



COMMITTEE FOR MINERAL RESERVES
INTERNATIONAL REPORTING STANDARDS

Beyond Inferred

Position paper

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ICMM

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1. Introduction

The principal objective of the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) is to promote best practice public reporting of Exploration Results, Exploration Targets, Mineral Resources and Mineral Reserves.

The CRIRSCO International Reporting Template (the Template) includes a number of Mineral Resource and Mineral Reserve categories, based on the extent to which these have been defined by geological, and other technical and economic studies. It does not allow for public reporting of estimates of quantities of non-economic mineralization.

Public reporting is targeted at investors and potential investors in mineral exploration and mining companies. Such stakeholders rely on informed statements relating to Mineral Resources or Mineral Reserves prepared by Competent Persons as defined in the Template.

CRIRSCO recognizes that situations exist where reporting of potential mineral assets that are not covered by the categories defined by the Template may be required and that different stakeholders, such as governments, may require reports on these additional categories. In addition, CRIRSCO acknowledges that it is common practice amongst mineral companies to maintain registers or inventories of such material for their own strategic planning purposes. Such purposes include, for example, the prioritisation of exploration targets for future work and maintaining records of mineralized material that currently fails to meet requirements for public reporting but may do so in future (for example if economic conditions change).

CRIRSCO has engaged and continues to work with organisations developing classifications of material 'beyond Inferred' with the aim of both assisting in such developments and also ensuring that the resulting classification schemes are consistent with the Template.

This paper is intended to expand on CRIRSCO's views on material 'beyond Inferred' and to explain the relationship between the CRIRSCO-aligned reporting standards and other classification systems that categorize such material, in particular the United Nations Framework Classification for Resources (UNFC).

This paper should be read in conjunction with the "*Bridging Document between the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) Template and the United Nations Framework Classification for Resources (UNFC)*" (the Bridging Document; UNECE 2024), and the accompanying Guidance Note of its usage (CRIRSCO & UNECE 2024), which explain how to map the CRIRSCO classification to the UNFC.

2. Background

CRIRSCO was formed in 1994 and has grown from five member organisations to an association representing fifteen national reporting organisations (NROs)¹.

In July 2006, CRIRSCO published the International Reporting Template for the public reporting of Exploration Results, Mineral Resources and Mineral Reserves ('the Template') which represented a synthesis of the minerals reporting standards of CRIRSCO members. The Template was most recently revised in June 2024 (CRIRSCO 2024).

In 2010 CRIRSCO released a position paper on the categorization of material 'beyond Inferred' to explain the relationship between the CRIRSCO-aligned reporting standards and other classification systems that categorize such material, such as the UNFC.

In 2015 a Bridging Document was published, mapping the Template definitions to the 2009 version of the UNFC.

Also in 2015, CRIRSCO published an update of the CRIRSCO position paper on 'beyond Inferred' to include reference to the term Exploration Targets which had been added in the 2013 version of the CRIRSCO Template.

In April 2024, a revised bridging document (UNECE 2024) and accompanying Guidance Note (CRIRSCO & UNECE 2024) on its usage were published, mapping the 2019 Template definitions to the 2019 version of the UNFC.

In June 2024, an updated version of the CRIRSCO Template was published. This did not differ significantly from the previous 2019 version of the Template apart from the incorporation of changes to some of the CRIRSCO definitions, including the removal of the word 'eventual' from the definition of a Mineral Resource.

This paper provides an update on the CRIRSCO position on material 'beyond Inferred', including guidance to companies seeking to categorize this material for either stakeholder (e.g. government) reporting, or internal strategic purposes.

¹ Details of the current CRIRSCO member organisations and links to their individual websites and codes and standards are provided on the CRIRSCO website at: <https://www.crirSCO.com/>.

3. The CRIRSCO International Reporting Template

The Template provides a framework for the CRIRSCO-aligned reporting codes and standards which provide rules and guidance on public reporting for the benefit of investors or potential investors in mining and exploration companies. The use of specific CRIRSCO codes or standards is mandatory for reporting in some jurisdictions in order to comply with legal obligations, stock market regulations, or to meet other specific legislative requirements.

The Template includes standard definitions of common terms that are used in all Template-aligned reporting codes and standards. The definitions contained in the Template have been adopted by all CRIRSCO members, although due to specific local requirements minor differences may exist among member reporting codes and standards. These differences are not considered to be material.

The Template contains definitions for Exploration Results, Exploration Targets, Mineral Resources (including Measured, Indicated and Inferred Resources) and Mineral Reserves (including Proved and Probable Reserves), as well as technical study stages (Scoping studies, Pre-Feasibility studies and Feasibility studies).

The general relationship between these defined terms is illustrated in Figure 1. The highest level of confidence is represented by Proved Reserves and the lowest by Exploration Results.

Material which is publicly reported as Mineral Resources must have reasonable prospects for economic extraction. Public reporting of Mineral Reserves must be supported by Pre-Feasibility or Feasibility studies (or life of mine plan for an operating mine) that show their technical and economic viability.

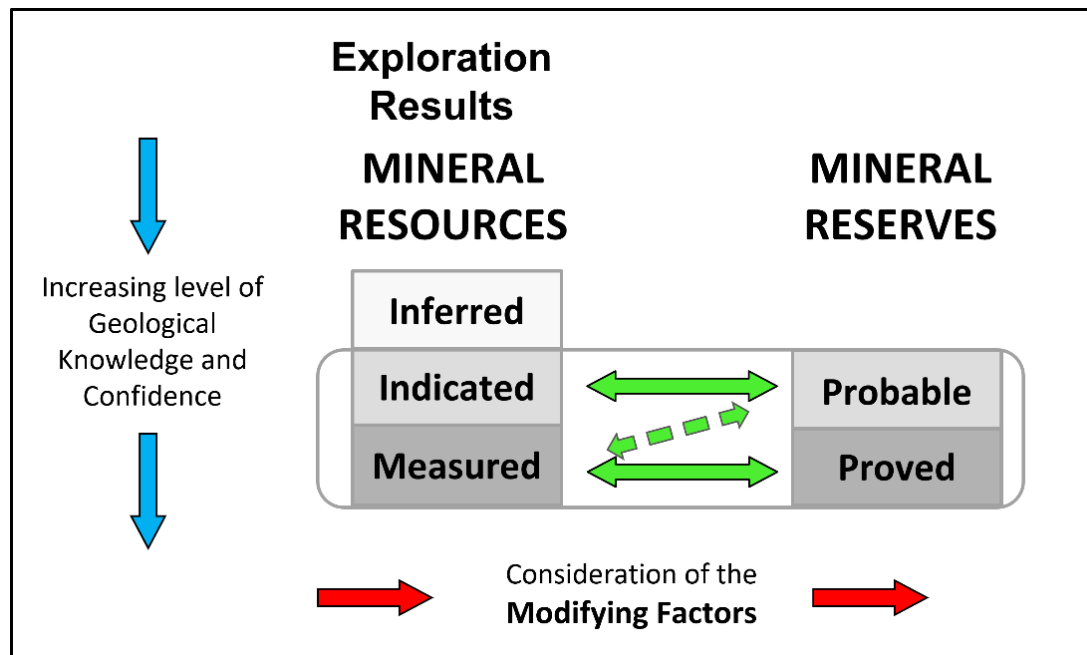


Figure 1 General relationship between Exploration Results, Mineral Resources and Mineral Reserves (CRIRSCO International Reporting Template June 2024, Figure 1)

4. The United Nations Framework Classification for Resources

The UNFC is a resource project-based and principles-based classification system for defining the environmental-socio-economic viability and technical feasibility of projects to develop resources (UNECE 2019).

Products of a resource project are classified on the basis of the three fundamental criteria of environmental-socio-economic viability (E), technical feasibility (F), and degree of confidence in the estimate (G), using a numerical coding system. Combinations of these criteria create a three-dimensional system (Figure 2). Categories (e.g. E1, E2, E3) and, in some cases, sub-categories (e.g. E1.1) are defined for each of the three criteria.

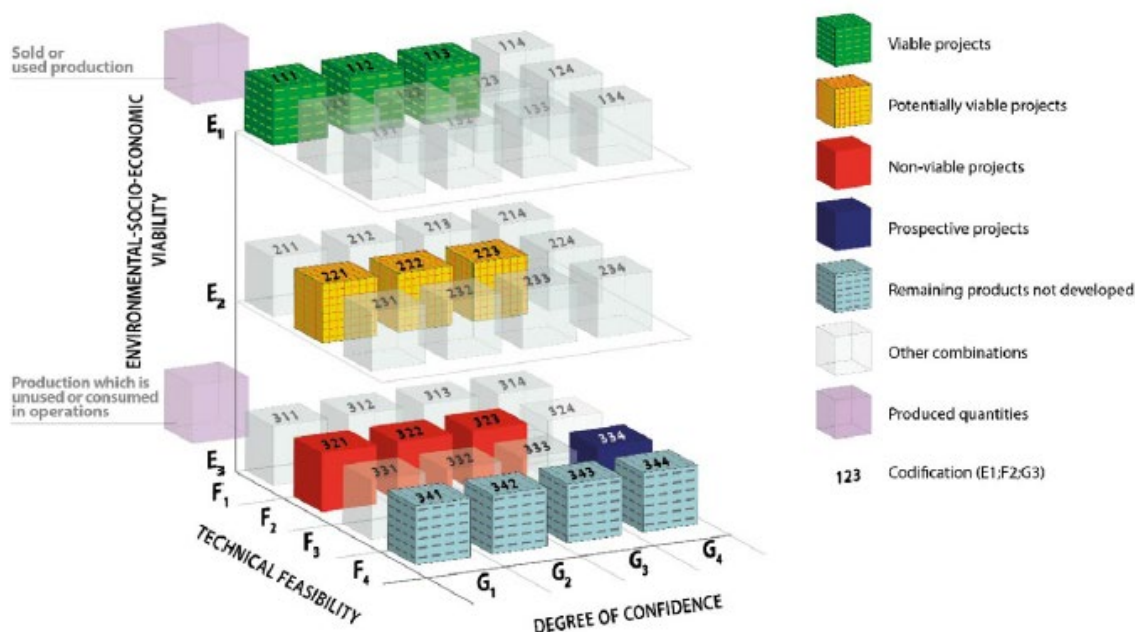


Figure 2 UNFC categories and examples of classes (United Nations Framework Classification for Resources, Figure 1)

UNFC has been designed to meet, to the extent possible, the needs of applications pertaining to:

- policy formulation based on resource studies;
- resources management functions;
- corporate business processes; and
- financial capital allocation.

Although it was originally developed for application in the minerals sector, over the past two decades the application of the UNFC has expanded to include a range of different sectors and is considered to be a global classification and management system applicable to mineral, petroleum, nuclear fuel, renewable energy and anthropogenic resources, as well as injection projects for geological storage. To understand its application in the minerals sector, readers should refer to the Supplementary Specifications for the Application of the United Nations Framework Classification for Resources to Minerals (UNECE, 2021).

5. Comparing the systems

The main difference in the two classification systems is the fundamental CRIRSCO requirement for reasonable prospects for economic extraction (Mineral Resources) or technical and economic viability (Mineral Reserves) to support public reporting to inform investors.

Guidance provided in the Template notes that a decision on whether the test of reasonable prospects has been met requires judgment by a Competent Person or Persons and goes on to say: 'a Mineral Resource is not an inventory of mineralization drilled or sampled, regardless of cut-off grade, likely mining dimensions, location or continuity. It is a realistic inventory of mineralization which, under assumed and justifiable technical and economic conditions, might, in whole or in part, become economically extractable'.

This clearly sets a 'lower' boundary to Mineral Resources which must meet the test of 'reasonable prospects for economic extraction', that is to say, all classes of Mineral Resource are implicitly economic and a viable target for future development, but without guarantees that such development will eventuate.

By contrast, the UNFC includes production and non-economic mineral assets as it is intended to include all mineralization that has been mined, discovered or is yet to be discovered within a given area, be this a single mine, a mineralized province or a global or regional aggregation of many mineralized areas. Classification of non-economic mineral assets can be used for non-public reports to other agencies, such as governments, or simply for companies' internal planning purposes.

With the UNFC a Class is uniquely defined by selecting from each of the three criteria a particular combination of a Category or a Sub-category (or groups of Categories/Sub-categories). The first set of Categories (the E Axis) designates the degree of favourability of environmental-socio-economic conditions in establishing the viability of the project, including consideration of market prices and relevant legal, regulatory, social, environmental, and contractual conditions, and in this respect corresponds with the 'Modifying Factors' used under CRIRSCO. The second set of Categories (the F Axis) designates the maturity of technology, studies, and commitments necessary to implement the project, and in general terms corresponds with the Study levels used under CRIRSCO. The third set of categories (the G Axis) designates the degree of confidence in the estimate of the quantities of products from the project, corresponding with the CRIRSCO resource and reserve categories.

The Bridging Document maps the CRIRSCO classification for Mineral Resources and Mineral Reserves to the UNFC categories of Viable Projects and Potentially Viable Projects.

In addition, the UNFC includes the following 'boxes' which classify non-economic mineral assets, and hence, apart from Prospective Projects (to which CRIRSCO Exploration Targets are mapped), are not directly mappable to CRIRSCO standard definitions:

- Non-viable Projects:
 - E3F2 (sub-categories E3.3, F2.3): where the quantities are yet to be confirmed technically recoverable but are not expected to become environmentally-socially-economically viable in the foreseeable future.
 - E3F2 (sub-categories E3.2, F2.2): early-stage studies where the quantities are yet to be confirmed technically recoverable but where environmental-social-economic viability cannot yet be determined due to insufficient information.
- Prospective Projects:
 - E3F3G4: where the existence of a developable product is based primarily on indirect evidence and has not yet been confirmed. Further data acquisition and evaluation would be required for confirmation.
- Remaining products not developed:
 - E3F4 (sub-category E3.3): where no technically viable development project or mining operation can be identified. These may become developable in the future as technological or environmental-socio-economic conditions change.

These materials are referred to by CRIRSCO as 'beyond Inferred' and a discussion on treatment of these is included in the following sections.

6. Categorizing beyond Inferred

In this Position Paper CRIRSCO categorizes material beyond Inferred into four primary categories which can be further categorized to describe the stage of the project and main cause of the mineral assets not progressing to Mineral Resources. Beyond Inferred material should be stated as a specific volume in the ground for a given mineral project development case.

Primary categories are:

- Discovered not economic – where the mineral assets are quantified but there is no current reasonable prospect for economic extraction.
- Discovered unquantified – where there are known mineral assets, but the technical study work or orebody knowledge data collection is incomplete.
- Discovered unrecoverable – where there are known mineral assets but there is no reasonable expectation to obtain the license to operate due to legal, regulatory, environmental or social conditions.
- Undiscovered unquantified – where mineral assets are predicted based on landforms or prospective regional terranes.

Secondary categories:

- Stage A – brownfields or greenfields mineral assets.
- Stage B – new projects (project) or remnants (dumps, pillars, tailings etc.).
- Cause – main cause of the mineral assets not progressing to Mineral Resources.

Table 6-1 summarizes CRIRSCO's categorization of material beyond Inferred and maps these to the UNFC categories. These categories sit outside of the CRIRSCO standard definitions and hence are not included in the Bridging Document.

Table 6-1 CRIRSCO beyond Inferred categorization mapped to UNFC

CRIRSCO beyond Inferred Resources category				UNFC category		
Beyond Inferred Category	Stage A	Stage B	Cause ²	E	F	G
Discovered not economic	Brownfields or Greenfields	Project or Remnants	Economic factors e.g. price/cost	3.3	2.3	1,2,3
			Geometallurgical / metallurgical factors			
			Mining factors e.g. too complex / deep			
Discovered unquantified	Brownfields or Greenfields	Project or Remnants	Study work incomplete	3.2	2.2	3
			Orebody knowledge work incomplete	3.2	3	4
Discovered unrecoverable	Brownfields or Greenfields	Project or Remnants	Environmental factors	3.3	4	1,2,3
			Social / community factors			
			Legal / regulatory factors			
Undiscovered unquantified	Greenfields	Project		3.2	4	4

² List of causes is not exhaustive, and companies can add additional causes.

Exploration Targets and Exploration Results

In addition to Mineral Resources and Mineral Reserves, CRIRSCO allows for the reporting of Exploration Targets as a statement or estimate of the exploration potential of a mineral deposit and Exploration Results to provide an update of data and information generated by mineral exploration programs. These provide information that might be of use to investors, but which do not form part of a declaration of Mineral Resources or Mineral Reserves.

Exploration Targets fall within discovered unquantified (orebody knowledge work incomplete) and, as described in the Bridging Document, map to Prospective Projects under UNFC.

As noted above, an Exploration Target is defined as a statement or estimate of exploration potential, and can be used in two different ways, namely:

- a) At a very early stage of work on a property, an Exploration Target expressed as **a statement** is often used for a conceptual target that is used to guide exploration strategy in terms of the target size and type, where confirmation of the presence of potentially economic mineralisation has yet to be confirmed by physical sampling. This would be regarded as falling in the category of “undiscovered unquantified” with a UNFC coding of E3.2, F4 and G4.
- b) At a more advanced stage of exploration, an Exploration Target expressed as **an estimate** of the potential size of a target for a mineral deposit in a defined geological setting where the presence of potentially economic mineralisation has been confirmed by physical sampling, but insufficient exploration work has been completed to allow a Mineral Resource to be estimated. This would be regarded as falling in the category of “discovered unquantified” with a UNFC coding of E3.2, F3 and G4.

7. Considerations for using beyond Inferred material

External reporting

The Template recognizes that companies can be required to issue reports into more than one regulatory jurisdiction, with compliance standards that may differ from the Template.

Where compliance requires the reporting of mineral assets beyond Inferred, such material should only be disclosed with a very clear disclaimer explaining that it is additional to the categories covered by the CRIRSCO-aligned codes because at the time of reporting it does not present any reasonable prospects for economic extraction.

Periodic review

Beyond Inferred material does not currently meet the test of reasonable prospects for economic extraction for any of a number of reasons. However, the use of the word currently is deliberate as it is to be expected that this situation would be dynamic over time and that material would move through the categories, or be removed altogether, depending on the results of continued exploration and technical studies.

Categories should be reviewed periodically to determine whether they should be altered to take account of changes in environmental, social or economic criteria and assumptions. The cause sub-category can be used to identify potential ongoing options for each category, for example:

- Discovered not economic:
 - Where the cause is economic factors – this may require a cost reduction or price increase and should be monitored.
 - Where the cause is geometallurgical / metallurgical factors – this may require a new processing method and is a target for R&D.
 - Where the cause is mining factors – this may require a new technology to enable and is a target for R&D.
- Discovered unquantified:
 - These require budgeting and planning to complete the required work to determine whether there are reasonable prospects for economic extraction.
- Discovered unrecoverable:
 - These require periodic review for potential changes to the legal, regulatory, environmental or social conditions.
- Undiscovered unquantified:
 - These require exploration to determine whether any potential exists.

The brownfields or greenfields sub-category can be used to prioritise work programs, with typically more option value in brownfields potential.

8. Conclusions

CRIRSCO and UNFC are complementary systems, serving different stakeholder needs.

CRIRSCO's primary audience is exchanges and investors with a focus on current and short to medium term (5 to 25 years) economic viability for public reporting. Its classification system helps investors by ensuring reports reflect economically viable prospects and enables comparability of reporting between projects.

UNFC's primary audience is governments and international agencies, with a focus on medium-long term (>10 years) prospects to guide strategic planning. The UNFC is a generalised system which can be applied in other industry sectors, including resources derived from solar, wind, geothermal, hydro-marine, bioenergy, injection for storage, hydrocarbons, minerals, nuclear fuels, water and other sources. Where the UNFC is applied in the minerals sector supplementary specifications are taken into account, allowing it to be applied to a wider array of applications beyond investor reporting (CRIRSCO's focus), and encompassing a broader range of mineral assets, including non-economic ones.

Material beyond Inferred includes potentially viable but currently non-economic materials which are included in the UNFC but not in the CRIRSCO template. CRIRSCO's approach to internal reporting of beyond Inferred, as outlined in this paper, will help companies prioritise exploration and resource management for near term economic benefits, and aid in longer term strategic planning.

Regular review of beyond Inferred material ensures dynamic classification based on new data and conditions.

9. Recommendations

Companies can adopt both CRIRSCO and UNFC systems for comprehensive resource management as follows:

- Align corporate reporting practices with international standards to ensure consistency and comparability.
- Utilize the CRIRSCO systems for Stock Exchange and Shareholder reporting.
- Utilize the UNFC system for policy formulation and resource management at governmental levels.
- Ensure Competent Persons are well-versed in both CRIRSCO and UNFC standards³.
- Enhance stakeholder communication by clearly differentiating between public and non-public reports.
- Maintain transparency in reporting to meet regulatory and investor expectations.

With regards to beyond Inferred material, CRIRSCO recommends companies to:

- Develop internal guidelines for the categorization of non-economic mineral assets.
- Regularly review and update beyond Inferred categories.
- Invest in exploration and technical studies, including consideration of alternative project development options, to move materials from non-economic to economically viable categories.
- Encourage research and development to define and address technical and economic challenges of non-economic mineral assets. Prioritize research for high probability of success.

³ A Qualified Expert under the UNECE is not the equivalent of a Competent Person under CRIRSCO. The Bridging Document Guidance Note provides a comparison of these terms (CRIRSCO & UNECE 2024).

10. References

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