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**Development and Implementation Road Map for the United Nations Framework Classification for Resources:
The next five years: Petroleum**

Bridging Document between the Petroleum Resources Management System and the United Nations Framework Classification for Resources – 2023 Update

**Prepared by the Petroleum Working Group of the Expert Group on
Resource Management**

Summary

This is a Bridging Document between the Petroleum Resources Management System (PRMS) and the United Nations Framework Classification for Resources (UNFC). A previous Bridging Document between the 2009 edition of UNFC and the 2007 publication of PRMS was published in 2013. This 2023 Bridging Document aims to update the relationship to be consistent with the 2018 edition of PRMS and the 2019 edition of UNFC. The updates of PRMS and of UNFC did not change the principles that underpin the systems but did include additional terminology and clarification of definitions. The use of UNFC and PRMS to describe petroleum resource projects should be seen as complementary, and the application of each system is dependent on the purpose of the evaluation and reporting requirements.

I. Introduction

1. A Bridging Document facilitates an explanation of the relationship between the United Nations Framework Classification for Resources (UNFC) and another classification system that has been endorsed by the Expert Group on Resource Management as an Aligned System for an equivalent resource. They incorporate instructions and guidelines on how to classify a resource project by application of that Aligned System using the UNFC Numerical Codes. The relevant Bridging Document shall be identified when reporting estimates using the UNFC Numerical Codes.
2. The Society of Petroleum Engineers (SPE) (and on behalf of its co-sponsors) maintains and publishes the petroleum commodity-specific specifications via the Petroleum Resources Management System (hereinafter referred to as PRMS). The principles in PRMS have provided many of the foundations and keystones for the consistent application of UNFC for petroleum resource projects. A previous Bridging Document between the 2009 edition of UNFC and the 2007 publication of PRMS was published in 2013. This 2023 Bridging Document aims to update the relationship to be consistent with the 2018 edition of PRMS¹ and the 2019 edition of UNFC.² The updates of PRMS and of UNFC did not change the principles that underpin the systems but did include additional terminology and clarification of definitions.
3. Many of the principles, definitions and guidelines in PRMS are common to UNFC, but their application should not limit the full granularity or use of UNFC. Although PRMS identifies technical feasibility and environmental and social issues as factors, amongst others, to be considered in the viability of any project, UNFC has a unique clarity in expanding the handling of these issues in relation to their impact on the project development and life cycle.
4. PRMS is independent of UNFC and may be mandatory for reporting purposes in some jurisdictions or for specific requirements. This Bridging Document has no bearing whatsoever on such mandatory reporting requirements or on the independent application of PRMS.
5. The use of UNFC and PRMS to describe petroleum resource projects should be seen as complementary, and the application of each system is dependent on the purpose of the evaluation and reporting requirements.

II. Overview

6. UNFC and PRMS are both systems designed to support the evaluation of resources and their classification and categorization through the communication of project maturity risk and uncertainty of outcomes. UNFC is designed to accommodate resource projects of all kinds, while PRMS is designed only for petroleum projects. Moreover, UNFC facilitates greater granularity in describing the project status with regard to technical feasibility and environmental, social and economic viability via numerical codes.
7. The definitions and guidelines of PRMS are designed to provide a common reference for the international petroleum industry, including as the basis for national reporting and regulatory disclosure agencies and to support petroleum project and portfolio management requirements. They are intended to improve clarity in global communications regarding petroleum resources.
8. PRMS and UNFC will continue to be supported with industry education programmes, guidelines and/or specifications and examples or case studies to assist in implementation across a wide spectrum of technical and/or commercial settings. PRMS and UNFC have an allowance for flexibility in methodology and approach. However, some requirements are mandatory or recommended.

¹ PRMS 2018, available at: <https://www.spe.org/en/industry/petroleum-resources-management-system-2018/>

² UNFC 2019, available at: https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/publ/UNFC_ES61_Update_2019.pdf

9. In both systems, the basis of the evaluation and assumptions shall be documented for good governance.

10. PRMS is a two-dimensional system, whereas the UFNC is a three-dimensional system. A comparison of the UNFC and PRMS frameworks is shown in Figure I and Figure II respectively.

Figure I
UNFC Categories Examples of Classes

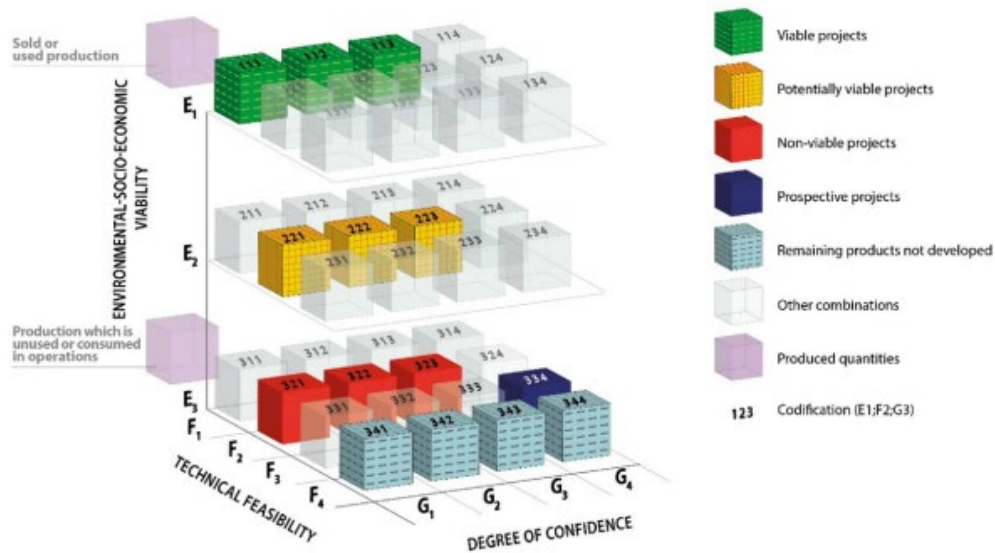
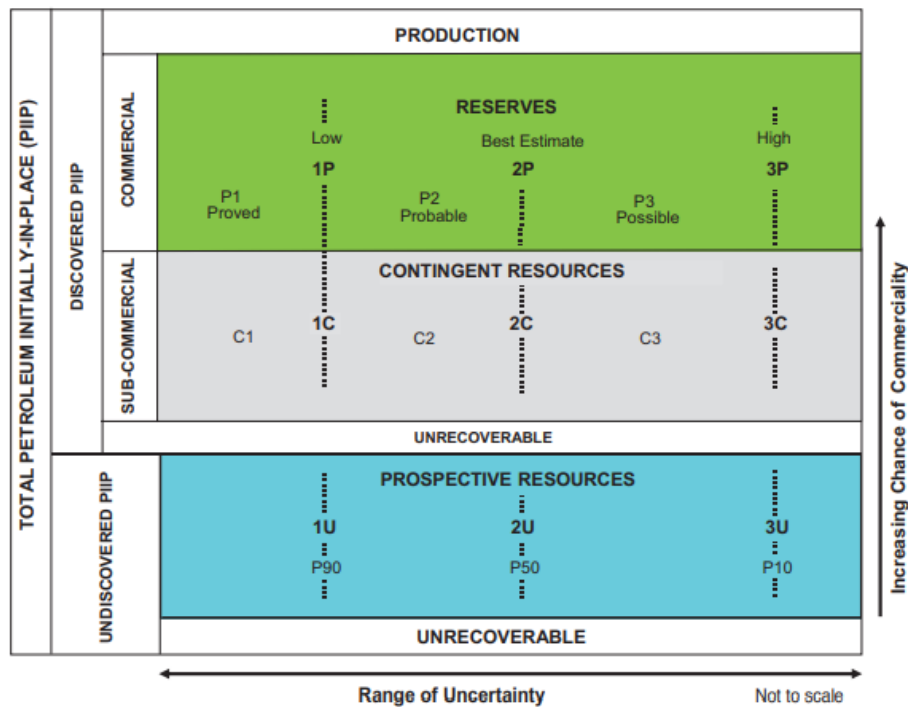


Figure II
PRMS Classification Framework



III. Direct Mapping of Categories and Sub-categories

11. The Degree of Confidence G axis of UNFC and the Range of Uncertainty X axis of PRMS can be directly mapped.

12. Technical Feasibility (F axis) and Environmental-Socio-Economic Viability (E axis) are mapped to two axes for UNFC, in PRMS, this is combined into one mapping of Increasing Chance of Commerciality on the Y axis. The result of this difference is that direct mapping of the Y axis and the E and F axes is not always straightforward.

A. Application of the G Axis

13. The Degree of Confidence in estimates is represented on the G Axis in UNFC and on the X-axis Range of Uncertainty for PRMS. The Degree of Confidence (G) axis may be mapped to the PRMS Range of Uncertainty, as shown in Table 1.

14. A corresponding G1, G2 and G3 should be provided for any given project and represent the associated low, best and high estimates. G-axis categories may be used discretely as deterministic incremental (i.e., G1, G2 and G3) or in cumulative scenario form (i.e., G1, G1+G2, G1+G2+G3). Where probabilistic methods are used, the G1 represents the P90, the G2 the P50 and the G3 the P10. For viable or potentially viable projects, the range of uncertainty represents the outcomes that would be economically recoverable. If a quantity is expressed for the G4 Category without Sub-category refinement, then the sum of the G4.1 and G4.2 Sub-categories shall be stated. This equates to the 2U for Prospective Resources under PRMS.

15. The method for evaluating the G or X-axis estimates should always be documented.

Table 1

Mapping of PRMS Range of Uncertainty Categories to UNFC Degree of Confidence G Axis*

<i>PRMS Category</i>	<i>UNFC G Category</i>
Proved	G1
Probable	G2-G1
Possible	G3-G2-G1
Proved (1P)	G1
Proved plus Probable (2P)	G1 + G2 (=G2)
Proved plus Probable plus Possible (3P)	G1 + G2 + G3 (=G3)
Low estimate C1	G1
Best estimate C2	G2-G1
High Estimate C3	G3-G2-G1
C1 (1C)	G1
C1 plus C2 (2C)	G1 + G2 (=G2)
C1 plus C2 plus C3 (3C)	G1 + G2 + G3 (=G3)
1U (P90)	G4.1
2U (P50)	G4.1 + G4.2 (=G4)
3U (P10)	G4.1 + G4.2 + G4.3

* Combinations of G axis Categories (or Sub-categories), such as G1+G2, are shown here for illustrative purposes only. In practice, they will always be associated with the Categories (or Sub-categories) of the E and F axes and documented as Classes in the form: 111+112, for example.

B. Detailed mapping of the E and F Axes

16. PRMS Classes and Subclasses can be directly mapped to UNFC Classes and Sub-classes (Table 2). However, UNFC applies a greater level of granularity in representing Sub-categories of Technical Feasibility (F) and Environmental-Socio-Economic Viability (E).

17. Overall, Discovered Petroleum Initially-In-Place (PIIP) can be mapped to Known Sources, and Undiscovered PIIP can be mapped to Potential Sources. Further, Reserves can be mapped to Viable Projects, Contingent Resources to Potentially Viable and Non-Viable Projects, Prospective Resources to Prospective Projects and Unrecoverable to Remaining Products. Table 2 shows the mapping of Classes, while Table 3 shows a mapping of the E-F Sub-category matrix to the PRMS Project Maturity Sub-classes with a colour-coded and numeric key. Note that the E and F Categories set minimum standards for the UNFC Classes. For example, a Potentially Viable Project must be at least E2 and F2.

Table 2
Mapping of PRMS and UNFC Classes and Categories*

PRMS Class		UNFC "minimum" Categories			UNFC Class	
Discovered	Reserves	E1	F1	G1,G2,G3	Known Sources	Viable Projects
	Contingent Resources	E2	F2	G1,G2,G3		Potentially Viable Projects
		E3	F2	G1,G2,G3		Non-Viable Projects
	Unrecoverable	E3	F4	G1,G2,G3		Remaining Products ^a
Undiscovered	Prospective Resources	E3	F3	G4	Potential Sources	Prospective Projects
	Unrecoverable	E3	F4	G4		Remaining Products ^a

* Further discussion of "minimum" is included towards the end of Section IV. PRMS Contingent Resources are always subdivided in UNFC between Potentially Viable Projects and Non-viable Projects based on the distinction between E2 and E3 Categories. Non-sales quantities are always classified as E3 in UNFC.

^a Remaining products not developed from identified projects (discovered) and prospective projects (undiscovered).

Table 3
Mapping of the E-F Matrix to the PRMS Project Maturity Sub-classes with a Colour Coded and Numeric Key

	F1.1	F1.2	F1.3	F2.1	F2.2	F2.3	F3.1	F3.2	F3.3	F4
E1.1	1	2	3	4						
E1.2	1	2	3							
E2			4	4	5					
E3.1	12	12	12	12	12	12				
E3.2			6	6	6		8	9	10	
E3.3			7	7	7	7				11

<i>UNFC Class</i>	<i>UNFC Sub-class</i>	<i>Code</i>	<i>PRMS Class</i>	<i>PRMS Sub-class</i>
Sold or used production			Production	
Production which is unused or consumed in operations				
Viable Projects	On Production	1	Reserves	On Production
	Approved for Development	2		Approved for Development
	Justified for Development	3		Justified for Development
Potentially Viable Projects	Development Pending	4	Contingent Resources	Development Pending
	Development On Hold	5		Development On Hold
Non-Viable Projects	Development Unclassified	6		Development Unclassified
	Development not Viable	7		Development Not Viable
Remaining products not developed from identified projects		11	Unrecoverable	
Prospective Projects		8	Prospective Resources	Prospect
		9		Lead
		10		Play
Remaining products not developed from prospective projects		11	Unrecoverable	
Defined but not classified in PRMS		12		
Less common mappings				

18. In PRMS, lease fuel or Consumed in Operations (CiO) (but not any other E3.1 non-sales quantities) may be included in the Reserves class but must be reported separately from sales quantities. However, in certain circumstances, a project may be seen to be environmentally-socially-economically viable (E1.1), e.g., a very large oil discovery in a mature hydrocarbon province, even though appraisal activities are still ongoing to optimize the development plan (F2.1). Such a project would still be classified as a Potentially Viable Project under UNFC and a Contingent Resource under PRMS. Most PRMS Project Maturity Sub-classes map to more than one location in the E-F matrix, as shown in Table 3. Section IV of this Bridging Document describes how the quantities within these PRMS Sub-classes shall be assigned to the correct Sub-classes within UNFC.

19. There are four cells within the E-F matrix that map directly and uniquely to corresponding PRMS Project Maturity Classes. These cells relate to Prospective Projects (Prospective Resources in PRMS) and Remaining Products (Unrecoverable in PRMS).

C. Prospective Prospects

20. The Generic Specifications of UNFC define Sub-categories for the F axis that map directly to the PRMS Project Maturity Sub-classes for Prospective Resources. UNFC enforces the use of the E3.2 and G4 Sub-categories for the classification of Prospective Projects. Table 4 shows the full mapping of UNFC to PRMS for Prospective Projects and Prospective Resources.

Table 4
Mapping of UNFC Prospective Projects to PRMS Prospective Resources

		Low Estimate	Best Estimate	High Estimate
Prospective Resources	Prospect	E3.2,F3.1,G4.1	E3.2,F3.1,G4.1+G4.2	E3.2,F3.1,G4.1+G4.2+G4.3
	Lead	E3.2,F3.2,G4.1	E3.2,F3.2,G4.1+G4.2	E3.2,F3.2,G4.1+G4.2+G4.3
	Play	E3.2,F3.3,G4.1	E3.2,F3.3,G4.1+G4.2	E3.2,F3.3,G4.1+G4.2+G4.3

D. Remaining Products

21. In the context of petroleum, Remaining Products from identified projects (Known Sources) and prospective projects (Potential Sources) in UNFC correspond to those quantities that are currently classified in PRMS as Unrecoverable within Discovered and Undiscovered PIIIP. Within the E-F matrix, the Remaining Products are found at the intersection of the E3.3 and F4 Categories. These are mapped to the Unrecoverable class in PRMS.

22. Within UNFC, the geologic uncertainty for Known Sources is described using Categories G1 to G3, while the geologic uncertainty for Potential Sources is described using Category G4 (Table 5).

Table 5
Mapping of UNFC Remaining Products to PRMS Unrecoverable

		Low Estimate	Best Estimate	High Estimate
Unrecoverable	Discovered	E3.3,F4,G1	E3.3,F4,G1+G2	E3.3,F4,G1+G2+G3
	Undiscovered	E3.3,F4,G4.1	E3.3,F4,G4.1+G4.2	E3.3,F4,G4.1+G4.2+G4.3

IV. Sub-Division of PRMS Project Maturity Classes to Multiple UNFC Sub-Categories

23. As UNFC contains more granularity than PRMS, it is to be expected that there may be examples where a single PRMS project maturity Sub-class could map to multiple combinations of UNFC Sub-categories (Figure IV.3).

A. Commercial projects sub-categorization

24. PRMS project maturity Sub-classes for Reserves map directly to Viable Projects but also to the UNFC Sub-categories F1.1 to F1.3 on the F axis and can also be mapped to the E1.1, E1.2 or E3.1 Sub-categories on the E axis.

25. Note that the definitions of economic within PRMS and UNFC are not fully aligned. In UNFC, a project is economic when the anticipated monetary revenues equal or exceed the costs by a margin that satisfies financing requirements, taking risks and opportunities into account. The project provides a positive return on investment, often measured in monetary criteria, such as having a positive net present value (NPV) at an agreed discount factor required for development to proceed. In PRMS, a project is economic when it has a positive undiscounted cumulative cash flow from the effective date of the evaluation, and the net revenue exceeds the net cost of operation. Notwithstanding, a project in PRMS is only commercial when it meets the equivalent definition of economic within UNFC, namely that

the net cash flows should be discounted using a defined discount rate. This means that a Viable Project within UNFC is equivalent to Reserves within PRMS, but an economically viable project within PRMS may not be economic based on the UNFC definition.

26. The subdivision of quantities between E1.1 and E1.2 for PRMS Reserves categories is resolved by following the definitions of the Sub-categories. Quantities where extraction and sale are environmentally, socially and economically viable based on the current market, environmental and social and regulatory considerations and realistic assumptions of future market, environmental, social and regulatory considerations are categorized as E1.1. Quantities for which extraction and sale are not economic based on current market conditions and realistic assumptions of future market conditions but are made viable through government subsidies and/or other considerations are categorized as E1.2. The PRMS framework does not facilitate this level of granularity.

27. In UNFC, environmental and social issues are an integral part of assessing the economics and viability of the project and may be used as a traffic light for the project to proceed based on relevant social and environmental metrics. Conversely, non-compliance with relevant environmental and social criteria may also lead to the suspension of an existing project or the deferment of a planned project. Any economic viability analysis needs to incorporate expected future product demand and policy implications by governments and regulatory authorities to achieve net-zero emissions. This may include policies such as a requirement for carbon capture and storage or other nature-based solutions and additional taxes and tariffs

28. PRMS recommends that lease fuel (or CiO) should not be included in sales quantities or resource estimates. However, under certain conditions, in PRMS, it is allowed to be reported (which is permitted under some regulations), and if reported, it must be indicated separately from sales quantities. PRMS also notes that all other non-sales quantities (flare and losses) must not be included as sales quantities of Reserves.

29. UNFC does not recognize lease fuel (or CiO) as part of Viable Projects. Lease fuel (plus flaring and other losses) is always reported separately from sales quantities. All such quantities (lease fuel, flare or other losses) are categorized within the E3.1 Sub-category as non-sales. The project Subcategory (F axis) will be the same as that associated with the quantities being extracted and sold from that project. The degree of confidence (G axis) will similarly reflect the project uncertainty. When mapping a volume from the UNFC E3.1 Sub-category to PRMS, care must be taken to not include such quantities as Reserves or, if appropriate, to assign only the lease fuel to the Reserves Category and, in such cases, to document them separately from sales quantities. Flare gas and other losses are defined by PRMS but not explicitly categorized, but good practice is to maintain a record of these quantities.

B. Potentially viable and non-viable project sub-categorization

30. The mapping of Potentially Viable and Non-Viable Projects with PRMS Contingent Resources is slightly more complex, with each project needing to be reviewed for the status of environmental-socio-economic viability and technical feasibility.

31. There is a direct link between PRMS project maturity Sub-classes and the UNFC Sub-classes, as shown in Table 6. Note that the UNFC Sub-categories set minimum standards for the Sub-classes when used in UNFC. For example, Development Pending must be at least E2 and F2.1 and cannot be equated to E3 or to F2.2 (or lower). On the other hand, it could also be E1F2.1, or it could be E2F1.3.

Table 6
Mapping of PRMS Contingent Resource Sub-classes to UNFC Sub-classes using the E and F Axis Categories and Sub-categories*

<i>PRMS Sub-class</i>		<i>E axis “minimum” Category or Sub-category</i>	<i>F axis “minimum” Sub-category</i>	<i>UNFC Sub-class</i>
Contingent Resources	Development Pending	E2	F2.1	Development Pending
	Development on Hold	E2	F2.2	Development on Hold
	Development Unclarified	E3.2	F2.2	Development Unclarified
	Development not Viable	E3.3	F2.3	Development not Viable

* See paragraph 31 for a discussion of “minimum”.

32. Mapping of the four PRMS Sub-classes to the UNFC Categories and Sub-categories shall be based on the following guidelines.

33. Development Pending projects must, as a minimum, satisfy the definitions of both F2.1 and E2 but could fall in either the F1.3 or F2.1 Sub-category based on the level of technical feasibility and maturity. A project that meets all technical requirements but does not meet current economic thresholds is sub-categorized as F1.3. Further, a project with remaining technical feasibility issues to be resolved is sub-categorized as F2.1.

34. The 2018 edition of PRMS separated the “Development Unclarified or on Hold” Sub-class into two sub-classes that map one-to-one with the “Development on Hold” and “Development Unclarified” Sub-classes of UNFC (see Figure IV.5). Projects On Hold are like Development Pending projects, but their progression towards commerciality is constrained by activities which may or may not be outside the control of the evaluator. Projects on Hold are classified as E2F2.2 to reflect the chance of commerciality but considering the current lack of activity progress.

35. Development Unclarified projects are those where there is generally a lack of data to make the assessment of the viability or where the evaluation is still at an early stage. The projects are sub-categorized as E3.2 and as F1.3, F2.1 or F2.2 based on the level of technical maturity. A project that meets all technical requirements but does not meet current viability thresholds is sub-categorized as F1.3. A project with remaining technical and environmental-social, and economic issues to be resolved is sub-categorized as F2.1. If activities are on hold or evaluation is still to be completed, the project is sub-categorized as F2.2.

36. Development Not Viable projects are technically feasible projects (based on existing technology or technology currently under development), but they have been assessed as having insufficient current potential to warrant any further data acquisition activities at this time. In such cases, it can be helpful to identify and record these quantities as part of a portfolio so that the potential for a commercial development opportunity will be recognized in the event of a major change in commercial conditions. The projects should align with Sub-category E3.3 in UNFC. Typically, the project will not have matured technically due to the lack of potential and would be sub-categorized as F2.3. However, there could be circumstances where, for example, the project has matured to F1.3, and the environmental-socio-economic conditions have changed significantly. Alternatively, projects in Development Not Viable for an extended period or deemed unlikely to be progressed in a reasonable timeframe should be considered for reclassification to F4 or Unrecoverable.

V. Sales and Non-Sales Products

37. PRMS states that “Although Reserves are recommended to be sales quantities..., the CiO quantities may be included as Reserves or Resources; when included these quantities must be stated and recorded separately from the sales portion.” Within UNFC, production

quantities of each non-sales type should be differentiated (see Generic Specification D) and reported separately to sales.

VI. Reserves Status in PRMS

38. The equivalent term for PRMS Reserves in UNFC 2019 is Viable Projects. In PRMS, projects classified as Reserves may be allocated to the following status based on the funding and operational status of wells and associated facilities within the reservoir development plan:

- Developed Reserves are expected quantities to be recovered from existing wells and facilities
 - Developed Producing Reserves are expected to be recovered from completion intervals that are open and producing at the time of the estimate
 - Developed Non-Producing Reserves include shut-in and behind-pipe Reserves with minor costs to access
- Undeveloped Reserves are quantities expected to be recovered through significant future investments.

39. UNFC does not provide additional sub-categories that correspond to these PRMS Reserves status subdivisions.

40. Nevertheless, it is recognized that it may be useful at the generic level to reflect the funding and operational status of wells and associated facilities when reporting petroleum quantities using UNFC. In such cases, the quantities associated with each relevant UNFC Class (or Sub-class, if used) may be reported in accordance with these subdivisions provided that in every case, the aggregated quantities are also reported together with the appropriate UNFC Numerical Code for the Class or Sub-class. Developed Non-Producing Reserves may be classified as Approved for Development. Undeveloped Reserves may be sub-classified as either Approved for Development or Justified for Development, depending on the approval status.
