



ASSOCIAÇÃO BRASILEIRA DE
EMPRESAS DE PESQUISA MINERAL



Technical Guidelines CBRR

Thomas Brenner (Votorantim Metais) & Celeste Queiroz (Vale)



Introduction

- ▶ **CRIRSCO** is a grouping of representatives of organizations that are responsible for developing mineral reporting codes and guidelines:
 - ▶ CIM (Canada)
 - ▶ JORC (Australasia)
 - ▶ SAMCODES (South Africa)
 - ▶ SME (United States of America)
 - ▶ Comision Minera (Chile)
 - ▶ PERC (Europe)
 - ▶ MPIGM (Mongolia)
 - ▶ NAEN (Russia)
 - ▶ **CBRR (Brazil)**
- ▶ The similarity of the various national reporting codes and guidelines has enabled CRIRSCO to develop the **International Minerals Reporting Code Template, the “IRT”**, which was the main reference for the CBRR Guide.
- ▶ Jorc Code_2012 and SME Guide_2014 were also an important source of contribution to the CBRR Guide.

**GUIA CBRR PARA DECLARAÇÃO DE
RESULTADOS DE EXPLORAÇÃO,
RECURSOS E RESERVAS MINERAIS**

“Guia CBRR”
Edição 2015

Preparado pela Comissão Brasileira de
Recursos e Reservas “CBRR”



CONTENTS

INTRODUCTION	3
SCOPE	4
Competence and Responsibility.....	6
Reporting Terminology.....	8
Reporting General.....	8
Reporting of Exploration Results.....	9
Reporting of Mineral Resources.....	11
Reporting of Mineral Reserves.....	15
Technical Studies.....	18
Commodity Pricing and Marketing.....	20
Permitting and Legal Requirements.....	21
Environmental, Social and Health and Safety Considerations.....	21
OTHER DECLARATIONS.....	22
TABLE 1.....	26
TABLE 2.....	47
APPENDIX 1: Generic Terms and Equivalents.....	49
APPENDIX 2: Code of Ethics.....	51
APPENDIX 3: Recognized Professional Organizations (RPOs).....	52

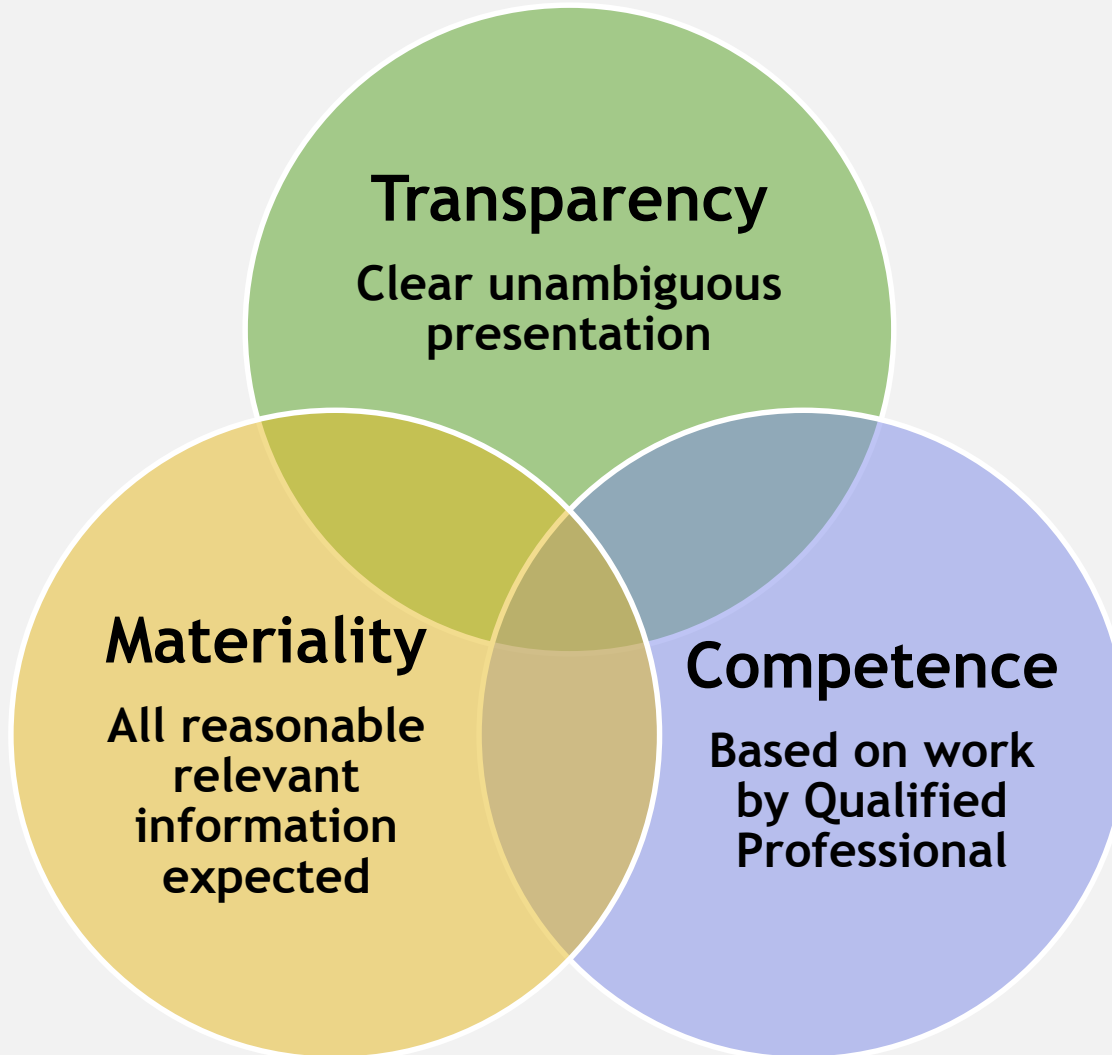
THE CBRR GUIDE FOR REPORTING
EXPLORATION RESULTS, MINERAL RESOURCES,
AND MINERAL RESERVES

“CBRR Guide”
2015 edition

Prepared by
“Comissão Brasileira de Recursos e Reservas ‘CBRR’”



The Main Principles of the CBRR Guide



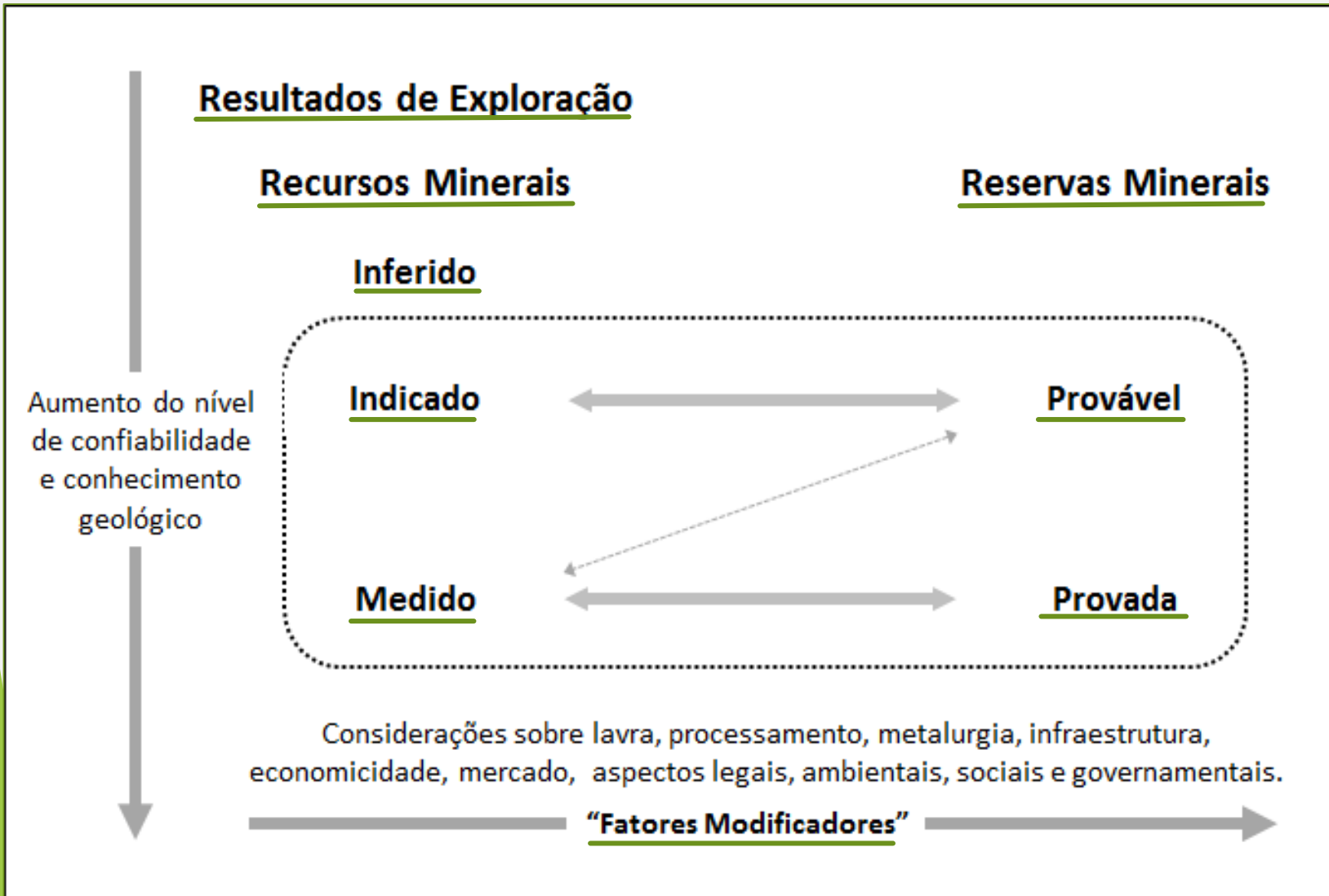
The CBRR *Profissional Qualificado* (Qualified Professional)

- ▶ A Qualified Professional is a mineral industry professional registered with Brazilian Commission of Resources and Reserves (CBRR) or a member of a Recognized Professional Organization (RPOs).
- ▶ The CBRR and the RPOs have enforceable disciplinary processes including the powers to suspend or expel members.
- ▶ A Qualified Professional registered with the CBRR must have:
 - ▶ at least 10 (ten) years of professional experience and
 - ▶ a minimum of 5 (five) years of relevant experience
 - ▶ including at least 3 (three) years in a Position of Responsibility.

CBRR Guide - key aspects

- ▶ The Guide is **applicable to all solid minerals**, including diamonds, other gemstones, industrial minerals, stone and aggregates, and coal.
- ▶ **Public Reports** are reports prepared for the purpose of informing investors on Exploration Results, Mineral Resources or Mineral Reserves.
- ▶ CBRR Guide requires publicly reported reserve and resource information to be based on **work undertaken by a Qualified Professional**.
- ▶ The Qualified Professional must be **named** in the public report and may be either an employee or a specialist consultant.
- ▶ It is the Qualified Professional's **responsibility** to ensure that the estimates have been properly calculated.

CBRR Guide - key Definitions



Indicated Mineral Resource:

Measured Mineral Resource:

➤ part of a Mineral Resource for

Modifying Factors:

➤ considerations used to convert Mineral Resources to Mineral Reserves.

➤ these include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

estimate.

can be converted to a Proved Mineral Reserve but is of sufficient quality to serve as the basis for a decision on the development of the deposit.

justified.

be converted to a Proved or Probable Mineral Reserve.

CBRR Guide - key aspects

- ▶ Any statement referring to potential quantity and grade of an **Exploration Target** must be expressed as ranges and must include a detailed explanation of the basis for the assumptions made and procedures used to estimate.
- ▶ CBRR Guide **do not allow** statements in public reports which provide **only total figures** for Mineral Resources or Mineral Reserves:
 - **Mineral Resource** estimates must be allocated to the defined categories of **Measured, Indicated and Inferred Resources**;
 - **Mineral Reserve** estimates must be allocated to the defined categories of **Proved and Probable Reserves**.

CBRR Guide - key aspects

- ▶ A Mineral Resource is a realistic inventory of mineralization which, under assumed and justifiable **technical and economic conditions**, might, in whole or in part, become economically extractable.
- ▶ The term ‘**reasonable prospects for eventual economic extraction**’ implies a judgment by the Qualified Professional of the **technical and economic factors** likely to influence the prospect of economic extraction, **including the approximate mining parameters**.

Study Accuracy Ranges for Capital and Operating Cost Estimates

Operating cost			
Category	Scoping Study	Prefeasibility Study	Feasibility Study
Basis	Order-of- magnitude estimate	Quantified estimates with some factoring	Describes the basis of the estimate; detailed from zero-based budget; minimal factoring
Operating quantities	General	Specific estimates with some factoring	Detailed estimates
Unit costs	Based on historic data for factoring	Estimates for labor, power, and consumables, some factoring	Letter quotes from vendors; minimal factoring

Operating cost			
Category	Scoping Study	Prefeasibility Study	Feasibility Study
Basis	Order-of- magnitude estimate	Quantified estimates with some factoring	Describes the basis of the estimate; detailed from zero-based budget; minimal factoring
Operating quantities	General	Specific estimates with some factoring	Detailed estimates
Unit costs	Based on historic data for factoring	Estimates for labor, power, and consumables, some factoring	Letter quotes from vendors; minimal factoring

Table 2 is based on The 2014 SME Guide for Reporting Exploration Results, Mineral Resources, and Mineral Reserves (the 2014 SME Guide)

Check List of Assessment and Declaration Criteria

D. Mineral Resource and Reserve Classification			
Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
1. Criteria	Not applicable.	<p>Description and justification of criteria used to classify the resource, including relationship to cut-off grade assumptions.</p> <p>To classify a resource as Measured or Indicated, there should be a reasonably high level of confidence with respect to the quality of the information used to estimate this resource, as well as the interpretation of this information.</p> <p>If Inferred Mineral Resources are used in economic evaluations, this should be disclosed.</p> <p>Reconciliation with previous Mineral Resource estimates.</p> <p>A conceptual analysis to justify reasonable prospects for eventual economic extraction; Scoping Study preferred.</p>	<p>Description and justification of criteria used to classify the reserves, and confirmation of resource classification assumptions with respect to cut-off grades used in the production schedule.</p> <p>Description of all Modifying Factors used to demonstrate economic viability of Measured and Indicated Mineral Resources to support declaration of a Mineral Reserve.</p> <p>Inferred Mineral Resources should be excluded from demonstration of economic viability to support declaration of a Mineral Reserve</p> <p>Discussion of the level of confidence in the Modifying Factors.</p> <p>Uncertainty in Modifying factors may reduce all or part of the Proved Mineral Reserve to a Probable Mineral Reserve.</p> <p>Reconciliation with previous Reserve estimates.</p>
2. Risks and Opportunities	Opportunity expressed as Exploration Target ranges of tonnages and grades.	<p>Discussion of uncertainty of geological boundary assumptions and their risk and opportunity for overall Mineral Resource estimates.</p> <p>Address uncertainties on the tonnage and grade of production increments.</p> <p>Determine work programs to upgrade classification or increase resources.</p>	Determine work programs to upgrade Probable Mineral Reserves to Proved Mineral Reserves.

D. Mineral Resource and Reserve Classification			
Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
1. Criteria	Not applicable.	<p>Description and justification of criteria used to classify the resource, including relationship to cut-off grade assumptions.</p> <p>To classify a resource as Measured or Indicated, there should be a reasonably high level of confidence with respect to the quality of the information used to estimate this resource, as well as the interpretation of this information.</p> <p>If Inferred Mineral Resources are used in economic evaluations, this should be disclosed.</p> <p>Reconciliation with previous Mineral Resource estimates.</p> <p>A conceptual analysis to justify reasonable prospects for eventual economic extraction; Scoping Study preferred.</p>	<p>Description and justification of criteria used to classify the reserves, and confirmation of resource classification assumptions with respect to cut-off grades used in the production schedule.</p> <p>Description of all Modifying Factors used to demonstrate economic viability of Measured and Indicated Mineral Resources to support declaration of a Mineral Reserve.</p> <p>Inferred Mineral Resources should be excluded from demonstration of economic viability to support declaration of a Mineral Reserve</p> <p>Discussion of the level of confidence in the Modifying Factors.</p> <p>Uncertainty in Modifying factors may reduce all or part of the Proved Mineral Reserve to a Probable Mineral Reserve.</p> <p>Reconciliation with previous Reserve estimates.</p>
2. Risks and Opportunities	Opportunity expressed as Exploration Target ranges of tonnages and grades.	<p>Discussion of uncertainty of geological boundary assumptions and their risk and opportunity for overall Mineral Resource estimates.</p> <p>Address uncertainties on the tonnage and grade of production increments.</p> <p>Determine work programs to upgrade classification or increase resources.</p>	Determine work programs to upgrade Probable Mineral Reserves to Proved Mineral Reserves.

Questions?



Thank you!

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the slide, creating a modern, layered effect against the white background.