Bridging CRIRSCO Template To UNFC

Bridging Document and Guidance Document

Introduction

RESOURCE MANAGEMENT WEEK

2024
Bridging CRIRSCO Template To UNFC

Bridging Document and Guidance Document

Introduction
Introduction

Presentation Outline

Background
- Organizations
- Documents

CRIRSCO Template: UNFC relationship
- The UNFC/CRIRSCO Template - Bridging Document
- 2024 Update
- Guidance Note on the use of the Bridging Document
Use of UNFC

UNFC provides a method for governments and NGOs to incorporate published data into databases, mineral inventories, etc.

Use of CRIRSCO Template

PERC is recognised by ESMA for use on European Union stock exchanges (ESMA = European Securities and Markets Authority)

The SAMREC Code sets out minimum standards, recommendations and guidelines for Public Reporting for solid minerals of Exploration Results, Mineral Resources and Mineral Reserves in South Africa.

Accepted on a number of other stock exchanges around the world (Canada, Singapore, ...)

International Reporting Standards
To promote best practice in the international public reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves.

CRIRSCO is an international advisory body without legal authority, relying on its constituent members to ensure regulatory and disciplinary oversight at a national level.

It recognizes the truly global nature of the minerals industry and the agreed need for international consensus on reporting standards.
CRIRSCO was developed to create a world-wide system to harmonize the reporting of Mineral resources and reserves based on a common standard and to protect the public against possible misreporting and fraud (Bre-X).

Most companies use this system for their own internal and public reporting.

Most stock exchanges and security commissions require the reports following this standard.
Introduction

CRIRSCO Reporting Standards

- Fifteen national reporting organisations (NROs)
Introduction

CRIRSCO Reporting Standards

All of members have:

A Code of Conduct/Ethics
Enforceable disciplinary procedures (including expulsion)
Continuous Professional Development (CPD) requirements and monitoring systems

Figure 6. The regulatory environment for the reporting of Exploration Results, Mineral Resources and Ore Reserves in Canada (OSC, 2019)
Introduction

CRIRSCO Reporting Standards

3 Principles: Transparency, Materiality and Competence

16 Common Definitions
Introduction
CRIRSCO Reporting Standards

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction.

The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.
Introduction

International Reporting Standards

Exploration Results

MINERAL RESOURCES
- Inferred
- Indicated
- Measured

MINERAL RESERVES
- Probable
- Proved

Increasing level of geological knowledge and confidence

Consideration of mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social, and governmental factors (the “Modifying Factors”).
Introduction
Alignment and Bridging

- Aligned System - A classification system that has been aligned with UNFC as demonstrated by the existence of a Bridging Document that has been endorsed by the Expert Group on Resource Management.

- A document that explains the relationship between UNFC and another classification system, including instructions and guidelines on how to classify estimates generated by application of that system using the UNFC Numerical Codes.
Bridging Documents
Basics For Mineral Deposits

- CRIRSCO for minerals
- PRMS for petroleum
- IAEA Red Book – Nuclear
- Russian Federation – Petroleum
- China – Minerals
- China – Petroleum
### UNFC Classes defined by categories and sub-categories

<table>
<thead>
<tr>
<th>Class</th>
<th>Sub-class</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viable Projects</td>
<td>On Production</td>
<td>1, 1.1, 1, 2, 3</td>
</tr>
<tr>
<td></td>
<td>Approved for Development</td>
<td>1, 1.2, 1, 2, 3</td>
</tr>
<tr>
<td></td>
<td>Justified for Development</td>
<td>1, 1.3, 1, 2, 3</td>
</tr>
<tr>
<td>Potentially Viable Projects</td>
<td>Development Pending</td>
<td>2*, 2.1, 1, 2, 3</td>
</tr>
<tr>
<td></td>
<td>Development On Hold</td>
<td>2*, 2.2, 1, 2, 3</td>
</tr>
<tr>
<td>Non-Viable Projects</td>
<td>Development Unclarified</td>
<td>3.2, 3, 2, 1, 2, 3</td>
</tr>
<tr>
<td></td>
<td>Development Not Viable</td>
<td>3.3, 2.3, 1, 2, 3</td>
</tr>
</tbody>
</table>

Remaining products not developed from identified projects: 3.3, 4, 1, 2, 3

Remaining products not developed from prospective projects: 3.3, 4, 4

*Potentially Viable Projects may satisfy the requirements for E1*
Bridging Documents
Alignment of Systems

UNFC
- Sales Production
- Non-sales Production
  - Class
  - Commercial Projects
  - Potentially Commercial Projects
  - Non-Commercial Projects
    - Additional quantities in place
- Exploration Projects
  - Additional quantities in place

PRMS
- Production
  - Class
  - Reserves
  - Contingent Resources
    - Unrecoverable
  - Prospective Resources
    - Unrecoverable

CRIRSCO
- Extracted
  - Class
  - Mineral Reserves
  - Mineral Resources
    - Not reported
  - Not reported
  - Not reported
  - Exploration Results
    - Not reported
Bridging Documents
Alignment of Systems

Exploration Results
MINERAL RESOURCES
- Inferred
- Indicated
- Measured

MINERAL RESERVES
- Probable
- Proved

Increasing level of geological knowledge and confidence

Consideration of mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social, and governmental factors (the “Modifying Factors”).
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Bridging Documents
Alignment of Systems

Along with the Generic Specifications, these provide the foundation and keystones for consistent application of UNFC-2009 for solid minerals.

CRIRSCO has provided commodity-specific specifications via the CRIRSCO Template of 2013.

Approved by the Expert Group on Resource Classification at its Sixth Session, 28 April – 1 May 2015.
This document has been prepared by the Ad Hoc Task Group for Revising the CRIRSCO-UNFC Bridging Document (2023) which was established in April 2023 at the request of the UNECE’s Expert Group on Resource Management and the CRIRSCO Executive. The Task Group was charged with updating the previous version of the CRIRSCO-UNFC Bridging Document, which was issued in 2015, in order to take account of subsequent changes including the publication in 2019 of updated versions of both systems.
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I. INTRODUCTION

II. BACKGROUND

III. OVERVIEW OF SYSTEM CONTENTS

IV. COMPETENCY AND QUALIFICATION REQUIREMENTS

V. MAPPING CRIRSCO TEMPLATE TO THE UNFC CATEGORIES AND SUB-CATEGORIES

VI. MAPPING UNFC 2019 TO THE CRIRSCO TEMPLATE 2019

VII. References

VIII. Appendix I: Key features of the CRIRSCO Template and the UNFC

IX. Appendix II: Terminology

+ 3 Figures and 9 Tables
Since their initial releases, both the UNFC and the CRIRSCO Template have been updated several times. Additionally, the national reporting codes and standards aligned to the CRIRSCO Template are also updated periodically and may not necessarily be aligned with the most recent version of the CRIRSCO Template. Relevant information with respect to the use of UNFC in the minerals sector was published in the Supplementary Specifications for the Application of the United Nations Framework Classification for Resources to Minerals as adopted in 2021 (UNECE, 2021). Users of the Bridging Document should use the most recent version of guidance documents for both systems.

<table>
<thead>
<tr>
<th>CRIRSCO Template</th>
<th>UNFC-2009 “minimum” Categories</th>
<th>UNFC-2009 Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral Reserve</td>
<td>Proved</td>
<td>E1 F1 G1</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>G2</td>
</tr>
<tr>
<td>Mineral Resource</td>
<td>Measured</td>
<td>E2 F2 G1 G2</td>
</tr>
<tr>
<td></td>
<td>Indicated</td>
<td>G2</td>
</tr>
<tr>
<td></td>
<td>Inferred</td>
<td>G3</td>
</tr>
<tr>
<td>Exploration Results</td>
<td>E3 F3 G4</td>
<td>Exploration Projects</td>
</tr>
</tbody>
</table>
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## Bridging Documents
### Alignment of Systems

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>CRIRSCO considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Development and operation are confirmed to be environmentally-socially economically viable.</td>
<td>The reported estimates have confirmed prospects for economic extraction under currently realistic assumptions. This may be demonstrated by the results of a FS or the LoMP for an operating mine ….</td>
</tr>
<tr>
<td>E2</td>
<td>Development and operation are expected to become environmentally-socially- economically viable in the foreseeable future.</td>
<td>The reported estimates have reasonable prospects for eventual economic extraction based on a preliminary judgement with respect to reasonably assumed Modifying Factors (including ESG aspects). This should be based on the results of studies carried out at Pre-Feasibility or Scoping study levels.</td>
</tr>
</tbody>
</table>
| E3       | Development and operation are not expected to become environmentally-socially- economically viable in the foreseeable future OR evaluation is at too early a stage to determine environmental-socio-economic viability. | The reported estimates do not have reasonable prospects for eventual economic extraction based on an initial consideration of reasonably assumed Modifying Factors (including ESG aspects)…. [OR]  
[There is a ] lack of sufficient information to complete a reliable assessment. |
<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>CRIRSCO considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Technical feasibility of a development project has been confirmed.</td>
<td>Feasibility Study or Operating Mine (Life of Mine Plan). ....</td>
</tr>
<tr>
<td>F2</td>
<td>Technical feasibility of a development project is subject to further evaluation.</td>
<td>Pre-Feasibility Study or Scoping Study Report, or a Public Report on a Mineral Resource Estimate. ...</td>
</tr>
<tr>
<td>F3</td>
<td>Technical feasibility of a development project cannot be evaluated due to limited data.</td>
<td>A Public Report on Exploration Results which includes an estimate(s) of an Exploration Target(s).</td>
</tr>
<tr>
<td>F4</td>
<td>No development project has been identified.</td>
<td>A Public Report on an exploration opportunity which includes historical estimate(s) and/or estimates of Exploration Target(s).</td>
</tr>
</tbody>
</table>
## Bridging Documents
### Alignment of Systems

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>CRIRSCO considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Product quantity associated with a project that can be estimated with a high level of confidence.</td>
<td>Corresponds with a Measured Resource or Proved Reserve category of confidence.</td>
</tr>
<tr>
<td>G2</td>
<td>Product quantity associated with a project that can be estimated with a moderate level of confidence.</td>
<td>Corresponds with an Indicated Resource or Probable Reserve category of confidence.</td>
</tr>
<tr>
<td>G3</td>
<td>Product quantity associated with a project that can be estimated with a low level of confidence.</td>
<td>Corresponds with an Inferred Resource category of confidence. In certain situations, Exploration Targets may be assigned to this category.</td>
</tr>
<tr>
<td>G4</td>
<td>Product quantity associated with a Prospective Project, estimated primarily on indirect evidence.</td>
<td>Corresponds with the CRIRSCO Exploration Target which is a statement or estimate of exploration potential for a mineral deposit where there has been insufficient exploration to estimate Mineral Resources. Exploration Targets must be expressed as a range of quantity and quality.</td>
</tr>
</tbody>
</table>
Bridging Documents
Alignment of Systems

- Reported Exploration Target estimate
  - Tonnage: Tmin to Tmax;
  - Grade: Gmin to Gmax

- Estimated contained product quantities:
  - Minimum estimated quantity: Qmin = Tmin * Gmin
  - Maximum estimated quantity: Qmax = Tmax * Gmax
  - Average estimated quantity: Qav = 0.5 * (Qmin + Qmax)

- The following UNFC classifications would then be reported:
  - E3, F3, G4 - Qav
In the minerals sector the UNFC can be applied in two slightly different ways, namely:

- **Classification of estimates of a specified volume on an individual minerals project**
  - In this context the UNFC provides a framework for reporting estimates in a standardised manner to facilitate the incorporation of such estimates into mineral inventory databases held by companies, government bodies or other interested parties.

- **Classification of minerals projects**
  - In this context the UNFC provides a framework for comparing raw materials projects across the spectrum from exploration to extraction, processing, and recycling.
## Alignment of Systems: UNFC to CRIRSCO

<table>
<thead>
<tr>
<th>UNFC code</th>
<th>Type of study on which the estimates are based</th>
<th>CRIRSCO category</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>Life of Mine Plan or Feasibility Study (estimates included in a life of mine plan which is viable under current conditions)</td>
<td>Proved Mineral Reserve</td>
</tr>
<tr>
<td>112</td>
<td></td>
<td>Probable Mineral Reserve</td>
</tr>
<tr>
<td>211</td>
<td>Pre-Feasibility Study (estimates included in a life of mine plan which is potentially viable under current conditions)</td>
<td>Proved Mineral Reserve</td>
</tr>
<tr>
<td>212</td>
<td></td>
<td>Probable Mineral Reserve</td>
</tr>
<tr>
<td>213</td>
<td></td>
<td>Inferred Mineral Resource</td>
</tr>
<tr>
<td>221 + 121</td>
<td>Pre-Feasibility Study or Scoping Study report or a Public Report on a Mineral Resource estimate (estimates which are considered to be economically extractable under reasonably assumed conditions)</td>
<td>Measured Mineral Resource</td>
</tr>
<tr>
<td>222 + 122</td>
<td></td>
<td>Indicated Mineral Resource</td>
</tr>
<tr>
<td>223 + 123</td>
<td></td>
<td>Inferred Mineral Resource</td>
</tr>
</tbody>
</table>

**NOTES:**
1. In all cases the estimates in different UNFC classes for an individual mineral project should not overlap, such that the derived CRIRSCO categories of Mineral Resources would be considered to be reported exclusive of Mineral Reserves.
• **Objective:** The purpose of reporting a UNFC estimate in compliance with a CRIRSCO-aligned code or standard should be clarified.

• **Relevant legislation and regulations:** A specific CRIRSCO code or standard recognised by the relevant government legislation or stock exchange regulations must be selected (e.g., the JORC Code, PERC Reporting Standard, NI 43-101 legislation, the SAMREC Code, etc.)

• **Competent Person (CP) requirement:** A minerals industry professional(s) who has a qualification that is recognised by the relevant legislation, regulations and reporting code or standard is needed. Qualified Expert as defined by the UNECE (UNECE, 2022) may not be sufficient.

• **Technical Report requirement:** The release of an accompanying Competent Person’s Report (CPR) or public reporting may be required which summarises the information and assumptions on which the estimates are based and also discusses any material uncertainties as clear and transparent information. The Competent Person(s) should, consider the checklist provided in Table 1 of the CRIRSCO Template.

• **Types of estimates that can be reported:** CRIRSCO-aligned codes and standards, do not allow the reporting of estimates for non-viable projects. Estimates for prospective projects can only be reported as Exploration Targets and must be presented as a range of quantities and qualities to indicate the associated uncertainty.
Guidance Note on Competency Requirements

Competency and Qualifications

4 “E”s of a Qualified Person

**Expertise**
Proficiency with the disclosure obligations of NI 43-101 and awareness of the CIM best practice guidelines.

**Education**
Geoscientist (PGeo.) or engineer (P.Eng.) with a university degree related to exploration or mining.

**Experience**
At least 5 years experience in exploration or mining, and relevant experience to subject matter.

**Ethics**
Professional association recognized by law in Canada, or listed in Appendix A.

CRIRSCO Template - Competent Person

The definition has two separate elements:

**Qualification requirement:** A Competent Person is a minerals industry professional, who is a [National Reporting Organisation (NRO) to insert appropriate membership class and name of Professional Organisation (PO)] or other Recognised Professional Organisations (RPOs) with enforceable disciplinary processes including the powers to suspend or expel a member.

**Experience requirement:** A Competent Person must have a minimum of five years relevant experience in the style of mineralisation or type of deposit under consideration and in the activity which that person is undertaking. (CRIRSCO, 2019)
Guidance Note on Competency Requirements
Competency and Qualifications

UNFC - Qualified Expert

*Guidance Note on Competency Requirements for the Estimation, Classification and Management of Resources*

Qualified Expert: an independent person with education, training and relevant professional experience in a discipline pertinent to a resource, acting in compliance with the professional standards of competence and ethics established by his/her Professional Organization. This person is responsible for the standards and methodologies used for collecting, analysing and verifying information used in a Qualified Assessment. (UNECE, 2022)
Thank you!

Hendrik Falck
Minerals Working Group Chair
UNECE
Date 22 April 2024, Geneva