



**Bridging Document**

**between the**

**Committee for Mineral Reserves International  
Reporting Standards (CRIRSCO) Template**

**and the**

**United Nations Framework Classification for  
Resources (UNFC)**

Effective 1 May 2015

As contained in Annex III of Part II of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 incorporating Specifications for its Application (ECE Energy Series No. 42).



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## REVISED ANNEX III <sup>a, b</sup>

### BRIDGING DOCUMENT BETWEEN THE CRIRSCO TEMPLATE AND UNFC-2009

#### I. INTRODUCTION

Bridging Documents explain the relationship between UNFC-2009 and another classification system that has been endorsed by the Expert Group on Resource Classification as an Aligned System. They incorporate instructions and guidelines on how to classify estimates generated by application of that Aligned System using the UNFC-2009 Numerical Codes. The relevant Bridging Document shall be identified when reporting estimates using the UNFC-2009 Numerical Codes.

A long-standing agreement is in place for CRIRSCO to provide the commodity-specific specifications for solid minerals. In accordance with this agreement, CRIRSCO has provided commodity-specific specifications via the CRIRSCO Template of 2013 (hereinafter referred to as the "Template").<sup>14</sup> Along with the Generic Specifications, these provide the foundation and keystones for consistent application of UNFC-2009 for solid minerals.

The Template (and the codes/standards aligned with it) is independent from UNFC-2009 and may be mandatory for reporting purposes in some jurisdictions or in particular circumstances. This Bridging Document has no bearing whatsoever on such mandatory reporting requirements or on the independent application of the Template (and the codes/standards aligned with it).

Unless constrained by regulation, the application of commodity-specific specifications shall not limit in any way the use of the full granularity of UNFC-2009.

#### II. OVERVIEW OF THE CRIRSCO TEMPLATE (2013)

The CRIRSCO Template is the most recently developed international standard for the reporting of Exploration results, Mineral Resources and Mineral Reserves. It is in turn based on a number of national or regional reporting standards that are compatible and consistent with each other and the Template, and whose authors contributed to the development of the Template that represents current international best practice for Public Reports by companies.<sup>15</sup> The basic framework on which the Template and the standards aligned to it are based is shown in Figure III.1.

The Template is focussed on establishing and maintaining consistent and appropriate standards for Public Reports (as defined by CRIRSCO) and hence does not address all mineralisation that may be relevant for other purposes, such as national inventories or internal use. Consequently, full application of UNFC-2009 for solid minerals can extend beyond the classes explicitly defined in the Template.

#### Figure III.1

General Relationship between Exploration Results, Mineral Resources and Mineral Reserves, as set out in the CRIRSCO Template

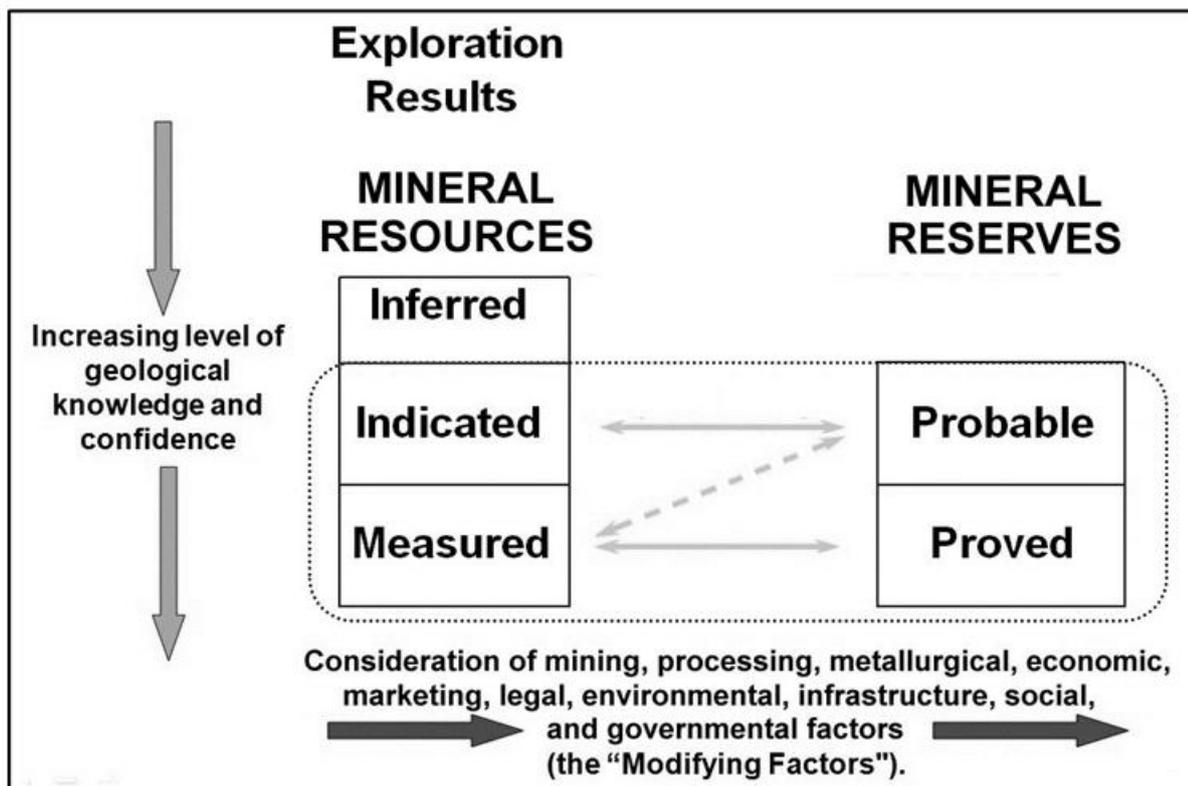
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<sup>a</sup> This document was approved by the Expert Group on Resource Classification at its Sixth Session, 28 April – 1 May 2015.

<sup>b</sup> Annex III from Part II of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 incorporating Specifications for its Application (ECE Energy Series No. 42). For consistency, the numbering of the footnotes is the same as in the original Bridging Document i.e. 14 to 17.

<sup>14</sup> Available at: [http://www.crirSCO.com/templates/international\\_reporting\\_template\\_november\\_2013.pdf](http://www.crirSCO.com/templates/international_reporting_template_november_2013.pdf).

<sup>15</sup> In the Template, a Public Report "refers to any report on Exploration Results, Mineral Resources or Mineral Reserves, prepared for the purpose of informing investors or potential investors and their advisers, or to satisfy regulatory requirements".



### III. DIRECT MAPPING OF CATEGORIES AND SUB-CATEGORIES

#### A. Application of the G-axis

Where geological studies have been carried out and an estimate of the quantity of mineralization is possible (volume, tonnes, grade/quality etc.) then classification takes place on the vertical geological axis of the Template on the basis of the level of detail of the studies and the degree of confidence in the geological model. Mineral Resources are defined as Inferred, Indicated or Measured, reflecting an increasing level of geological knowledge and confidence.

The Geological Knowledge (G) axis has a direct mapping to the Template as shown in Figure III.2, which also shows the mapping of the E and F axes at the Category level. Note that the E and F Categories set minimum standards for the UNFC-2009 Classes. For example, a Potentially Commercial Project must be at least E2 and F2, but it could also be E1F2 or E2F1.

**Figure III.2**

Mapping of CRIRSCO Template to UNFC-2009 Classes and Categories. See preceding paragraph (second paragraph in Section III.A.) for explanation of “minimum”.

CRIRSCO Template		UNFC-2009 “minimum” Categories			UNFC-2009 Class
Mineral Reserve	Proved	E1	F1	G1	Commercial Projects
	Probable			G2	
Mineral Resource	Measured	E2	F2	G1	Potentially Commercial Projects
	Indicated			G2	
	Inferred			G3	
Exploration Target		E3	F3	G4	Exploration Projects

## B. Detailed mapping of the E and F axes

Mineral Resources are in situ estimates of mineralization prior to conversion to Mineral Reserves (i.e. with no adjustments for mining dilution or losses), although preliminary consideration is given to mining, processing, metallurgical, economic, marketing, legal, infrastructure, environmental, social and governmental factors (the Modifying Factors). Furthermore, portions of a mineral deposit that do not have reasonable prospects for eventual economic extraction must not be included in a Mineral Resource. In UNFC-2009, a Mineral Resource estimate will generally be classified as E2F2. Optionally, it may be further sub-classified on the F axis into F2.1 or F2.2 (refer to Figure III.3 and Annex V of this Specifications Document, which provides specific guidance in the differentiation between the project maturity Sub-classes). In some cases, a Mineral Resource estimate could correspond to E1F2, where there is no doubt regarding economic viability, or E2F1 where there is no doubt concerning technical viability (Sub-category F1.3). (Note that these combinations do not change the UNFC-2009 Class, which remains as Potentially Commercial Projects, as shown in Figure III.2.)

Where adequate geological studies have been carried out but preliminary assessment of the Modifying Factors indicates that the project is not viable in the foreseeable future (i.e. it does not have “reasonable prospects for eventual economic extraction”), the mineralization is classified as “inventory” and is not converted to a Mineral Resource.<sup>16</sup> “Inventory” is not a defined term in the Template, and such quantities may not be disclosed in a Public Report (as defined above), but for other purposes would generally be classified in UNFC-2009 as either E3F2 where the quantities are technically recoverable but are not expected to become economically viable in the foreseeable

<sup>16</sup> For more discussion regarding what constitutes “reasonable prospects for eventual economic extraction” in the context of different solid mineral commodities, refer to the discussion on Mineral Resources in the Template.

future (Sub-categories E3.3, F2.3) or where economically viability cannot yet be determined due to insufficient information (Sub-categories E3.2, F2.2), or E3F4 where no technically viable development project or mining operation can be identified (Sub-category E3.3). The inventory will be reviewed in future should conditions change.

In the Template, Mineral Resources may be reported inclusive of, or additional to, Mineral Reserves. Note that in UNFC-2009, classes such as 221 are always exclusive of other classes, such as 111. Where classes are aggregated, they must be documented explicitly (e.g. 111 +221).<sup>17</sup>

Mineral Reserves are generally quoted as the product of mining activities (tonnage and grade or quality), i.e. the quantities delivered to the process plant. For some commodities, e.g. coal, Mineral Reserves are quoted as saleable product (tonnage and quality). Otherwise, where processing is required to produce a saleable product, recovery or yield factors shall be provided. A Mineral Reserve will always correspond to E1F1. Optionally, it may be further sub-classified on the E axis into E1.1 or E1.2 and on the F axis into F1.1, F1.2 or F1.3.

Conversion of Mineral Resources to Mineral Reserves requires technical studies of at least pre-feasibility level to demonstrate that mining, processing, metallurgical, economic, marketing, legal, infrastructure, environmental, social and governmental factors (the Modifying Factors) have been adequately addressed and the project yields a positive financial return. In UNFC-2009, this requirement is also reflected in the definitions of the E1 and F1 Categories.

Provided that the Modifying Factors are satisfied, Indicated Resources can be converted to Probable Reserves. Similarly, Measured Resources may usually be converted to Proved Reserves, but can only be converted to Probable Reserves if the confidence in the Modifying Factors is less than the geological confidence. Inferred Resources shall not be converted to a Mineral Reserve (see Figure III.1).

Figure III.3 shows a mapping of the E-F Sub-category matrix to the Template with a colour coded and numeric key. Note that colours and numbers are aligned with the PRMS mapping (see Annex IV) and hence not all numbers are used here.

UNFC-2009 is a project-based system. Where a mining operation has both Mineral Reserves and Mineral Resources (excluding Mineral Reserves), these correspond to two separate projects in UNFC-2009. Referring to Figure III.2, the Mineral Reserves are associated with a Commercial Project whereas the Mineral Resources are associated with a Potentially Commercial Project. These may be further subdivided using the UNFC-2009 Sub-classes (Figure III.3) if desired.

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<sup>17</sup> For Public Reporting purposes, certain aggregations are not permitted.

In rare cases, a project that is actively extracting a commodity may, under the Template, be assigned zero Mineral Reserves due to inadequate confidence in the estimation of any future recoverable quantities. In such cases, a meaningful economic evaluation cannot be completed and hence the project would be classified as E2F1.1 on the basis that economic viability was “expected”. The project would be documented as a Potentially Commercial Project and should be explicitly identified and explained, e.g. in a footnote.

**Figure III.3**

Mapping of CRIRSCO Template to E-F Axes of UNFC-2009. Note that “Inventory” is not a defined term in the Template. The relationship between the Template and UNFC-2009 G axis Categories is shown in Figure III.2. Colours and numbers are aligned with the PRMS mapping (see Annex IV) and hence not all numbers are used here.

	F1.1	F1.2	F1.3	F2.1	F2.2	F2.3	F3	F4
E1.1	1	2	3	4				
E1.2	1	2	3					
E2			4	4	5			
E3.1	12	12	12	12	12	12		
E3.2			6	6	6		8	
E3.3			7	7	7	7		11

		UNFC-2009 Sub-Classes	
Mineral Reserve	1	On Production	
	2	Approved for Development	
	3	Justified for Development	
Mineral Resource	4	Development Pending	
	5	Development On Hold	
Inventory (not defined in Template)	6	Development Unclassified	
	7	Development Not Viable	
	11	Additional Quantities in Place	
Exploration Target		8	
Special Cases	Classification not in Template	12	
	Less Common Mappings		

### C. Exploration Target

An Exploration Target is a statement or estimate of the exploration potential of a mineral deposit in a defined geological setting where the statement or estimate, quoted as a range of tonnes and a range of grade or quality, relates to mineralization for which there has been insufficient exploration to estimate Mineral Resources. The Exploration Target is mapped to E3 F3 G4 in UNFC-2009.

### D. Exploration Results

Exploration results include data and information generated by exploration programmes but which are not part of a formal declaration of Mineral Resources and Mineral Reserves and therefore do not have an equivalent in UNFC-2009. Exploration results emanate from the early stages of exploration when the quantity of data available is generally not sufficient to allow any reasonable estimates of tonnage and grade to be made.

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