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UNITED NATIONS FRAMEWORK CLASSIFICATION FOR FOSSIL ENERGY AND MINERAL RESERVES AND RESOURCES 2009

Report prepared by the Task Force on Revision of the United Nations Framework Classification for Fossil Energy and Mineral Resources

Summary

At the fifth session of the Ad Hoc Group of Experts on Harmonization of Fossil Energy and Mineral Resources Terminology a Task Force was established and charged with, amongst other issues, revising the United Nations Framework Classification for Fossil Energy and Mineral Resources (UNFC) that had been adopted in 2004 (UNFC-2004). This report summarizes the work of the UNFC Revision Task Force in relation to revising the text of UNFC-2004 only. The Task Force, which consists of the members of the Extended Bureau of the Ad Hoc Group of Experts plus selected experts, has developed and proposed a revised version of UNFC-2004, based on recommendations arising from a previous study by a Mapping Task Force of the Ad Hoc Group of Experts. This Report serves to document the due and transparent process that has been undertaken in preparing a draft revised text of UNFC-2009.

The Report is for presentation to the seventh session of the Ad Hoc Group of Experts for its background information when considering whether to recommend the use of the proposed revised UNFC-2009 in lieu of UNFC-2004.

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INTRODUCTION

1. This report summarizes the work of the United Nations Framework Classification for Fossil Energy and Mineral Resources (UNFC) Revision Task Force (RTF) with respect to revision of the UNFC of 2004 (UNFC-2004). The RTF will communicate its final position on this report to the seventh session of the Ad Hoc Group of Experts on Harmonization of Fossil Energy and Mineral Resources Terminology (Ad Hoc Group of Experts). The RTF was established by the Ad Hoc Group of Experts to develop and propose a revised version of the UNFC that had been adopted in 2004, based on recommendations arising from a previous study by a Mapping Task Force (ECE ENERGY SERIES No. 33 and ECE/ENERGY/71).

2. The RTF mandate also included the preparation of a Discussion Paper on the Need/Desirability of Specifications and Guidelines for the UNFC (ECE/ENERGY/GE.3/2009/7). Consequently, in the following discussions, any references to specifications and guidelines should not be seen as a recommendation to develop specifications and guidelines for the UNFC or to rely on specifications and guidelines of the classification systems to which the UNFC is mapped. This issue will be considered in the RTF Discussion Paper.

I. THE REVISION PROCESS

3. In 2004, the United Nations Economic and Social Council (ECOSOC) in its resolution 2004/233 invited the Member States of the United Nations, international organizations and the regional commissions to consider taking appropriate measures for ensuring worldwide application of the UNFC.

4. A number of important classifications have been revised. Generally, there has been a trend towards convergence with the principles found in UNFC-2004. The revised classifications included:

(a) 2005 – New Russian Federation Classification;

(b) 2006 Revised Committee for Mineral Reserves International Reporting Standards (CRIRSCO) Template;

(c) 2007 Society of Petroleum Engineers/World Petroleum Congress/American Association of Petroleum Geologists/Society of Petroleum Evaluation Engineers Petroleum Resources Management System (SPE-PRMS);

(d) 2008 Revised United States Securities and Exchange Commission (SEC) definitions for oil and gas reporting.

5. In addition, the Canadian Oil and Gas Evaluation Handbook (COGEH) was issued in 2002 and updated in 2007, and this is also in reasonable conformance with these revised classifications.

6. While clear evidence of convergence could be observed, it was even clearer that the number of different classifications did not decrease. Despite broad similarities between the systems, differences do exist. This is to be expected, given that classification systems are designed to serve the specific needs of the stakeholders and take into account their specific circumstances.

7. In 2007, the Ad Hoc Group of Experts decided to map certain classification systems to UNFC-2004 and established a Task Force (UNFC Mapping Task Force (MTF)) for this purpose. The report of the MTF (ECE ENERGY SERIES No. 33 and ECE/ENERGY/71), recommended that certain changes be made to the category definitions of the UNFC in order to achieve alignment between the UNFC, SPE-PRMS and the CRIRSCO Template. The MTF “proposed a simplification of 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". It also stated "It is envisaged that the mapping based on these proposed generic UNFC definitions could form the basis of a harmonised system that allows users to classify commodity quantities and report them within various systems and, using the mapping modules, also present results using UNFC codification. Further, these mapping modules can serve as a "template" such that other national, industrial, and institutional level systems can be similarly mapped into UNFC codes and thus promote international communication and global assessments". The Ad Hoc Group of Experts then:

(a) Considered the provisional Report of the MTF, and generally agreed to use it as a basis for revising the UNFC and its specifications and guidelines, subject to comments from members of the Ad Hoc Group of Experts following further review;

(b) Confirmed authorization of the Bureau of the Ad Hoc Group of Experts to act on the views received on revising UNFC-2004 (item (e) of the programme of work for 2008);

(c) Requested that a proposal for a revised UNFC be submitted to the Extended Bureau of the Committee of Sustainable Energy for consideration as early as possible;

(d) Requested the Bureau to prepare any proposed changes to the UNFC through a due and transparent process, including by posting a draft text on the ECE website for public comment over a sufficient period of time; further requested that any proposals, comments and/or recommendations to be submitted to the Extended Bureau of the Committee on Sustainable Energy should be published on the ECE website; and requested the Bureau to define an appropriate timeline, taking into consideration the guidance of the Director of the ECE Sustainable Energy Division (ECE/ENERGY/GE.3/2008/2).

8. The Bureau of the Ad Hoc Group of Experts then nominated the UNFC Revision Task Force consisting of the Extended Bureau members plus selected experts for the purpose of developing and proposing a revised UNFC.

9. The RTF held a number of teleconferences and three workshops: one in London, 10-11 September 2008, hosted by StatoilHydro and BP; one in Stavanger, 2-4 March 2009, hosted by the Norwegian Petroleum Directorate; and one in London, 1-2 September 2009, hosted by Ernst & Young.

10. A draft revised UNFC and a draft Explanatory Note to it were posted on the Ad Hoc Group of Experts website for public comment on 8 December 2008 with the deadline of 6 February 2009.

11. At the sixth session of the Ad Hoc Group of Experts, a significant number of those present were in favour of adopting the Draft UNFC-2009, while recognizing that there might be a need to modify the text in the future. Some delegations (Turkey, Ukraine, Qatar, Venezuela, Organization of the Petroleum Exporting Countries (OPEC) Secretariat) requested that the comments received to the draft revised UNFC-2008 and accompanying draft Explanatory Note following the close of the public comment period on 6 February 2009 that had not already been incorporated, notably the comments received from the OPEC Secretariat on 17 March 2009 and the additional comments received during the meeting, should be fully considered before a final

Draft UNFC-2009 text was prepared. It was noted that since some of the requested changes conflicted with other requests, it was not possible to incorporate all requested changes. However, it was acknowledged that the report of the Revision Task Force should provide a detailed explanation of the basis for adopting some proposed changes, but not others.

12. This report summarizes the general considerations of the RTF.

II. GENERAL CONSIDERATIONS

13. The draft revised UNFC was prepared primarily on the basis of the recommendations of the MTF. Emphasis was placed on simplifying the current version and adopting generic terminology using plain language. Further revisions were then made to reflect the comments received on the initial draft revised UNFC. The comments were, with few exceptions, positive to the proposal for this version and provided constructive comments for further improvements.

14. A compilation of comments received by the RTF is reproduced in Annex I. The summary of requested changes or comments has been developed by the RTF and should be seen only as the basis for highlighting key issues; it must not be read as being fully representative of the views of the individual or organization that made the comment. For a complete understanding of the points raised, reference must be made to the actual submission document by using the link to the ECE website.

15. In reference to paragraph 11 above, the approach taken following the sixth session was to make changes to the initial draft only where there was clear evidence that such a change would correct an error/omission or clarify a misleading statement.

16. It was clear that some of the suggestions were incompatible with each other, e.g. some asked for more detail (i.e. more sub-categories) while others requested less; in such cases it was appropriate to adopt a balance between the two positions. The primary basis for determining a reasonable compromise was that the number of categories/sub-categories should not be increased from the 2004 version without good reason. In fact, the total number of categories/sub-categories has been reduced relative to UNFC-2004.

17. A comparison between the definitions of UNFC-2004 and the proposed definitions for a revised UNFC is shown in Annex II.

III. SPECIFIC COMMENTS

18. In the following sections, the comments received and the changes made are grouped together where possible to capture particular issues, since in some cases there were several comments received about the same issue. In Annex I, a cross-reference to the relevant section is provided for each point raised.

1. Users of earlier versions of the UNFC

19. Several countries and organizations raised the fact that changes to the UNFC made it difficult for them as they had adopted or adapted and implemented a prior version of the UNFC. This is a problem when material changes are made to a classification system and it is necessary to try to limit such effects without compromising the need for improvement. In developing its recommendations, the MTF took great care to minimize changes that would impact existing application of the UNFC. However, some material changes were considered necessary to ensure alignment with both the CRIRSCO Template and SPE-PRMS for comparable classes. The primary changes were a consequence of the fact that, despite there being reasonable alignment between the CRIRSCO Template and SPE-PRMS (e.g. for probable reserves), each system mapped the equivalent quantity to a different class within the UNFC, which was untenable if the UNFC was to act as a framework classification under which these two widely-used classifications could co-exist. Those countries and organizations that have adopted previous versions of the UNFC, or have adapted it to serve their specific country or organization needs, could naturally, like any country and organization, continue to use their own classification system and, if they wish, develop their own mapping modules to the revised UNFC.

20. Annex II illustrates the changes to the category and sub-category definitions between 2004 and the proposed revised draft of UNFC-2009. These changes are almost entirely in line with the recommendations of the MTF. The additional material change was the removal of the sub-categories of E2, which is discussed below.

21. It should be evident from a comparison of the 2004 and proposed 2009 category and sub-category definitions that no re-evaluation of estimates should be required. In virtually every case, the solid minerals and petroleum definitions have been reduced to shorter and simpler generic definitions that do not impose any additional constraints beyond those embodied in the previous version. On the other hand, it is clear that in a few cases the actual classification (as opposed to the estimate itself) could change, depending on the circumstances. For example, a quantity previously categorized on the E-axis as E2.2 would now be E3.3.

22. The level of detail provided by the sub-categories is to some extent a reflection of practice in the petroleum sector. These were maintained where it was felt the same sub-categories could usefully be applied to solid minerals. This logic, whereby sub-categories were considered optional, led to the modification to the E sub-categories of E2.1 and E2.2 mentioned above. A fundamental boundary in the minerals sector is the one that underlies “Mineral Resources” as defined in the CRIRSCO Template. This boundary aligns with the E2.1/E2.2 boundary of the UNFC-2004. Maintaining this distinction would have meant that quantities that satisfied the CRIRSCO definition of a Mineral Resource could only be unambiguously classified under the UNFC by use of sub-categories. This would have been contrary to the desire to establish a high level framework classification with optional use of sub-categories. Under the revised version, a Mineral Resource aligns with E2 and hence removes the need to apply sub-categories unless further detail is considered appropriate in particular circumstances.

23. All other changes to category and sub-category definitions were reflected in the report of the MTF, which was presented to the Ad Hoc Group of Experts at its fifth session.

2. Specifications and guidelines

24. There were submissions (and comments at the sixth session) that specifications and guidelines were not necessary for the Draft UNFC-2009 on the basis of the following reasons, among others: (a) this view is in line with the MTF Report recommendations and corresponds to the UNFC being a " Framework Classification"; (b) the generic definitions have been designed to be as simple as possible, capturing the key principles from the UNFC-2004, but excluding detailed and/or commodity-specific information that could be captured better in guidelines; (c) should guidelines and specifications be developed for the revised UNFC, then the benefit of simplification and flexibility gained from the revision would be lost; (d) guidelines and specifications are commodity-, country- or institution-specific and are designed to best serve the needs of specific users; (e) mapping would facilitate an improved understanding of the UNFC and might lead to further convergence of classification systems and/or further revisions of the UNFC in the future.

25. However, several submissions (and comments at the sixth session) expressly asked for specifications/guidelines and also for examples to be prepared. Indeed, as stated in the MTF report, "The Task Force decided to develop generic principle-based definitions for each of the categories and sub-categories and recommends that the differences in application between solid minerals and petroleum are addressed in the form of additional commodity-specific guidelines. These generic definitions have been designed to be as simple as possible, capturing the key principles from the existing (2004) system, but excluding detailed and/or commodity-specific information that could be captured better in the guidelines." and "While the proposed UNFC definitions for categories and sub-categories shown in the table are applicable to the full range of commodities, it is clear that the variations in evaluation methods and classification detail will require guidelines that are more commodity specific. The Task Force recognises that for purposes of providing these guidelines, quantities can be broadly divided into solid minerals and petroleum."

26. The need/desirability of specifications and guidelines for the UNFC is subject to further evaluation and will be discussed in a separate report (discussion paper) by the RTF (see paragraphs 2 and 11).

3. Add reference to Mapping Task Force report

27. Since the revised UNFC has been developed in response to the recommendations of the MTF, consideration was given to directly referencing the MTF report from within the UNFC text. This was not implemented for several reasons.

28. The primary reason for not referencing the MTF report was the fact the report is not consistent with the proposed revised UNFC-2009. Since completing the report, there have been changes to the definitions of categories/sub-categories, as discussed above, and these changes would then impact the mapping results presented in the MTF Report.

29. The MTF report is referenced in the Explanatory Note accompanying the Draft UNFC-2009.

4. Remove reference to financial reporting

30. The UNFC has been designed with the goal of it having the capability to be a framework classification, including in relation to financial reporting. As a framework classification, it does not impose any rules with respect to financial reporting obligations and it would be entirely at the discretion of the relevant regulatory body whether or not the classification was to be adopted as the basis for such purposes. This is analogous to the position of SPE-PRMS for the petroleum sector.

5. Use of the term "reserves"

31. The MTF had recommended that the revised UNFC text avoid reliance on the terms "reserves" and "resources" and instead defined classes using simple non-technical terminology. Consequently, the draft UNFC used the term "resources" only in a general sense and did not refer to "reserves" as part of the classification system.

32. There were comments both for and against this approach. As a compromise for those who wished "reserves" to be included, and in recognition of the significance placed on the term, it has been included in the title of the revised draft. The text of the Explanatory Note has also been revised.

33. Although the term "reserves" has similar connotations under many classification systems, there are material differences between the specific definitions that are applied within the extractive industries. If the Draft UNFC-2009 is to serve as a framework classification, it would either have to develop its own definition of the term, which would inevitably conflict with some if not all existing definitions, or it could use the term in only a non-specific sense as in the title. The latter approach was determined to be the only practical solution, as well as reflecting the MTF recommendation.

6. Maintenance of the Classification

34. A suggestion was made to make specific reference to SPE and CRIRSCO in the context of maintenance of the UNFC. This has not been done as the need for specifications and guidelines is still under consideration and the maintenance requirements will depend on the form of complementary texts, if any.

7. Improvements to Figure 1

35. The need to add clarity to Figure 1 was accepted.

8. Reverse sequence of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 and Explanatory Note

36. The suggestion to document the Draft UNFC-2009 first and then include the Explanatory Note as an annex was accepted and has been implemented.

9. Expand G4 to account for uncertainty

37. This is an issue that has led to much discussion. There is a requirement in the petroleum sector to be able to capture a range of estimates for an undrilled prospect. However, the minerals sector has not expressed a similar need and so it may be considered as a commodity-specific requirement that does need to be documented at the highest level of the system. As stated in the revised Draft UNFC-2009, the defined categories can be further sub-divided by the users to best serve their specific needs and circumstances and this was illustrated in the MTF report. In addition, the supporting explanation text relating to G4 (Annex I) has been expanded in the revised draft.

38. This is the sort of issue that would be best handled in specifications and guidelines (see paragraph 2).

10. Show additional classes on Figure 1

39. Some users find the 3D representation complicated, so it is necessary to keep it as simple as possible. The classes that were illustrated were identified as “examples” only and the text states that other combinations are possible. In addition, footnote e to Figure 2 of ECE/ENERGY/GE.3/2009/L.5 indicates that Potentially Commercial Projects could include E1 (i.e. 121, 122 and 123). The basis for selecting the particular classes that were illustrated in Figures 1 and 2 was that they reflect the primary sub-divisions documented in the MTF report.

40. However, it was recognized that some existing users of the UNFC considered other classes to be of particular importance and were concerned these other classes were either no longer valid or were considered to be of diminished importance. Consequently, Figure 1 was revised to show additional classes.

11. Remove references to “project” in Figure 1

41. The concept of a project is relatively recent in the classification of resource quantities. However, it has now become widely accepted and adopted in the petroleum sector, and SPE-PRMS is explicitly defined as a project-based system. In the mining sector, the project-based approach is recognized as being consistent with business practices: pre-feasibility and feasibility studies are prepared, including integrated life-of-mine plans, and a decision is made based on these to raise and spend capital for development.

42. The project-based approach reflects the fact that no recovery estimates can be made other than in the context of an extraction project, even if that project is only defined conceptually at an early stage of maturity. The project is what defines the linkage between the efforts of extraction such as those associated with investment of capital (and the decision-making process associated with that investment) and the estimated quantities of the commodity that may be recovered and sold. In this way, the UNFC provides coherence with a suite of other critical management information.

12. Two-dimensional and three-dimensional representations of the United Nations Framework Classification for Fossil Energy and Mineral Resources

43. It is evident from discussions, particularly at the annual sessions of the Ad Hoc Group of Experts, that some users prefer the 3D representation, while others find the 2D version clearer. The only fair and equitable solution to this issue is to provide both 3D and 2D representations.

13. Exclude definitions of sub-categories

44. This is a question of providing a balance between those requesting less detail and those that have requested more (e.g. see Section III.I). A compromise position has been adopted, as discussed in Section II. It should be noted that use of the sub-categories is optional.

45. In addition, it was proposed that some sub-categories could be combined (F1.2 with F1.3; F2.1 with F2.2; and F3 with F4). However, these sub-categories align directly with those of SPE-PRMS and are considered to have important applications. As an example, the distinction between F1.2 and F1.3 reflects the boundary between being able to demonstrate a technically feasible development project and one that has been firmly committed. In many cases, the time spent in F1.3 will be quite limited, but there are examples where projects are planned, but remain uncommitted for many years, perhaps for strategic or market reasons.

14. Artisan mining considerations

46. A comment was received that the commercial emphasis of the UNFC might make it difficult for operators of small mines to adopt it. Emphasis on decisions rather than on formal studies supporting decisions may actually facilitate the use of the classification for the artisan mining sector at no detriment to the industrial sector. For example, there is no specific requirement to have a feasibility study of the form usually generated for large scale projects in order to assign quantities to F1. The key is that “sufficient” studies have been completed to demonstrate feasibility of extraction. If the mine is currently in operation, for example, then the estimated future recovery clearly satisfies the definition of F1.

47. The level of detail for reporting of artisan mining activities is a function of regulatory requirements rather than the classification system. Draft UNFC-2009 can be applied at a very high level or, by use of sub-classes, at a level of significant detail. This flexibility facilitates mapping to the UNFC of commodity, country or institution classification systems, which are designed to serve their specific needs and circumstances.

48. Examples of implementation in artisan mining could be included in commodity-specific guidelines.

15. Classifying all resources on a common basis

49. A view was expressed that it is difficult to classify all mineral resources under a single system due to the wide range of exploration activity and geological knowledge about individual deposits. This is one reason for the structure of the UNFC, where it can be used to define classes at a high level based on the primary categories, or further detail can be captured through the use of sub-categories. It is recognized that different commodities may need separate specifications

and guidelines. Different countries and institutions will use whichever classification system that best serves their own needs and circumstances, and may also develop mapping modules to the UNFC, on a voluntary basis and at their discretion.

16. Meeting local needs and avoiding frequent changes

50. For any classification system to be adopted locally, it must be able to meet the user's needs. This is a key point and a goal of the UNFC has been to provide a simple, generic system that provides the basic framework for the classification of any resource.

51. It is a requirement that a classification system should not be subject to frequent changes. The changes made to UNFC-2004 were a direct consequence of the desire to develop a framework classification that could be applied to both minerals and fossil energy on the basis of a common set of principles, aligned with widely used commodity specific classifications such as the CRIRSCO Template and SPE-PRMS.

52. In contrast, it is recognized that guidelines would be expected to be updated regularly as technological and commercial developments occur.

17. Explanatory notes to G1/G2/G3

53. A request was made for a change to the text in the explanatory note to G1/G2/G3 where the word "must" had been used inappropriately. The wording has been modified in the revised draft.

18. Discussion of developed/undeveloped sub-categories

54. In corporate reporting in the petroleum sector, a distinction is often made between those quantities that can be recovered from wells and facilities that are already in place (i.e. the capital investments have been made) and those that require further investments before they can be recovered, even where they are part of the same development project. The potential to accommodate this through the existing sub-categories of F1.1 and F1.2 should be investigated.

19. Definition of "total in place" using E categories

55. The draft UNFC-2009 is designed to capture all resources, so that a "material balance" can be maintained between quantities initially located in situ, quantities that have already been extracted, quantities that are forecast to be extracted by future development projects or mining operations, and quantities that are (currently) considered to be unrecoverable. The ability to combine classes to establish, for example, the "total in place" resource quantity, is an important benefit of the flexibility of the system. This is the sort of issue that would be best handled in specifications and guidelines (see paragraph 2).

20. Exclude exhausted resources from inventory

56. A suggestion was made that exhausted resources (being quantities that remain in situ, but are rendered unrecoverable by the extraction process) should be excluded from the inventory and incorporated with production, since they are "lost". However, since these quantities have not

been extracted and remain in situ, it is considered more appropriate to designate them as "additional quantities in place", since it is conceivable that in some cases technological developments may allow some of these quantities to be recovered in the future.

21. More detailed definition of G categories

57. Several submissions referred to the need for more specific definitions for the G categories or explanation in guidelines to the UNFC (e.g. by reference to quantitative probability levels). The use of very general terminology such as "high", "moderate" and "low" in relation to the level of confidence required could undoubtedly benefit from further specification and guidance. However, it is not considered appropriate to incorporate more specific rules at a high level since the underlying commodity-specific approaches are different and a single set of more specific rules could not be adopted at a generic level. This is clearly an issue that is covered in the consideration of specifications and guidelines (see paragraph 2).

22. Ensure E categories include economic and social viability

58. A need to explicitly link both economic and social viability to the E categories was identified. This was addressed by providing a footnote to the definition of each of the three E categories.

23. E3 contains sub-categories of a different nature

59. E3, as the "lowest" E category, is used to capture quantities that do not satisfy the requirements of E1 (economic viability confirmed) or E2 (reasonable prospects for economic extraction and sale in the foreseeable future). As such, E3 needs to incorporate all other economic scenarios, which are defined as: planned for extraction but not available for sale (e.g. used for on-site power generation); economic viability not yet determined; and economic viability assessed as inadequate to satisfy E2.

24. Application to unconventional petroleum resources

60. Application of the UNFC to unconventional petroleum resources was identified as an aspect that needs to be clarified, with a request that the system be enhanced by sub-classifying in place quantities. The ability to further sub-divide categories is a recognized strength of the UNFC and it should therefore be feasible to develop other classes that are useful for specific needs or resource types. For example, category F4 could be sub-divided.

61. As discussed above, the sub-categories that have been defined in the revised draft UNFC represent a compromise between those who have requested more sub-categories and those who have requested fewer (or even none at all).

25. Text changes to UNFC and explanatory note

62. Several suggestions were made for specific text changes to the UNFC and the explanatory note. These were all considered carefully and some have been adopted, based on the approach outlined in paragraph 15.

26. Indicate users and purpose of proposed revised UNFC-2009

63. As set out in Section I of the revised draft of UNFC-2009, it has been designed to meet, to the extent possible, the needs of applications pertaining to energy and mineral studies, resources management functions, corporate business processes and financial reporting standards.

27. Subjective nature of E axis categories

64. A need to be more specific with respect to the definitions of the economic and social conditions (E axis categories) was identified. This is an issue for all classification systems that are not completely prescriptive in this respect (e.g. SEC reporting for petroleum) and would ideally be dealt with through specifications and guidelines (see paragraph 2).

28. Assessments made for different purposes

65. While there will clearly be a need for different levels of detail depending on the purpose for which an assessment is made, it should not require the fundamental classification structure to be different. There may be a need for specifications and/or guidelines on how to address the different perspectives of governments and companies. The issue of timing of extraction is particularly important in this context.

66. Where corporate reserve reporting is considered to understate the full (longer-term) recovery from a deposit (as mentioned in one submission), additional quantities may be assessed by government and added to the quantities that are reported by the companies in order to better represent the estimated ultimate potential. Geoscience Australia provided a mapping of its system to the UNFC and highlighted its use of the term Economic Demonstrated Resources (EDR) to capture future longer term potential, incorporating additional resources beyond that found in company reserve/resource reports. Handling such a situation with Draft UNFC-2009 is extremely straightforward, because of (a) its project-based approach and (b) its flexibility in terms of defining classes by combining or sub-dividing individual categories. EDR would reflect a combination of categories and could be defined as a different class that is directly relevant to resources management functions, but would not be used in business management processes.

67. Examples could be developed to illustrate how such issues can be dealt with using the revised UNFC.

29. Reference to Class 113

68. Under the CRIRSCO Template and related minerals classifications, in contrast to petroleum classification systems such as SPE-PRMS, there are no “possible” reserves and hence there would be no equivalent to Draft UNFC-2009 Class 113. It has been stated that such a class is “not acceptable” for mineral reserves. However, it is noted that the USGS (for example) refers to “inferred reserves” in its classification system[1], which would align with UNFC Class 113[2], indicating that this class is used for solid minerals in certain circumstances. The usage of this

[1] http://minerals.usgs.gov/minerals/pubs/mcs/2007/mcsapp07.pdf
[2] http://www.unece.org/energy/se/pdfs/UNFC/oct07/TimKlett_USGS.pdf

Class for solid minerals can also be found in countries with classification systems based on the McKelvey Box, such as Turkey.

69. A key attribute of the UNFC is its ability to capture resource estimates under any combination of E, F and G categories that is theoretically meaningful. Draft UNFC-2009 explicitly states that "there are no explicit restrictions on the possible combinations of E, F and G categories or sub-categories", and it would seem to be inappropriate to impose any commodity-specific restrictions at a generic level, particularly as there is overlap between the minerals and petroleum sectors (e.g. oil sands mining).

70. A distinction must be made between providing a system that allows all possible combinations to be used where relevant (including 113), and the possible imposition of stock exchange or other disclosure rules that preclude public reporting of such estimates by companies. If such a restriction were considered to be appropriate in the context of public-domain corporate reporting of solid minerals, for example, it would be appropriately addressed in commodity-specific specifications or in the rules for disclosure as established by the regulatory body.

71. It is important that the classification has sufficient granularity to provide any information that may be appropriate for public disclosure, but it is not a function of the classification to determine what information should be disclosed (or to whom or when it should be disclosed). Except where enforced/constrained by regulation, public disclosure of such information is the sole prerogative of the owner of the information.

30. E axis and terminology in Figure 3

72. A comment was received that although no sub-categories were now defined for E2, it still appeared in relation to two different sub-classes in Figure 3. A class or sub-class is uniquely defined by a specific combination of E, F and G categories/sub-categories. Hence, only one category (axis) designation need be different to define a different sub-class. Both sub-classes of "development pending" and "development on hold" must satisfy the definition of E2 (previously they both aligned with E2.1), but are distinguished by their F axis designation.

31. Distinction between F4 and potentially commercial

73. There was some ambiguity noted between "potentially commercial projects" and "additional quantities in place", which has been addressed by modifying the wording used in footnotes f and g to Figure 2 of the UNFC. The primary distinguishing features between the classes are: potentially commercial projects have "reasonable prospects for eventual economic extraction"; non-commercial projects are technically (theoretically) feasible but do not have "reasonable prospects for eventual economic extraction", i.e. they are not expected to become economically viable in the foreseeable future; and additional quantities in place are those quantities for which no technically feasible extraction project can be defined at this time. This is an issue that could be further clarified through the use of specifications and guidelines (see paragraph 2).

32. Add "undiscovered" to "potential deposit"

74. There was some discussion within the MTF regarding the expression "discovered" and it

was concluded that although the term is well-defined and understood in petroleum, it was sometimes less definitive with respect to a mineral deposit. For this reason, the expression "potential deposit" has been used, including in the definition of G4, without reference to discovered/undiscovered. A suggestion for a glossary of terms was also received and this could help to address this use of terminology (see Section III.43).

33. Collaboration with International Energy Statistics on terminology

75. The potential benefit of collaboration with the International Energy Statistics (InterEnerStat) project regarding terminology is noted. Since InterEnerStat is still developing definitions, it would be appropriate to ensure that they are kept advised of the development of Draft UNFC-2009 and, if a glossary of terms is to be developed, it should be aligned with their definitions where possible.

34. Definition of non-sales production

76. Non-sales production is common in the petroleum sector where produced gas is used for on-site power generation purposes ("fuel gas"). There may also be "losses" in the production processing system such as flaring of gas. Since the quantities produced at the well-head (where the oil/gas reaches the surface) may differ significantly from the amounts actually sold from the production facilities, there is a need to distinguish between sales quantities and non-sales quantities.

35. Assurance of reliability of estimates

77. A question was raised regarding the reliability of estimates made under the UNFC and how this would be assured. However, the Ad Hoc Group of Experts is only responsible for providing the classification system itself and is not in any way involved with estimating and auditing of resource quantities that have been classified under the UNFC.

36. Tracking of changes to estimates

78. Tracking of changes to reserve/resource estimates on an annual basis is very useful statistical information and is widely used in public disclosure documents for the benefit of analysis and investors. The UNFC provides a classification system which, if used for estimating and reporting purposes on a regular basis, would provide information regarding changes to resource estimates. However, the usefulness of the data would depend on the detail and frequency of reporting, which is not a function of the classification system or a responsibility of the Ad Hoc Group of Experts.

37. Requirement for detailed breakdown of production

79. The usefulness of classifying separately the component parts of production (sales, flaring, re-injection, own use, etc.) would provide useful statistical information. This facilitates material balance accounting, energy efficiency assessments and emissions management. However, this is largely a petroleum issue and sub-dividing beyond sales/non-sales is considered to be inappropriate at a generic level. At the commodity-specific level, further sub-divisions would certainly be possible and this should be addressed in specifications and/or guidelines.

38. Application of the United Nations Framework Classification for Fossil Energy and Mineral Resources to uranium

80. This issue was considered by the MTF (ECE ENERGY SERIES No. 33 and ECE/ENERGY/71). It was understood that the CRIRSCO Template can be, and is, applied to uranium. Since the Template was mapped to the UNFC, there should be no problem applying the UNFC directly for classifying uranium resources. This application should be clarified through commodity-specific specifications and/or guidelines, and also demonstrated through examples (see paragraph 2). The International Atomic Energy Agency (IAEA) stated in its note to the Director of the Sustainable Energy Division dated 28 February 2008 that, in a comparison of the Nuclear Energy Agency (NEA)/IAEA uranium resource classification scheme with the UNFC-2004, "in this sense [i.e. the fact that the uranium system was not developed for commercial reporting] the two classification schemes are fundamentally different". The letter also noted that "some members" of the uranium group felt that the UNFC-2004 "has far too many categories for straightforward national/international reporting" and the "UNFC's use of separate economic and feasibility axes adds to both the number of categories and the confusion, since these are not independent variables". Nevertheless, the IAEA was able to present a provisional mapping of its system to the UNFC-2004 at the fifth session of the Ad Hoc Group of Experts, with the caveat that **"**UNFC correlation with NEA/IAEA and national classification systems is still under consideration". Moreover, the IAEA has not submitted any comments on the Draft UNFC-2009 during the two months period open for public comments or at the sixth session of the Ad Hoc Group of Experts. It is also worthy of note that the Draft UNFC-2009 is greatly simplified relative to UNFC-2004.

39. Different systems for different needs

81. A view was expressed "*that there are, and should continue to be, various and different classification systems, responding to various and specific needs" and that the generic terminology of the UNFC "would allow easy translation and better understanding among existing and future classifications and across commodity boundaries, through appropriate mapping modules"*. Since the UNFC is not mandatory, preparers of resource estimates can continue to use any classification system they like (except where constrained by regulation). As noted, mapping of these various existing classification systems to the UNFC can provide an indication of similarities between them, as well as highlighting differences. Mapping modules can illustrate the relationships between the different classification systems and can be used to translate between them where the systems are based on common principles. This approach has been used to map SPE-PRMS and the CRIRSCO Template to the UNFC. The MTF recognised that the mapping of UNFC to other classifications would be easier if the UNFC definitions were simplified. It has also been used under the International Accounting Standards Board (IASB) framework to map SPE-PRMS and the CRIRSCO Template. Mapping provides a tool that can lead to harmonization of terminology and to stimulate convergence among classification systems, through a voluntary, merit-driven, bottom-up approach. However, what mapping cannot do is provide assurance that estimates made under those different systems are not significantly different.

82. The following two examples illustrate the lack of comparability between similar classification systems that are based on essentially the same definition of proved reserves, but have different (i.e. their own) specifications and guidelines.

83. Firstly, TNK-BP published its audited proved petroleum reserves in 2004 under both the SEC definition and the SPE definition. The actual wording of the two definitions of proved reserves is very similar, but the specifications are significantly different. The estimated proved reserves of the company were quoted as 4.3 billion barrels of oil equivalent (bn boe) under the SEC system and 9.0 bn boe under the SPE system.[3]

84. Secondly, BP published its 2003 proved petroleum reserves estimates under both the SEC definition and the United Kingdom Statement of Recommended Practice (SORP) definition. In this case, the wording of the two definitions is virtually identical and yet BP's United Kingdom proved gas reserves were reported as being 17 per cent higher under the SEC definition than under SORP.[4]

85. In both cases, the material differences (and hence lack of comparability) resulted from differences between the specifications and guidelines of the various classifications. While none of the figures above is wrong, these two examples are a clear illustration of the real world. Even for one commodity, petroleum, and for the largest economy with 150 years of petroleum history, there is a view that there is still a need for "various *and different classification systems, responding to various and specific needs*". Since then, however, both the SEC and SPE systems have been updated and are now much more closely aligned, while SORP has largely been replaced by SPE-PRMS. This shows that, while these systems remain different, a process of harmonisation/convergence is underway, led by users, based on merit and undertaken on a voluntary basis. A UNFC with its own specifications and guidelines would simply provide another estimate, different than those mentioned above, unless it adopted the specifications and guidelines of one of the quoted systems. These two examples clearly illustrate the impact of using systems that are based on different specifications and guidelines. Mapping modules could be used to illustrate the similarities and differences between these systems, and hence highlight the particular reasons for these substantial differences in estimates that were all quoted as "proved reserves".

86. The development of the UNFC since 1992 has been driven by a desire to provide a framework classification that could lead to a harmonization of terminology. The UNFC has been endorsed by ECE and ECOSOC, which while welcoming the ECE endorsement, invited Member States of the United Nations, international organizations and the regional commissions to consider taking appropriate measures for ensuring worldwide application of the UNFC. Nevertheless, its application is entirely optional, and countries, industry and institutions will continue to use whichever classification systems they consider to be the most suitable for their needs.

40. United Nations Framework Classification for Fossil Energy and Mineral Resources governance structure

87. A view was expressed that the current Ad Hoc Group of Experts structure was adequate for future governance of the UNFC. As this issue is not within the mandate of the RTF, it will not be

[3] http://www.tnk-bp.com/press/releases/2004/6/2/

[4] http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/20-F_Difference_Table_28Jun04.pdf

discussed further here. However, this issue is intertwined with the issue of revising UNFC-2004 (see, for example, III.6) and is on the agenda for consideration at the seventh session of the Ad Hoc Group of Experts.

41. United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 for United Nations Economic and Social Council approval

88. A recommendation was made that, as with UNFC-2004, the Draft UNFC-2009 should be submitted to ECOSOC for its approval, on the basis that, UNFC-2004 being a constituting text whose legitimacy is derived from an ECOSOC Resolution, any revision would have to follow the same process, and not to do so would deny the 132 Member States of the United Nations that are not ECE members the right to consider the proposed revisions to UNFC-2004.

89. In the report of the sixth session of the Ad Hoc Group of Experts, the Director of the Sustainable Energy Division "noted that the potential revision of the UNFC could be seen as a concerted effort to implement ECOSOC Resolution 2004/233, whereby ECOSOC invited the United Nations Member States, international organizations and regional commissions to consider taking appropriate measures for ensuring worldwide application of the UNFC. The revised Draft UNFC-2009 is a much more user-friendly piece of work that now also benefits from the efforts undertaken by the Mapping Task Force and its recommendations. The Director provided clarification that, in view of the above, and on the background of the due process that had been completed, if the revised Draft UNFC-2009 or slightly modified version thereof was accepted there would be no requirement to return to ECOSOC to request a new resolution. This had been confirmed by the ECE Executive Office and the Legal Office of the United Nations Office at Geneva".

90. As this is an issue that was not within the mandate of the RTF, it will not be discussed further here.

42. Sub-division of development pending

91. A proposal that the two sub-classes of development pending should be combined was accepted and the revised draft UNFC-2009 has been modified to reflect this suggestion.

43. Glossary of terms for United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009

92. A recommendation was made that a glossary of terms should be developed. This would facilitate application of the revised UNFC and should be considered in the future.

44. Unpublished comments

93. Several email comments were received that were not directly relevant, were forwarded by others, and/or were received too late for posting to the ECE website:

(a) Anibal Martinez, World Petroleum Council, helpfully highlighted some errors in the bibliography, which have now been corrected, and supported the inclusion of the word "reserves" in the title of the document.

(b) Michael O'Brien, AngloGold Ashanti Limited, provided some comments on the MTF report in relation to the mapping of the CRIRSCO Template to the UNFC. Since this mapping will need to be reconsidered once a final UNFC-2009 is completed, it is recommended that the comments be considered at that time.

(c) Alan Clegg, TWP Eurasia A.S., submitted comments regarding the practical application of the UNFC, particularly in the context of financial reporting for solid minerals. The essential goal of consistent application (for any classification system) highlights the requirement for appropriate specifications and guidelines to be provided.

IV. PROPOSED CHANGES TO THE DRAFT REVISED UNITED NATIONS FRAMEWORK CLASSIFICATION FOR FOSSIL ENERGY AND MINERAL RESERVES AND RESOURCES 2009 AND EXPLANATORY NOTE

94. After due consideration of the many constructive comments received, the RTF has prepared a revised draft UNFC-2009 for the consideration of the Ad Hoc Group of Experts at its seventh session. The Draft UNFC-2009 is accompanied by an explanatory note, which explains in some detail the issues contained in this revised Classification. It does not form part of the classification itself. The Draft UNFC-2009 and accompanying explanatory note is published in document ECE/ENERGY/GE.3/2009/L.5.

Annex I

COMMENTS RECEIVED

No	Source (ctrl+click to see actual submission)	Date	Requested changes or comments (very brief summary only)	RTF response
1	Rafael Sandrea, PhD	8 December 2008	No changes	None required
2	CRIRSCO Board	12 December 2008	Limited or no specifications and guidelines in UNFC itself	See III.2
			Add reference to mapping document	See III.3
			Remove reference to financial reporting	See III.4
			Remove or revise text on use of term "reserves"	See III.5
			Add reference to SPE/CRIRSCO re maintenance	See III.6
3	Ken Mallon	5 January 2009	Improve Figure 1	See III.7
			Make Explanatory Note an appendix of UNFC	See III.8
			Expand G4 to account for uncertainty	See III.9
			Text on use of term "reserves" excellent and critical to keep in	See III.5
4	William Prast, PhD	7 January 2009	Remove or revise text on use of term "reserves"	See III.5
5	State Commission of Ukraine on Mineral Resources	27 January 2009	Add other classes to Figure 1	See III.10
			Remove references to "project" in Figure 1	See III.11
			Remove Figures 2 and 3	See III.12
			Exclude definitions of sub-categories	See III.13
6	Federation of Indian Mineral Industries (FIMI)	4 February 2009	Difficult for small mines to adopt commercial-based system	See III.14
			Unjustified for small mines to generate data in UNFC-2009 format	See III.14
			Have adopted UNFC-1997 and difficult to change now	See III.1
			Difficult to classify all resources on common basis	See III.15
			Classification needs to meet local needs and frequent changes should be avoided	See III.16

7	SPE Oil and Gas Reserves Committee	4 February 2009	Improved from previous versions and easily mapped to PRMS	None required
			Highlighted error in footnote labelling	Fixed
			Revise text in explanatory notes to G1/G2/G3 definitions	See III.17
			Add footnote regarding use of G4 sub-categories and reference to risk	See III.9
			Add discussion regarding developed/undeveloped sub-categories used in petroleum	See III.18
8	Commission of Mineral Resources, Ministry of Environment - Poland	4 February 2009	Requirement for more detailed application guidelines and examples	See III.2
			Definition of "total in place" for mineral resources using E categories	See III.19
			Exclude exhausted resources from inventory (include in production)	See III.20
			More detailed definition of G categories or explanation in guidelines	See III.21
9	AAPG	5 February 2009	Handle expansion of G4 to account for uncertainty through mapping or by further explanatory notes	See III.9
			Ensure both economic and social viability are captured in definitions of E categories	See III.22
10	Russian Working Group	6 February 2009	Remove/reduce number of sub-categories and combine F4 with F3	See III.13
			E3 contains sub-categories of different nature	See III.23
			Reinstate E2.2 sub-category.	See III.1
			More detailed definition of G categories	See III.21
11	World Energy Council	6 February 2009	Welcome degree of simplicity and clarity. No specific comments.	None required
12	Energy Resources Conservation Board of Alberta, Canada	6 February 2009	Clarification of application to unconventional petroleum resources.	See III.24

13	Trevor Ellis CPG-AIPG, CMA-AIMA, CGA(CO), FAusIMM(CP)	6 February 2009	Text changes to sections I, II, III and Annex II.	See III.25
			Add labelling to Figure 1.	See III.7
			Preference for 3D presentation – some difficulty to grasp 2D Figures 2 and 3.	See III.12
14	StatoilHydro Ad Hoc Group of Experts	6 February 2009	Indicate intended users and purpose of UNFC-2009	See III.26
			Add examples in explanatory note or in other documentation	See III.2
			More detailed definition of G categories	See III.21
			Subjective nature of E axis	See III.27
15	Geoscience Australia	13 February 2009	Need for additional explanations to ensure consistent application	See III.2
			Need to accommodate assessments made for different purposes	See III.28
			Reference to class 113 not being appropriate for mineral reserves	See III.29
			Possible inclusion of, or reference to, mapping documents	See III.3
			Some confusion over changes to E axis and terminology in Figure 3	See III.30
			Unclear about distinction between F4 and Potentially Commercial Projects	See III.31
			Expansion of label "Potential Deposit" to include "(undiscovered)"	See III.32
			Retention of term "reserves" since has well established definition for minerals	See III.5

16	Atle Tostensen, Statistics Norway and Oslo Group on Energy Statistics	20 February 2009	Recommendation to refer to work of InterEnerStat regarding harmonization of terminology	See III.33
			Question regarding definition of non-sales production	See III.34
			Question regarding assurance of reliability of estimates	See III.35
			Tracking of changes on annual basis	See III.36
			Requirement for breakdown between sales, flaring, re-injection, own use, etc.	See III.37
17	Geoscience Australia – Ian Lambert	20 February 2009	Different levels of detail between commercial reporting and national (inventory) reporting	See III.28
			Different timeframe between commercial reporting and national (inventory) reporting	See III.28
			Application of UNFC to uranium classification	See III.38
18	OPEC Secretariat	17 March 2009	Different classification systems responding to various and specific needs	See III.39
			Add reference to mapping report in UNFC text	See III.3
			Add further mapping modules over time and apply specifications and guidelines of mapped system	See III.39
			No need to develop specifications and guidelines for UNFC	See III.2
			No need to change structure of Ad Hoc Group of Experts for UNFC governance	See III.40
			UNFC-2009 should be submitted to UN ECOSOC	See III.41
			No need to eliminate use of the term "reserves"	See III.5
			No need for two sub-classes of development pending (Figure 3)	See III.42
			Expand G4 to account for uncertainty	See III.9
			Suggested text changes to UNFC-2009 and Explanatory Note (supplied as edited draft text showing track changes)	See III.25

19	Additional comments at the Sixth Session of the Ad Hoc Group of Experts (no written submissions available and only “new” comments included here)	25-27 March 2009	Preference for 2D version of UNFC-2009	See III.12
			Question regarding why quantities would be extracted but not sold	See III.34
			Need to show differences between UNFC-2009 and previous versions	See Annex II
			Need for examples/guidelines	See III.2
			Delete "practical" from paragraph 4 of UNFC-2009	See III.25
			Need for a glossary of terms	See III.43

Annex II

UNITED NATIONS FRAMEWORK CLASSIFICATION FOR FOSSIL ENERGY AND MINERAL RESOURCES 2004 DEFINITIONS AND PROPOSED DEFINITIONS FOR UNITED NATIONS FRAMEWORK CLASSIFICATION FOR FOSSIL ENERGY AND MINERAL RESERVES AND RESOURCES 2009

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 has been confirmed to be economically viable.[5]
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 economic on the basis of current market conditions and 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 not economic on the basis of current market conditions and realistic assumptions of future market conditions, but is made viable through government subsidies and/or other considerations.

[5] The phrase “economically viable” encompasses economic (in the narrow sense) plus other relevant “market conditions”, and includes consideration of prices, costs, legal/fiscal framework, environmental, social and all other non-technical factors that could directly impact the viability of a development project.

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
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.	Extraction and sale is expected to become economically viable in the foreseeable future.
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.	No sub-categories defined. [Comment: E2.1 would now be classified as E2, i.e. no material change]
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.	No sub-categories defined. [Comment: E2.2 would now be re-classified as E3.3]
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	Quantities that are of undetermined economic viability or are of no economic interest (unrecoverable).	Extraction and sale is not expected to become economically viable in the foreseeable future or evaluation is at too early a stage to determine economic

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
	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.		viability.
E3.1	Not defined.	Quantities that will be produced but not sold.	Quantities that are forecast to be extracted, but which will not be available for sale.
E3.2	Not defined.	Economic viability undetermined.	Economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase).
E3.3	Not defined.	Additional quantities remaining in-place, i.e. the quantities initially in-place less the produced and remaining recoverable quantities.	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for economic extraction and sale in the foreseeable future.
F1	Mining Report and/or Feasibility Study has demonstrated extraction of the reported quantities to be justified. Cost data must be reasonably accurate, and no further investigations should be necessary to make the investment decision. The	Development and/or production plans have demonstrated production of the reported quantities to be justified.	Feasibility of extraction by a defined development project or mining operation has been confirmed.

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
	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.		
F1.1	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. It presents the current status of the deposit, providing a detailed and accurate, up-to-date statement on the reserves and the remaining resources.	The development project is completed and the facilities are producing.	Extraction is currently taking place.
F1.2	Not defined.	Development projects for recovery of a commodity are committed when firm commitments have been made for the expenditures	Capital funds have been committed and implementation of the development project or mining operation is

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
		and activities needed to bring a discovered accumulation to the production stage. 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. 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.	underway.
F1.3	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	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.	Sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project or mining operation.

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
	geological, engineering, environmental, legal and economic information accumulated on the project. Generally, a separate environmental impact study is required.		
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 summarises 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.	Feasibility of extraction by a defined development project or mining operation is subject to further evaluation.
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	There are no current plans to develop or to acquire additional data at the time

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
		technically justified.	due to limited potential.
F3	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. 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. 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 mineralisation, to establish continuity, quantity, and quality of a mineral deposit, and thereby define an investment opportunity.	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.	Feasibility of extraction by a defined development project or mining operation cannot be evaluated due to limited technical data.
F4	Not defined.	Not defined.	No development project or mining operation has been identified.
G1	Detailed exploration involves the detailed three-dimensional delineation of a	Quantities that are estimated to be recoverable from a known (drilled)	Quantities associated with a known deposit that can be estimated with a high level

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
	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.	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. Quantities in this category that are associated with a development project (i.e. F1) may be subdivided to reflect their development and producing status.	of confidence.
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 moderate level of confidence.

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
G3	Prospecting is the systematic process of searching for a mineral deposit by narrowing down areas of promising enhanced mineral potential. The methods utilised 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	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 mineralised 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.	Quantities that are estimated to be recoverable from an un-drilled accumulation, on the basis of inferred geological and reservoir production performance characteristics.	Estimated quantities associated with a potential deposit, based primarily on indirect evidence.

Cat.	2004 Coal, uranium and other solid minerals	2004 Petroleum	Proposal for revised UNFC definitions
	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.		
