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**STAKEHOLDER REQUIREMENTS FOR SPECIFICATIONS FOR THE UNITED
NATIONS FRAMEWORK CLASSIFICATION FOR FOSSIL
ENERGY AND MINERAL RESERVES AND RESOURCES 2009**

Report prepared by the Specifications Task Force

Summary

A revised text of the United Nations Framework Classification for Fossil Energy and Mineral Resources (UNFC-2009) was approved by the Committee on Sustainable Energy at its eighteenth session. As discussed at the seventh 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 contacting a representative range of stakeholders in each of the four key areas of application of UNFC-2009 and requesting their views on what specifications, if any, they considered to be necessary in order that UNFC-2009 would adequately serve their needs. The four areas of application are: International Energy and Minerals Studies; Government Resources Management; Industry Business Processes; and, Financial Reporting.

This Report was presented in draft form to the first session of the Expert Group on Resource Classification as the basis on which it considered how best to accommodate the stated needs of stakeholders for specifications to be provided for UNFC-2009.

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INTRODUCTION

1. This report summarizes the work of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources (UNFC) Specifications Task Force (STF) with respect to documenting the stated need of stakeholders for specifications to be provided for the UNFC of 2009 (UNFC-2009). The STF communicated its position on this report to the first session of the Expert Group on Resource Classification, which was previously (until end-2009) known as the Ad Hoc Group of Experts on Harmonization of Fossil Energy and Mineral Resources Terminology (Ad Hoc Group of Experts).
2. The members of the STF are listed in Annex I.

I. BACKGROUND

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. In 2007, the Ad Hoc Group of Experts decided to map certain classification systems to the UNFC of 2004 (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, the Template developed by the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) and the Petroleum Resources Management System (PRMS) 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). 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”.
5. The Ad Hoc Group of Experts then 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).
6. The Bureau of the Ad Hoc Group of Experts then nominated the UNFC Revision Task Force (RTF) which developed and proposed a revised text of the UNFC (UNFC-2009), which was presented at the seventh session of the Ad Hoc Group of Experts and subsequently approved by the Committee on Sustainable Energy at its eighteenth session. The RTF also prepared a report that discussed the comments received on the initial published draft text and provided its reasoning for recommending certain changes, but not others (ECE/ENERGY/GE.3/2009/6).

7. Concurrent with the development of the revised text of the UNFC, the RTF was mandated to prepare a discussion paper on “The Need and/or Desirability to Develop Specifications and Guidelines” (ECE/ENERGY/GE.3/2009/7). The paper identified several options for ways of addressing this issue, including one of not providing any specifications or guidelines for UNFC-2009. The options were discussed at the seventh session of the Ad Hoc Group of Experts. One of the recommendations of the RTF was that before attempting to agree on the most appropriate option, it would be beneficial to seek the views of a broad range of stakeholders representing each of the four key areas of application of UNFC-2009 and requesting their views on what specifications, if any, they considered to be necessary in order that UNFC-2009 would adequately serve their needs. The four areas of application are: International Energy and Minerals Studies; Government Resources Management; Industry Business Processes; and, Financial Reporting.

8. The RTF report strongly supported the view that it would not be constructive (or practical) for the Expert Group on Resource Classification to consider developing comprehensive new specifications and guidelines for UNFC-2009 where detailed commodity-specific specifications and guidelines already exist within the classification systems of the CRIRSCO Template and PRMS.

9. The current terms of reference of the Expert Group on Resource Classification confirms that the provision of specifications and guidelines for UNFC-2009 shall be undertaken through cooperation with the SPE for petroleum and CRIRSCO for minerals, recognizing that it is useful that they be tailored to meet, to the extent possible, the needs of applications pertaining to energy studies, resources management functions, corporate business processes and financial reporting standards. It should be noted that a Memorandum of Understanding (MoU) exists between the Economic Commission for Europe (ECE) and SPE (signed in 2006) whereby it was agreed that SPE’s Oil and Gas Reserves Committee would, inter alia, develop *Specifications and Guidelines* for the application of the UNFC, and the SPE/WPC/AAPG definitions.

10. This report summarizes the general considerations of the STF.

II. THE PROCESS

11. The members of the STF were sub-divided into four small “working groups” each representing one of the areas of application of UNFC-2009. Where possible, members were assigned to the group that reflected their own personal background. In all cases, there was at least one member from the minerals sector and one from the petroleum sector in each group.

12. Wherever possible, appropriate individuals were identified in key organizations in each of the four “stakeholder groups” using the wide experience of the STF members, with extensive cross-collaboration between the working groups in order to share contact names that were considered to be potentially useful to the other groups. Efforts were made to ensure that a broad geographic spread of contacts was established. Contact was made by a variety of methods as appropriate, including by phone, email, personal letter and meetings.

13. Contacts were generally on an informal basis, since it was recognised that the most useful feedback would be based on the personal experiences of individuals dealing with reserve/resource data in their daily work. Consequently, it was considered to be inappropriate to publicly attribute specific comments to the individual(s) who raised the issue. A summary of the

feedback received on requirements for specifications, cross-referenced to the relevant section in this report, is presented in Annex II. A full list of organizations that were contacted by the STF is included as Annex III. Comments received on or before 30 April 2010 were considered in the preparation of this report.

III. SPECIFIC ISSUES

14. In the following sections, the comments received have been consolidated and summarised in order to identify and discuss each specific issue. The issues have not been sub-divided into the four areas of application of UNFC-2009, or between minerals and petroleum, since many comments were applicable to more than one of the four areas of application of UNFC-2009 or were generic in nature. Issues that may be limited to a specific area of application or are commodity-specific are identified in the text.

15. The first nine issues that are discussed below were identified by the RTF and highlighted in its report (ECE/ENERGY/GE.3/2009/6) as being more appropriate for consideration as specifications and/or guidelines rather than incorporation in UNFC-2009 itself. A further issue that was identified in the RTF report was the need for a glossary of terms; since such a glossary would ideally be part of any document containing specifications, it is also included here. The remaining issues reflect feedback from stakeholders through the STF process.

1. Expand G4 to account for uncertainty

16. The supporting explanation to the definition of G4 makes reference to the need to be able to capture a range of uncertainty for estimates of potentially extractable quantities during the exploration phase. The evaluation of a range of uncertainty for exploration projects is widely applied in the petroleum sector and is addressed in PRMS, though there are no clear standards regarding the external reporting of such quantities or how risk should be incorporated. This issue is partly addressed in the Template in that order-of-magnitude or “target” quantities may be reported, provided that they are not misrepresented as an estimate of Mineral Resources, but there are no specifications regarding the documentation of a range of uncertainty (e.g. “low”, “best” and “high” estimates, as in PRMS). Such a level of detail could be particularly relevant at a government inventory level for solid minerals as well as for petroleum.

2. Distinction between developed and undeveloped

17. 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 addressing a single accumulation. This distinction is not widely used in the minerals sector. The potential to accommodate this through the existing sub-categories of F1.1 and F1.2 should be investigated.

3. Definition of “total in place” using E categories

18. 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. PRMS is also designed to provide a resource “material balance”, if desired. The Template is not designed to provide a resource “material balance”.

4. More detailed definition of G categories

19. The use of very general terminology such as “high”, “moderate” and “low” in relation to the level of confidence required in UNFC-2009 could undoubtedly benefit from further specification and guidance. However, there are key differences in the approaches used in the minerals and petroleum sectors, and this issue is already addressed in the Template and PRMS in a manner best suited to dealing with solid minerals and petroleum fluids. In PRMS, either deterministic or probabilistic methods are expressly permitted, but there is some ambiguity regarding the relationship between them which is also relevant to the issue of aggregation, discussed in Section III.11.

20. It is noted that, in the supporting explanation for G1, G2 and G3, UNFC-2009 highlights that the key distinction is between solids and fluids. Historically, industry practice has generally been defined by the traditional distinction between the minerals and petroleum industry sectors, leading to the development of different classification approaches as seen in the Template and PRMS. Until relatively recently, this distinction between industry sectors was also aligned, for the most part, with the extraction methodology: the mining of solid minerals and the production of fluids through wells. However, this distinction has become blurred, with solid petroleum (e.g. bitumen) that is extracted by mining techniques being classified using PRMS, and uranium-rich fluids (from in-situ leaching) being classified using the Template. This sector-based approach may be failing to take full advantage of the extensive experience of the other sector when dealing with a commodity that is extracted by the petroleum sector as a solid or by the mining sector as a fluid.

21. Coalbed methane is widely accepted as part of the petroleum sector since it is produced through wells and is classified using PRMS or other petroleum-based systems. Coal resources are mostly considered as part of the mining sector, but the new SEC petroleum rules apply to coal that is mined for the purpose of generating synthetic oil or gas. Underground coal gasification is unclear, with the coal resources being classified and reported according to the Template, but it is not clear how the producible gas reserves should be classified. They could fall within the remit of PRMS, since the gas does contain some hydrocarbons (methane).

5. Subjective nature of E axis categories

22. A need to be more specific with respect to the definitions of the economic and social conditions (E axis categories) was identified. In particular, the need for improved clarity in the definition of “reasonable prospects for eventual economic extraction”, as used in the Template to define a Mineral Resource, was mentioned. This is an issue for all classification systems that are not completely prescriptive in this respect (e.g. SEC reporting for petroleum) and is addressed in both the Template and PRMS by the base case economic evaluation being based on a reasonable view of future prices and costs. See also Section III.49 with respect to timing. In addition, some guidance may be appropriate with respect to the classification of projects that are not able to proceed due to being located in an environmentally-sensitive area.

6. Assessments made for different purposes

23. 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. In this context, aggregation is particularly relevant (see III.11), as is the issue of timing of extraction, since governments may be expected to have a longer term perspective than commercial companies. The Template does not address this issue fully as it is specifically designed for corporate reporting purposes, though it does refer to the fact that appropriate time periods for eventual extraction may be quite different for different commodities. PRMS addresses this point by providing the option to select an appropriate level of detail, e.g. with optional sub-classes.

7. Reference to Class 113

24. Under the Template and related minerals classifications, and in contrast to petroleum classification systems such as PRMS, there are no “possible” reserves and hence there would be no equivalent to UNFC-2009 Class 113. However, in addition to being widely used in petroleum, it has been noted that some government bodies and countries do use this category for the reporting of solid minerals. Consequently, it would seem to be most appropriate to leave the reporting requirements open to the individual regulatory bodies rather than impose commodity-specific restrictions on UNFC-2009. It may be appropriate to clarify that external corporate reporting of mineral reserves excludes such a category, while reporting requirements for petroleum reserves are more variable in this regard.

8. Distinction between F4 and potentially commercial

25. There was some ambiguity noted in the draft of UNFC-2009 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 UNFC-2009. 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.

26. This issue is not addressed in the Template, since it does not permit the reporting of discovered quantities that do not have “reasonable prospects for eventual economic extraction”. PRMS defines essentially the same sub-classes as UNFC-2009, but is perhaps ambiguous in that it includes reference to both “technology” and “commercial conditions” in its definitions of Development Not Viable and Unrecoverable.

9. Definition of non-sales production

27. Non-sales production is common in the petroleum sector where, for example, 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.

28. This issue is addressed in PRMS, but with some ambiguity. Losses due to on-site processing or flaring are always excluded from reserves. Further, it is recommended that fuel gas (or lease fuel, since it could include oil) is excluded from reported reserves, since these are defined as sales volumes. However, it is acknowledged in PRMS that in some cases (e.g. SEC reporting) lease fuel may be included in reserves and PRMS will therefore allow this, though it states that such volumes should be reported separately from sales volumes. A further complication can arise where there are “transfers” of gas for use as fuel by adjacent fields.

29. Although this issue has not been identified as a problem in the minerals sector, and is not explicitly addressed in the Template, there is a similar situation with respect to processing losses. In this case, by contrast with PRMS, Mineral Reserves are defined in terms of ore tonnage and average grade before any on-site processing, and the sales quantities (which are not called Mineral Reserves under the Template¹) are reported separately, either in terms of actual quantities by weight or in terms of mineral processing recovery factors.

10. Glossary of terms

30. A previous suggestion that a glossary of terms be developed for UNFC-2009 could be addressed by incorporating one in any complementary texts that may be produced, e.g. for documentation of specifications. Both the Template and PRMS provide a glossary or an explanation of generic terms, and any glossary that may be developed for UNFC-2009 should, wherever possible, use the same definitions for equivalent terms.

11. Requirement for aggregation to national level

31. This issue has been identified as a critical problem in both the minerals and petroleum sectors. It is of particular importance at a government inventory reporting level (and for global studies based on such estimates), but it is also an issue in the petroleum sector for corporate financial reporting, since such reporting is commonly aggregated up to a country or even continent level.

32. The Template explicitly precludes the aggregation of Mineral Reserves and Mineral Resources, highlighting the fact that, firstly, there are fundamental differences between them and, secondly, Mineral Resources are sometimes reported inclusive of those quantities that are separately reported as Mineral Reserves. This specification is clearly appropriate for corporate reporting, but government bodies require an assessment of the full resource potential of their country and hence need to be able to aggregate reserve and resource estimates without risk of double accounting. A consistent approach to aggregation at a national level would be beneficial in communications between governments, as well as facilitating global studies.

33. PRMS makes reference to aggregation, both within classes (Reserves, Contingent Resources and Prospective Resources) and also across classes, but does not provide any detailed guidance on best practice. The impact of the “portfolio effect” in statistical aggregation is a

¹ Coal is an exception in that the term Marketable Coal Reserves may be used.

contentious issue in the petroleum sector. There is also a lack of guidance on aggregation of estimates that may be based on different economic assumptions or determining and applying risk factors where the project is not yet committed.

12. Confusion between reserves and resources

34. A key strength of UNFC-2009 is the fact that it avoids these terms, both of which are used differently between the minerals and petroleum sectors. This leads to the opportunity to use UNFC-2009 as a tool to facilitate global communications by identifying comparable estimates from the two sectors. For example, UNFC-2009 code 111 corresponds to sales quantities and hence can be used to relate estimates made using the Template or PRMS without compromising either of those systems or requiring either one to modify its own definition of “reserves” (see also discussion in Section III.9).

13. Confusion between in-situ and recoverable quantities

35. Apart from quantities assessed as F4 in UNFC-2009, all other estimates are identified as “potentially recoverable”. In this context, there is a difference between the minerals and petroleum sectors where estimates are made for “contingent development projects or mining operations”. In such cases, the actual development plan or mining approach has not yet been defined and hence the recovery from the extractive process cannot be determined. Consequently, in the Template, in-situ estimates are used for Mineral Resources. However, these estimates exclude portions of a deposit that do not have “reasonable prospects for eventual economic extraction” and, since the recovery mechanism has yet to be defined, may be considered as “potentially recoverable”. In PRMS, estimates for Contingent Resources and Prospective Resources are defined in terms of recoverable volumes, though such estimates will generally have a large range of uncertainty in terms of recovery factors because of the lack of definition of the development plan at that stage.

14. Comprehensive, consistent and coherent reporting

36. In order to be useful, any classification system requires specifications and guidelines. As a high-level, generic system, UNFC-2009 requires sufficient specifications to ensure comparability at that level. If the system is to provide a meaningful basis for global communications, quantities reported as compliant with UNFC-2009 must conform to a base level of standards that will ensure an acceptable level of comparability across commodities. For example, quantities that are reported as 111 are limited to those estimated with high confidence as future sales quantities. Such quantities may not be the same as those quoted as “proved reserves” under the Template or PRMS (see Section III.9). In the minerals and petroleum sectors, there can be substantial differences between the quantities extracted or produced at the surface and the quantities of a particular commodity that will be available for sale from the project. The UNFC provides a basis for ensuring a base level of comparability by limiting a particular class, such as 111, to the estimated future sales quantities regardless of the actual commodity.

15. Documentation of assumptions

37. Full documentation of assumptions is an essential requirement for any estimate of resource quantities and should be noted in specifications. However, the extent to which such information is disclosed publicly is entirely a matter for the relevant regulatory body.

16. Illustration of all resource categories in an accumulation/basin/project

38. Examples of the relationship between classes would provide useful clarification regarding appropriate classification, and could usefully be incorporated into specifications.

17. Probability levels for allocation to appropriate classes

39. The specification of quantitative probability levels can provide useful information provided that its limitations are also recognised. In addition, there is a fundamental difference in the estimation process between minerals and petroleum that means that any proposal for such specification must be cognizant of this difference. To some degree, this issue has been addressed in UNFC-2009 in the Supporting Explanation for Categories G1, G2 and G3, where a distinction is made between solids and fluids. In the latter case, where a scenario approach is preferred, probabilistic methods may be applied, as acknowledged in PRMS. However, it is also noted that there is a lack of complete alignment in PRMS between estimates made using probabilistic methods and those based on deterministic methods. An explicit specification regarding the convention for reporting probabilistic estimates would also be helpful in ensuring unambiguous communications.

18. Clarity in reporting (e.g. gross/net interest)

40. It should always be absolutely clear on what basis the estimated quantities are being quoted. In general, reports at a government level are “gross”, i.e. they reflect the quantities that are attributable to the project or deposit as a whole, whereas corporate reported should clearly indicate the “net” quantities legally attributable to the company’s economic interest in the project.

41. It is noted that there are inconsistencies in the treatment of royalty interests (i.e. in some cases, the royalty interest is included in the stated company reserve/resource estimate and in other cases it is excluded. A consistent approach, or at least one that is based on clear logic, should be specified and should be in alignment with the International Accounting Standards Board’s (IASB) views.

19. Inadequacy of PRMS specifications, leading to lack of comparability

42. PRMS provides a broad classification framework that intentionally leaves a significant amount of flexibility up to the user, and hence it can be adopted by a wide range of stakeholders with different objectives. However, this can lead to limited comparability unless all the associated assumptions are documented and made available alongside the corresponding estimates. Where comparability is required, and particularly where estimates have been aggregated, this requires a higher level of specification in order that there is sufficient comparability. Examples include corporate reporting for financial purposes and government reporting used for international studies.

20. Need to reflect three key categories (reserves, discovered resources and undiscovered resources)

43. UNFC-2009 captures this requirement clearly, as illustrated by the abbreviated version of

the system (Figure 2, UNFC-2009). In addition, further granularity is available through the use of sub-classes that are aligned with those of PRMS. Further guidance on the distinctions between sub-classes, which would largely reflect F-axis boundaries of UNFC-2009, may be provided in the PRMS Applications Document, which is currently in preparation. The Template does not address currently non-economic material, as it is not reported publicly.

21. Add labels (“unit name”) for 111, etc.

44. A fundamental principle of UNFC-2009 is to limit the use of labels to “key” classes and sub-classes that comprised groups of classes, such as “Commercial Projects”. There may be a case for some additional labels associated with combinations of classes that may be of particular importance at a government inventory level, for example. However, if labels were to be assigned to individual classes, such as UNFC-2009 code 111, great care would be required in order to avoid terms that are already in use, but which have different meanings in different industry sectors (see Section III.12). The term “proved reserves” could not be used, for this reason. The possible use of plain language should also be considered (see Section III.26), assigning labels such as “low estimate”, “best estimate” and “high estimate”, for example.

22. Linkage between period of no activity and economic category

45. The possible linkage between the duration of a period of lack of exploration or exploitation activity on a deposit and its economic classification has some merit, but it is likely that different periods may be relevant to different commodities/circumstances. Both the Template and PRMS address this issue of timing to some degree, and it is difficult to see more specific and/or generic specifications being appropriate, but it should be considered further.

23. General guidelines required for UNFC, but practical mapping guidelines developed by each country between its system and UNFC

46. Specifications for UNFC-2009 must be sufficient to establish an adequate level of comparability, but this would not be intended to restrict the continued application of other systems or the mapping of those systems to the UNFC.

24. Set fundamental reporting guidelines (not user-specific)

47. It could be argued that, as a high-level, generic classification system, specifications for UNFC-2009 should also be at a high level and not user-specific. However, there may be a case for making a distinction between (a) quantities extracted as solids and those extracted as fluids, and (b) corporate reporting and government reporting (see Section III.18).

25. COGEH should be foundation (for petroleum guidelines)

48. The Canadian Oil and Gas Evaluation Handbook (COGEH) is a very comprehensive set of guidelines developed over the last few years, which continues to be updated and expanded. It must be applied in public reporting of companies’ oil and gas reserves and resources in Canada under its securities regulations. The definitions on which it is based are very close to, but not identical to, those of PRMS and the COGEH guidelines are not currently recognised by SPE and its co-sponsors of PRMS as basis for its application. The obvious potential for these guidelines to be more widely adopted should not be overlooked. In addition, it should be noted that the

Norwegian Petroleum Directorate (NPD) has developed petroleum guidelines for reporting to the Norwegian National Budget.

26. Use of plain language to the extent possible, minimising technical terminology and detail

49. In the development of UNFC-2009, the definitions of the categories and sub-categories were simplified and the most commonly-used classes defined using plain language, providing harmonized generic terminology at a level suitable for global communications. It is recognised that commodity-specific detailed specifications and guidelines will require the use of technical terminology for application by experts, but such terminology can also be misleading or confusing to non-expert users. Any high-level, generic specifications that may be developed for UNFC-2009 should continue to use plain language wherever possible (see also Section III.21).

27. Supported by technical report and involvement of a qualified person

50. The requirement for appropriate supporting documentation is discussed in Section III.15. In corporate reporting for the minerals sector, the requirement for involvement of a qualified or “competent” person is well-established and fully documented in the Template. In the oil & gas sector, practice is more varied. In Canada, the oil & gas requirements are comparable to those of the Template, but PRMS does not address this issue at all (though the SPE separately publishes standards for estimating and auditing reserves information). A key requirement of the Template (and also the Canadian oil and gas rules) is that the person responsible for the estimation is a member of an organization that can impose sanctions on the individual.

28. Resource valuation

51. The monetary valuation of resource quantities is outside the scope of resource classification and there are no plans to attempt to expand UNFC-2009 to cover this issue. However, it is recognised that valuation processes can be facilitated by ensuring that the classification system provides the appropriate basis for valuation purposes. UNFC-2009 should be able to satisfy this need as it is project-based, a critical requirement for valuations. Further, through the use of project maturity sub-classes, it allows projects to be linked to typical ranges of risk probabilities. This should facilitate consistent assessment of risk as input to valuations.

29. Commodity-specific guidelines

52. It is widely recognised that there is a need for commodity-specific guidelines. It is also widely accepted that the CRIRSCO Template and PRMS provide commodity-specific guidelines that address many of the issues raised in this report, and there is no intention to duplicate these. It is also noted that there is support for adoption of the COGEH guidelines for petroleum (see Section III.25). The objective of the STF was to consolidate a list of issues that stakeholders had identified as important for their application and then to consider which of these may not be fully addressed in one or both of these systems. Following completion of the STF study, it will be necessary to discuss with CRIRSCO and SPE how best to respond to those commodity-specific needs. The fact that many existing mining sector reporting regulations are based on the CRIRSCO codes must be kept in mind, and conflicts with those must be avoided.

30. Cross-referencing economic/social viability with G axis

53. The possibility of linking the level of economic and social viability of projects to the categories of the G axis was raised. Given the flexibility of UNFC-2009, in terms of being able to select from each of the three axes, E, F and G, independently, it is not considered to be appropriate to provide such a linkage in high-level specifications.

31. More granulation to meet individual needs and resource types

54. The potential to expand the granularity of UNFC-2009 to meet specific needs or resource types is a very important strength of the system. Careful consideration needs to be given to how such expansion of the system could (or should) be constrained so that different users do not adopt the same sub-category identifiers for different purposes.

32. Classification of undiscovered resources

55. A recommendation was made that the classification of undiscovered (prognostic) mineral resources should be subject to further subdivision, as highlighted by the Russian Federation minerals system of using three classification levels of P1, P2 and P3. This issue is not addressed in the Template, but is covered in PRMS through the use of Prospect, Lead and Play, as mentioned in Figure 3 of UNFC-2009, and the potential to provide a consistent generic basis for such sub-categories should be carefully considered.

33. Proved and probable reserves based on forecast costs

56. Both the Template and PRMS are based on the use of reasonable forecasts of prices and costs, as opposed to some fixed basis, such as using an historical average. UNFC-2009 is entirely aligned with the Template and PRMS, in that the definition of E1 refers to “realistic assumptions of future market conditions”.

34. Classification based on “risk” profiles

57. Clear classification into different risk “profiles” is identified as a requirement, with minimal ambiguity in their application. The project maturity sub-classes (optional in both PRMS and UNFC-2009) provide an excellent framework for subdividing projects on the basis of different levels of risk. However, it is recognised that additional clarity (i.e. specifications) in defining the boundaries between these sub-classes would be beneficial. Additional guidance may be provided in the PRMS Applications Document, which is currently in preparation.

58. Project maturity sub-classes have not been adopted in the minerals sector, but since public reporting is generally on a mine by mine basis, the status of each mine and any risks associated with it can usually be ascertained by reference to the text discussion that is included in the disclosures.

35. Good guidelines required for unbiased estimates

59. Reserve/resource information must be unbiased, which requires good guidelines. This is probably best achieved by guidelines being primarily principles-based but with strong, clear, prescriptive rules where necessary. The Template is based on this philosophy, as is the Canadian

oil and gas practice. PRMS is more “accommodating” in that it too is principles-based, but leaves a moderate amount to flexibility to the user. See also Section III.25.

36. Management and board responsibility

60. The benefit in having senior company management and the board of directors taking full responsibility for public reporting of reserve/resource estimates was noted. However, this would be an issue for the relevant regulatory body rather than an issue that would be specified in UNFC-2009. It is also linked to the matter of independent auditing of estimates (see Section III.27).

37. Governance and administrative system for guidelines

61. Guidelines require a governance and administrative system to support ongoing development and maintenance. Both CRIRSCO and SPE have systems in place and the Expert Group on Resource Classification is planning to establish a Technical Advisory Group to perform a similar function, though with the additional requirement for very close liaison with CRIRSCO and SPE with respect to commodity-specific guidelines. It should be noted that a view has been expressed that the governance structure for PRMS is not suitable for regulatory (financial reporting) purposes.

38. Transparency of estimation methods

62. Estimation methods are generally well documented in the public domain. Perhaps more of an issue is ensuring that all official views on interpretation matters are disseminated widely in the public domain and in a timely manner. This is a clear responsibility of the body mentioned above in Section III.37.

39. Measurement and reporting issues

63. The possible need to provide additional information in the reporting of petroleum reserves/resources was raised. Two specific areas were identified, neither of which is currently covered in PRMS:

(a) Gas volumes should be reported with an average heating value or normalised to a base value;

(b) Crude oil volumes should be reported with average density, BTU, impurities, and separate from natural gas liquids.

Some disclosure rules (e.g. Canada) require some segregation such as reporting heavy oil separately from light/medium crude, but not the reporting of average “quality” measures as suggested here. Historically, gas reserves were reported in energy terms (instead of volumes) in Australasia, but that practice seems to have become more variable. While actual disclosure requirements will be set by the relevant regulatory body, it could be beneficial to set some standards for reporting that would ensure that when such details are provided, they are reported on the basis of a common set of definitions and procedures.

40. Specifications and guidelines for “unconventional” petroleum resources

64. Although PRMS is intended to cover “unconventional” petroleum resources, there is a view that it does not address them adequately. The PRMS Applications Document (in preparation) is expected to provide additional guidance in this respect. Two distinct characteristics of “unconventional” petroleum resources that require addressing are: (i) where reservoir performance is essentially unpredictable until a well has been drilled and initial production rates observed; and (ii) where the commodity (e.g. bitumen) is mined as a solid, and where existing mining practices for resource classification may be more relevant than those developed for fluids. (Note that the same issue occurs in reverse in the minerals sector where, for example, uranium may be produced through wells and may be more logically classified using a system designed to handle the production of fluids.)

41. Distinction between “conventional” and “unconventional” petroleum resources

65. Although there is widespread use of the terms “conventional” and “unconventional” petroleum resources, there are several problems with this apparent distinction: (i) there is no widely-accepted definition of the terms, with some definitions including deep water production, for example, even though the produced oil may be “conventional”; (ii) it is a moving target in the sense that resources that were previously considered unconventional can become considered to be conventional as technology changes; and, (iii) PRMS defines “unconventional resources” using technical terms, being accumulations “that are not significantly affected by hydrodynamic influences”, which may be fine for technical experts, but will not be particularly meaningful to non-experts.

66. A more meaningful distinction would be to provide additional granularity in reporting, similar to that specified under the Canadian oil and gas regulations, which require the separate reporting of “product types”: light and medium crude oil (combined); heavy oil; natural gas excluding natural gas liquids; natural gas liquids; synthetic oil; bitumen; coal bed methane; hydrates; shale oil; or shale gas. While actual disclosure requirements are for the regulator to decide, it would be extremely beneficial for the definitions of the various product types to be standardised (see also Section III.39).

42. Effective date of estimation

67. It is self-evident that any resource estimate must reflect a specific date (“Effective Date”) in order that it is clear that it is based only on information that was available prior to that date and, when referring to remaining quantities, reflects only those estimated quantities remaining as at that date. Provision of an Effective Date is a requirement under the Template and PRMS, but it should also be captured at a generic level in UNFC-2009 so that there can be no doubt that an estimate quoted as being accordance with UNFC-2009 must have an Effective Date associated with it.

43. Reference point

68. Specification of a reference point will facilitate communication about the use of the quantities extracted (sales, fuel, flare, etc.) and the nature of the reference point (custody transfer meter, process control meter, indirect measurement/ mass balance calculations, estimates) and the type of transfer (sales to third party at arms length, netback valuation upon delivery to shared

infrastructure/upgrading plant). See also Section III.9.

44. Using industry best practice

69. The focus on industry-specific solutions has historically reflected a distinction between the mining of solids and the production of fluids through wells, and the classification systems of the Template and PRMS have developed in response to that distinction. However, there is an increasing degree of overlap between industries with, for example, bitumen being mined for conversion to synthetic crude oil and uranium being produced as a fluid by in-situ leaching. The situation has become even more confused with the new SEC rules requiring that coal which is mined with the *intent* of processing it into synthetic oil or gas (or selling it for that purpose) is classified as an oil and gas producing activity and must be reported under those rules rather than the mining rules.

70. Given the vast experience of each industry, it would seem to be counter-productive to attempt apply a fluids-based classification system to the mining of solids and vice versa. It would also appear to reflect a complete failure to recognise and benefit from the carefully-developed and well-tested classification specifications and guidelines of the system that is used in the other sector, which should be considered as best practice for that type of extraction process.

45. Clarity on economic assumptions for proved reserves

71. There is some ambiguity in PRMS with respect to economic assumptions to be used for proved reserves, including reference to the possibility of having zero proved reserves in some circumstances despite the project satisfying the requirements for commerciality. Such “flexibility” could lead to a lack of comparability in financial reporting, for example.

46. Benefit in globally-consistent terminology and definitions

72. Some stakeholders recognise a clear benefit from the use of globally-consistent terminology and definitions, both at a corporate and a national level of reporting. Others consider that the commodity-specific nature of the two industries is such that a distinction in specifications and guidelines is necessary (see Section III.29). UNFC-2009 offers the potential to provide that global terminology without compromising the integrity of the two underlying commodity-specific systems (but see also Section III.44).

47. Reconciliation of incremental and cumulative deterministic methods

73. This issue was raised specifically in the context of PRMS, where both approaches are explicitly allowed, but there is a lack of guidance on the reconciliation of the two methods. More guidance may be provided in the SPE Applications Document, which is in preparation. In fact, this issue is referenced in UNFC-2009 since it was recognised that cumulative (or probabilistic) methods are generally the basis for estimation in the petroleum sector (since it is dealing with fluids), while the so-called incremental approach is more appropriate when dealing with solids as in the minerals sector. The mapping between the Template and PRMS provided an indication of the relationship between the two approaches, but there remains a problem when attempting to apply PRMS to solids or the Template to fluids (see Section III.44).

48. Tracking of reasons for project delays

74. For government resource management purposes, it would be useful to be able to capture the primary reason for project delays in moving forwards towards development approval and production. For example, it would be helpful to be able to distinguish between projects that are delayed due to lack of human resources, financial capital or appropriate technology.

49. Need to clarify timing issues

75. The UNFC-2009 definitions (and also the Template and PRMS) use general terms for timing issues such as “foreseeable future” and “significant delay”, for which specifications and/or guidelines should be considered. In addition, further granularity would be useful to distinguish between the timeframes adopted by companies as being consistent with “foreseeable future” and the longer timeframes considered relevant for government inventory reporting. For example, a proposal has been made to sub-divide the Development Not Viable sub-class to distinguish between projects that are forecast to become viable within 20-25 years and those that fall outside that timeframe.

50. Further granularity for “Additional Quantities in Place”

76. For government resources management purposes, it may be helpful to be able to sub-divide Additional Quantities in Place based on “grade”, particularly for coal and non-conventional petroleum resources like bitumen, coalbed methane and shale gas. Consideration could be given to adding sub-categories to F4 to provide this further level of granularity.

51. Undiscovered and unconventional uranium and thorium resources

77. Consideration should be given to ensuring that UNFC-2009 can address undiscovered and unconventional uranium and thorium resources appropriately, which may require additional specifications.

IV. DISCUSSION

78. A key goal of UNFC-2009 is to provide a high-level generic classification system that facilitates global communications among all stakeholders. This requires, as a minimum, that it is able to ensure a reasonable level of comparability between estimates of resource quantities that are classified by the same code or class when applying UNFC-2009, regardless of the commodity. Comparability requires specifications and guidelines. However, there is no intention to generate an independent (or different) set of commodity-specific specifications and guidelines from those already embodied in widely-accepted systems such as the CRIRSCO Template (as reflected in the family of codes that conform to it) and PRMS.

79. In the Revision Task Force (RTF) report on specifications and guidelines (ECE/ENERGY/GE.3/2009/7), four options for the provision of specifications and guidelines were discussed. The first option, that no specifications and guidelines are provided for UNFC-2009, would clearly fail to address the issue of comparability as it would rely wholly on the specifications and guidelines that applied to the system being mapped to UNFC-2009. As highlighted in the RTF report, assigning estimates that are based on different specifications to the same UNFC code would completely undermine its usefulness as an umbrella system. The other

three options presented in the RTF report were all variants of an alternative approach, whereby specifications and guidelines at a commodity-specific level were provided through some form of linkage between the Template and UNFC-2009 for minerals and between PRMS and UNFC-2009 for petroleum.

80. It has been agreed that the provision of specifications and guidelines for UNFC-2009 shall be undertaken through cooperation with CRIRSCO for minerals and SPE for petroleum. Since there is no intention to develop new, and different, commodity-specific specifications and guidelines, some form of “linkage” between UNFC-2009 and these commodity-specific systems would be the logical solution. The precise form of any linkage would have to be agreed both within the Expert Group on Resource Classification and with CRIRSCO and SPE. This approach would help to promote the Template and PRMS as the preferred commodity-specific systems, and would not affect reserve/resource reporting based on those systems, but it would also provide a sound basis for UNFC-2009 to act as an umbrella system. UNFC-2009 could then be used to complement the commodity-specific classifications by ensuring that only equivalent (comparable) estimates made under these two systems are classified under the same UNFC-2009 code.

81. It is evident that both the Template and PRMS incorporate many of the specifications raised by the UNFC’s stakeholders, but it is also clear that they are not able to respond fully in their current form to the expressed needs of all stakeholders, though perhaps for somewhat different reasons.

82. The Template is explicitly designed for external corporate reporting as required by regulatory bodies and is widely accepted for that purpose. It does not seek to address the needs of governments for national inventory purposes. Consequently, it includes specifications that are entirely appropriate for public reporting purposes, such as not aggregating mineral reserves and mineral resources, but which may not be appropriate for national inventory purposes.

83. PRMS provides a broad classification framework that intentionally leaves a significant amount of flexibility up to the user, and hence it can be adopted by a wide range of stakeholders with different objectives. However, this can lead to limited comparability unless all the associated assumptions are documented and made available alongside the corresponding estimates. Where comparability between estimates is particularly important, e.g. for financial reporting, this requires a higher level of specification (i.e. less flexibility) in order to ensure that the estimates reflect a common basis.

84. In the case of the Template, it could be expanded to incorporate additional specifications and guidelines to address a broader range of stakeholders, including governments, but this could lead to apparently conflicting guidance (e.g. with respect to the aggregation of mineral reserves and mineral resources) which could reduce the effectiveness and clarity of the system as it currently stands. Similarly, PRMS could be “tightened up” so that it would be more suitable for regulatory reporting, for example, but this would limit its flexibility in other areas.

85. A further issue is that, although the CRIRSCO/SPE mapping of the two systems showed that there is reasonable comparability between them, there are also some key differences. The definition of quantities as proved reserves, for example, is quite different between systems. PRMS assigns commodity sales volumes as proved reserves (i.e. post-processing), whereas the

Template assigns pre-processed extracted quantities as proved reserves and provides for sales quantities of the metal or mineral to be published separately through reference to processing recovery factors. Coal is slightly different as it may also be quoted as “Marketable Coal Reserves” (post-processing) in addition to “Coal Reserves” (pre-processing).

86. All of the categories that are currently reported under CRIRSCO-based codes or PRMS provide useful information to users of reserve/resource information and there is no suggestion that such disclosure practices should change. However, if UNFC-2009 is to provide a generic (cross-commodity) tool for classifying quantities, it is clear that it must reflect a common set of principles. In the case of “proved reserves”, limiting UNFC-2009 code 111 to sales quantities only, for example, will help to ensure comparability between minerals and petroleum. Application of the term “proved reserves” would not provide this. The key is to ensure clarity in reporting so that it can easily be identified by users of the information which particular numbers from each of the underlying systems are comparable with each other, not to constrain or influence the information that is currently disclosed.

87. UNFC-2009 offers the potential to address these differences between systems without compromising the integrity of the underlying systems. This can be achieved through the provision of some high-level generic specifications for UNFC-2009 that are entirely compatible with the detailed and commodity-specific specifications of the Template and PRMS, but which are designed to ensure reasonable comparability at a generic level, i.e. regardless of the specific commodity involved. In addition, consideration must be given to the issues raised by stakeholders that may be best dealt with at a commodity-specific level.

1. Types of external reporting

88. In line with the goal of providing a tool to facilitate global communications, the focus of UNFC-2009 must be on those resource estimates that are made available in the public domain. While four key areas of application of UNFC-2009 have been identified, there are two main subdivisions where clear differences in reporting requirements are evident. These may be referred to as “State reporting” (e.g. government inventory reporting) and “Company reporting” (e.g. for financial reporting purposes). There are also some differences between industry sectors that are primarily a consequence of the distinction between the mining of solids and the production of fluids through wells.

2. State reporting

89. State reporting may include consolidation of information supplied by companies, or estimates derived by a government’s own experts, or a combination of the two. The focus is on establishing reserve/resource estimates for the whole country, including areas that may not be licensed to any exploration/mining companies, and will be based on “gross” (100%) estimates rather than the “net” quantities attributable to any particular company (though that information may also be collated, of course). The estimates will consider the period beyond that of any company’s legal rights and will often require aggregation of quantities that would normally be reported separately at a corporate level (e.g. reserves and resources).

90. A key issue for State reporting is the need to aggregate quantities at a higher lever level than would generally be permitted for corporate reporting. However, the terminology used in the Template and in PRMS is based around making a clear distinction between, say, reserves and

resources, since they should always be reported separately at a corporate level. Although these estimates may not be directly equivalent, it is necessary to be able to assess the overall long-term resource potential at a national level. Since the Template and PRMS do not provide any standardised or accepted terminology that could be adopted globally for aggregated estimates at a national level (e.g. Economic Demonstrated Resources, as used by Geoscience Australia), additional classes could be defined under UNFC-2009 that, combined with appropriate specifications, could provide a common basis for reporting aggregated estimates. In this way, the specifications of the Template, for example, which preclude the aggregation of reserves and resources, would remain in place, but the option to aggregate for national reporting purposes would exist at the level of UNFC-2009.

3. Company reporting

91. Corporate reporting requirements include internal company reporting for portfolio management and decision-making, and are based on evaluations at a project or individual deposit level with a focus on the commerciality of the project and establishing the proportion of future production (and hence revenue) legally attributable to the corporate entity. Financial reporting tends to be a sub-set of the information developed for internal corporate reporting purposes. Estimated quantities disclosed by the company as future sales should reflect those “net” quantities for which the company has a legal right to produce (or an economic interest therein).

92. As mentioned above, PRMS incorporates a degree of flexibility that allows users to select different options for the level of detail needed for their reporting objective, as well as reflecting variations in current financial reporting practice (e.g. the treatment of royalty or lease fuel). This flexibility makes it very amenable to internal corporate reporting, as companies will choose the most appropriate level of detail to suit their needs, but it may also make it less suitable for direct application to financial reporting, where a level of comparability between companies is required. Specifications to UNFC-2009 could be provided that are very simple in nature and entirely generic, but which would ensure that reporting under the UNFC would provide an appropriate level of comparability for financial reporting and global communications.

93. As mentioned above, under the Template’s definitions, a proved mineral reserve (extractable ore tonnage and average grade) is not directly comparable to a proved petroleum reserve (generally sales quantities, but which may include lease fuel), despite using identical terminology. This lack of direct comparability for quantities classified using the same terminology is a potential problem for meaningful global communications among non-experts, especially when dealing with aggregated estimates. Further, while corporate petroleum reserves are always reported as net quantities attributable to the company, mineral reserves may be quoted for the mine as a whole, with the company’s participating percentage interest in the project being quoted separately.

94. The extensive nature of disclosures made under the Template is a key strength of the system. All the necessary information is generally made available to provide estimates that can be compared directly with estimates that would be reported under PRMS. If mining companies complemented these disclosures with a summary table documenting which of the reported numbers corresponded to the relevant UNFC codes such as 111 and 112 (i.e. the net sales quantities), and reporting under PRMS also included net sales quantities (excluding lease fuel), there would be a direct comparability of estimates derived under the two commodity-specific

systems without impacting either system or the evaluation process. The investor would get both the information that he/she is used to and also a clear indication of which of those numbers are directly comparable across industries. This link could also provide a basis for a simplified IFRS that could be applied equally to both sectors without needing to address each one separately, while still relying on the Template and PRMS for the commodity-specific classification and reporting requirements.

4. Solids vs. fluids

95. There is some concern about the potential for re-inventing the wheel with some “unconventional” resources. In the petroleum sector, PRMS is stated to be suitable for application to solids (e.g. mined bitumen) even though it was originally designed for fluids. This approach ignores the fact that the Template has been developed specifically to address the mining of solids and would seem to be eminently suitable for such application. Similarly, the minerals sector is attempting to apply its system (designed for solids) to uranium produced as a fluid through wells. This example apparently leads to a commercially producing in-situ leach mining project having zero reserves, which may be perfectly correct under the wording of the Template-based code, but would definitely not be the case if PRMS principles were applied. This particular situation is clearly inconsistent with the “close alignment” between the Template and PRMS that is quoted in the CRIRSCO/SPE mapping project undertaken for the IASB.

96. Currently, each industry is applying its own system to extraction processes that are very different from those on which the design of the system was based. So far, there appears to be a reluctance to adopt practices from the other sector, even though they may be more appropriate and the ultimate result (according to the CRIRSCO/SPE mapping project) should be equivalent in terms of the level of confidence in the estimate. More consideration needs to be given to the potential benefits of distinguishing evaluation and classification methodologies on the basis of the nature of the extraction process rather than on the industry sector that traditionally mined/produced that commodity.

V. RECOMMENDATIONS

97. There is very strong support noted among existing users of the Template-based codes and PRMS for the specifications and guidelines incorporated in those systems to provide the fundamental basis for solid minerals and petroleum respectively. In addition, it is clear that many of the issues raised by stakeholders are addressed to some degree in these systems and it would be counter-productive to duplicate those or, worse, deviate from accepted industry practices. In order to ensure that these specifications and guidelines are recognised as providing the preferred commodity-specific basis for UNFC-2009 application, subject to the approval of Expert Group on Resource Classification, it is recommended that possible mechanisms for some form of “linkage” (text reference) between UNFC-2009 and the Template/PRMS is considered.

98. It is evident that a number of issues have been raised by stakeholders that are not currently addressed fully in the Template and/or PRMS. Some are clearly generic in nature, and hence should be specified as an integral part of UNFC-2009 (e.g. as an addendum or complementary text), while others may be more appropriately addressed at a commodity-specific level. It is recommended that each issue is carefully considered in turn and either: (i) a generic UNFC specification is developed to address the issue, for the eventual approval of the Expert Group on Resource Classification, but subject to a public comment period; (ii) an explanation is provided

to the Expert Group to demonstrate that the issue is, or will be, adequately addressed in both the Template and PRMS; or, (iii) an explanation is provided to the Expert Group to justify why a specification is not considered necessary and/or appropriate for that issue (e.g. because it is a disclosure issue rather than one of classification).

99. Since CRIRSCO and SPE have agreed to cooperate with the Expert Group on Resource Classification in developing specifications for UNFC-2009 at a commodity-specific level (refer to Section I, paragraph 9), they must be directly involved in any discussions regarding how best to respond to the issues that have been identified. It is therefore recommended that a task force is established to prepare a report to the Expert Group that addresses the three points raised in the preceding paragraph. The task force should be of similar composition to the STF, or it could be the Technical Advisory Group if such a group can be established soon enough to ensure that the work continues without any delay. In either case, it must include formal CRIRSCO/SPE representation and should also include representatives from government organizations (minerals and petroleum) and the financial sector. The Bureau of the Expert Group on Resource Classification should set the mandate and terms of reference for the task force.

100. A key goal of UNFC-2009 is to provide a high-level global communications tool and the comments received by the STF on specifications show that comparability is high on the list of requirements of stakeholders. This can be provided by defining carefully what “goes into each box” in UNFC-2009 by providing simple, generic specifications using plain language. Even where some issues are addressed in the Template or PRMS, if they are appropriate at a high level for any classification system, it is recommended that they are captured in an addendum to UNFC-2009 so that the specification (e.g. a requirement to quote an Effective Date for any resource estimate) would apply regardless of whether or not the Template or PRMS was the basis for the estimate. The intention should be to keep these to the minimum necessary to ensure adequate comparability of estimates reported under UNFC-2009, but also to be consistent with specifications that may exist in the Template or PRMS.

101. Examples of issues for which generic UNFC-2009 specifications *may be* appropriate include:

General Specifications	
Issue	Comment
Effective Date	Remaining quantities must be linked to a specific date
Commodity Type	Should be reported separately by sales product or, where aggregated, clarity provided on what commodities are included
Basis for estimate	Estimates should be clearly identified as either gross (100%) or net (quantity attributable to company)
Reference Point	Estimates must be linked to a reference point for comparability
Documentation	General specification for full documentation to be kept (<u>not</u> a requirement for disclosure)
Fluids vs. solids?	Further clarity on distinction made for G1/G2/G3 in Annex I of UNFC-2009
G axis/probabilities	Specifications for probability levels when using scenario approach (to align with PRMS)

G4 granularity	Need to be able to capture (i) range of uncertainty and (ii) different maturity levels (PRMS, RF P1/P2/P3)
Commodity-specific specifications	Linkage to Template/PRMS
Glossary of terms	Only define “new” terms (if any), all others to be provided by cross-reference to Template, PRMS, InterEnerStat, etc.
Specifications for State Reporting	
Aggregation by commodity	Rules for aggregation of reserves and resources, including consideration of risking
Definition of additional classes	Classes that are aggregations of other defined classes, e.g. EDR (as used by GA) or equivalent
Large scale resource deposits	Rules/guidelines for classifying deposits where some areas are licensed, but others are not
Aggregation using energy equivalence	Rules for defining energy equivalence?
Specifications for Company Reporting	
Net legal entitlement	Specification that reported sales quantities must be net to company (legally attributable)
Royalty	Clarity on inclusion/exclusion for reported quantities?
Economic assumptions	Management view, or view of Competent Person, or published view that is considered reasonable forecast
Aggregation	Rules for aggregation of quantities? Probability levels, risking?
Competent Person?	Generic reference? (Not explicitly addressed in PRMS)
Oil/gas quality?	Rules for defining oil/gas quality, or energy equivalent, or definition of “different” commodities?

Annex I

SPECIFICATIONS TASK FORCE MEMBERS

Chairperson

James Ross

International Energy and Minerals Studies

Tim Klett

Yuri Podturkin (supported by the Russian Working Group)

Government Resources Management

Per Blystad

Kjell-Reidar Knudsen

Ian Lambert (supported by Yanis Mieзитis)

Industry Business Processes

Roger Dixon

David MacDonald

Financial Reporting

Ferdinando Camisani-Calzolari

David Elliott

Danny Trotman

Annex II

FEEDBACK RECEIVED ON REQUIREMENTS FOR SPECIFICATIONS

No.	Issue Raised	Source or Primary Area of Interest	Report Reference
1	Expand G4 to account for uncertainty	RTF report (III.9)	III.1
2	Distinction between developed and undeveloped	RTF report (III.18)	III.2
3	Definition of “total in place” using E categories	RTF report (III.19)	III.3
4	More detailed definition of G categories	RTF report (III.21)	III.4
5	Subjective nature of E axis categories	RTF report (III.27)	III.5
6	Assessments made for different purposes	RTF report (III.28)	III.6
7	Reference to Class 113	RTF report (III.29)	III.7
8	Distinction between F4 and potentially commercial	RTF report (III.31)	III.8
9	Definition of non-sales production	RTF report (III.34)	III.9
10	Glossary of terms	RTF report (III.43)	III.10
37	Additional granularity for G4 aimed at more detailed reflection of uncertainty	International Studies	III.1
38	Definition of initial total-in-place resources and aggregation of classes to ensure material balance and flexibility of UNFC	International Studies	III.3
39	More detailed definitions of G axis, with account taken of undiscovered resources and developing technologies	International Studies	III.4
42	More detailed and explicit characterisation of E axis categories	International Studies	III.5
43	Treatment of differing resource estimates and reconciliation of actual recovery against forecasts	International Studies	III.6
11	Requirement for aggregation to national level	International Studies	III.11
12	Confusion between reserves and resources	International Studies	III.12
13	Confusion between in-situ and recoverable quantities	International Studies	III.13

14	Comprehensive, consistent and coherent reporting	International Studies	III.14
19	Consistency in classification	International Studies	III.14
15	Documentation of assumptions	International Studies	III.15
18	For G4, thorough documentation of assumptions	International Studies	III.15
21	Documentation of assumptions	International Studies	III.15
16	Illustration of all resource categories in an accumulation/basin/project	International Studies	III.16
17	Probability levels for allocation to appropriate classes	International Studies	III.17
20	Clarity in reporting (e.g. gross/net interest)	International Studies	III.18
44	Monetary valuation of reserves/resources	International Studies	III.28
36	Need for commodity-specific specifications and guidelines, with a distinction between petroleum and solid minerals due to differences in methodology of estimation	International Studies	III.29
40	Cross-referencing of economic and social viability of projects to the categories of the G axis	International Studies	III.30
41	More granulated subdivision of the UNFC when applied to individual needs and resource types (e.g. unconventional petroleum resources)	International Studies	III.31
107	Need to capture uncertainty when dealing with Exploration Projects (G4)	Government Resource Management	III.1
108	Clarity on distinction between F1 sub-categories	Government Resource Management	III.2 & III.20
109	Distinction between primary and secondary recovery projects	Government Resource Management	III.3, III.13 & III.16
110	Statistical aggregation issues	Government Resource Management	III.4 & III.11
118	Consider need to identify separately resources situated in “restricted areas” (e.g. environmentally sensitive areas)	Government Resource Management	III.5
114	Distinction between corporate financial reporting, which may be constrained by the current licence period, and corporate reporting to government, where the government wants the full economic recovery estimate	Government Resource Management	III.6, III.8, III.18 & III.22
115	Need to distinguish between sales and lease fuel where, for example, a main field may consume gas that is produced by a satellite field	Government Resource Management	III.9

25	Aggregation of mineral reserves and resources for government reporting (incl. criteria for dealing with the issue of deductions for losses)	Government Resource Management	III.11
97	Aggregation (e.g. for national inventory reporting) can suffer from “double-counting” where mineral resources are reported inclusive of mineral reserves	Government Resource Management	III.11
100	Specifications required for definition and aggregation of quantities reported under Exploration Projects and Additional Quantities in Place	Government Resource Management	III.11
111	Aggregation when underlying economic assumptions are different	Government Resource Management	III.11
112	Aggregation when projects have a risk of not proceeding	Government Resource Management	III.11
125	Undertake further mapping of national systems to UNFC-2009 prior to development of additional classes for national reporting purposes	Government Resource Management	III.11
116	Specification for treating royalty volumes in a consistent fashion	Government Resource Management	III.18
22	Inadequacy of PRMS specifications, leading to lack of comparability	Government Resource Management	III.19
23	Need to reflect three key categories (reserves, discovered resources and undiscovered resources)	Government Resource Management	III.20
98	The Template does not address currently non-economic material (since it is not publicly reported)	Government Resource Management	III.20
24	Add labels ("unit name") for 111, etc.	Government Resource Management	III.21
126	Add additional labels to main classes of resources	Government Resource Management	III.21
26	Linkage between period of lack of exploration or exploitation activity and economic category	Government Resource Management	III.22
27	General guidelines required for UNFC, but practical mapping guidelines developed by each country between its system and UNFC	Government Resource Management	III.23
28	Too early for specifications for UNFC at government level; need to establish global reporting form, then detailed specifications can be developed at a national level based on national legislation and local/regional needs	Government Resource Management	III.23
117	Need to be aware of NPD’s guidelines for reporting, which may come into the same category as COGEH	Government Resource Management	III.25

45	Classification of undiscovered (prognostic) mineral resources requires further subdivision, as highlighted by the Russian Federation system of using three classification levels of P1, P2 and P3	Government Resource Management	III.32
113	Distinction between exploration projects at different levels of maturity	Government Resource Management	III.32
88	Clear benefit in unified global standards for the energy sector and for solid mineral resources at a government level	Government Resource Management	III.46
119	Need to track reasons for delay in projects maturing	Government Resource Management	III.48
120	Need to clarify timing of “foreseeable future”, “significant delay”, etc.	Government Resource Management	III.49
124	Add further granularity to Development Not Viable sub-class	Government Resource Management	III.49
128	Need to add granularity to Additional Quantities in Place and ensure a longer term perspective than used for business purposes	Government Resource Management	III.31, III.49 & III.50
129	PRMS and the Template are not adequate for national inventory purposes (e.g. with respect to unconventional petroleum and inventory coal)	Government Resource Management	III.20 & III.40
131	More detailed definition of G axis categories and possible further granularity of G1 and G2	Government Resource Management	III.4, III.17 & III.31
132	Need to accommodate undiscovered and unconventional uranium and thorium resources	Government Resource Management	III.51
93	Use of specific economic assumptions less important than clear disclosure of key assumptions	Financial Reporting	III.5 & III.15
95	Use of specific economic assumptions less important than clear disclosure of key assumptions	Financial Reporting	III.5 & III.15
34	Must achieve a minimum level of reliability, competency and consistency	Financial Reporting	III.14
56	Reserve/resource information must be reliable and be consistent from both year to year and between companies	Financial Reporting	III.14
31	Disclosure of key assumptions, parameters and methods, and discussion of risks and uncertainties	Financial Reporting	III.15
46	Specified probability levels for reserve categories	Financial Reporting	III.17
80	Clarity required on application of probability constraints at different levels of aggregation and relationship between deterministic and probabilistic methods	Financial Reporting	III.17
78	Clarity required on determination of net volumes legally attributable to company	Financial Reporting	III.18

51	Internal guidelines can provide internally consistent estimates, but lead to inconsistencies between companies especially where the classification system (e.g. PRMS) has options	Financial Reporting	III.19
75	PRMS generally satisfactory for internal business processes, but further specifications required for external reporting (e.g. financial reporting)	Financial Reporting	III.19
85	Flexibility of PRMS makes it broadly suitable for all needs, but more specific rules may be required for particular circumstances, such as financial reporting	Financial Reporting	III.19
123	Need for additional detail (i.e. specifications and/or guidelines) on application of UNFC-2009 in relation to financial statements	Financial Reporting	III.19 & III.29
94	Need for clarity in defining different resource categories	Financial Reporting	III.20
29	Set fundamental reporting guidelines (not user-specific)	Financial Reporting	III.24
54	Guidelines should be designed to provide good technical practice, regardless of the specific application (and should not focus on a specific application such as accounting)	Financial Reporting	III.24
30	COGEH should be foundation (for petroleum guidelines)	Financial Reporting	III.25
60	Extensive disclosure of supporting information required for a new stock exchange listing, but underlying basis is same as required for routine reporting under Canadian Securities Administrators regulations and COGEH guidelines	Financial Reporting	III.25
32	Use of plain language to the extent possible, minimising technical terminology and detail	Financial Reporting	III.26
33	Supported by technical report and involvement of a qualified person	Financial Reporting	III.27
48	Requirement for independent evaluators	Financial Reporting	III.27
52	Estimates should be audited in accordance with clear standards	Financial Reporting	III.27
58	Published information should be subject to independent confirmation	Financial Reporting	III.27
83	Requirement for Competent Person or equivalent	Financial Reporting	III.27
35	Although resource valuation is not part of UNFC-2009, the application needs should be considered in order to ensure an appropriate basis for valuation is provided by the classification system.	Financial Reporting	III.28
122	Resource valuation should be based on CRIRSCO codes	Financial Reporting	III.28
91	Additional specifications and guidelines, if any, should be consistent with those found in the Template or PRMS	Financial Reporting	III.29
96	The Template adequately addresses specifications and guidelines that are appropriate for both business processes and financial reporting	Financial Reporting	III.29
99	Specifications and guidelines for UNFC-2009 should take into account current mining sector reporting rules and regulations	Financial Reporting	III.29
47	Proved and probable reserves based on forecast costs	Financial Reporting	III.33

49	Clear classification into different risk “profiles” is required, with minimal ambiguity in their application	Financial Reporting	III.34
81	Application of risking and/or use of sub-classes when aggregating within classes (e.g. contingent resources)	Financial Reporting	III.34
50	Reserve/resource information must be unbiased, which requires good guidelines	Financial Reporting	III.35
53	Enforcing management and board responsibility is very important	Financial Reporting	III.36
59	Senior management should take personal liability for published information	Financial Reporting	III.36
55	Guidelines require a governance and administrative system to support ongoing development and maintenance	Financial Reporting	III.37
89	PRMS is a good basis for internal corporate business processes, but is not suitable for regulatory (financial) reporting due to inappropriate governance structure	Financial Reporting	III.37
57	Reserve/resource information should be based on well-defined methods that are publicly available	Financial Reporting	III.38
82	Definitions for commodities and/or distinction based on “quality”	Financial Reporting	III.39
76	Explicit requirement for effective date to be quoted	Financial Reporting	III.42
77	Clarity required on reference point and definition of sales	Financial Reporting	III.43
79	Rules for mined petroleum should reflect mining industry best practice (i.e. CRIRSCO Template)	Financial Reporting	III.44
84	Clarity on economic assumptions for proved reserves	Financial Reporting	III.45
92	Clear benefit in globally-consistent terminology and definitions, and level of granularity, in corporate reporting	Financial Reporting	III.46
130	Need a consistent basis for reserve/resource classification in the financial sector in order to ensure comparability between companies for investors	Financial Reporting	III.14
104	Specifications required to ensure clarity regarding boundaries between categories (E, F and G)	Business Processes	III.4, III.5 & III.20
121	Need for clarity on meaning of “Reasonable Prospects for Eventual Economic Extraction”	Business Processes	III.5 & III.49
103	Aggregation issues need to be addressed	Business Processes	III.11
65	Describe the allocation of ownership	Business Processes	III.18
66	Petroleum-specific specifications should be those provided by PRMS	Business Processes	III.29
67	No additional guidance required for PRMS, pending Applications Document (in preparation)	Business Processes	III.29
68	PRMS good at a high level but needs to be supplemented by more detailed guidelines comparable to those found in COGEH. The PRMS Applications Document (in preparation) may not be adequate in this respect	Business Processes	III.29

70	No additional guidance required for PRMS, pending Applications Document (in preparation)	Business Processes	III.29
71	No additional guidance required for PRMS at this time	Business Processes	III.29
74	No additional guidance required beyond that found in PRMS and its associated Applications Document (in preparation)	Business Processes	III.29
86	No additional guidance required beyond that found in PRMS and its associated Applications Document (in preparation)	Business Processes	III.29
102	Additional granularity required, e.g. for Exploration Projects	Business Processes	III.32
64	Provide, at a high level, a basis on which technical and commercial analysis are conducted	Business Processes	III.33
105	Specifications required for capturing likelihood of an uncommitted project proceeding	Business Processes	III.34
61	Gas volumes should be reported with an average heating value or normalised to a base value	Business Processes	III.39
62	Crude oil volumes should be reported with average density, BTU, impurities, and separate from natural gas liquids	Business Processes	III.39
63	Clearly describe the ways in which quantities of petroleum should be measured	Business Processes	III.39
106	Specifications required for communicating probabilities	Business Processes	III.39
69	Additional specifications/guidelines are required in PRMS for application to “unconventional” petroleum resources, such as shale gas and tight oil production	Business Processes	III.40
72	PRMS generally adequate, but additional specifications/guidelines are required for application to “unconventional” petroleum resources	Business Processes	III.40
73	Need for clarity in the distinction between “conventional” and “unconventional” petroleum resources	Business Processes	III.41
101	Reference point specification	Business Processes	III.43
87	Integration of petroleum classification with the mining sector is important	Business Processes	III.44
90	Clarity required on the reconciliation of incremental and cumulative deterministic methodologies	Business Processes	III.47
127	No additional specifications and guidance required beyond that found in the Template and PRMS	Business Processes	III.29

Annex III

ORGANIZATIONS CONTACTED

1. A very broad range of stakeholders was contacted by the members of the STF. In some cases, responses were compiled in such a way that not all organizations appear on the list, and in others the respondent had requested anonymity. In any event, the majority of the responses received were the views of individual reserve/resource specialists within the organizations and hence none of the views submitted to the STF can or should be attributed to any of the organizations contacted. The STF approach ensured that the responses were mainly received from individuals who deal with reserve/resource data on a daily basis and who were therefore best qualified to provide insights into issues requiring specification in order to meet their particular needs. In some cases, particularly large organizations with a range of interests or responsibilities, more than one individual in the organization was contacted.

2. In the following lists, organizations are grouped according to the primary area they represent as stakeholders, while recognising that there could be significant overlap in some cases.

- **Organizations that compile and publish global/international reserve/resource studies**

All-Russian Petroleum Research Geological Institute
BGR, Germany
Global Energy Assessment (GEA), Energy Program, International Institute for
Applied Systems Analysis (IIASA), Austria
IHS Energy
International Energy Agency (IEA)
Oil and Gas Research Institute of Russian Academy of Sciences
Russian Oil and Gas State University
Russian Working Group, including GKZ
Schlumberger - Russia, Regional Technology Center
U.S. Geological Survey (USGS)
World Energy Council (WEC)

- **Government entities responsible for compiling reserve/resource data for national inventory and related purposes**

China Geological Survey
Danish Energy Agency
Department of Energy, Petroleum Resource Development Bureau, Philippines

Department of Mineral Fuels, Ministry of Energy, Thailand
Dept Energy & Climate Change (DECC), UK
Directorate General of Hydrocarbons, India
Energy Information Administration (EIA), USA

Energy Resource Conservation Board (ERCB), Canada
 Geological Survey of Norway
 Geoscience Australia
 International Department of China national Petroleum Corporation, CNPC
 Mineral Resources and Reserves Evaluation Center
 Ministry of Land and Resources, China
 Ministry of Economic Development, New Zealand
 National Energy Board (NEB), Canada
 Natural Resources Canada
 Norwegian Petroleum Directorate
 Nova Scotia Department of Energy
 PETRONAS, Malaysia
 PETROVIETNAM, Vietnam
 PPPTMGB Lemigas, Indonesia
 Research and Consulting Center
 Ministry of Land and Resources, China
 Research Institute of Petroleum Exploration and Development, CNPC
 SA Depart. of Minerals and Energy (DME)
 SA Geological Survey (Geoscience)
 State commission of Ukraine on Mineral Resources
 State Commission on Mineral Reserves, Russian Federation

- **Minerals and Oil & Gas Companies**

Absolute Holdings Limited
 Africa Cellular Towers Limited
 African Eagle Resources PLC
 African Rainbow Minerals Limited
 Amis
 Anglo American PLC
 Anglo Minred
 Anglo Platinum Limited
 Angloamerican
 Anglocoal
 Anglogold Ashanti Limited
 Angloplat
 Anooraq Resources Corporation
 Aquarius Platinum Limited
 Arcelormittal SA Limited
 Argent Industrial Limited
 Assore Limited
 BG
 BHP Billiton PLC
 BRC Diamondcore Limited
 Breakwater Resources Ltd
 BSI Steel Limited
 Canadian Association of Petroleum Producers (CAPP)
 Central Rand Gold Limited
 ChevronTexaco
 Chrometco Limited
 Citadel Resouce Group
 Cluff

Coal of Africa Limited
 Cobar Consolidated Resources
 Coffey Mining
 ConocoPhillips
 Consultant Economic Geologist
 Consulting Geologist
 CRIRSCO Chile
 CSA Global (Consultants)
 De Beers Group
 Diamondcorp PLC
 DONG
 DRDGOLD Limited
 Eastern Platinum Limited
 ENI
 Exxaro Resources Limited
 ExxonMobil
 FerrAus Ltd
 Firestone Diamonds
 Firestone Energy Limited
 First Uranium Corporation
 Formerly Devon Energy
 Gaffney Cline & Associates
 GDF Suez
 Gold Fields Limited
 Gold One International Limited
 Golder Associates (Consultants)
 Goodhope Diamonds (Kimberley) Ltd
 Great Basin Gold Limited
 Harmony Gold Mining Company Limited
 Heathgate Resources Pty Ltd
 Highveld Steel and Vanadium Corp LD
 Hulamin Limited
 Hwange Colliery Company Limited
 Impala Platinum Holdings Limited
 Implats
 Industry Economics & Taxation (MCA)
 Infrasons Holdings Limited
 Insimbi Refractory & Alloy Sup LTD
 Integra Mining
 JCI Limited
 Jubilee Platinum PLC
 Keaton Energy Holdings Limited
 Kimberley Consolidated Mining LTD
 Kio Ltd
 Kiwara PLC
 Kumba Iron Ore Limited
 Lewis Minerals Resource Consulting Pty Ltd
 Lonmin
 Malachite Resources Limited
 Mantra Resources
 Marathon
 Merafe Resources Limited

Metmar Limited
 Metorex Limited
 Micon International Limited
 Minarco-mineconsult
 MINVAL Associates
 Minxcon
 Miranda Mineral Holdings Limited
 Mvelaphanda Resources Limited
 Nexen
 Northam Platinum Limited
 Norwest Corporation
 Occidental
 Palabora Mining Company Limited
 Pamodzi Gold Limited
 Pan African Resources PLC
 Petmin Limited
 Petrobras
 Pioneer Natural Resources
 Platmin Limited
 Polyus Gold (OJSC)
 Private consultant
 PT Padangbarra Sukes Makmur Indonesia
 Rand Uranium
 Randgold & Exploration Company LD
 Rio
 Rockwell Diamonds Incorporated
 Ross Petroleum
 RWE Dea
 Ryder Scott
 Sallies Limited
 Sasol
 Saudi Aramco
 Sentula Mining Limited
 Sephaku Holdings Limited
 Shell
 Simmer and Jack Mines Limited
 Small Explorers and Producers Association of Canada (SEPAC)
 South African Coal Mining Holdings LTD
 Statoil
 Talisman
 Thabex Limited
 Total
 Trans Hex Group Limited
 Uranium One Inc
 Vale Exploration Pty Ltd
 Venmyn
 Village Main Reef Gold Min Comp LD
 Watts, Griffis and McOuat Limited
 Wescoal Holdings Limited
 Wesizwe Platinum Limited
 White Water Resources Limited
 Witwatersrand Cons Gold Resources
 Xstrata

Xstrata Copper
Zambia Copper Investments Limited

- **The Financial Sector**

Alberta Securities Commission
Association of Mining Analysts
BC Securities Commission (BCSC), Canada
Chartered Financial Analysts Society, Calgary, Canada
Deloitte
Formerly Royal Bank of Canada
Hulf Hamilton
IASB
J. R. Lacey International Ltd.
JSE
KAR Presentations
KPMG
Liberum Capital
MAS-Financial Consulting
Maxim Mining Consulting
Ooch Ziff Management Europe Ltd
Oriel
Resource valuation expert
TMX Venture Exchange (TSXV), Canada
UBS
Various mining and oil & gas analysts (London based)
