

THE CHILEAN CODE FOR RESOURCES AND MINERAL RESERVES ASSESSMENT

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Chilean Mining Commission

www.comisionminera.cl

AGENDA

- Motivation
- The focus of the Code
- Uncertainties and Risks
- Resources and Reserves
- The Chilean Code

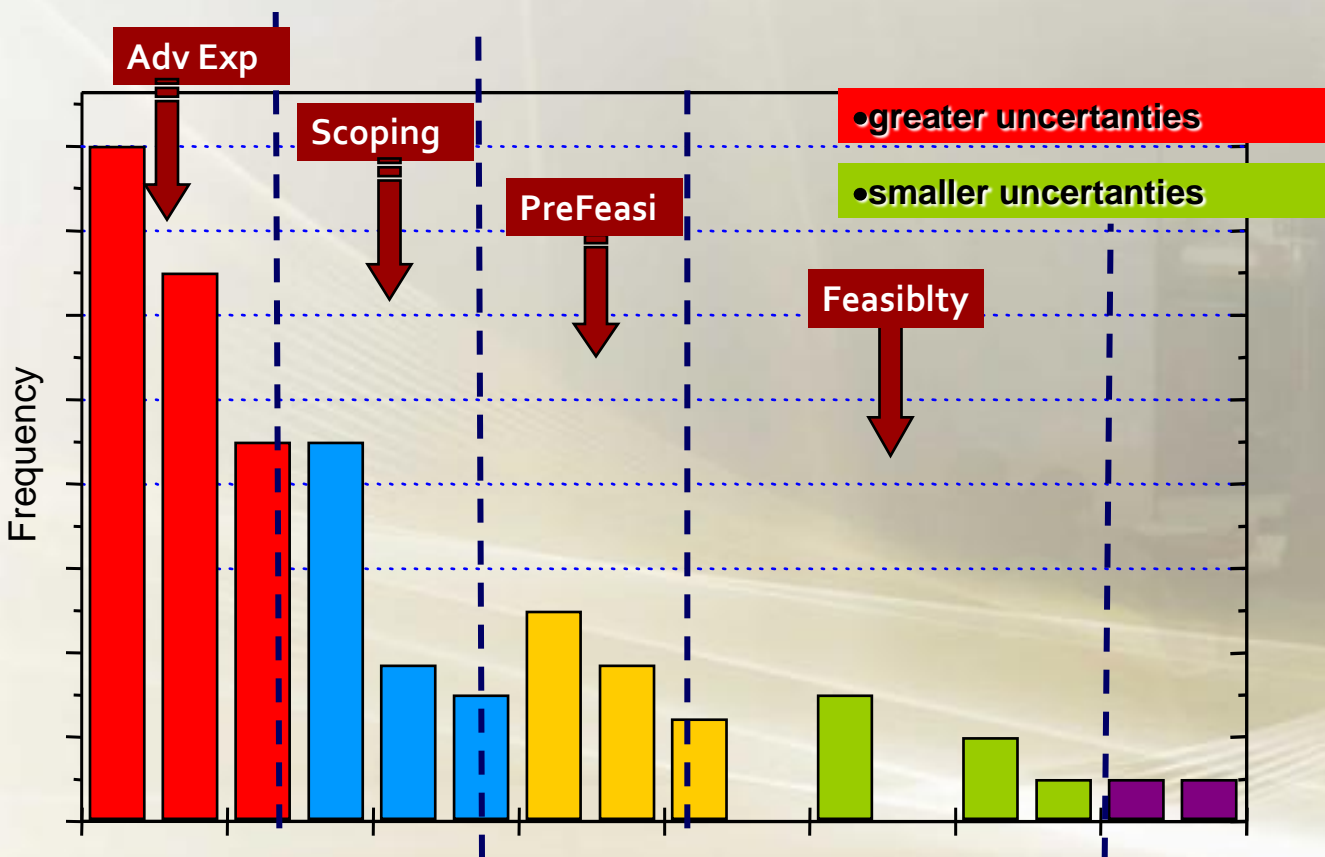
Globalization of the world economics brought more rigorous international regulations in all commercial contexts.

The last economic crisis enforced better information standards and much greater transparency of the assets of companies and financial services.

The mining industry has not been out of this situation : countries with vigorous exploration and mine development activities such as Australia, Canada, y South Africa have established technical standards to inform and report venture prospects, mineral resources, and ore reserves.

¿ ... and why this exigency?. Because of the transparency required for national governments, financial institutions, stakeholders, and citizens in relation to their non-renewable resources ; ...because of the uncertainties affecting mine assets ; because of the negligence that often occurs in reporting ; because of the proven frauds that have existed in the mining industry , because all of the previous reasons??

The greater uncertainties are centered in the preliminary studies, and exploratory activities in which financing is mostly based on risk capital. The smaller uncertainties are centered in the feasibility or bankable studies in which the financing frequently corresponds to public capitalization.



Probability of occurrence of a mine based on a	
ANOMALY	1-2%
ADVANCED EXPL	25-30%
SCOPING	50%
PRE FEASIBIL	80%
FEASIBILITY	90%
CONSTRUCTION	100%

Transparency is always recognized but not always accomplished



However, the timing for transparency and trust is arriving.

At the present time;

- The IASB has proposed new accounting rules to inform on the companies's corporate finances (IFRS). For those devoted to extractive activities the IASB's proposal recommends well specific standards that must be applied by certified qualified professionals to do it.*
- Mine closure standards enforce to guarantee the extension of mine extraction through the mineral inventories which require certification of a **qualified professional**.*
- Mine projects and businesses listed in the financial and capital markets require transparent and reliable information to guarantee to the public the mine assets potential and their values. This potential that finally impact the companies's capitalization and their values also require a **qualified professional**.*
- The multi-listing of mine properties in a foreign market may affect national professionals because only a foreign professional may report and inform on a property in that foreign country. Ideally, global markets require **global professionals**.*



Development and evaluation of mine assets require a common platform of unambiguous concepts and standard definitions as guidelines to support mine data capture, interpretation, processing and reporting.

This is the minimum requirement to inform publicly on mine assets and contribute to an efficient capital market for the mineral-based businesses

A platform implies to set up and adopt a Code or Standards allowing Qualified Competent Persons to certify the characteristics, vulnerabilities, potential, and challenges of a mineral property based on their qualifications, experience, and credibility.

The Code makes easy the transparency towards the markets and maintain the public confidence and faith in accordance with international standards of the industry.

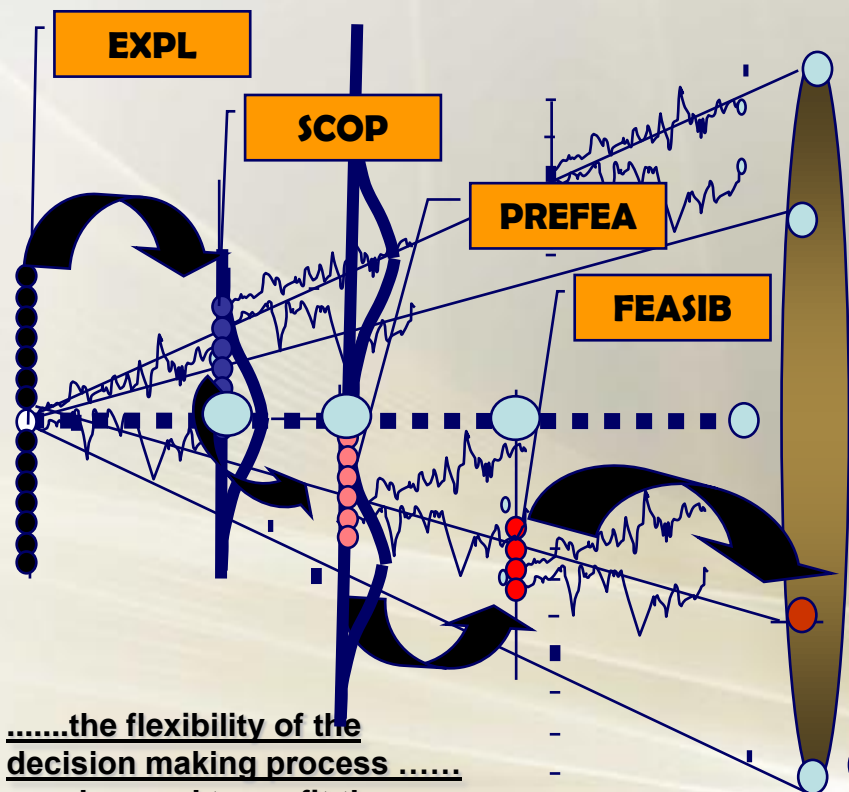
Based on these considerations the Ministry of Mines of Chile assigned to the Instituto de Ingenieros de Minas de Chile the responsibility to prepare a Code of guidelines to inform and report exploration prospects, mineral resources, and ore reserves (Nov 2002)..

The conditions of the Ministry were to:

- Invite to different audiences of the country's mining sectors*
- Follow the key international criteria established by Australia, Canada, and others.*
- Revise the existing material issued on this topic up to these days in Chile.*

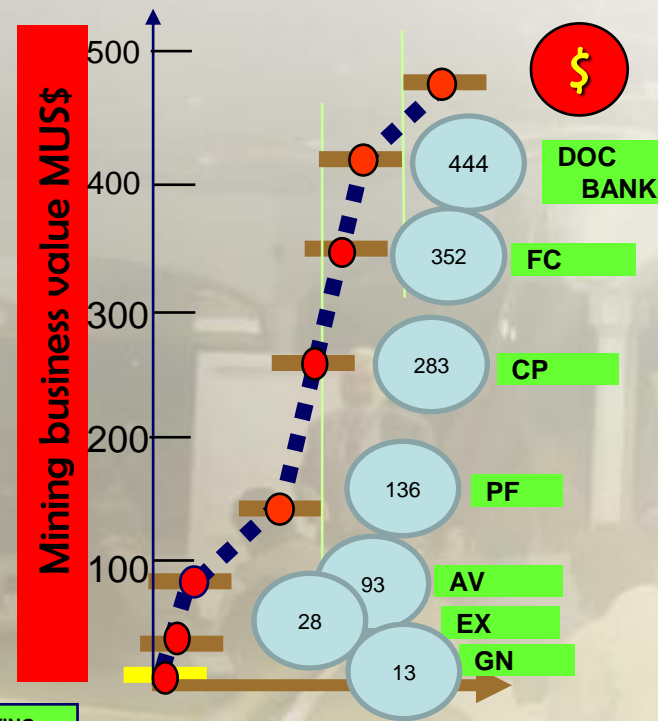
22 mining entities – among them private and public mining companies, metallic, non-metallic, base metals, and precious metals enterprises, consultants as well as regulators assisted in the preparation, final issue, and presentation of the Code to the Ministry of Mines (Nov 2003).

The central focus of the Code contents was to consider the orderly and systematic transit demanded by a mining project to transform resources into reserves and to convert these reserves into a mine project.

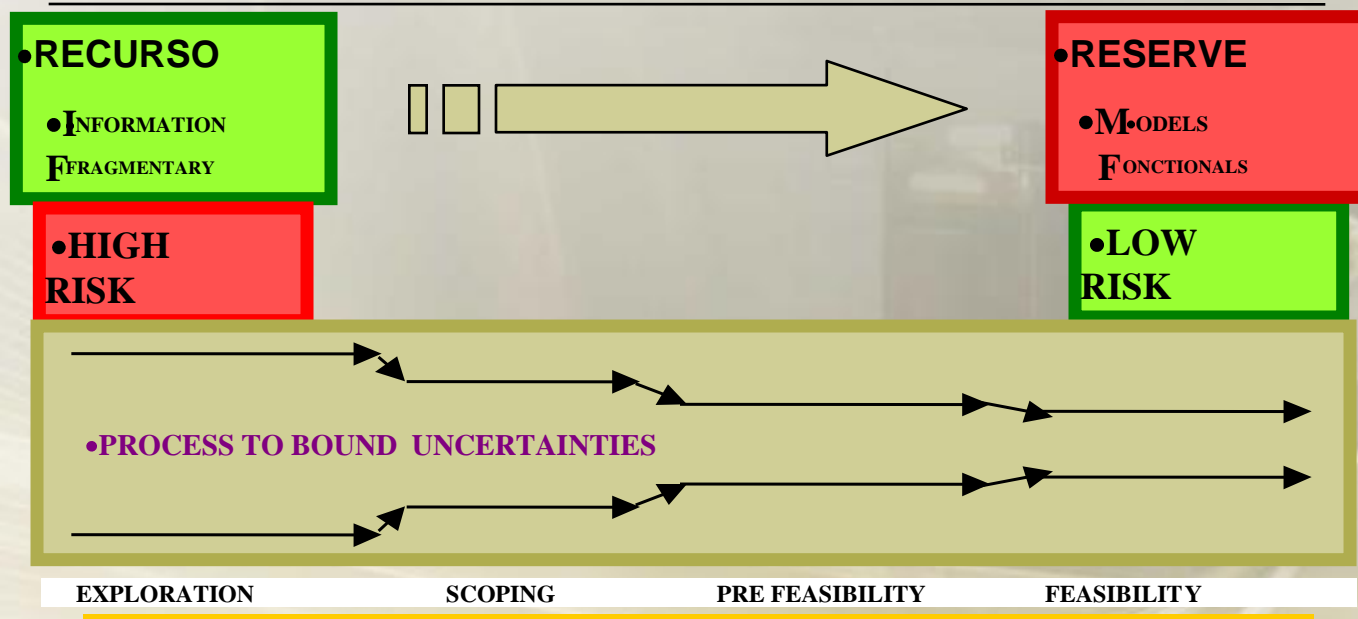


.....the flexibility of the decision making process
can be used to profit the opportunities and to mitigate risks.....

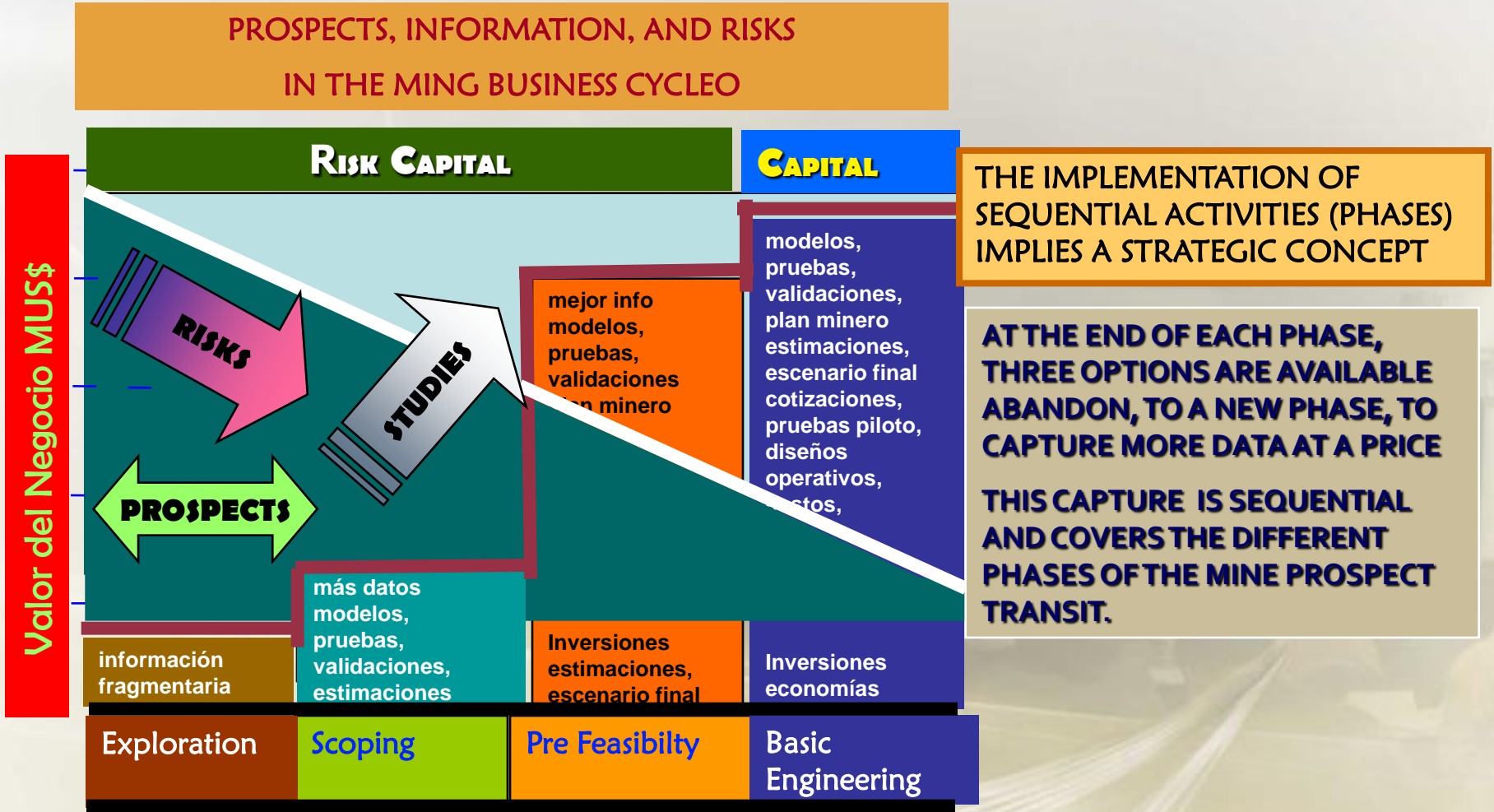
- TO FOLLOWING PHASE
- MORE INFORMATION
- ABANDON



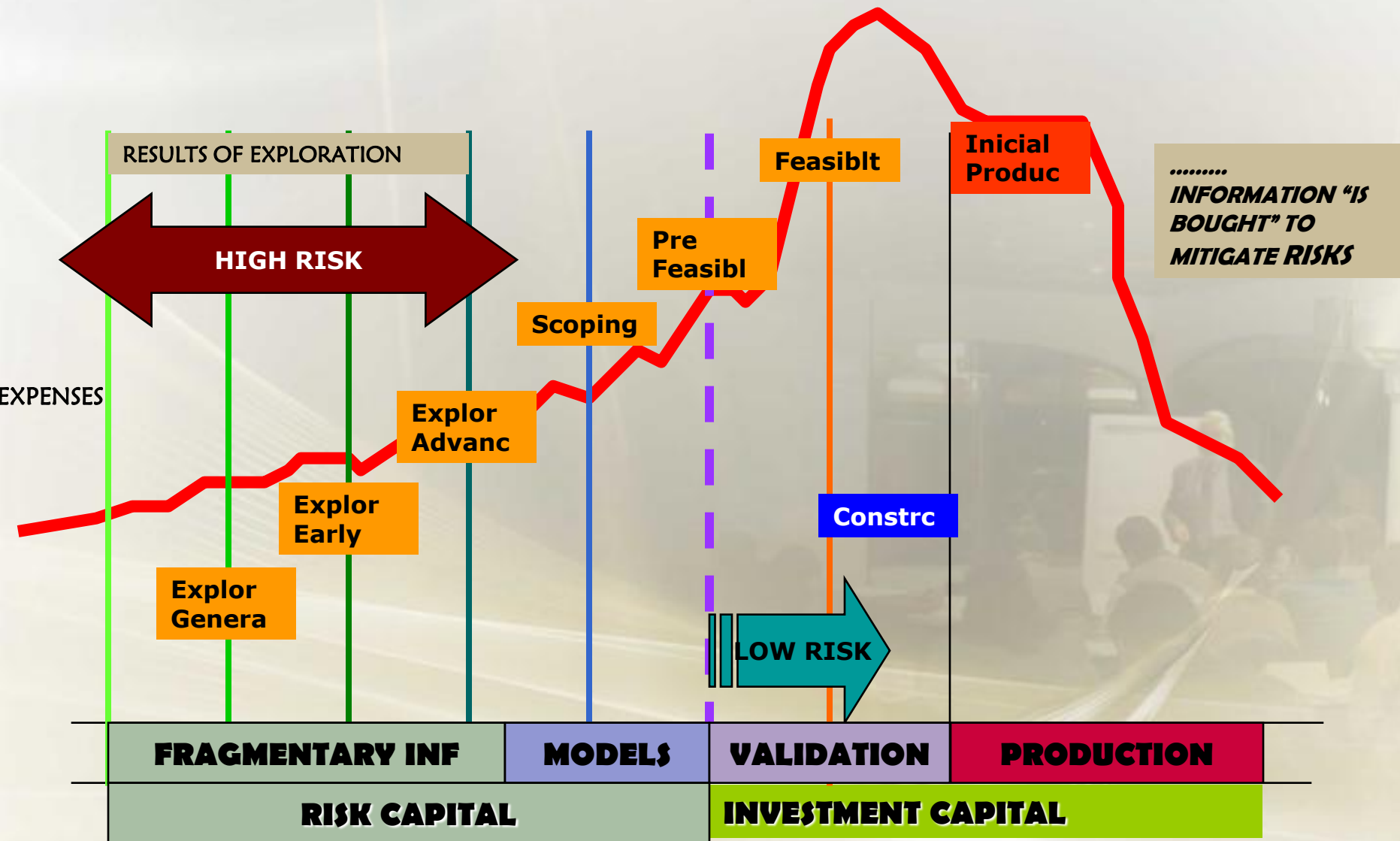
□ The underlying concept that guides the Chilean code is that uncertainty must not be confused with ignorance. Uncertainty implies the capture of some fragmentary information that allows us to have a measure on the precision affecting a selected estimate. Ignorance implies the total absence of information and data on the values reached by a selected variable or technical parameter. By the same token, uncertainty should not be confused with negligence.



□ The strategic response for mitigating uncertainties and risks is the development of exploration and engineering activities through phases (scoping, pre-feasibility, y basic engineering).



TRANSIT FROM EXPLORATION TO DEVELOPMENT TO PRODUCTION IMPLIES "TO BUY" INFORMATION



Geological risks

A meticulous description of the geological characteristics is required

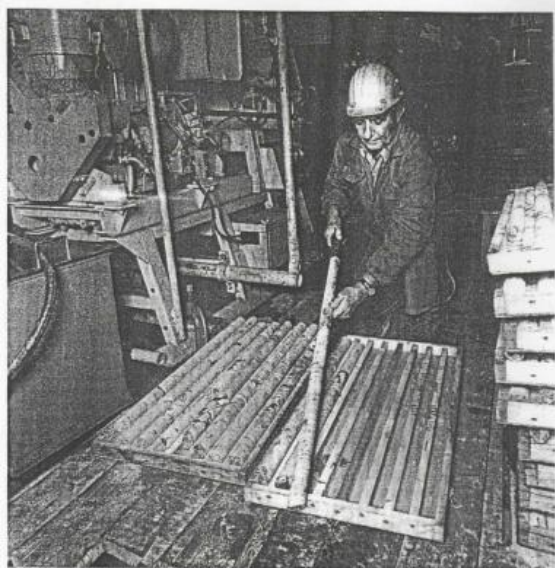


to identify presence of minerals and contaminants

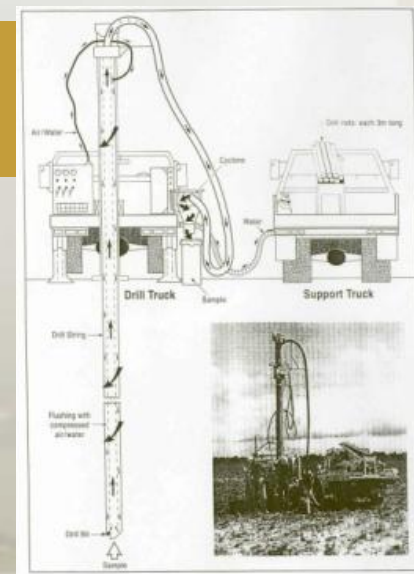
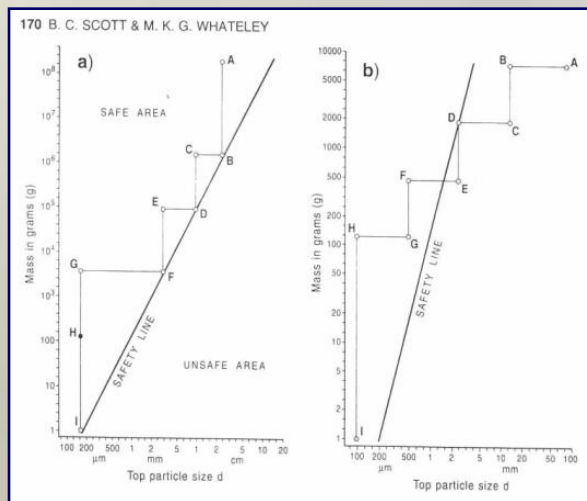
□ Technical risks :

Data capture, grade estimates, geo-metallurgical unit definition, sample size reduction, chemical assays, commercial risks; environmental permits, among others.

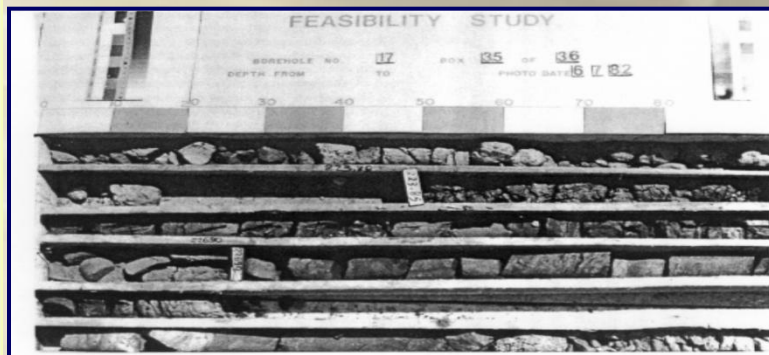
□ sampling/size reduction:



□ drilling:



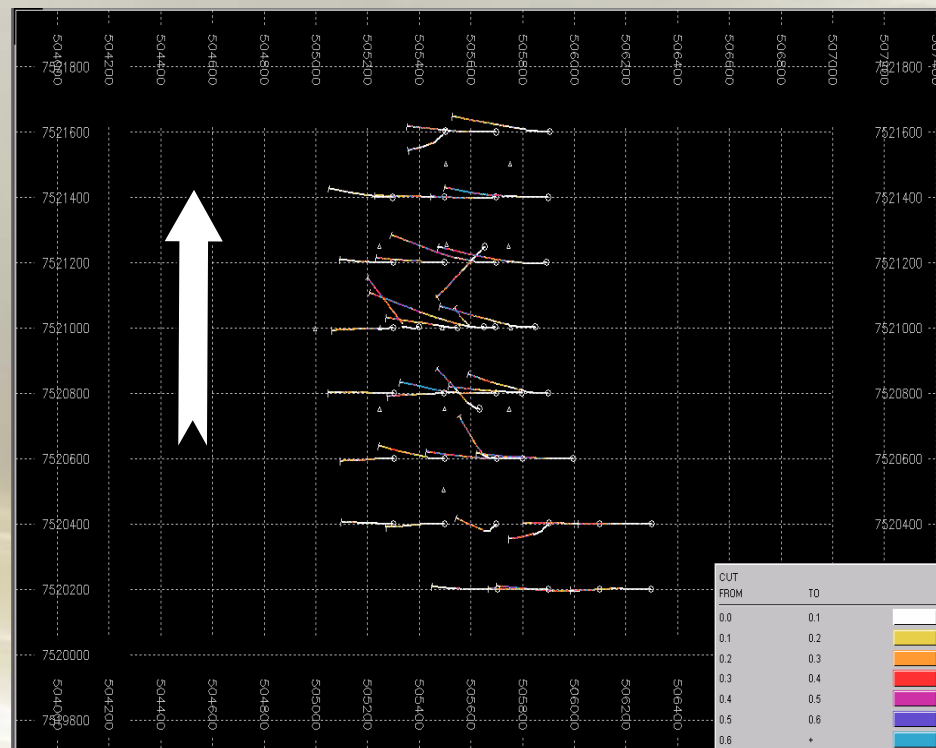
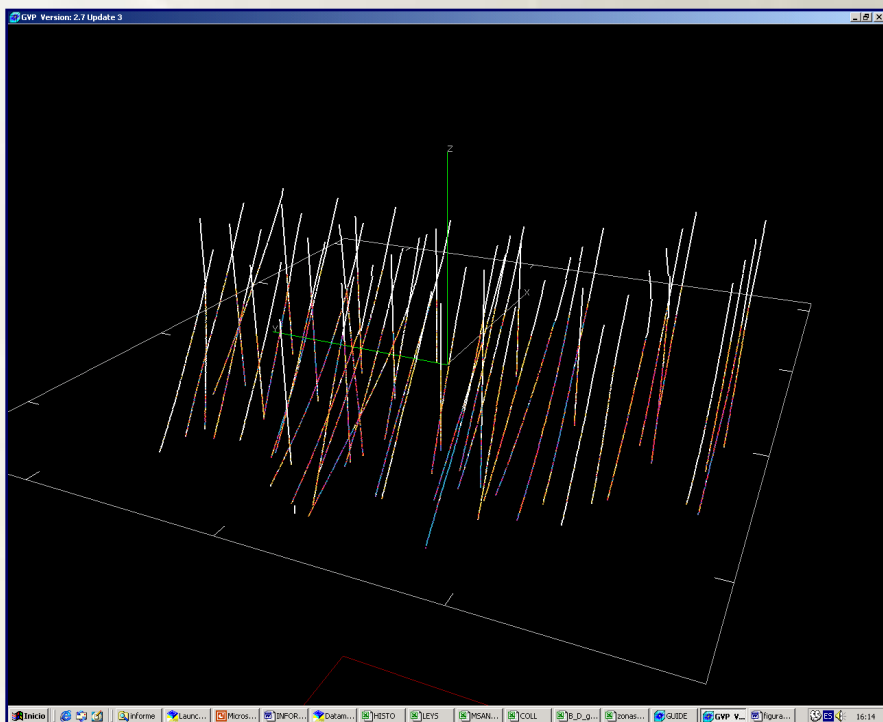
□ chemical assays:



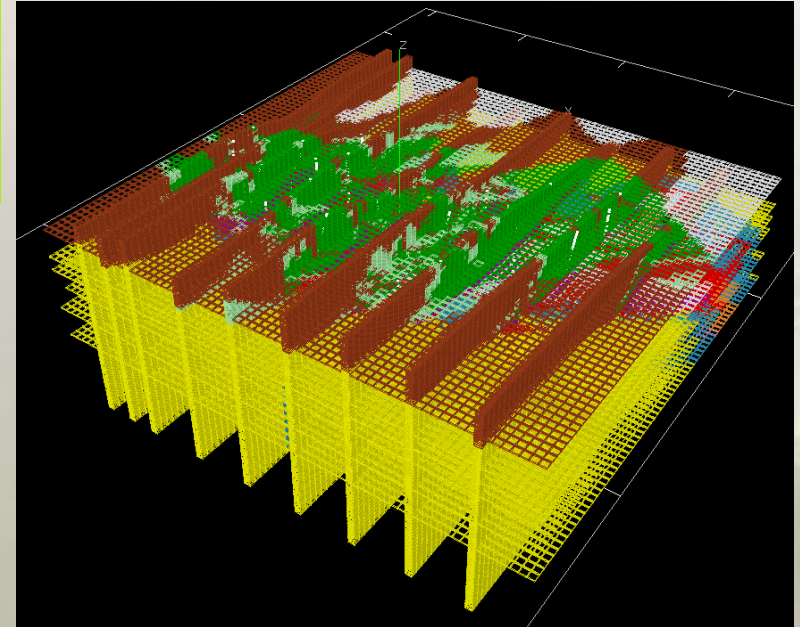
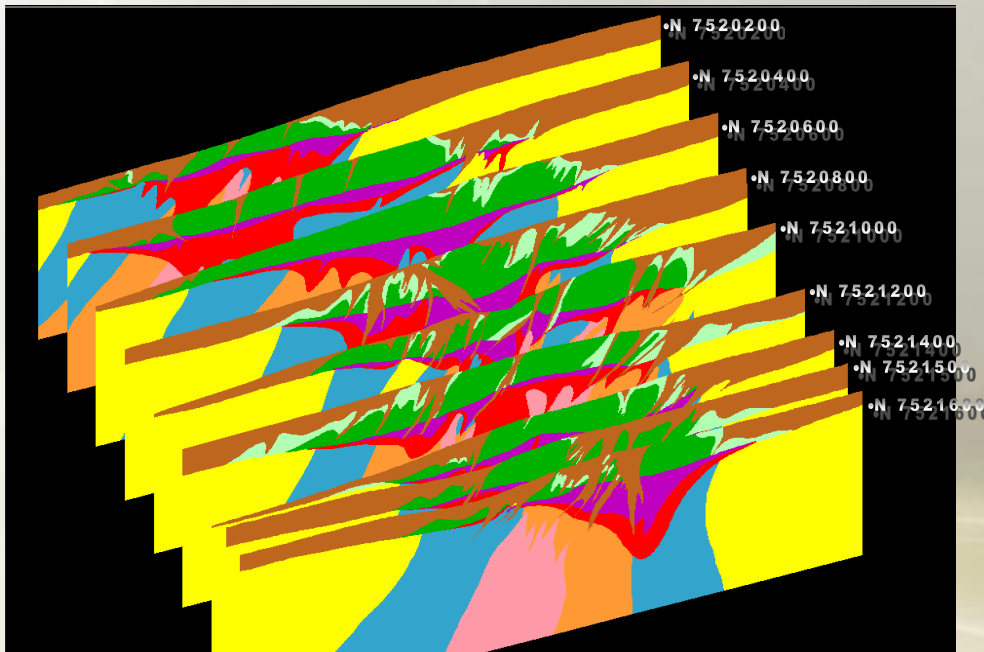
□ core recovery

Geological model:

The geological model makes coherent and consistent the 3D data in order to have a systematic, explicit, and complete information.



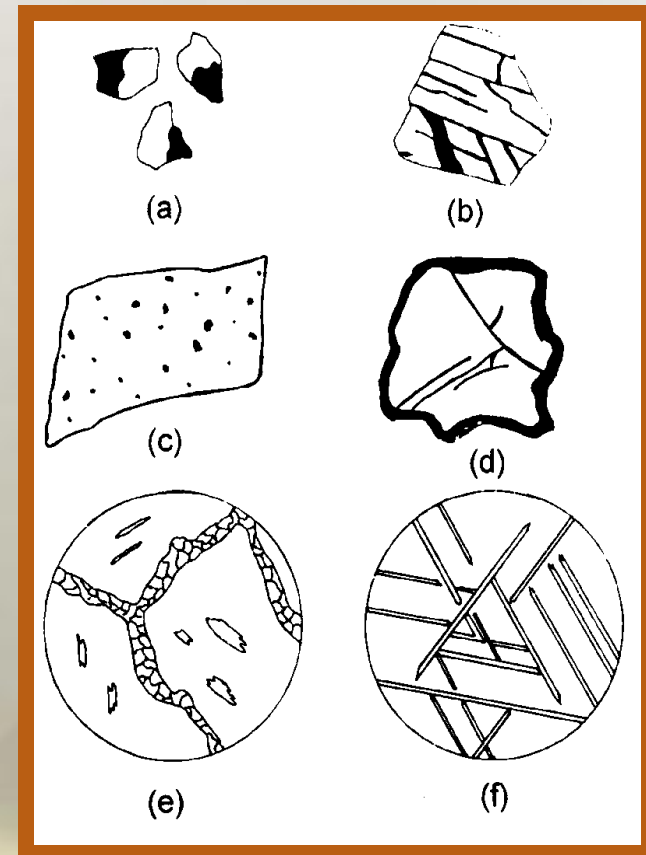
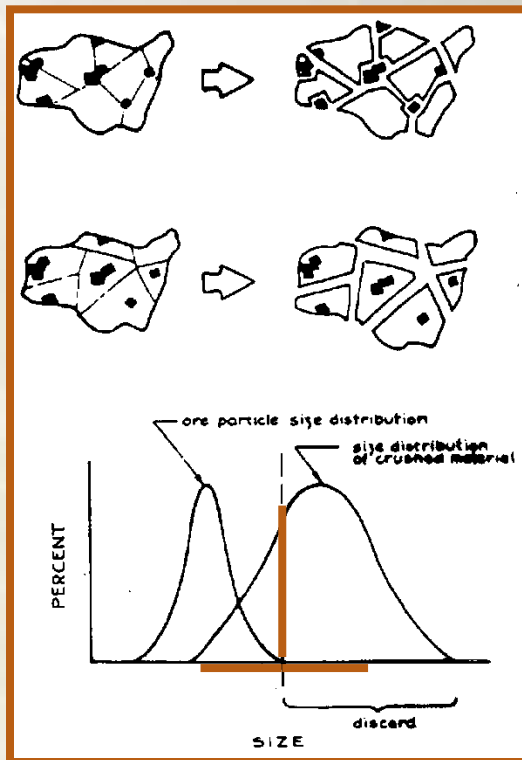
□ **mineralogy:** effort to identify refractory minerals (these are difficult to recover). For instance, chalcopyrite within oxide ores or gold in pyrite.



grade continuity model: a 3D model requires the modeling of geological sections, profiles, and plants modeling where the privileged directions of the mineralization and their continuity are clearly established.

□ Geometallurgical risks

*Refractory ores:
they demand more energy for
crushing and grinding.*

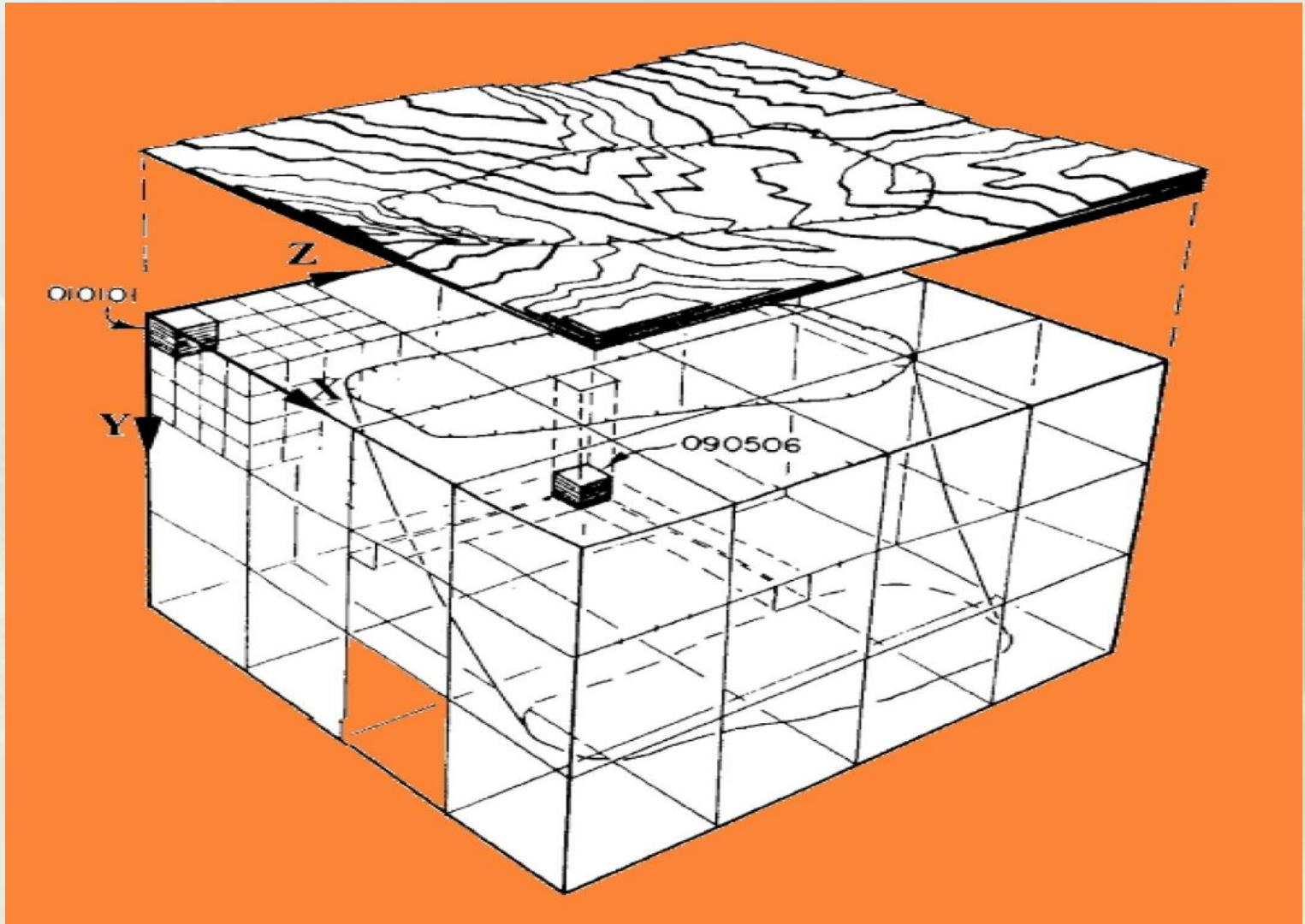


Texture analysis:

*It is important to anticipate
the ore internal structure.*

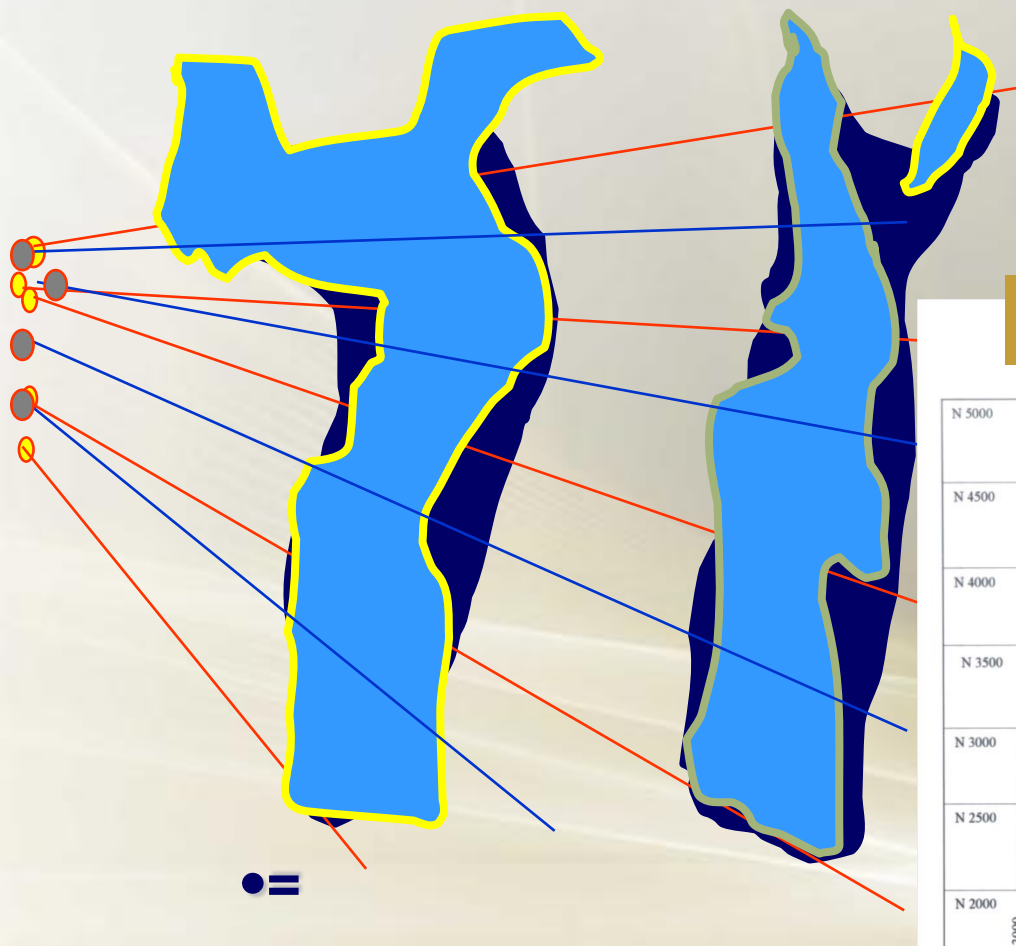
Resource model:

Cut-off grade:

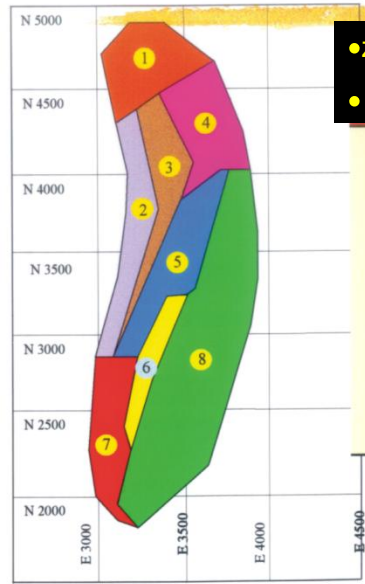


• Dilution risks:

ore contamination: more low grade material or waste and less ore material



Rock hardness: *higher costs*

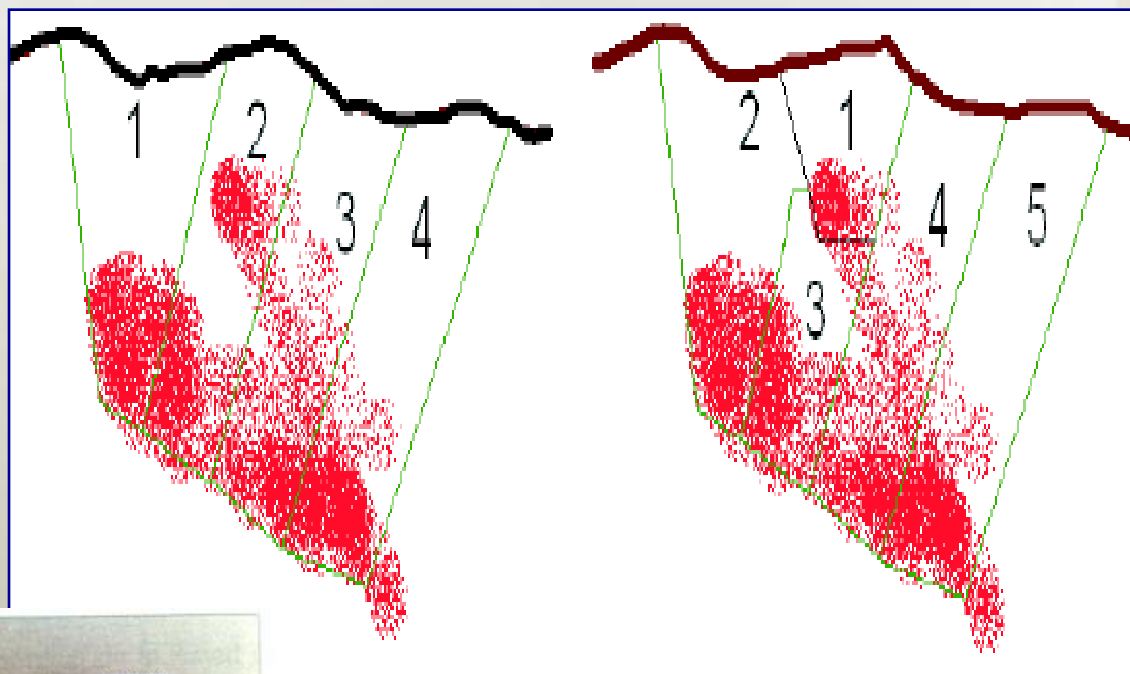


• zona recuperación ley de concentrado dureza

	%	%CuT	wi
1	86	28 a 30	14 a 14,5
2	<90	28 a 30	12,5
3	<90	>32	<12
4	86	30, con insoluble alto	13,5 a 14
5	86	>32	13,5 a 14,5
6	80 a 86	30 a 32	15,8
7	80 a 86	30	12 a 15
8	<80	28	14,8

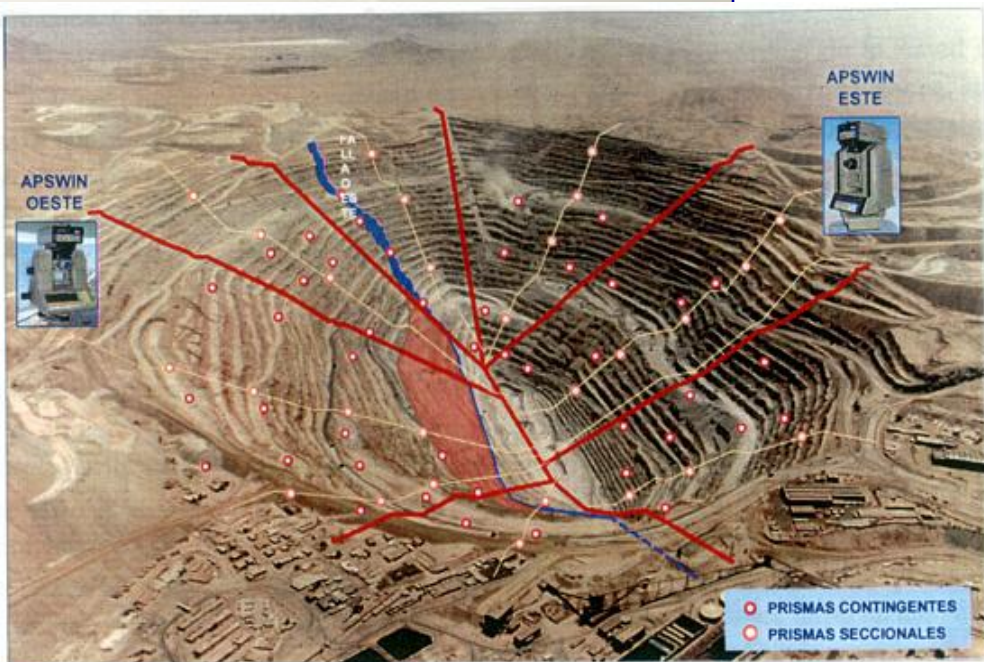
Geotechnical risks:

Colapse, wall slides, others



Mine plan risks:

metal prices, operating costs,
productivities, reliability.

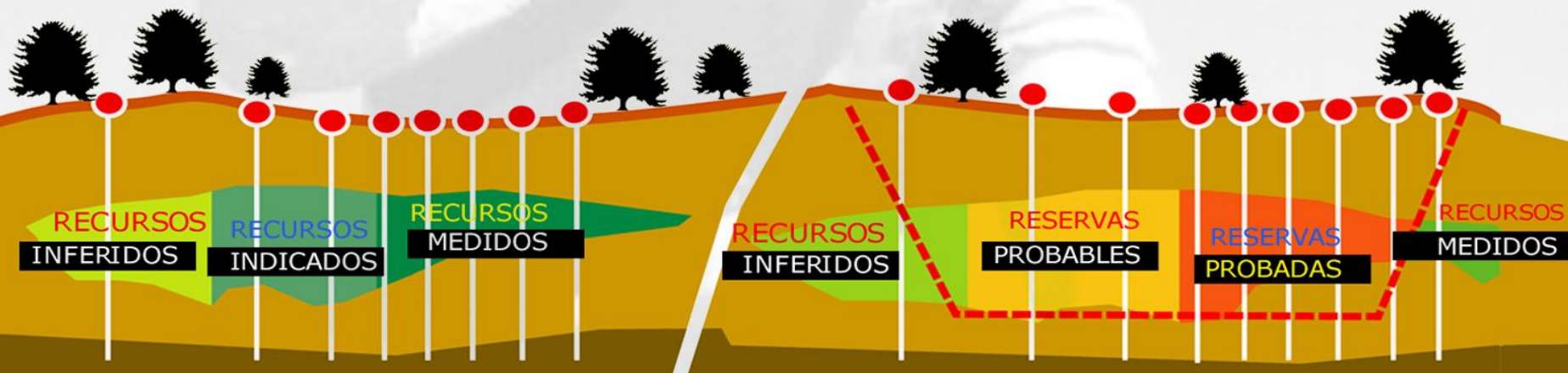
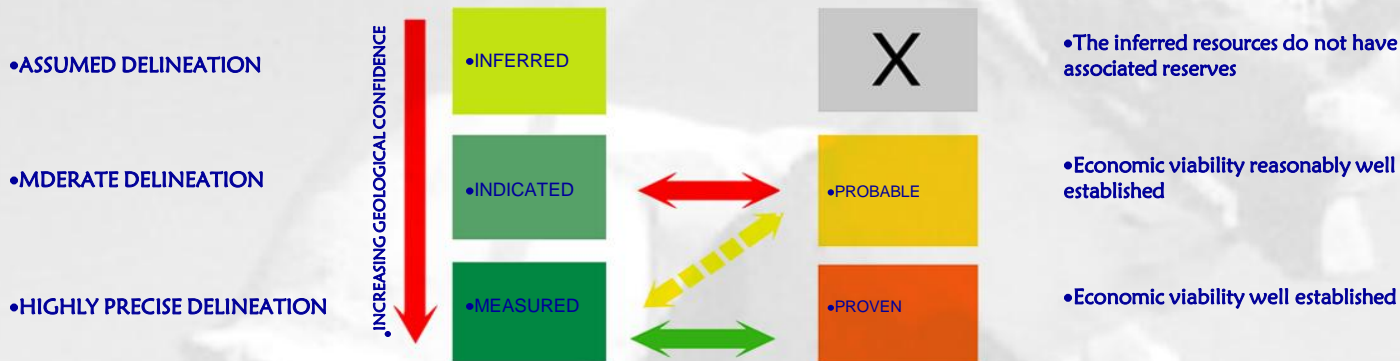


IMPROVING THE TECHNICAL AND FINANCIAL REPORTING OF MINERAL RESOURCES AND RESERVES

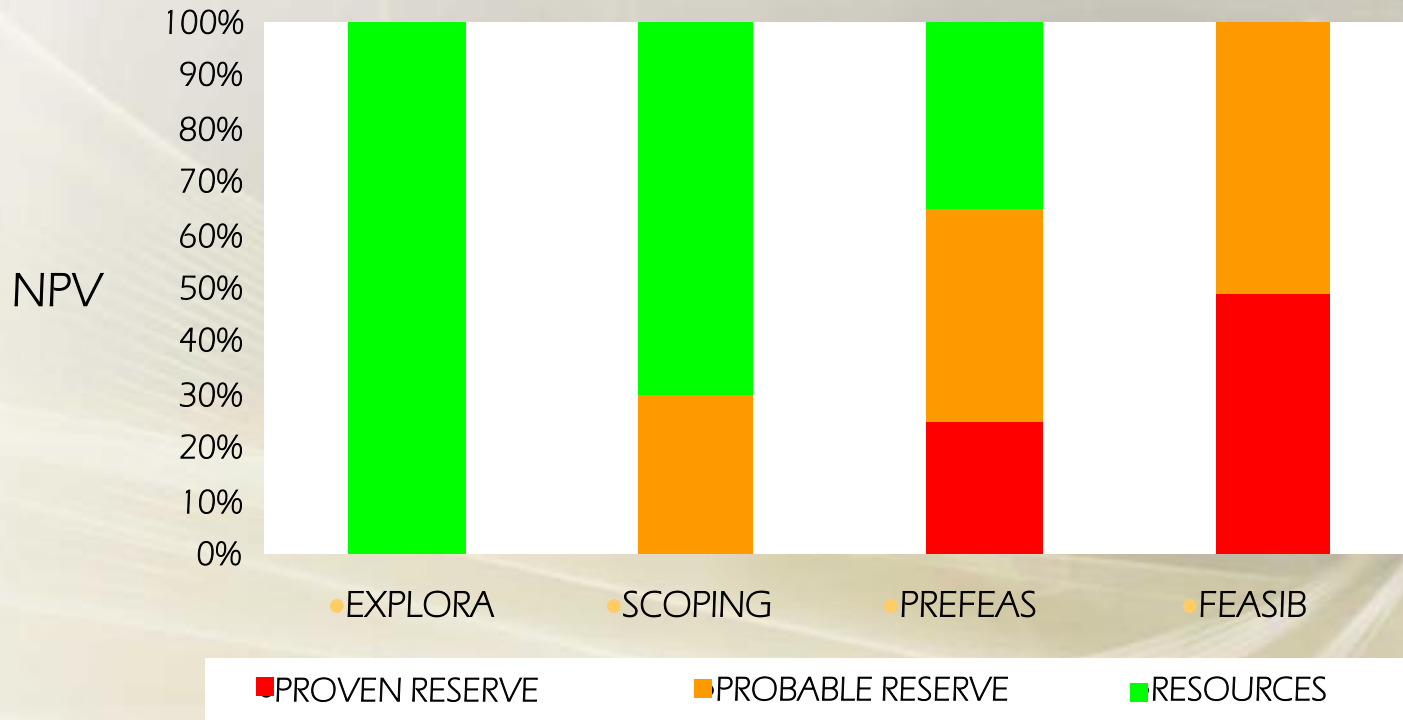
*Resources
Reserves*

• GEOSCIENTIFIC DELINEATION

• ECONOMIC VIABILITY



RESOURCES / RESERVES PROPORTIONS
SUPPORTING THE NPV OF A MINE PROJECT
AS IT PROGRESSES THROUGH ENGINEERING PHASES



- *When reporting resources and reserves a clear distinction between them is mandatory. They should be clearly quantified.*
- *Inferred resources when incorporated into a mine plan they require a clear explanation on the programs being considered to transform them into indicated resources and then into measured resources.*
- *A significant difference between resources and reserves may indicate that some resources are not viable because strong technical / economic reasons. In other words, these resources are far from becoming actual reserves.*
- *At any rate, codes are not prescriptive. The judgment of the qualified professional is important in making the right decision when ore and mineral categorization is under his/her responsibility.*

It has been accepted that resources and reserves publicly reported are estimates..

The qualified professionals must have sufficient experience to know what is a requirement to inform and report publicly on resources and reserves in such a way that his/her responsibility and reputation is always in good standing.

Although codes do not impose any methodology or system, most of the qualified professionals follow a routine to assure the confidence in a mineral categorization.

A method proposed by Dr. Harry Parker of AMEC, is usually used for measured and indicated resources:

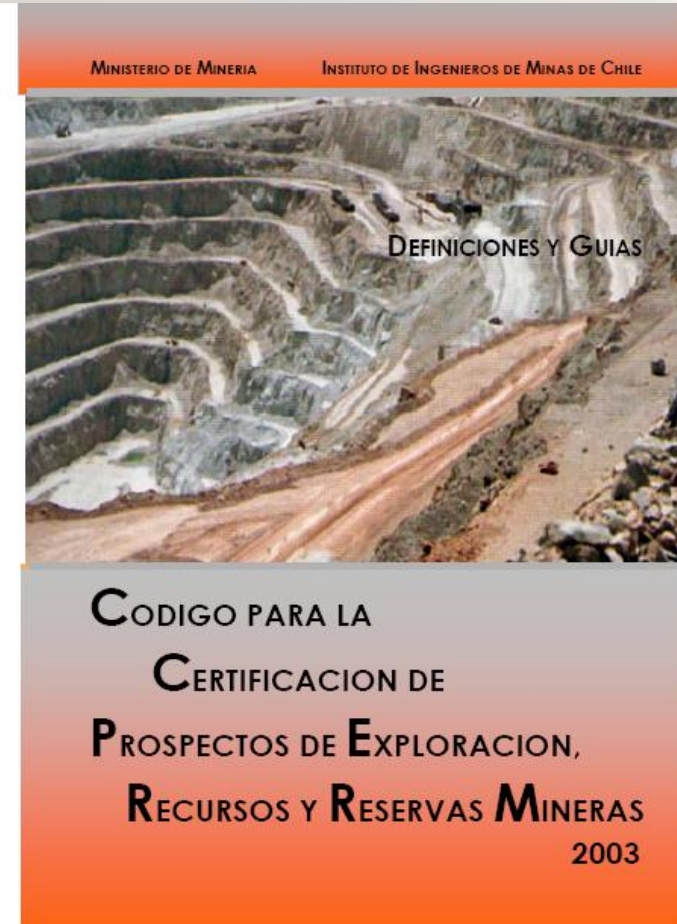
<i>Measures</i>	<i>+/- 15% with 90% confidence on a three-month basis</i>
<i>Indicated</i>	<i>+/-15% with 90% confidence on an annual basis</i>

The Chilean Code

Based on all these uncertainties and risks as well as other mine vulnerabilities and their mitigations, the Instituto de Ingenieros de Minas de Chile, with the sponsorship of the Ministry of Mines prepared a Code for the Certification of Exploration Prospects, Mineral Resources and Reserves (Nov 2003).

the Código incorporates:

the global nature of the present mining business and the existing international codes ; the essential characteristics of the geoscientific information, the transparency, the materiality of the information, and the required competency for the professional in charge of the reporting, the requirements to qualify them in the area of mineral resources and reserves.



In order to

- institutionalize the acceptance and adoption of the Chilean financial community*
- generate this institution on the basis of an auto-governed entity*
- give this entity disciplinary powers to impose fines and other penalties to those professionals acting with negligence and dishonest practices*

the Ministry of Mines and the Government sponsored a law project to create the “Comisión para la Certificación de Competencias en Recursos y Reservas Mineras” in charge of managing the National Registry of Competent Persons in Mineral Resources and Reserves and the qualification of the Competent Persons – In our case the law took five years to become promulgated the 31 of December 2007..

Biblioteca del Congreso Nacional

Identificación de la Norma : LEY-
20235

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Fecha de Promulgación :

17.12.2007

Organismo : MINISTERIO DE
MINERIA

LEY NÚM. 20.235

REGULA LA FIGURA DE LAS
PERSONAS COMPETENTES Y

CREA LA

COMISIÓN CALIFICADORA DE
COMPETENCIAS DE RECURSOS

Y

RESERVAS MINERAS

Teniendo presente que el H.

Congreso Nacional ha

dado su aprobación al siguiente

Proyecto de Ley:

□ *the Comisión was proposed as a corporation of private nature in charge of qualifying Competent Persons; revising and issuing the updating of the Code already prepared ; establishing training programs for Competent Persons ; supervising the activities of Competent Persons in their role as qualified professional in reporting mineral resources and reserves ; validating the status of competences of Competent Persons and other tasks.*

□ *this Comisión has five partners:*

The Institute of Mining Engineers, the College of Engineers; the College of Geologists; the Society of National Mining, and the Mining Council.

□ *the Comisión is member of the:*

Committee for Mineral Reserves International Reporting Standards (CRIRSCO) that group to the National Organizations in charge of the Mineral Resources /Reserves Standards in : Australia, Canada, Chile, Europe, South Africa, and USA.

CRIRSCO has a partnership with the ICMM in the mineral resources area.

IMPROVING THE TECHNICAL AND FINANCIAL REPORTING OF MINERAL RESOURCES AND RESERVES

The
Chilean Code

CRIRSCO

- AUSTRALIA
- Australasian Code for Mineral Resources and Ore Reserves Reporting of Exploration Results.

~ The JORC Code ~

- SOUTH AFRICA

- South african code for Reporting of mineral resources And mineral reserves.

~ The SAMREC Code ~

- CANADA
- CIM DEFINITION STANDARDS
On Mineral Resources and Mineral Reserves
Prepared by the CIM Standing Committee on
Reserve Definitions.

~ National Instrument 43-101 ~

- EUROPEAN CODE

- Code for Reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves.

~ The PERC Code ~

- CHILE
- DEFINICIONES Y GUIAS
Código para la Certificación de Prospectos de
Exploración, Recursos, y Reservas Mineras.

• ~ Ley 20.235 ~

- USA
- A Guide for Reporting Exploration Information, Mineral Resources, and Mineral Reserves

• The SME ~

The Comisión

- ❑ *has a close relation with the institution partners through their representatives : one for each of the five institutions.*
- ❑ *has a close relation with CRIRSCO in issues of interest for the mineral sector*
- ❑ *has been awarded partial financing from the Chilean CORFO, Mine Cluster program to carry out in 2009 and 2010 training and educational Seminars, Workshops, and other meeting in the mining sector.*
- ❑ *contributes in a permanent fashion with other entities to close the gap between the financial and the mining sector.*

**The Chilean
Commission has
qualified 60
professionals of
the mining sector
as Competent
Persons**

**From these 60
professionals 31
are geologists**

The Chilean Comisión, as any other national organization, demands the following requirements to become a qualified Competent Person (www.comisionminera.cl)

- to have five years of relevant experience and competence in a specific area of mineral resources and reserves*

- to be graduated from an accredited university in the country. There is a reciprocity principle in relation to the recognition of foreign Competent Persons with those countries that respond in the same fashion in relation to Chilean Competent Persons.*

- to accept and apply the Chilean Code for information and reporting.*

An Admission Commission revises the application of candidates to become PC.

The Comisión

- ❑ *has achieved to be considered by the Canadian Securities Administrators (CSA) as a recognized foreign organization in its proposal for the new version of the NI 43-101.*
- ❑ *has been requested by the Ministry of Mines in Chile to accelerate the listing of mine properties either in the stock exchanges or in public investment funds.*
- ❑ *is contributing with some latin - american countries in getting into the CRIRSCO.- family of Codes.*

Finally,

*the Chilean Commission is ready to assist the
Brazilian mining community in establishing the
Brazilian Mining Commission.*

Muchas Gracias