michilla in Chile, La Granja in Peru, El Pachón in Argentina. Gold ore bodies included El Indio in Chile, La Virgen and La Arena in Perú, and San Pedro in Mexico, plus other minor deposits of Brazil, Ecuador, and Bolivia.</p> <p>He is accredited as a competent person by the Comisión Calificadora de Competencias en Recursos y Reservas (Law of the Republic of Chile N°20.235) with the registration number 0005.</p> <p>144478 CIM, Canada            1998 IIMCH, Instituto de Ingenieros de Minas de Chile            158 CGCH, Colegio Geólogos de Chile.</p>



## STAFF PERMANENT TECHNICAL

NAME	POSITION	EXPERIENCE, ACCREDITATION, PROFESSIONAL DEVELOPMENT
Javier Córdova Carreño	Senior Mining Engineer	<p>A Mining Engineer with over of 10 years of experience. In 1997, he graduated in Mining Engineer from Universidad de Santiago de Chile.</p> <p>He has worked in activities related to planning and development of operational problems by mathematical formulations; design of mining plans, production control, reconciliations, design of methodologies to optimize the sequence of dump filling, planning software implementation, among others.</p> <p>His has an advanced knowledge of the following software:</p> <ul style="list-style-type: none"><li>• DATAMINE</li><li>• Gemcom</li><li>• 3D and 4D Whittle</li><li>• Vulcan</li></ul> <p>All skills developed working in companies like Minera Spence SA, BHP Chile Inc., Minera Mantos de La Luna SA, Compañía Minera Dayton de Andacollo, Angloamerican Chile, Sociedad Minera Punta del Cobre.</p>



## STAFF PERMANENT TECHNICAL

NAME	POSITION	EXPERIENCE, ACCREDITATION, PROFESSIONAL DEVELOPMENT
Víctor Astudillo Casanova	Support Engineer	<p>Qualified to assist in preparing short and long term projects as well as to carry them out. He is able to manage or advise mining operation in the extraction and processing of minerals. Trainer of Vulcan Software workshops:</p> <ul style="list-style-type: none"><li>• Basic</li><li>• Intermediate and Advance</li><li>• Geological Modelling</li><li>• Grade Control</li><li>• Drill and Blast</li><li>• Short Term Planner</li><li>• Underground Mining Design</li><li>• Optimization and Design of Open Pit</li><li>• Lava</li><li>• Chronos</li><li>• Stope Optimiser</li></ul>



## STAFF PERMANENT TECHNICAL

NAME	POSITION	EXPERIENCE, ACCREDITATION, PROFESSIONAL DEVELOPMENT
Rodrigo Jorquera Tello	Assistant Project Engineer.	<p>Engineer specialized in processes, and qualified to develop, implement, evaluate and supervise maintenance and operation plans which aim is to achieve optimum availability and reliability of all mechanical equipment and measuring instruments.</p> <p>He manages CAD – CAM tools and engineering softwares such as Pro Engineer, SolidWorks and Vulcan.</p> <p>Theoretical and practical experience in management of energy resources and in the implementation of projects related to the use of non-conventional renewable energies.</p> <p>Experience in maintenance supervision in a wide range of equipments involved in manufacturing and measurement processes; control of risks associated with it; activity planning and material, economic and human resources management.</p>



## Company Profile

### ASSOCIATES

As Part of the Core Mining Studies concept of technical networking, we have technical selected associates. The permanent associates of **Core Mining Studies** are currently based by the following professionals:

NAME	EXPERIENCE, ACCREDITATION, PROFESSIONAL DEVELOPMENT
Fernando Hintze F.	Geologist specialized in Economic Geology. He combines more than 30 years of experience associated with the complete chain of the geological value: exploration, geological project evaluation, mining project evaluation in its different stages of engineering, production and economic geology. Skills that have been obtained working in different geological areas and deposit types, mainly in large copper porphyries (Chuquicamata, El Salvador, Los Pelambres, Potrerillos) and other smaller deposits. He has worked in Chile, Peru, Argentina and Ecuador.
Eduardo Alvarez H.	Senior Geologist, B.S. of Universidad de Chile, graduate degree inn the Northern Arizona University and Geological Studies. He has worked as staff geologist and as consultant in Chile, Peru, Argentina y Brazil.
José Luis Fuenzalida I.	Senior Geologist specialized in geological computing and resource estimation. He has carried out consultant works in mining operations, in survey of geological, geotechnical and mining planning processes. Also, he has carried out consultancy in design, construction and implementation of geological and documentary data bases.
Martín Pérez V.	Senior Geologist of the Universidad de Chile. He has worked in the exploration area and in geological resource evaluation in different projects in Chile, Peru, Ecuador y Argentina.
José Miguel Carrera S.	Mining Civil Engineer with more than 35 years of working performance. His extensive experience has allowed him to perform conceptual and basic engineering projects, cost analysis, mining business evaluation and Due Dilligences in mines and mining projects, such as Codelco-Chile, San José Mining Company, Disputada de Las Condes Mine, among others. He has also developed mining projects in Argentina and Bolivia. More than 10 years in the area of teaching is featured, which was developed at Universidad de Santiago de Chile.



## 2010 ACTIVITIES

MAIN CLIENT
Marcobre S.A.C.
BHP Billiton
Minera Cerro Dominador
SBX
Minera Las Cenizas S.A.
VALE
TECK
BARRICK
International Copper Corp. (ICC)
Minería Activa





## 2011 ACTIVITIES

MAIN CLIENT
Minera Andes Iron Ltda.
SAMCO Minerals
Minera Escondida Limitada (MEL)
Minera Esperanza
SBX
Minera Las Cenizas S.A.
VALE
TECK

MAIN CLIENT
BARRICK
Spence
San Gabriel
White Mountain t Titanium Corp.
Collahuasi
International Copper Corp. (ICC)
Cerro Colorado
Minería Activa



## Company Profile

## VIÑA DEL MAR OFFICE





## ANTOFAGASTA OFFICE





## MAPTEK USERS CONFERENCE AUSTRALIA



Claudia Monreal Contact Simulation for Potassium Fields VALE PRC-MENDOZA



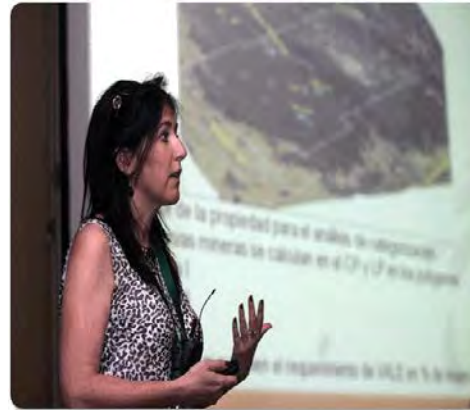
Javier Córdova Dump Filling Optimization by Linear Planning

APRIL 2011

## MAPTEK USERS CONFERENCE VIÑA DEL MAR

Claudia Monreal Simulation on Applied to Mining Solutions

Claudia Monreal junto a 3 de los 33 Mineros: Juan C. Aguilar, Jorge Galleguillos, Luis Urzúa



OCTOBER 2011



Claudia Monreal General Manager of Core Mining Studies, during her speech

*SEMINAR OF RESOURCES, RESERVES AND MINE PLANNING, JULY 2011*

Claudia Monreal during questions round



Claudia Monreal Simulation as Strategic Planning Tool



Edmundo Tulcanaza Mining Commission President (Chile), Claudia Monreal and Jaime Henríquez Director of Planning Codelco Mining.

*ACTIVITIES OUTREACH, ENTREPRENEURSHIP COLLOQUIUM  
ANDRÉS BELLO UNIVERSITY - VIÑA DEL MAR*



## EXPONOR ANTOFAGASTA



JUNE 2011

