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Accommodating environmental and social considerations in the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009**Draft guidance on accommodating environmental and social considerations in the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009*****Prepared by the E axis Sub-group of the Expert Group on Resource Classification***Summary*

The Expert Group on Resource Classification E axis Sub-group was established to examine the social and environmental aspects of classification using the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 (UNFC-2009). The work does not attempt to address the important wider social or environmental issues that lie beyond the realm of classification. This document provides *a report on the development of* draft guidance on accommodating environmental and social considerations in UNFC-2009 and is presented for consideration and discussion by the Expert Group at its seventh session. As directed, it addresses the socio-environmental issues at a high level, and proposes high-level guidance and also clarification of some terms in UNFC-2009. Although UNFC-2009, the associated resource-specific classification guidelines (Committee for Mineral Reserves International Reporting Standards (CRIRSCO) Template, Petroleum Resources Management System (PRMS), and the Nuclear Energy Agency (NEA)/International Atomic Energy Agency (IAEA) Uranium Classification) and similar systems, cite social and environmental issues as factors in classification, none of them contain any significant guidance. The recommendations in the report fall into three main areas: (i) clarification of terms related to socio-environmental factors; (ii) high-level guidance on accommodating social and environmental considerations in UNFC-2009; and (iii) the development of detailed guidelines.

* This document provides a report on the development of draft guidance on accommodating environmental and social considerations in UNFC-2009.



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I. Introduction

1. Until recently, social and environmental factors have rarely been considered in the classification of natural resources. However, their importance has grown considerably in the last few years, and many projects that have met all other criteria for the extraction of a resource (in the E, F and G axes of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 (UNFC-2009)) have been delayed or even cancelled because they failed to meet social or environmental standards.
2. The Expert Group on Resource Classification (Expert Group) E axis Sub-group was established to examine the social and environmental aspects of classification using UNFC-2009. As directed, the report addresses this at a high level and proposes some guidance without going into detail. This should be subject to review and testing over the next years, during which time detailed guidance should be developed.
3. The major recommendations are:
 - (a) A clarification of terminology, for example, the difference between “economic” and “economic in the narrow sense”, and also for other terms.
 - (b) High level guidance, including a division of the E2 category into E2.1 and E2.2, and providing definitions for this purpose based on:
 - (i) Whether there is an active attempt (Active Stakeholder Engagement) to resolve social and environmental issues, and,
 - (ii) The probability of this resulting in the implementation of a project.
 - (c) Development of detailed guidelines for socio-environmental issues:
 - (i) That are common to all resource types, and,
 - (ii) For issues that are specific to a resource type.
4. Possible approaches are described.

II. Terms of Reference

5. The Terms of Reference for the current Phase 2 of the E axis Sub-group that were approved at the sixth session of the Expert Group in 2015 are:

Phase 2 Sub-group Terms of Reference

6. Prepare guidance on assessing environmental and social considerations for the classification of resources according to UNFC-2009. This is expected to include, but is not limited to providing:
7. A list and definitions of the E axis classification factors, as identified in UNFC-2009.
8. Guidance for the E axis factors which, as noted by the Expert Group, “should revolve around high-level principles”.
9. A recommendation on the extent to which more detailed guidance is required.
10. A recommendation on how the high-level and any detailed guidance should be provided. Most of the E axis classification factors are not commodity-specific and the Sub-group should consider whether guidance should be:
 - (a) separately in each of the commodity-specific documents by the organizations that manage these documents (Petroleum Resources Management System (PRMS), Committee for Mineral Reserves International Reporting Standards (CRIRSCO) Template,

and the Organisation for Economic Cooperation and Development (OECD) Nuclear Energy Agency (NEA)/International Atomic Energy Agency (IAEA) resource reporting scheme (also known as the 'Red Book'), and also under development for Injection Projects for the purpose of geological storage., and for renewable energy. Currently, there is little guidance on the E axis factors in any of these; or

(b) as a single source and, if so, whether this should be prepared under the direction of the Expert Group, either by a continuation of the work of this Sub-group, by a separate Task Force of the Expert Group; or

(c) by other means.

11. Consider establishing sub-classes to distinguish between various E axis factors, such as environmental and social conditions. UNFC-2009 currently does not provide for making this distinction.

12. Many of the UNFC-2009 E axis factors are of a broad scope but the Sub-group should consider only those aspects that are relevant to UNFC-2009 E axis resource classification, not the broader issues.

III. Scope

13. The Terms of Reference direct the Sub-group to: "... consider only those aspects that are relevant to UNFC-2009 E axis resource classification, not the broader issues."

14. Socio-environmental issues, typically described as a requirement for "Social Licence" or "Social Licence to Operate" (SLO), have attracted a large amount of interest and attention in recent years. While acknowledging the importance of the broader issues, UNFC-2009 classifies projects that are currently commercial, potentially commercial or non-commercial, at the time of an evaluation, within the foreseeable future. It is not concerned with the merits of social or environmental issues that are associated with resource production; that important debate belongs elsewhere.

15. The E axis is concerned with "Socio-Economic" criteria for the classification of resources using UNFC-2009. The economic aspects are not a core consideration for this exercise, other than a need to be able to distinguish them from the socio-environmental aspects and the impact that the latter may have on project economics.

16. The main focus has been on fossil energy and mineral resources. Although there will be many common aspects, the social and environmental issues associated with other resource types that have been, or will be added, to UNFC-2009 should also be considered in future work.

IV. The UNFC-2009 E axis

A. Introduction

17. The Terms of Reference of the E axis Sub-group require it to provide: "A list and definitions of the E axis classification factors, as identified in UNFC-2009."

18. This is not intended to include factors other than the socio-environmental, such as the economics, market prices, legal, regulatory or contractual conditions, but the latter do not exist in isolation, and the relationship between them and socio-environmental factors has been addressed to a limited extent.

19. The UNFC-2009 E axis Categories and Sub-categories (UNFC-2009 *incorporating* Specifications for its Application, ECE Energy Series No. 42, Part I, Annex I, page 9 and Annex II page 12, respectively) are shown in Appendix B. Since these were developed, there has been increased recognition of a requirement for social acceptability of projects, often outside the realm of formal regulatory approval. UNFC-2009 also classifies projects based on level of maturity (UNFC-2009 Specification G “Classification of projects based on level of maturity”).

20. The UNFC-2009 E axis combines two aspects of resource classification that are not directly related, the economics and the socio-environmental aspects of a project. A project may meet all the feasibility requirements of the F and G axes and of the economic component of the E axis, but unless it is also socially and environmentally acceptable, it cannot proceed. An attempt has been made to clarify the issues that arise from the combination of these economic and socio-environmental factors in one axis, in particular with regard to terminology.

B. The components of the E axis

21. Extracts from UNFC-2009 that are relevant to the E axis are provided below. The terms in bold are of particular relevance and are discussed further. UNFC-2009 describes the E axis factors as (UNFC-2009 *incorporating* Specifications for its Application, Part I, Section II, Categories and Sub-categories):

“...**the degree of favourability** of **social** and economic conditions in establishing the **commercial viability** of the project including consideration of market prices and relevant legal, regulatory, **environmental** and contractual conditions”.

22. **Degree of favourability** is not defined, but when used for classification would be expressed by the probability that a project will be carried out.

23. The distinction between E1, E2, and E3 of the E axis is addressed by UNFC-2009 Specification H “Distinction between E1, E2 and E3”, which says:

“The distinction between quantities that are classified on the Economic axis as E1, E2 or E3 is based on the phrase “reasonable prospects for economic extraction and sale in the foreseeable future”. The definition of “foreseeable future” can vary depending on the commodity and hence more detailed specifications can be found in relevant commodity-specific systems that have been aligned with UNFC-2009. The Economic axis Categories encompass all non-technical issues that could directly impact the viability of a project, including commodity prices, operating costs, legal/fiscal framework, environmental regulations and known environmental or social impediments or barriers. Any one of these issues could prevent a new project from proceeding (and hence quantities would be classified as E2 or E3, as appropriate), or it could lead to the suspension or termination of extractive activities in an existing operation. Where extractive activities are suspended, but there are “reasonable prospects for economic extraction and sale in the foreseeable future”, remaining technically recoverable quantities shall be reclassified from E1 to E2. Where “reasonable prospects for economic extraction and sale in the foreseeable future” cannot be demonstrated, remaining quantities shall be reclassified from E1 to E3.”

24. Despite the statement, “...more detailed specifications can be found in relevant commodity-specific systems...”; they, in fact, contain little or no guidance on how to classify with respect to socio-environmental conditions. Extracts from these commodity-specific systems are given in Appendix I.

25. Other relevant extracts are:

“Potentially recoverable quantities may be recovered in the future through projects that are **contingent** on one or more conditions yet to be fulfilled. **Contingent projects** are classified into projects for which the social and economic conditions are expected to be acceptable for implementation and those where they are not. In the former case, contingency is caused by the recovery project not being sufficiently matured to confirm technical and/or commercial feasibility, which can then provide the basis for a commitment to extract and sell the commodity at a commercial scale. In the latter case, neither the project nor the economic and social conditions are sufficiently matured to indicate a reasonable potential for commercial recovery and sale in the foreseeable future. (UNFC-2009 *incorporating* Specifications for its Application, Part I, Section III, Classes)

26. The terms “economically viable” and “economic in a narrow sense”¹ are also used, in Footnote d of UNFC-2009 *incorporating* Specifications for its Application, Part I, Annex I, Definition of Categories and Supporting Explanations as:

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

27. This definition of “economically viable” (which includes “economic in the narrow sense”) is for the E axis factors, but in practice, a project would not be economically viable unless it also met the requirements for, not only the E axis, but, those of the F and G axes to an extent that it can proceed. This suggests that the terms “commercial” and “economically viable”, as the latter is used in UNFC-2009, are synonymous.

28. The term “**economic (in the narrow sense)**” is not defined in UNFC-2009, and nor is it used elsewhere, but it is considered to mean that a project satisfies a monetary criterion, such as having a positive Net Present Value at a particular discount factor.

29. **Commercial viability** is described (UNFC-2009 *incorporating* Specifications for its Application, Part I, Section III, Classes Footnote c to Figure 2) as:

“**Commercial Projects** have been confirmed to be technically, economically and socially feasible....”

30. That is, they have satisfied all requirements of the E, F and G axes, to be feasible to proceed. (This is the sense in which the term “commercial” is used in PRMS.)

31. To avoid confusion, between the terms “commercial”, “economic” and “economic in the narrow sense” this report uses them in the following sense²:

- “**Economic**” is used instead of “**Economic in the narrow sense**”. It considers only the monetary aspects of a project – for instance, a discounted Net Present Value

¹ The International Accounting Standards Board (IASB) defines an “economic resource” as “A right or other source of value that is capable of producing economic benefits”. A social licence to operate (SLO) could be considered to be such a benefit, although it begs the question as to what an economic benefit is.

² Common industry practice is to estimate the discounted Net Present Value (NPV) of a project, a monetary metric. Market Based Valuation (MBV) which includes consideration of social and environmental issues may capture the concept of “economically viable” as it is currently used in UNFC-2009, and warrants further review.

(NPV) greater than zero, which is the common usage of the word “economic” for project assessment.

- **Commercial (UNFC-2009 “economic”, or in the footnote to UNFC-2009 Figure 2, “commercial”)**, is synonymous with “**economic viability**” (as used in UNFC-2009) and implies not only economics (in the narrow sense), but that there are no other barriers to production (i.e., no contingencies), and encompasses all the requirements for a project to proceed.

32. Some projects only become viable, i.e., “economic” because they are subsidised. Although subsidies could be the result of social considerations, this is already handled in UNFC-2009 as E1.2 and does not need to be considered further (it is not, however, covered by the CRIRSCO Template or PRMS).

33. **Contingencies** are criteria that must be satisfied before a project can proceed to production and may include “market prices and relevant legal, regulatory, environmental and contractual conditions” and others. Although the specific contingencies may differ between projects, almost all projects would include social and environmental issues. Economic viability is also a requirement for all projects except when a project is subsidised. See UNFC-2009 *incorporating* Specifications for its Application, Part I, Section III, Classes, and also PRMS; the CRIRSCO Template uses the term “modifying factors” in the same sense.

34. The distinction between social and environmental contingencies is not defined in UNFC-2009, and the following is suggested:

- **Environmental** as the physical impact or changes to the natural environment (not on humans) due to an extraction project, often measurable (e.g., CO₂ emissions, amount of waste moved, changes in surface geochemistry, etc.).
- **Social** as the impact on humans as a result of changes in the environment due to an extraction project (e.g., health issues due to heavy metal contamination). Some aspects may be measurable, but many others are qualitative.

35. It is not clear where the boundary between “social” and “political” would lie, but the political aspect of a project may be thought of as a process for dealing with the environmental and social (and other) issues, rather than a “factor”. It is not further considered here.

C. Social licence to operate

36. A project cannot proceed unless the social and environmental contingencies are resolved, typically described as obtaining a “social licence to operate” (SLO). There are several “definitions” of “social licence”, but in summary and with respect to this exercise, achieving a social licence to operate is the resolution of any social and environmental issues that could inhibit, or prevent, a project proceeding. This does not mean that all such issues will have been resolved to the satisfaction of all parties, but that, for a specific project, they have been resolved to an extent that the project can proceed, even if there are still objections. Consideration should also be given to whether a social licence to operate is likely to be maintained over the life cycle of a project.

D. The relationship between socio-environmental and other actors

37. The various factors involved in resource classification do not exist in isolation and the distinction between them is rarely black and white (i.e., binary)³. The related issues of ownership, contract terms, legal, regulatory issues, and in some cases, fiscal terms (taxes, royalties, etc.) may be affected by social and environmental issues. A delay due to the resolution of these as a result of socio-environmental issues can have a significant impact on the economics of projects, even making them no longer economically viable (i.e., negative NPV).

38. These are addressed, to a limited extent, in Section VI.

V. Current E axis guidelines

39. There is a large literature around the issue of socio-environmental matters, mainly on how to handle them when developing a project, but almost nothing related to classification.

40. Appendix I contains a summary of material from various sources relating to the E axis and socio-environmental factors. These are cited as classification criteria in most of them, but none contain any significant guidance. This is unlike the F and G-axes, which are covered in considerable detail in resource-specific guidance and associated publications.

41. An exception is found in publications from organizations such as the World Bank and the International Finance Corporation (IFC), which must rate projects in order to assess the risk and uncertainty that they carry before making loans. Although these publications do not classify in the same way as UNFC-2009, they provide a useful approach that may be used to develop detailed guidelines.

VI. High-level classification guidance for the E axis

A. Introduction

42. The Sub-group was directed to provide: “Guidance for the E axis factors” which, as noted by the Expert Group, “should revolve around high-level principles”.

43. Detailed guidelines are beyond the scope of this report, but the distinction between these and “high-level principles” is not clear. This is especially the case because, unlike the F and G axes, there is little in the resource specific guidelines to back up any high-level principles.

44. There is a high degree of commonality in the socio-environmental aspects of all resource types, although there will be differences in detail, but there may also be issues that are specific to a particular resource.

B. Social and environmental classification criteria

45. It is proposed that classification be based on two factors, the concepts of:

³ The classification of resources is often more of an exercise in Fuzzy Logic than Boolean (binary) Logic. See https://en.wikipedia.org/wiki/Fuzzy_logic.

(a) Active Stakeholder Engagement⁴ or No Active Stakeholder Engagement to resolve socio-environmental issues. The criterion of Active Stakeholder Engagement must be based on proof that it is in a manner that would lead to a project being carried out, and would not be satisfied by an unsubstantiated claim or a token effort. The nature of this will depend on the project and on the socio-environmental issues that are involved. It could include, for example, documented proof that an Environmental and Social Impact Assessment (ESIA) was being carried out or has been submitted for approval, that there are constructive discussions with interested parties, the establishment of training and other social programmes, etc. The level of effort required will depend on the project. In an established area with a history of resource development, it may be a matter of routine and require little or no effort, but in other cases, may require a high level of effort over an extended period of time.

However, just because there is active engagement with stakeholders, it does not necessarily mean that it will be successful. That would be assessed by the second criterion, an estimate of:

(b) Probability of Approval, the probability that approval to proceed will be attained and maintained over the life cycle of the project. In many cases, there will be a history of similar project development that can be used as an analogue. When this is not the case, although an assessment will be more subjective, it should be based as much as possible on an objective and documented analysis of the probability of approval. This will always depend on the specifics of the project and the legal, regulatory and social environment in which it is proposed to be carried out.

46. Environmental and social factors can be considered under two headings:

(a) Those subject to formal legal and regulatory processes such as the granting of environmental approval or a license to drill. In this case, demonstrating Active Stakeholder Engagement and estimating a Probability of Approval will often be straightforward.

(b) Those outside a formal legal or regulatory process. These could be local communities that have a concern about the impact of a mineral recovery project on the community, or organisations that would not be directly affected but who have concerns of a more general nature. This may trigger further activity within a formal legal or regulatory process, or informal civil activity ranging from protests to violent action. In the extreme, civil unrest and war would also fall under this heading. The estimation of the probability of approval will usually be much more difficult in this case but the following points should be noted:

(i) An evaluation can only be based on the information that is available at the time of the evaluation, and cannot take into account speculation on the impact of future, unknown, events.

(ii) Assigning probability does not imply formal calculation, and subjective estimation of probability⁵ (at different levels of sophistication) will usually be more appropriate.

(iii) The uncertainty associated with any estimate should be recognized.

⁴ The term “Constructive Engagement” was suggested by a member of the Bureau of the Expert Group, but has not been used, since whether engagement is constructive or not may be a matter of opinion.

⁵ There are a number of approaches to making subjective probability estimates, from simple “guesses” to sophisticated Delphi exercises.

(iv) It will often be necessary to provide a description of how the probability was estimated. This will be especially the case when the information is to be used for investment decisions or raising of funds for a project.

47. Projects will fall into high, medium and low levels of probability of approval, as shown below. Although the estimation of probabilities will be subjective, the percentages given below are based on studies of common usage of terms, such as “high probability”⁶.

48. The criteria of Level of Stakeholder Engagement and Probability of Approval are related and may be combined as follows:

- (a) Active Stakeholder Engagement with:
- High probability of approval (>80%)
 - Medium probability of approval (50 – 80%)
 - Low (< 50%), or unknown probability of approval
- (b) No Active Stakeholder Engagement:
- A high probability (>80%) of approval based on a demonstrated history of outcomes in analogous situations.
 - Medium probability (50 – 80%) of approval based on a demonstrated history of outcomes in analogous situations
 - Low (< 50%) or unknown probability of approval.

49. The E2 Category of UNFC-2009 currently contains no Sub-categories and it is proposed to establish two Sub-categories, reflecting the level of engagement and the probability of approval:

E2.1 Active Stakeholder Engagement and High Probability of Approval (E2.1) or Medium Probability of Approval (E2.2).

E2.2 No Active Stakeholder Engagement but a High Probability of Approval (E2.2).

50. The relation between the UNFC-2009 Project Maturity Sub-categories (UNFC-2009 *incorporating* Specifications for its Application, Part I, Figure 3) warrants further examination.

51. Depending on the Probability of Approval, projects may also be categorized in the E3 Category and its Sub-categories. Application of this to classification in UNFC-2009 is summarized in Table 1.

Table 1

High Level Classification on Level of Stakeholder Engagement and Probability of Approval

Stakeholder Engagement	Active	Not Active
Probability of Approval		
High (> 80%)	E2.1	E2.2
Medium (50 – 89%)	E2.2	E3.3
Low (< 50%)	E3.3	
Unknown or unclarified	E3.2	

⁶ Although the probabilities shown here are empirical, they are based on surveys of word usage. A useful reference on this topic is, Mosteller, F. and Youtz, C., 1990, Quantifying Probabilistic expressions, *Statistical Science*, Vol. 5, No. 1 pp.1 -34. The Intergovernmental Panel on Climate Change has a similar approach, but the words that it uses are not the same.

52. The extent to which potential social acceptance has actually been tested and evaluated should be addressed in detailed guidelines.

53. Appendix III shows a revised version of the current Annex I of UNFC-2009 *incorporating* Specifications for its Application, Part I, for the E axis that incorporates this proposed revision and also a change in the description of projects from “economic” to “commercial”.

C. Related contingencies

54. As noted above, other E axis factors may be affected by the socio-environmental issues. These include:

- (a) Legal framework. The right to produce and sell (or benefit) from a resource.
 - E3 if there is no legal right to produce and sell, as is the case for many exploration activities.
 - E2 if the legal right to produce and sell is being negotiated but not finalized, or is in dispute.
 - E1 if the legal right to produce and sell is established and not in dispute.
- (b) Regulatory approval. This is usually required for many aspects of extraction operations, ranging from major environmental approval to specifics such as individual well abandonment approvals.
 - E3 if not applied for.
 - E2 if applied for but not yet received.
 - E1 if received or, in areas and jurisdictions where there is an established history of approval and approval is expected.

55. Classification may be relatively straightforward for formal legal and regulatory processes, since they have either:

- (a) Not been initiated (i.e., not been applied for).
- (b) Been initiated and are in the process of being considered.
- (c) Been initiated and approval has not been granted.

56. Other E axis non-economic factors mentioned in UNFC-2009, for which classification may be less clear, include:

- (a) Fiscal framework (which may be influenced by social and environmental issues), the terms regarding taxes, royalties, production sharing, or other fiscal provisions under which extraction operations are carried out.
 - E3 if not determined.
 - E2 if it is being negotiated but not finalized, is in dispute, or there is uncertainty due to the possibility of a change that could affect the economic viability of a project.
 - E1 if established and not in dispute or uncertain in any manner.
- (b) Contractual conditions. These are specific to a project, but may contain terms beyond those of the legal or fiscal framework (e.g., a requirement to use local labour, lease expiry after a specific time period, abandonment and reclamation obligations, etc.). A specific contract may not always be required, but if it is:

- E3 but does yet not exist.
- E2 if they are being negotiated but not finalized, are in dispute, or there is uncertainty due to the possibility of a change that could affect the economic viability of a project.
- E1 if established, not in dispute or uncertain in any manner, and is expected to be concluded with a high degree of certainty.

57. Not all of these contingencies will be relevant in every case and there may be additional ones that are not listed here. (Note: the Canadian Oil and Gas Evaluation Handbook (COGEH) Guidelines for Estimation and Classification of Resources Other than Reserves (ROTR) that were published in mid-2014, and incorporated in COGEH Volume 2, contain considerable material on such barriers or contingencies, including flow charts to guide the decision process for resource classification.) An environmental or social contingency that results in the delay of a project can have a major impact on the economic viability (e.g. a decrease in the discounted NPV) that may warrant a reclassification.

VII. Detailed guidance

58. The E axis Sub-group was directed to provide:

“A recommendation on the extent to which more detailed guidance is required.

A recommendation on how the high-level and any detailed guidance should be provided. Most of the E axis classification factors are not commodity-specific and the Sub-group should consider whether guidance should be:

(a) separately in each of the commodity-specific documents by the organizations that manage these documents (CRIRSCO Template, PRMS and ‘Red Book’), under development for Recipient Reservoirs, and for Renewables). Currently, there is little guidance on the E axis factors in any of these, or,

(b) as a single source and, if so, whether this should be prepared under the direction of the Expert Group, either by a continuation of the work of this Sub-Group, by a separate Task Force of the Expert Group, or

(c) by other means.”

59. The guidelines proposed here address only “high-level” principles, not details. Until recently, resource classification has paid no more than lip-service to socio-environmental factors with respect to classification (despite all the major resource-specific guidelines identifying them as classification criteria). For this reason, it is recommended that further detailed guidance, beyond that provided here, should be developed.

60. The major socio-environmental factors are common to all types of resource, although there will be some that are specific to a particular resource. This could be dealt with by having a common document, the main section of which deals with the common issues, but with sub-sections for each resource area.

61. The development of detailed guidelines independently by the various resource-specific areas would lead to duplication of effort and maybe to inconsistencies between them and it is recommended that the Expert Group establishes a follow-up committee for detailed guidelines related to socio-environmental issues. This should:

(a) Identify the socio-environmental issues that are common to all resource types and develop detailed guidelines for these.

(b) Identify the socio-environmental issues that are specific to individual resource types. The development of detailed guidelines for these would be better carried out by the authors of the resource-specific guidelines. This may be done as part of an Expert Group on Resource Classification committee or independently.

62. The follow-up committee could be a continuation of the E axis Sub-group or a new Task Force of the Expert Group.

VIII. Conclusions and recommendations

63. This report provides information on issues relevant to the socio-environmental factors of the UNFC-2009 E axis. It proposes some high-level guidance and also clarification of some terms in UNFC-2009. Although UNFC-2009, the associated resource specific classification guidelines (PRMS, CRIRSCO Template, NEA/IAEA 'Red Book'), and similar systems, cite social and environmental issues as factors in classification, none of them contain any significant guidance. Extracts from these and other sources is given in the appendices.

64. This report is submitted as the basis for further consideration of the issues involved, with presentation of a proposal for approval by the Expert Group on Resource Classification to be made at subsequent meetings. This may lead to a proposal for changes to UNFC-2009 during a possible update in 2018 or later.

65. The recommendations in the report fall into three main areas:

(a) Clarification and revisions of terms related to the UNFC-2009 E axis. The E axis combines economic and socio-environmental factors and the report proposes a revision of terminology to distinguish between them. It also addresses the concept of a contingency (which is not, however, confined to the E axis but also relevant to the F axis) and also notes that the E, F and G axes factors are not completely independent.

(b) High-level guidance on accommodating social and environmental considerations in UNFC-2009. This includes a proposed split of the E2 Sub-category into E2.1 and E2.2, as evidenced by the level of effort, the historical record in the area of operation, and the probability of obtaining a Social Licence to Operate (SLO). These are proposed for further review, with an objective of presenting recommendations for approval to the Expert Group in 2017. Implementation of such changes would likely await a general update of UNFC-2009 at a later date.

(c) The development of detailed guidelines. As noted, there are no detailed guidelines on classification for socio-environmental issues in UNFC-2009 or the resource-specific guidelines. Since many of these are common to all resource types, it is recommended that guidance on them should be prepared under the aegis of the Expert Group. Guidelines on issues that are specific to a particular resource would be the responsibility of the authors of the relevant resource specific guidelines.

IX. Notes

66. During a review of a draft of this document, the following comments were received:

(a) It was suggested that the split into E2.1 and E2.2 was not necessary, since this was adequately dealt with in UNFC-2009, Part I, VI Generic Specification H "Distinction between E1, E2, and E3" (see Appendix I, II.A) and the Project Maturity Classes (Figure 3 of UNFC-2009). This issue warrants further thought, but they do not appear to be adequate, by themselves.

(b) A criterion of “Active Effort” was questioned, and preference should be given to the probability of approval. The criterion of Active Effort” has been amended to “Active Stakeholder Engagement”. Active Stakeholder Engagement by itself does not necessarily imply a high probability of success and in developed areas approval may be a matter of course, requiring little or no effort. Further though may be given to this, but the proposed split considers both factors.

(c) If you have multiple issues to deal with on the E axis, the lowest ranking one is the one which should be assigned to the ultimate project classification as in the example in the Table below.

<i>Issue / potential contingency</i>	<i>Level of engagement</i>	<i>Probability of approval</i>	<i>Potential E Class</i>
Legal	Relevant licences	done	E1
Regulatory	Relevant permissions	granted	E1
Market access	Local use	99%	E1
Social	No objections expected	90%	E1
Economic	Project screened economic	POM = 95%	E1
Political	No worries expected	99%	E1
Internal & external approvals/commitments	Commitments made	100%	E1
Environmental	Licence approval in process. Issue with the black rimmed beetle frog habitat	50%	E2
Timing (<5 years or >5 years)	<5 years	Uncertain (see environmental)	E2
Total = lowest ranking issue			E2

Appendix I

Compilation of information on UNFC-2009 socio-economic (E axis) factors

I. Introduction

The current guidance on resource classification in the various standards typically identifies Socio-Economic factors in one way or another, but contains little or no guidance with respect to these. What there is, is summarized below, and was collected mainly by searching various documents using the term “social” (and variations such as “socio”). It contains the major reference material relevant to resource classification.

Appendix I(II) contains extracts from the United Nations Economic Commission for Europe (ECE) publication, United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 incorporating Specifications for its Application, ECE ENERGY SERIES No. 42.

Appendix I(III) contains extracts from the commodity-specific guidelines that are currently recognized by UNFC-2009:

(a) The CRIRSCO Template for solid minerals. Appendix III also contains extracts from The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (‘the Joint Ore Reserves Committee (JORC) Code’).

(b) Petroleum Resources Management System (PRMS) for oil and gas and the associated Application Guidelines.

(c) The NEA/IAEA Uranium Classification (‘Red Book’).

Appendix I(IV) contains extracts from other documents on socio-environmental issues:

(a) The Canadian Oil and Gas Evaluation Handbook (COGEH).

(b) JORC Code (one of the CRIRSCO-style reporting standards).

(c) South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC Code).

(d) Pan-European Standard for Reporting of Exploration Results, Mineral Resources and Reserves (PERC, “the PERC reporting standard”).

(e) Norwegian Petroleum Directorate (NPD), Guidelines to Classification of the Petroleum Resources on the Norwegian Continental Shelf, but this contains no reference to social issues.

Appendix I(V) provides references to regulatory reporting regimes:

(a) Canadian Securities Administrators (CSA) National Instrument 51-101 (CSA NI 51-101).

(b) United States Securities and Exchange Commission (SEC).

(c) Financial Accounting Standards Board (FASB).

(d) European Securities and Markets Authority (ESMA).

(e) The Australian Stock Exchange (ASX). This contains no reference to social conditions, but environmental factors are described as “modifying factors”.

II. Extracts from UNFC-2009 *incorporating* Specifications for its Application (ECE Energy Series No. 42 and ECE/ENERGY/94)

A. Categories and Sub-categories

Extract 1. “The first set of categories (the E axis) designates the degree of favourability of social and economic conditions in establishing the commercial viability of the project, including consideration of market prices and relevant legal, regulatory, environmental and contractual conditions.”

Extract 2. Footnote c to Figure 2 ‘Abbreviated Version of UNFC-2009, showing Primary Classes’:

“Commercial Projects have been confirmed to be technically, economically and socially feasible.”

Extract 3. “Potentially recoverable quantities may be recovered in the future through projects that are contingent on one or more conditions yet to be fulfilled. Contingent projects are classified into projects for which the social and economic conditions are expected to be acceptable for implementation and those where they are not. In the former case, contingency is caused by the recovery project not being sufficiently matured to confirm technical and/or commercial feasibility, which can then provide the basis for a commitment to extract and sell the commodity at a commercial scale. In the latter case, neither the project nor the economic and social conditions are sufficiently matured to indicate a reasonable potential for commercial recovery and sale in the foreseeable future. A deposit or an accumulation may give rise to several projects with different status.”

Extract 4.**Annex I^a Definition of Categories and Supporting Explanations (UNFC-2009, page 9)**

Category	Definition ^b	Supporting Explanation ^c
E1	Extraction and sale has been confirmed to be economically viable. ^d	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions. All necessary approvals/contracts will be obtained within a reasonable timeframe. Economic viability is not affected by short-term adverse market conditions provided that longer term forecasts remain positive.
E2	Extraction and sale is expected to become economically viable in the foreseeable future. ^d	Extraction and sale has not been confirmed to be economic but, on the basis of realistic assumptions of future market conditions, there are reasonable prospects for future extraction and sale in the foreseeable future.
E3	Extraction and sale is not expected to become economically viable in the foreseeable future or evaluation is at too early a stage to determine economic viability. ^d	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for economic extraction and sale in the foreseeable future; or economic viability of extraction cannot yet be determined due to insufficient information (e.g., during the exploration phase). Also included are quantities that are forecast to be extracted but which will not be available for sale.

^a Annex I forms an integral part of UNFC-2009.

^b The term “extraction” is equivalent to “production” when applied to petroleum.

^c The term “deposit” is equivalent to “accumulation” or “pool” when applied to petroleum.

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

Annex II^a Definition of Sub-categories (UNFC-2009, Page 12)

Category	Sub-category	Sub-category Definition
E1	E1.1	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions.
	E1.2	Extraction and sale is not economic on the basis of current market conditions and realistic assumptions of future market conditions, but is made viable through government subsidies and/or other considerations
E2	No Sub-categories defined	
E3	E3.1	Quantities that are forecast to be extracted but, which will not be available for sale.
	E3.2	Economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase).
	E3.3	On the basis of reasonable assumptions of future market conditions, it is currently considered that there are not reasonable prospects for economic extraction and sale in the foreseeable future.

^a Annex II forms an integral part of UNFC-2009.

Extract 5. (from UNFC-2009, Part II)

“VI. GENERIC SPECIFICATIONS

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

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

“H. Distinction between E1, E2 and E3

The distinction between quantities that are classified on the Economic axis as E1, E2 or E3 is based on the phrase “reasonable prospects for economic extraction and sale in the foreseeable future”. The definition of “foreseeable future” can vary depending on the commodity and hence more detailed specifications can be found in relevant commodity-specific systems that have been aligned with UNFC-2009. The Economic axis Categories encompass all non-technical issues that could directly impact the viability of a project, including commodity prices, operating costs, legal/fiscal framework, environmental regulations and known environmental or social impediments or barriers. Any one of these issues could prevent a new project from proceeding (and hence quantities would be classified as E2 or E3, as appropriate), or it could lead to the suspension or termination of extractive activities in an existing operation. Where extractive activities are suspended, but there are “reasonable prospects for economic extraction and sale in the foreseeable future”, remaining technically recoverable quantities shall be reclassified from E1 to E2. Where “reasonable prospects for economic extraction and sale in the foreseeable future” cannot be demonstrated, remaining quantities shall be reclassified from E1 to E3.”

III. CRIRSCO Template, PRMS and the NEA/IAEA ‘Red Book’

NOTE: These are the commodity-specific standards currently recognized by UNFC-2009

(a) CRIRSCO Template

“Reporting Terminology

Item 12. Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors. (Also in the JORC Code.)

Table 1: Check List of Assessment and Reporting Criteria

Other

- The effect, if any, of natural risk, infrastructure, environmental, legal, marketing, social or governmental factors on the likely viability of a project and/or on the estimation and classification of the Mineral Reserves.
- The status of titles and approvals critical to the viability of the project, such as mining leases, discharge permits, government and statutory approvals.
- Environmental descriptions of anticipated liabilities. Location plans of mineral rights and titles.”

(b) PRMS

“**Section 1.2** Not all technically feasible development plans will be commercial. The commercial viability of a development project is dependent on a forecast of the conditions that will exist during the time period encompassed by the project’s activities (see Commercial Evaluations, section 3.1). “Conditions” include technological, economic, legal, environmental, social, and governmental factors. While economic factors can be summarized as forecast costs and product prices, the underlying influences include, but are not limited to, market conditions, transportation and processing infrastructure, fiscal terms, and taxes.

Section 2.1.2 Determination of Commerciality

Discovered recoverable volumes (Contingent Resources) may be considered commercially producible, and thus Reserves, if the entity claiming commerciality has demonstrated firm intention to proceed with development and such intention is based upon all of the following criteria:

- Evidence to support a reasonable timetable for development.
- A reasonable assessment of the future economics of such development projects meeting defined investment and operating criteria:
- A reasonable expectation that there will be a market for all or at least the expected sales quantities of production required to justify development.
- Evidence that the necessary production and transportation facilities are available or can be made available:
- Evidence that legal, contractual, environmental and other social and economic concerns will allow for the actual implementation of the recovery project being evaluated.

Section 3.1 Commercial Evaluations

Investment decisions are based on the entity’s view of future commercial conditions that may impact the development feasibility (commitment to develop) and production/cash flow schedule of oil and gas projects. Commercial conditions include, but are not limited to, assumptions of financial conditions (costs, prices, fiscal terms, taxes), marketing, legal, environmental, social, and governmental factors. Project value may be assessed in several ways (e.g., historical costs, comparative market values); the guidelines herein apply only to evaluations based on cash flow analysis. Moreover, modifying factors such contractual or political risks that may additionally influence investment decisions are not addressed. (Additional detail on commercial issues can be found in the “2001 Supplemental Guidelines,” Chapter 4.)

Appendix I: Glossary of Terms Used in Resources Evaluations

Conditions 2007 - 3.1 The economic, marketing, legal, environmental, social, and governmental factors forecast to exist and impact the project during the time period being evaluated (also termed Contingencies).”

PRMS Applications Guidelines**“7.2 Cash-Flow-Based Commercial Evaluations**

Commercial conditions reflect the assumptions made both for financial conditions (costs, prices, fiscal terms, taxes) and for other factors, such as marketing, legal, environmental, social and governmental. Meeting the “commercial conditions” includes satisfying the following criteria defined in PRMS Sec. 2.1.2 for classification as Reserves:

A reasonable assessment of the future economics of such production projects meeting defined investment and operating criteria, such as having a positive NPV at the stipulated hurdle discount rate.

- A reasonable expectation that there is a market for all or at least some sales quantities of production required to justify development.
- Evidence that the necessary production and transportation facilities are available or can be made available.
- Evidence that legal, contractual, environmental, and other social and economic concerns will allow for the actual implementation of the recovery project evaluated.
- Evidence to support a reasonable timetable for development.

Where projects do not meet these criteria, similar economic analyses are performed, but the results are classified under Contingent Resources (discovered but not yet commercial) or Prospective Resources (not yet discovered but development projects are defined assuming discovery).

8.4.4 Assessment Methods.

To be Commercial under PRMS guidelines, in addition to technical development feasibility, the project must include economic, legal, environmental, social and governmental viability.”

“Reference Terms (Definition of Commercial)

Commercial	2007 – 2.1.2 and Table I	1.1, 2.66, 3.1, 4.5, 5.2, 6.2, 7.10, 8.40	When a project is commercial, this implies that the essential social, environmental, and economic conditions are met, including political, legal, regulatory, and contractual conditions. In addition, a project is commercial if the degree of commitment is such that the accumulation is expected to be developed and placed on production within a reasonable time frame. While 5 years is recommended as a benchmark, a longer time frame could be applied where, for example, development of economic projects are deferred at the option of the producer for, among other things, market-related reasons, or to meet contractual or strategic objectives. In all cases, the justification for classification as Reserves should be clearly documented.”
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(c) NEA/IAEA ‘Red Book’

This system is based on geological confidence in estimates and economic significance. Economic significance is based on cost of production, which includes a guideline to consider inter-alia “the costs of associated environmental and waste management during and after mining. No other references to social issues exist.

IV. Extracts from COGEH, JORC Code, SAMREC Code, PERC Reporting Code and ESMA

(a) COGEH

COGEH Volume 1.

“5.3.2 Commercial Status

Commercial status differentiates reserves from contingent resources. The following outlines the criteria that should be considered in determining commerciality:

- economic viability of the related development project;
- a reasonable expectation that there will be a market for the expected sales quantities of production required to justify development;
- evidence that the necessary production and transportation facilities are available or can be made available;
- evidence that legal, contractual, environmental, governmental, and other social and economic concerns will allow for the actual implementation of the recovery project being evaluated;
- a reasonable expectation that all required internal and external approvals will be forthcoming. Evidence of this may include items such as signed contracts, budget approvals, and approvals for expenditures, etc.;
- evidence to support a reasonable timetable for development. A reasonable time frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. While five years is recommended as a maximum time frame for classification of a project as commercial, a longer time frame could be applied where, for example, development of economic projects are deferred at the option of the producer for, among other things, market-related reasons or to meet contractual or strategic objectives.”

COGEH Volume 1 Section 2: Resources Other Than Reserves (ROTR) Guidance

This section was published in April 2014, and cannot be found in earlier editions of COGEH.

“ii. Other Contingencies

Other contingencies identified in COGEH are legal, environmental, political, and regulatory matters or a lack of markets and are required to be disclosed by regulatory regimes:

- **Legal contingencies** are related to rights to explore for, produce and to sell, or receive hydrocarbons in kind or payment for risk services. If legal issues call these rights into question and their resolution is expected within a reasonable timeframe, classification as a contingent resource is mandatory; if this is not the case, the appropriate classification would be unrecoverable. It should be noted that ownership is not a contingency (see Section 2.2.6 Ownership and Reporting of Resources);
- **Regulatory contingencies** are concerned with regulatory approval to proceed with development and production (also see the discussion of social licence below). COGEH Volume 2, Section 5.5 Regulatory Considerations addresses regulatory approval-related criteria for classification as reserves, noting that, for reserves, there must be at least a high probability that regulatory approvals will be granted, based on a history of approvals of similar applications in the region. If this is not the case, it indicates a contingency that must be resolved. However, this is valid only before and during the process of attempting to obtain regulatory approval, Once a decision is made, receipt of regulatory approval removes it as a contingent factor, while

denial of regulatory approval requires reclassification to development not viable or unrecoverable DPIIP. Generally, as regulatory approvals are granted or approvals are at least highly likely, economic contingent resources would typically be reclassified directly into the corresponding reserves confidence category.

- **Market access contingencies** may be a complete lack of access to markets, for instance, the physical inability to transport a product because there is no pipeline, or access to existing facilities may be inhibited by high cost, capacity limitations, or to low product prices. COGEH Volume 2, Section 5.6 Infrastructure and Market Considerations addresses market-related criteria for classification as reserves, noting that there must be a high probability that access to infrastructure and markets will be available in the near term. If this is not the case, it indicates a contingency that must be resolved. Generally, as the access contingencies are met, economic contingent resources would be reclassified directly into the corresponding reserves confidence category (e.g., low estimate contingent resources to proved reserves). Conceptual development plans, which may include grouping third party interest resources to support major infrastructure installation, including transmission lines, are permissible for sub-classification as economic contingent resources. If the volume of contingent resources in a region would not currently support the minimum economic criteria to install all facilities required to deliver petroleum resources to a viable market, then the related quantities would be classified as sub-economic contingent resources (development not viable).
- **Political factors**, which are listed as a contingency in COGEH, could include political or social unrest, war, or government action of any kind that may impede development.
- **Social licence**, which has assumed prominence recently, is noted as one of the conditions for assigning reserves in COGEH Volume 1, Section 5.3.2 Commercial Status, although it is not specifically identified as a contingency in COGEH, and is also a factor in PRMS and the United Nations Framework Classification (UNFC). Social licence is related to environmental contingencies, but it is not necessarily a function of formal regulatory approval. What constitutes social licence is not readily determined, and depends heavily on subjective personal opinions and political issues specific to each project's geographic location. At this time, guidance on the role of social licence in the classification of oil and gas resources is not well developed.
- **Internal and external approvals and commitment to project development** may be contingencies. COGEH Volume 2, Section 6.7 Reserves Related to Future Drilling and Planned Enhanced Recovery Projects addresses the need for internal and external approvals to permit classification as reserves, noting that, for major and/or marginally economic projects, evidence of commitment to proceed with the development in a reasonable timeframe is required for classification as reserves. Generally, as such projects are sanctioned with all necessary internal and external approvals, economic contingent resources would be reclassified directly into the corresponding reserves confidence category, as long as there were no other contingencies (e.g., low estimate contingent resources to proved reserves). Such reclassification may occur in multiple tranches in phased projects.
- **Development timing** could be a contingency. There is no overall requirement on the timing of development for contingent resources. COGEH Volume 2, Section 5.7 Timing of Production and Development addresses timing-related criteria for classification as *reserves*, noting that for proved + probable reserves, significant capital spending on a development project must proceed within five years and reserves must be produced within 50 years; otherwise potentially recoverable quantities would be classified as contingent resources. Generally, as a development

project matures to this level, economic contingent resources would be reclassified as reserves in their entirety. In massive staged projects, it would be appropriate to also reclassify resources on a staged basis as successive stages near commencement of spending. If conditions change such that active development of all or a portion of the project will be delayed beyond five years, the associated reserves volumes must be reclassified as economic contingent resources but the project maturity level would depend on the specific issues causing the delay and the chance of resolving this condition. Additional guidance on timing and activity levels for project maturity subclasses of contingent resources is discussed in Section 2.5.5.b Timing and Activity Levels.”

COGEH Volumes 2 and 3

No mention of social issues.

(b) JORC Code, Australia

“Social. The status of agreements with key stakeholders and matters leading to social licence to operate.

Other. To the extent relevant, the impact of the following on the project and/or on the estimation of the Ore Reserves:

Any identified material naturally occurring risks

The status of material legal agreements and marketing arrangements

The status of governmental agreements and approvals critical to the viability of the project such as a mineral treatment status and government and statutory approvals. There must be reasonable grounds to expect that all Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.”

(c) SAMREC Code

“Modifying Factors: “Modifying Factors’ include mining, metallurgical, economic, marketing, legal, environmental, social and governmental considerations.”

(d) PERC Reporting Code

“Reporting Terminology

Paragraph 11. Public Reports dealing with Mineral Resources and/or Mineral Reserves must only use the terms set out in Figure 1.

‘Modifying Factors’ are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

Modifying factors also include any other factors which impact on the feasibility of the project.

Assessment Criteria: Others.

Mineral Resources. Any potential impediments to mining such as land access, environmental or legal permitting. Location plans of mineral rights and titles.

Mineral Reserves: The effect, if any, of natural risk, infrastructure, environmental, legal, marketing, social or governmental factors on the likely viability of a project and/or on the estimation and classification of the Mineral Reserves. The status of titles and approvals critical to the viability of the project, such as mining leases, discharge permits, government and statutory approvals. Environmental descriptions of anticipated liabilities.”

V. Regulatory reporting regimes: NI 51-101, SEC, FASB and ESMA**(a) CSA NI 51-101****(i) CSA NI 43-101 Standards of Disclosure for Oil and Gas Activities**

Refers to COGEH for evaluation and disclosure standards. Considerable additional guidance is given in:

- Companion Policy 51-101CP Standards of Disclosure for Oil and Gas Activities
- Canadian Securities Administrators (CSA) Staff Notice 51-327 Guidance on Oil and Gas Disclosure
- See http://www.albertasecurities.com/industry/securities-law-and-policy/_layouts/Regulatory-Instruments/RegulatoryInstrumentDispForm.aspx?List=c425783b%2D0214%2D41e1%2Dbc6a%2D66e6766ff3aa&ID=104&Web=729da164%2D5e70%2D47a7%2Dbdea%2D6a26546e92e3 for more information.

(ii) CSA NI 43-101 Standards of Disclosure for Mineral Projects

“3.4 If an issuer discloses in writing mineral resources or mineral reserves on a property material to the issuer, the issuer must include in the written disclosure:

(d) the identification of any known legal, political, environmental, or other risks that could materially affect the potential development of the mineral resources or mineral reserves ...”

(b) SEC Regulation S-K Subparts 229, 1200

See SEC website (www.sec.gov) for details.

(c) FASB Extractive Activities – Oil and Gas (Topic 932). Oil and Gas Reserves Estimation and Disclosure.

See FASB website (www.fasb.org) for details.

(d) ESMA**“APPENDIX II - Mining Competent Persons Report – recommended content**

- v) Environmental, Social and Facilities – an assessment of
- (1) environmental closure liabilities inclusive of biophysical and social aspects, including (if appropriate) specific assumptions regarding sale of equipment and/or recovery of commodities on closure, separately identified;
 - (2) environmental permits and their status including where areas of material non-compliance occur;
 - (3) commentary on facilities which are of material significance;”

Appendix II

Current E axis Categories in UNFC-2009*

Part I, Annex I^a Definition of Categories and Supporting Explanations

Category	Definition ^b	Supporting Explanation ^c
E1	Extraction and sale has been confirmed to be economically viable. ^d	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions. All necessary approvals/contracts have been confirmed or there are reasonable expectations that all such approvals/contracts will be obtained within a reasonable timeframe. Economic viability is not affected by short-term adverse market conditions provided that longer-term forecasts remain positive.
E2	Extraction and sale is expected to become economically viable in the foreseeable future. ^d	Extraction and sale has not yet been confirmed to be economic but, on the basis of realistic assumptions of future market conditions, there are reasonable prospects for economic extraction and sale in the foreseeable future.
E3	Extraction and sale is not expected to become economically viable in the foreseeable future or evaluation is at too early a stage to determine economic viability. ^d	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for economic extraction and sale in the foreseeable future; or, economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase). Also included are quantities that are forecast to be extracted, but which will not be available for sale.

^a Annex I forms an integral part of UNFC-2009.

^b The term “extraction” is equivalent to “production” when applied to petroleum.

^c The term “deposit” is equivalent to “accumulation” or “pool” when applied to petroleum.

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

* UNFC-2009 *incorporating* Specifications for its Application, ECE Energy Series No. 42, ECE/ENERGY/94.

Part I, Annex II^a Definition of Sub-categories

Category	Sub-category	Sub-category Definition
E1	E1.1	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions.
	E1.2	Extraction and sale is not economic on the basis of current market conditions and realistic assumptions of future market conditions, but is made viable through government subsidies and/or other considerations.
E2	No Sub-categories defined	
E3	E3.1	Quantities that are forecast to be extracted, but which will not be available for sale.
	E3.2	Economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase).
	E3.3	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for economic extraction and sale in the foreseeable future.

^a Annex II forms an integral part of UNFC-2009.

Appendix III

Revised E axis Categories

The current UNFC-2009 E axis Categories and Sub-categories are provided in Appendix II. Suggested revisions are shown below, in *italics* and include:

- (a) Changing “economic” to “commercial”,
- (b) Adding sub-categories E2.1 and E2.2 to differentiate situations in which there are active efforts to resolve contingencies from those in which no such effort is being made, and,
- (c) The probability of the outcome.

Suggested Revised Categories

<i>Category</i>	<i>Definition^a</i>	<i>Supporting Explanation^b</i>
E1	Extraction and sale has been confirmed to be economically <i>commercially</i> viable	Extraction and sale is economic <i>commercially viable</i> on the basis of current market conditions and realistic assumptions of future market conditions. All necessary approvals/contracts have been confirmed or there are reasonable expectations that all such approvals/contracts will be obtained within a reasonable timeframe <i>and there are no impediments to the delivery of the product to a market. Commercial</i> Economic viability is not affected by short-term adverse market or other conditions provided that longer-term forecasts remain positive. <i>Adverse changes in conditions could result in reclassification to E2 or E3.</i>
E2	Extraction and sale is expected to become economically <i>commercially</i> viable in the foreseeable future. ^c	Extraction and sale has not yet been confirmed to be economic <i>commercial</i> but, on the basis of realistic assumptions of future market conditions, there are reasonable prospects for economic extraction <i>commerciality</i> in the foreseeable future. <i>Removal of all impediments (contingencies) is necessary for reclassification to E1.</i> <i>Adverse changes in conditions could result in reclassification to E3.</i>
E3	Extraction and sale is not expected to become economically <i>commercially</i> viable in the foreseeable future or evaluation is at too early a stage to determine economic <i>commercial</i> viability. ^c	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for <i>commerciality</i> economic extraction and sale in the foreseeable future; or, <i>commercial</i> economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase). Also included are quantities that are forecast to be extracted, but which will not be available for sale. <i>Removal of all impediments (contingencies) is necessary for reclassification as E2.</i>

^a Annex I forms an integral part of UNFC-2009.

^b The term “extraction” is equivalent to “production” when applied to petroleum.

^c The term “deposit” is equivalent to “accumulation” or “pool” when applied to petroleum.

Suggested Revised Sub-Categories

<i>Category</i>	<i>Sub-category</i>	<i>Sub-category Definition</i>
E1	E1.1	Extraction and sale is economic <i>commercially viable</i> on the basis of current market conditions and realistic assumptions of future market conditions.
	E1.2	Extraction and sale is not economic <i>commercially viable</i> on the basis of current market conditions and realistic assumptions of future market conditions, but is made viable through government subsidies and/or other considerations.
E2	<i>E2.1</i>	<i>There is an active attempt to resolve all impediments (contingencies) with a high probability of success, based on the characteristics of the project, previous history of similar projects in the area, or strong indications that approval will be granted. Resolution is expected within the foreseeable future.</i>
	<i>E2.2</i>	<i>There is either: An active attempt to resolve all impediments (contingencies) but the probability of approval is still uncertain, or, There is no active effort to resolve impediments, but based on the characteristics of the project and previous history of similar projects in the area, the probability of approval is better than medium. Resolution is expected within the foreseeable future.</i>
E3	E3.1	Quantities that are forecast to be extracted, but which will not be available for sale.
	E3.2	Economic <i>Commercial viability</i> of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase). <i>Or,</i> <i>Whether or not there is an active effort to obtain approval, the outcome is unknown or unclarified.</i>
	E3.3	On the basis of realistic assumptions of future market conditions, It is currently considered that there are not reasonable prospects for economic commerciality extraction and sale in the foreseeable future. <i>Whether or not there is an active effort to obtain approval, the probability of receiving approval is less than medium and may be zero.</i>