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**Specifications for the application of the United Nations
Framework Classification for Fossil Energy and Mineral
Reserves and Resources 2009 (UNFC-2009)**

Draft document prepared by the Specifications Task Force¹

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¹ Please kindly note that both draft documents have been prepared by the Specifications Task Force Phase Two as the “basis for discussion” at the third session of the Expert Group on Resource Classification (Geneva, 2-4 May 2012). The documents are being made available subject to the caveat that the draft text related to a few key issues is still under discussion within the Specifications Task Force Phase Two and certain commodity-specific specifications are still under consideration by the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) which may have an impact on the relevant generic specifications as noted herein. Further, parts of the document are still incomplete and consequently no formal approval can be given or implied at this stage. If the members of the Expert Group concur, the Bureau of the Expert Group will release the completed draft document for a formal public comment period only when it has achieved a consensus on the form and content of the document. Subsequent to the public comment period, all changes will require a further consensus to be achieved in the Bureau prior to publication of the final version.

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I. Introduction

1. At its eighteenth session in November 2009, the Committee on Sustainable Energy approved the final text of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 (UNFC-2009). The text of UNFC-2009 has been published as a United Nations Economic Commission for Europe (UNECE) publication; ECE/ENERGY/85 and ECE Energy Series No. 39 in the six languages of the United Nations (Arabic, Chinese, English, French, Russian and Spanish).
2. The principal objective of UNFC-2009 is to enhance international communication by providing a simple, generic classification framework for the reporting of fossil energy and mineral reserves and resources, even though such estimates may have been generated using classification or reporting systems that: (i) may use different terminology for comparable estimates, or the same terminology with different meanings; (ii) incorporate application guidelines that are commodity-specific; and, (iii) may reflect the extraction of solids by mining or the production of fluids through wells. UNFC-2009 has been developed to meet, to the extent possible, the needs of applications pertaining to international energy and mineral studies, government resource management functions, corporate business processes and financial reporting standards.
3. A key benefit of UNFC-2009 is the potential to provide a common basis for the minerals and petroleum sectors, whose classification systems have been developed primarily for the mining of solids and the production of fluids respectively, but which now must address the increasing overlap between the two extractive industries. Examples of this overlap include the mining of natural bitumen or coal for processing into synthetic oil or gas, and the production of minerals as fluids, such as the in-situ leaching of uranium.
4. At the first session of the Expert Group on Resource Classification in April 2010, it was agreed that generic specifications would be developed for UNFC-2009, but only to the extent considered necessary to achieve an appropriate level of consistency in the reporting of reserve and resource estimates under UNFC-2009. Specifications that were considered necessary for particular commodities would not be addressed, as these were agreed to be more appropriately incorporated in existing commodity-specific classification systems. Consequently, in addition to the provision of generic specifications, there was also a need to establish a linkage between UNFC-2009 and such commodity-specific systems so that the appropriate specifications are applied at a commodity level for the purpose of resource assessment. The agreed framework for this linkage is discussed in Section II.
5. It is recognised that there may be differences between reporting at a corporate level and reporting by State entities at a national level, where estimates have been aggregated and/or derived using different information and procedures. This issue is discussed further in Section III.
6. In Section IV, the issue of disclosure is addressed, noting that UNFC-2009 is a voluntary system that does not mandate specific categories of resources to be disclosed. Generic specifications are provided in Section V. These are considered necessary to ensure that resource quantities (for any commodity) that are reported as UNFC-2009 compliant are sufficiently comparable to provide meaningful information to users of such data.
7. Governance of UNFC-2009 and its specifications is the responsibility of the Technical Advisory Group, which reports to the Expert Group on Resource Classification.

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8. A Glossary of Terms is included (in Annex I), but is limited to those terms for which definitions are not already adequately provided in other published documents. In addition, guidelines on the application of key instructions in UNFC-2009 are provided in Annex II.

II. Commodity-specific specifications and the relationship with other resource classification systems

9. UNFC-2009 has been aligned with two other classification systems, which facilitates the reporting of the same resource quantities under either UNFC-2009 or the aligned system. The two systems are the CRIRSCO Template of 2006² developed by the Committee for Mineral Reserves International Reporting Standards (CRIRSCO), and the reporting codes and standards that are based on it, and the Petroleum Resources Management System of 2007 (SPE-PRMS³) developed by the Society of Petroleum Engineers (SPE), World Petroleum Council (WPC), American Association of Petroleum Geologists (AAPG) and Society of Petroleum Evaluation Engineers (SPEE).

10. Long-standing agreements are in place for CRIRSCO and SPE to provide the commodity-specific specifications for solid minerals and petroleum. In accordance with those agreements, they have provided commodity-specific specifications via the CRIRSCO Template and SPE-PRMS respectively. Along with the generic specifications, these provide the foundation and keystones for consistent application of UNFC-2009. It is recognised that these systems will continue to be developed in response to stakeholder needs and changes in technology, and hence additional commodity-specific specifications may be incorporated in the future.

11. Other classification systems may be mapped to UNFC-2009 through the CRIRSCO Template/SPE-PRMS, or directly to UNFC-2009. In either case, the mapping must comply with all UNFC-2009 definitions and generic specifications to the satisfaction of the Expert Group on Resource Classification. Estimates reported using UNFC-2009 must be comparable⁴ regardless of the mapped system being applied.

12. UNFC-2009 offers greater granularity than is available in the CRIRSCO Template/SPE-PRMS, and the application of commodity-specific specifications of mapped systems shall not limit in any way the use of the additional granularity of UNFC-2009.

13. The CRIRSCO Template (and the codes/standards based on it) and SPE-PRMS are independent from UNFC-2009 and may be mandatory for reporting purposes in some jurisdictions or in particular circumstances. This UNFC-2009 specifications document has no bearing whatsoever on such mandatory reporting requirements or on the independent application of these other systems/codes/standards.

14. The relationship between UNFC-2009 and the CRIRSCO Template, and between UNFC-2009 and SPE-PRMS, is explained in the Bridging Documents contained in Annex III and Annex IV, respectively.

² Available at: www.crirSCO.com/crirSCO_template_v2.pdf

³ Available at: www.spe.org/industry/docs/Petroleum_Resources_Management_System_2007.pdf

⁴ The requirement for comparability shall reflect due consideration of the fact that evaluations undertaken for the purpose of reporting estimates at regional or national levels (e.g. by State bodies) may differ from evaluations that are undertaken at the level of individual projects. See Section III.

15. It is hoped that additional classification systems will be mapped to UNFC-2009 in the future and, where possible, their alignment established.

III. National resource reporting

16. The CRIRSCO Template and SPE-PRMS are designed to be applied at the level of individual development projects or mining operations. For corporate reporting purposes, this assessment approach is essential, even though actual public disclosure may be at an aggregated level (e.g. as commonly found in the petroleum industry). UNFC-2009 can also be applied at a project level and in such cases there should be no significant difference in estimates between mapped systems.

17. At a State level, national inventory estimates should ideally be based on an aggregation of reported or published corporate estimates for individual projects but, more commonly, such estimates are either not available or they are incomplete. Further, where government organizations have a responsibility for developing resource estimates at a regional or national level, they do not always have access to all the relevant technical and commercial data for each project, and hence are not expected to be able to replicate corporate estimates on an individual project basis, regardless of the classification system being used. In such cases, published regional or national inventory estimates based on UNFC-2009 shall be derived using an appropriate methodology whereby the estimates can be considered to be reasonably comparable, at an aggregated reporting level, to estimates that would have been derived through a detailed project-by-project evaluation had such information been available.

18. When reporting aggregated estimates using UNFC-2009, it is mandatory that the relevant Numerical Codes for the individual Classes are disclosed. For example, it may be useful at a national level to determine the sum of estimated quantities for Commercial Projects and Potentially Commercial Projects at a “best estimate” level.⁵

IV. Disclosure

19. UNFC-2009 is a voluntary system and does not impose any rules regarding which categories of resources (Classes or Sub-classes) that should be disclosed. Unless mandated or restricted by a government or other regulatory body, the disclosure of resource quantities under UNFC-2009 is entirely at the discretion of the reporter. However, in order to ensure that those quantities that are disclosed will provide meaningful information to users of resource information, certain generic specifications are included below for the purpose of ensuring clarity and comparability. In some cases, these specifications can be appropriately addressed through the use of footnotes to the resource report.

V. Generic specifications

20. In these generic specifications, the following words have specific meanings:

⁵ This aggregation would be identified as 111+112+221+222+121+122+211+212. While additional labels may be useful to describe such combinations, the relevant Numerical Codes must also be stated (e.g. in a footnote).

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- “Shall” is used where a provision is mandatory;
- “Should” is used where a provision is preferred; and,
- “May” is used where alternatives are equally acceptable.

A. Use of numerical codes

21. While the defined Classes and Sub-Classes shown in Figures 2 and 3 of UNFC-2009 may be used as supplementary terminology, the relevant Numerical Code(s) shall always be reported in conjunction with each resource quantity. For example, these may be documented in the form 111, 111+112, or 1.1;1.2;1, as appropriate. (Examples of possible reporting formats and the use of combined categories, such as G1+G2, are shown in Annex VI, and an illustration of the relationship between primary classes of UNFC-2009 is included as Annex VII.)

B. Effective date

22. Reported quantities are estimates of remaining quantities as at the Effective Date of the evaluation. The Effective Date shall be clearly stated in conjunction with the reported quantities. The evaluation should take into account all data and information available to the evaluator prior to the Effective Date. If information becomes available subsequent to the Effective Date, but prior to reporting, that could have significantly changed the estimated quantities as at the Effective Date, the likely effect of this information shall be disclosed.

C. Commodity or product type (pending possible new CRIRSCO specification for solid minerals)

23. Estimated quantities should be reported separately for each commodity or product type that will be sold, transferred or disposed of separately. If, however, estimates for different commodities or product types have been aggregated for reporting purposes, the estimates shall be accompanied by a statement clarifying which commodities or product types have been aggregated and the conversion factor(s) used to render them equivalent for the purposes of aggregation.

D. Basis for estimate (pending possible new CRIRSCO specification for solid minerals)

24. Reported quantities may be those quantities attributable to the mine/development project as a whole, or may reflect the proportion of those quantities that is attributable to the reporting entity’s economic interest in the mining operation or development project.⁶ The reporting basis shall be clearly stated in conjunction with the reported quantities. Government royalty obligations are often treated as a tax to be paid in cash and are

⁶ The proportion of gross quantities attributable to a company will depend on the specific contractual arrangements governing development and extraction operations, and may be defined by regulation. For corporate reporting, the general principles used to determine net quantities shall be documented.

therefore generally classified as a cost of operations. In such cases, the reported quantities may include the proportion attributable to the royalty obligation. Where the reported quantities exclude the proportion attributable to the royalty obligation, this shall be documented.

E. Reference point

25. The Reference Point is a defined location within an extraction and processing operation where the reported quantities are measured or estimated. Where the Reference Point is not the point of sale to third parties (or where custody is transferred to the entity's downstream operations), its location shall be disclosed. Further, where such quantities are classified as E1, the information necessary to derive estimated sales quantities (e.g. the mineral processing recovery factor) shall also be provided.

F. Classification of projects based on level of maturity

26. Where it is considered appropriate or helpful to sub-classify projects to reflect different levels of project maturity, based on the current status of the project, the optional Sub-classes shown in Figure 3 of UNFC-2009 may be adopted for reporting purposes. Additional guidance on the distinction between the Sub-classes is provided in Annex V.

G. Distinction between E1, E2 and E3 (pending possible new CRIRSCO specification for solid minerals)

27. The distinction between quantities that are classified on the Economic axis as E1, E2 or E3 is based on the phrase "reasonable prospects for economic extraction and sale in the foreseeable future". The definition of "foreseeable future" can vary depending on the commodity and hence more detailed specifications can be found in relevant commodity-specific systems that have been aligned with UNFC-2009.

H. Confidence levels for G1, G2 and G3

28. The level of confidence for quantities that are classified on the Geological axis as G1, G2 and G3 is defined as "high", "medium" and "low", respectively. These are not specified more precisely at a generic level because there are fundamental differences between the approaches that are appropriate for commodities extracted as solids and those extracted as fluids, as discussed in the Supporting Explanation to the definitions of these categories in UNFC-2009. More detailed specifications can therefore be found in relevant commodity-specific systems that have been aligned with UNFC-2009.

I. Distinction between recoverable quantities and in situ (in-place) quantities

29. Other than quantities that are classified on the Feasibility axis as F4, all quantities are considered to be potentially recoverable on the basis of existing technology or technology currently under development, and are associated with actual or possible future exploration/development projects or mining operations.

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J. Aggregation of quantities (pending possible new CRIRSCO specification for solid minerals)

30. Estimated quantities associated with mining operations or development projects that are classified in different categories on the Economic or Feasibility axis shall not be aggregated with each other without proper justification and disclosure of the methodology adopted.⁷ Consideration should be given to:

- (a) The probability that some projects may never achieve E1 and F1 status, and hence there will be no recoverable quantities;
- (b) Avoidance of double-counting, e.g. where resource estimates have been reported inclusive of reserves, as is permitted in some classifications;
- (c) Aggregation of metal content (not tonnage of ore)⁸ where estimated commodity or product type sales quantities are not available;
- (d) Dependencies between projects, where relevant; and,
- (e) The portfolio effect when aggregating estimates that incorporate probabilistic or deterministic ranges of uncertainty.

K. Economic assumptions

31. In accordance with the definitions of E1, E2 and E3, economic assumptions shall be based on current market conditions and realistic assumptions of future market conditions. Except where constrained by regulation, assumptions of future market conditions should reflect the view of either:

- (a) The organisation responsible for the evaluation;
- (b) The view of a competent person⁹ or independent evaluator; or,
- (c) An externally published independent view, which is considered to be a reasonable forecast of future market conditions.

The basis for the assumptions (as opposed to the actual forecast) shall be disclosed.

L. Evaluator qualifications

32. Evaluators must possess an appropriate level of knowledge and experience. More detailed specifications can be found in relevant commodity-specific systems that have been aligned with UNFC-2009.

⁷ Note that regulatory bodies may explicitly preclude such aggregation under any circumstances.

⁸ It is not possible to sum grades and tonnages for different mineral deposits. Therefore, while national minerals inventories may draw on commercial reports for mineral deposits, the two cannot be compared. Further, most mineral deposits have multiple commodities, which need to be reported separately in national inventories.

⁹ Note that "competent person" may be defined by regulation.

M. Units and conversion factors

33. In order to facilitate global comparability of resource estimates, it is recommended that the Système International d'Unités (SI units) is used for reporting of resource quantities. However, it is recognized that there are traditional measurement units that are widely used and accepted for certain commodities; where such units are used for reporting purposes, conversion factors to SI units shall be provided. Similarly, where quantities are converted from volume or mass to energy equivalents, or other conversions are applied, the conversion factors shall be disclosed.

N. Documentation

34. Estimates of resource quantities shall be documented in sufficient detail that would allow an independent evaluator or auditor to clearly understand the basis for estimation of the reported quantities and their classification.

O. Expansion of G4 to account for uncertainty

35. In some situations, it may be helpful to express a range of uncertainty for quantities that are classified on the Geological axis as G4, e.g. Exploration Projects. In such cases, the following specification shall apply:

- G4.1: low estimate of the quantities;
- G4.2: incremental amount to G4.1 such that $G4.1+G4.2$ equates to a best estimate of the quantities;
- G4.3: incremental amount to $G4.1+G4.2$ such that $G4.1+G4.2+G4.3$ equates to a high estimate of the quantities.

Category G4 reflects the best estimate and is equal to $G4.1+G4.2$.

P. Optional labels for estimates

36. Where it is considered appropriate or helpful to use labels in addition to the numerical codes for a range of estimates for a specific development project or mining operation, the terms "Low Estimate", "Best Estimate" and "High Estimate" may be used to correspond to quantities that are classified on the Geological axis as G1, $G1+G2$ and $G1+G2+G3$ respectively.

Q. Classification of undiscovered resources

37. In some situations, it may be helpful to sub-classify Exploration Projects on the basis of their level of maturity. In such cases, the following specification shall apply:

- F3.1: where site-specific geological studies and exploration activities have identified the potential for an individual deposit with sufficient confidence to warrant drilling or testing that is designed to confirm the existence of that deposit in such form, quality and quantity that the feasibility of extraction can be evaluated;

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- F3.2: where local geological studies and exploration activities indicate the potential for one or more deposits in a specific part of a geological province, but requires more data acquisition and/or evaluation in order to have sufficient confidence to warrant drilling or testing that is designed to confirm the existence of a deposit in such form, quality and quantity that the feasibility of extraction can be evaluated;
- F3.3: at the earliest stage of exploration activities, where favourable conditions for the potential discovery of deposits in a geological province may be inferred from regional geological studies.

R. Classification of additional quantities in place

38. In some situations, it may be helpful to sub-classify Additional Quantities in Place on the basis of the current state of technological developments. In such cases, the following specification shall apply:

- F4.1: the technology necessary to recover some or all of the these quantities is currently under active development, following successful pilot studies on other deposits, but has yet to be demonstrated to be technically feasible for the style and nature of deposit in which that commodity or product type is located;
- F4.2: the technology necessary to recover some or all of the these quantities is currently being researched, but no successful pilot studies have yet been completed;
- F4.3: the technology necessary to recover some or all of these quantities is not currently under research or development.

S. Classification of “unconventional” resources (pending possible new CRIRSCO specification for solid minerals)

39. No draft generic specification prepared yet (awaiting CRIRSCO)

T. Timing issues (pending possible new CRIRSCO specification for solid minerals)

40. No draft generic specification prepared yet (awaiting CRIRSCO).

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Annex I

Glossary of Terms

In preparation.

Annex II

Guidelines on the application of key instructions in UNFC-2009

In preparation.

Annex III

Relationship between UNFC-2009 and the CRIRSCO Template

In preparation.

Annex IV

Relationship between UNFC-2009 and SPE-PRMS

In preparation.

Annex V

Guidelines on the use of project maturity to classify projects

In preparation.

Annex VI

Examples of reporting resource quantities using UNFC-2009

Still to be prepared.

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Annex VII

**Illustration of relationship between primary classes of UNFC-
2009**

Still to be prepared.
