

UNFC Mapping Task Force Report – October 1, 2007

Attachment 1- UNFC Definitions Revisions

The Task Force noted that the mandate invited to consider changes that would be required to bring the classifications and definitions together for wide acceptance and global adoption with UN support. This should also include changes to the UNFC for minerals and for petroleum to align these on a project status based framework.

The Task Force recognize that the mapping of UNFC to other classification would be easier if the UNFC definitions were simplified, which also would be appropriate for an umbrella classification. Further, we recognized that a major strength of the UNFC is its numerical basis which helps to avoid issues related to language. It is therefore somewhat contradictory to establish labels to each category. The labels need to be translated into other languages and problems with the actual meaning of the labels have already been raised (e.g. Intrinsically Economic and Exceptional Economic).

The Task Force recommends that for clarity, the labels for categories and sub-categories to be removed. Removing of the labels will certainly reduce the confusion and ambiguity that may arise by mapping to other systems where labels are in use. This may also remove confusion that might arise because of different labels to the categories and sub-categories for minerals and petroleum within the UNFC.

In addition to two different sets of labels, there are also two sets of definitions within the current version of the UNFC (i.e. one definition for solid minerals and one for petroleum). We decided to write generic principle-based definitions for each of the categories and sub-categories and to explain the differences in application between solid minerals and petroleum in the form of additional commodity-specific guidelines.

The Task Force agreed that the definitions should be kept at a high level, in order to maintain continuity with the current definitions and to ensure maximum potential for alignment with other systems: it is the principles that are important at this level, not the specific details. However, the current definitions are, in places, very detailed and contain commodity-specific guidelines rather than generic definitions (see, for example, the current definition of G4 for solid minerals).

The Task Force have simplified the current definitions, to the extent possible, to a point where they incorporate the necessary principles for all commodities, without material deviation from their current meaning, and excluded detailed and/or commodity-specific information that could be captured in commodity-specific guidelines. Table 1 compares the prior UNFC 2004 definitions for minerals and petroleum to the proposed generic description for each category and sub-category as contained in section 4 of the report.

Table 1: 2004 UNFC definitions and proposed changes

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
E1	Quantities, reported in tonnes/volume with grade/quality, demonstrated by means of a pre-feasibility study, feasibility study or mining report, in order of increasing accuracy, that justify extraction under the technological, economic, environmental and other relevant commercial conditions, realistically assumed at the time of the determination.	Production is justified under the technological, economic, environmental and other relevant commercial conditions, realistically assumed or specified at the time of the estimation	Extraction and sale is economically viable. Refer to definitions of E1.1 and E1.2.
E1.1	Extraction is justified under competitive market conditions. Thus, the average value of the commodity mined per year must be such as to satisfy the required return on investment.	Production is justified under normal economic conditions. Assumptions regarding future economic conditions may be constrained by regulation.	Extraction and sale is economically viable on the basis of realistic assumptions of future market conditions.
E1.2	Exceptional (conditional) economic quantities are at present not economic to extract under normal economic conditions. Their extraction is made possible through government subsidies and/or other considerations.	Exceptional economic quantities are at present not economic to produce under normal economic conditions. Their production is made possible through government subsidies and/or other considerations.	Extraction and sale is economic in spite of current adverse market conditions that are expected to be of a short-term nature as long-term forecasts are economic. Extraction that is deemed to be economic as a consequence of subsidies also falls into this sub-category.
E2	Quantities, reported in tonnes/volume with grade/quality, demonstrated by means of a pre-feasibility study, feasibility study or mining Report, in order of increasing accuracy, not justifying extraction under the technological, economic, environmental and other relevant commercial conditions, realistically assumed at the time of the determination, but possibly so in the future.	Production is not justified under the technological, economic, environmental and other relevant commercial conditions, realistically assumed at the time of the estimation, but which may become justified in the future.	Economic extraction has not been fully demonstrated to be economically viable. Refer to definitions of E2.1 and E2.2.

E2.1	Marginal economic quantities are quantities that at the time of determination are not economic, but border on being so. They may become economic in the foreseeable future as a result of changes in technological, economic, environmental and/or other relevant commercial conditions.	Marginal economic quantities are quantities that at the time of determination are not economic, but border on being so. They may become economic in the foreseeable future as a result of changes in technological, economic, environmental and/or other relevant commercial conditions.	Extraction has not yet been fully demonstrated to be economic, but on the basis of realistic assumptions of future market conditions, it is more likely than not that economic extraction will take place in the foreseeable future.
E2.2	Sub-marginal economic quantities are quantities that would require a substantially higher commodity price or a major cost-reducing advance in technology to render them economic.	Sub-marginal economic quantities are quantities that would require a substantially higher commodity price or a major cost-reducing advance in technology to render them economic.	Extraction and sale is not economically viable on the basis of realistic assumptions of future market conditions, and eventual economic extraction would require a substantially higher commodity price or a major reduction in costs to render it economic.
E3	Quantities, reported in tonnes/volume with grade/quality, estimated by means of a geological study to be of intrinsic economic interest. Since the geological study includes only a preliminary evaluation of economic viability, no distinction can be made between economic and potentially economic. These resources are therefore said to lie in the range of economic to potentially economic. Generally only in-situ quantity figures are reported.	Quantities that are of undetermined economic viability or are of no economic interest (unrecoverable).	Extraction is not available for sales, or is not commercial or economic to extract, or economic viability has not yet been determined. Refer to definitions of E3.1, E3.2 and E3.3.
E3.1	Not defined.	Quantities that will be produced but not sold.	Extraction without sale.
E3.2	Not defined.	Economic viability undetermined.	Economic viability of extraction has not yet been determined.
E3.3	Not defined.	Additional quantities remaining in-place, i.e. the quantities initially in-place less the produced and remaining recoverable quantities.	Estimated quantities that are in-situ, but where there is currently considered to be no potential for eventual economic extraction.

F1	<p>Mining Report and/or Feasibility Study has demonstrated extraction of the reported quantities to be justified.</p> <p>Cost data must be reasonably accurate, and no further investigations should be necessary to make the investment decision. The information basis associated with this level of accuracy comprises the reserve figures based on the results of detailed exploration, technological pilot tests and capital and operating cost calculations such as quotations of equipment suppliers.</p>	<p>Development and/or production plans have demonstrated production of the reported quantities to be justified.</p>	<p>A development project that has been demonstrated to be technically and commercially feasible.</p> <p>Refer to definitions of F1.1, F1.2 and F1.3.</p>
F1.1	<p>A Mining Report is understood as the current documentation of the state of development and exploitation of a deposit during its economic life including current mining plans. The operator of the mine generally makes it. The study takes into consideration the quantity and quality of the minerals extracted during the reporting time, changes in categories of economic viability due to changes in prices and costs, development of relevant technology, newly imposed environmental or other regulations, and data on exploration conducted concurrently with mining.</p> <p>It presents the current status of the deposit, providing a detailed and accurate, up-to-date statement on the reserves and the remaining resources.</p>	<p>The development project is completed and the facilities are producing.</p>	<p>The project is currently extracting products.</p>

F1.2	<p>Not defined.</p>	<p>Development projects for recovery of a commodity are committed when firm commitments have been made for the expenditures and activities needed to bring a discovered accumulation to the production stage.</p> <p>Undeveloped projects are committed only when it can be clearly demonstrated that there is intent to develop them and bring them to production. Intent may be demonstrated with funding / financial plans, declarations of commerciality, regulatory approvals and satisfaction of other conditions that would otherwise prevent the project from being developed and brought to production.</p> <p>These commitments should be unconditional, except for timing that may be dependent on the development of prior committed projects. An example of this would be where production is dedicated to a long-term sales contract and will only be developed as and when the capacity is required to satisfy the contract.</p>	<p>All necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is under way.</p>
F1.3	<p>A Feasibility Study assesses in detail the technical soundness and economic viability of a mining project, and serves as the basis for the investment decision and as a bankable document for project financing. The study constitutes an audit of all geological, engineering, environmental, legal and economic information accumulated on the project. Generally, a separate environmental impact study is required.</p>	<p>Development plans have demonstrated production of the reported quantities to be justified, but commitments to carry out the development works have not yet been made.</p>	<p>Implementation of the development project is justified on the basis of reasonable forecast commercial conditions at the time of reporting, and there are reasonable expectations that all necessary approvals/contracts will be obtained.</p>

F2	A Pre-feasibility Study provides a preliminary assessment of the economic viability of a deposit and forms the basis for justifying further investigations (detailed exploration and feasibility study). It usually follows a successful exploration campaign, and summarizes all geological, engineering, environmental, legal and economic information accumulated to date on the project. The pre-feasibility study addresses the items listed under the feasibility study, although not in as much detail.	Development and production of recoverable quantities has not been justified, due to conditions that may or may not be fulfilled.	A development project that has not yet been demonstrated to be technically and commercially feasible.
F2.1	Not defined.	Activities are ongoing to justify development and production in the foreseeable future.	Project activities are ongoing to justify development in the foreseeable future.
F2.2	Not defined.	Activities to justify development and production are unclarified or temporarily suspended.	Project activities are on hold and/or where justification as a commercial development may be subject to significant delay.
F2.3	Not defined.	Investigations have indicated that development and production will not be technically justified.	There are no current plans to develop or to acquire additional data at the time due to limited potential.

F3	<p>A Geological Study is an initial evaluation of economic viability. This is obtained by applying meaningful cut-off values for grade, thickness, depth, and costs estimated from comparable mining operations.</p> <p>Economic viability categories, however, cannot in general be defined from the Geological Study because of the lack of detail necessary for an Economic viability evaluation. The resource quantities estimated may indicate that the deposit is of intrinsic economic interest, i.e. in the range of economic to potentially economic.</p> <p>A Geological Study is generally carried out in the following four main stages: reconnaissance, prospecting, general exploration and detailed exploration (as defined below). The purpose of the geological study is to identify mineralization, to establish continuity, quantity, and quality of a mineral deposit, and thereby define an investment opportunity.</p>	<p>Project evaluation is incomplete or lacks sufficient definition to establish feasibility. This includes projects aiming to identify the presence of petroleum accumulation(s) or projects to improve recovery.</p>	<p>Project evaluation is incomplete or lacks sufficient definition to establish technical and commercial feasibility.</p>
G1	<p>Detailed exploration involves the detailed three-dimensional delineation of a known deposit achieved through sampling, such as from outcrops, trenches, boreholes, shafts and tunnels. Sampling grids are closely spaced such that size, shape, structure, grade, and other relevant characteristics of the deposit are established with a high degree of accuracy. Processing tests involving bulk sampling may be required. A decision on whether to conduct a feasibility study can be made from the information provided by detailed exploration.</p>	<p>Quantities that are estimated to be recoverable from a known (drilled) accumulation, or part of a known accumulation, where sufficient technical data are available to establish the geological and reservoir production performance characteristics with a high level of confidence.</p> <p>Quantities in this category that are associated with a development project (i.e. F1) may be subdivided to reflect their development and producing status.</p>	<p>Quantities associated with a known deposit that can be estimated with a high level of confidence.</p>

G2	General Exploration involves the initial delineation of an identified deposit. Methods used include surface mapping, widely spaced sampling, trenching and drilling for preliminary evaluation of mineral quantity and quality (including mineralogical tests on laboratory scale if required), and limited interpolation based on indirect methods of investigation. The objective is to establish the main geological features of a deposit, giving a reasonable indication of continuity and providing an initial estimate of size, shape, structure and grade. The degree of accuracy should be sufficient for deciding whether a Pre-feasibility Study and detailed exploration are warranted.	Quantities that are estimated to be recoverable from a known (drilled) accumulation, or part of a known accumulation, where sufficient technical data are available to establish the geological and reservoir production performance characteristics with a reasonable level of confidence.	Quantities associated with a known deposit that can be estimated with a reasonable level of confidence.
G3	Prospecting is the systematic process of searching for a mineral deposit by narrowing down areas of promising enhanced mineral potential. The methods utilized are outcrop identification, geological mapping, and indirect methods such as geophysical and geochemical studies. Limited trenching, drilling, and sampling may be carried out. The objective is to identify a deposit that will be the target for further exploration. Estimates of quantities are inferred, based on interpretation of geological, geophysical and geochemical results.	Quantities that are estimated to be recoverable from a known (drilled) accumulation, or part of a known accumulation, where sufficient technical data are available to establish the geological and reservoir production performance characteristics with a low level of confidence.	Quantities associated with a known deposit that can be estimated with a low level of confidence.

G4	<p>A Reconnaissance study identifies areas of enhanced mineral potential on a regional scale based primarily on results of regional geological studies, regional geological mapping, airborne and indirect methods, preliminary field inspection, as well as geological inference and extrapolation. The objective is to identify mineralized areas worthy of further investigation towards deposit identification. Estimates of quantities should only be made if sufficient data are available and when an analogy with known deposits of similar geological character is possible, and then only within an order of magnitude.</p> <p>In the case of uranium, reconnaissance studies identify speculative resources, defined as in-situ resources. This is uranium that is thought to exist, mostly on the basis of indirect evidence and geological extrapolations, in deposits discoverable with existing exploration techniques. The location of deposits envisaged in this category could generally be specified only as being somewhere within a given region or geological trend.</p>	<p>Quantities that are estimated to be recoverable from an un-drilled accumulation, on the basis of inferred geological and reservoir production performance characteristics.</p>	<p>Estimated quantities associated with a potential, but not yet confirmed deposit.</p>
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