

**Subject: Comments/proposals to Draft Bridging Document between the Oil and Fuel Gas Reserves and Resources Classification of the Russian Federation of 2013 and UNFC-2009: from Mr. Sigurd Heiberg, Petronavit a.s.**

14 August 2016

The GKZ and the Technical Advisory Group should be commended on producing a significant bridging document. The key achievement is clearly caused by identifying the project and not the accumulation as the information carrier. Practice will, over time surely prove the value of this move.

I have confined my comments to a detail on language. The English text will improve in clarity by replacing the words “reserves” and “resources” by “recoverable quantities”, “additional quantities in place” or sometimes simply “quantities”. I enclose comments in the text to illustrate the point. They are also provided below:

Page 2, footnote 1

In this text, replace reserves with recoverable quantities, which is a clear plain English term not requiring definition.

Para 12

Here the term recoverable reserves is used, suggesting that reserves may also be non-recoverable. Using recoverable quantities in lieu of reserves avoids the problem.

Para 15

Here, the appropriate term would be non-recoverable quantities.

Para 19

The appropriate term here is quantities. Additional quantities in place are distributed on the G-axis in E3F4.

Para 26

Use quantities in place in lieu of resources.

Para 26

Delete “to subdivide” (used twice)

**Comments from Mr. Sigurd Heiberg, Petronavit a.s., to Draft Bridging Document between the Oil and Fuel Gas Reserves and Resources Classification of the Russian Federation of 2013 and UNFC-2009.**

**United Nations Economic Commission for Europe  
Expert Group on Resource Classification**

**DRAFT FOR PUBLIC COMMENT**

**Draft Bridging Document between the Oil and Fuel Gas  
Reserves and Resources Classification of the Russian  
Federation of 2013 and the United Nations Framework  
Classification for Fossil Energy and Mineral Reserves and  
Resources 2009**

**Prepared by the State Commission of Mineral Reserves of the Russian  
Federation and the Technical Advisory Group of the Expert Group on  
Resource Classification**

*Summary*

This document provides the draft Bridging Document between the Oil and Fuel Gas Reserves and Resources Classification of the Russian Federation of 2013 (RF2013) and the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 (UNFC-2009). It compares reserves and resources by Categories of the RF2013 to Categories and Classes of UNFC-2009.

Bridging Documents explain the relationship between UNFC-2009 and another classification system that has been endorsed by the Expert Group on Resource Classification as an Aligned System. They incorporate instructions and guidelines on how to classify estimates generated by application of that Aligned System using the UNFC-2009 Numerical Codes. The relevant Bridging Document shall be identified when reporting estimates using the UNFC-2009 Numerical Codes. RF2013 is independent from UNFC-2009 and is mandatory for reporting to the Russian Federation Ministry of Natural Resources. This Bridging Document has no bearing whatsoever on the mandatory reporting requirements or on the independent application of RF2013.

This document is issued for public comment for a period of 60 days.

## I. Introduction

1. Bridging Documents explain the relationship between the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 (UNFC-2009) and another classification system that has been endorsed by the Expert Group on Resource Classification as an Aligned System. They incorporate instructions and guidelines on how to classify estimates generated by application of that Aligned System using the UNFC-2009 Numerical Codes. The relevant Bridging Document shall be identified when reporting estimates using the UNFC-2009 Numerical Codes.
2. This document compares reserves and resources by categories of the Russian Federation Classification to Categories and Classes of UNFC-2009.
3. The Russian Federation Classification (henceforth, RF2013) is the classification of reserves of oil and combustible gases approved by order of the Russian Federation Ministry of Natural Resources dated 01.11.2013 N477 with effective date of 1 January 2016. It establishes unified guidance regarding the Russian Federation principles for assessment and state accounting of reserves and resources of oil, combustible gases (free gas, gas from gas cap, gas dissolved in oil) and gas condensate.
4. RF2013 is independent from UNFC-2009 and is mandatory for reporting to the Russian Federation Ministry of Natural Resources. This Bridging Document has no bearing on the mandatory reporting requirements or on the independent application of RF2013.

## II. Basic principles for identifying reserves and resource categories in RF2013

5. Oil and gas reserves<sup>1</sup> in RF2013 are subdivided by the extent of commercial development and by degree of geological knowledge into the following categories: A (producing, drilled), B1 (producing<sup>2</sup>, not drilled, known), B2 (producing<sup>2</sup>, not drilled, estimated), C1 (known) and C2 (estimated).
6. Reserves of a deposit/part of deposit drilled by development wells and producing in accordance with an appropriate project Design Document (Development Process Plan or amendment thereto, Reservoir Management Plan or amendment thereto) correspond to the Category A (producing, drilled). Category A includes recoverable quantities of deposits whose geological structure, shape and dimensions have been determined and fluid contacts have been justified by drilling, testing and well logging data.
7. The characteristics of a deposit (production mode, oil, gas, condensate production rates, productivity of wells) have been established by well operation data.
8. **Category B1** (producing, not drilled, known) refers to reserves of adjacent parts of deposits not drilled by development wells and whose development is planned in accordance with an Approved Design Document, studied by seismic or other high-accuracy methods and drilled with prospecting, appraisal, exploration, transit or deepened wells that yielded commercial oil or gas inflows (individual wells may be not tested, but their productivity is inferred by well logging and mud logging data and core data).

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<sup>1</sup> RF2013 uses the term “reserves” for the recoverable volumes associated with all discovered accumulations whether commercial, potentially commercial or non-commercial. The term “resources” is applied to quantities potentially recoverable from undiscovered accumulations.

<sup>2</sup> “Producing” refers both to segments (A) which are on production and to segments (B1 and B2) offsetting producing wells and included in the approved Design Document but that are not currently on production.

9. Reserves of deposits/parts of deposits not drilled with development wells whose development is planned in accordance with an Approved Design Document, that have been studied by seismic or other high-accuracy methods, whose presence has been substantiated by data of geophysical and geological investigations and testing of individual wells while drilling are classified as the **Category B2** (producing, not drilled, estimated).
10. Reserves of deposits/parts of deposits that have not been brought into commercial development on which test operation thereof or test operation of individual wells may be carried out are categorized as the **Category C1** (known/explored). Deposits shall be studied by seismic or other high-accuracy methods and drilled with prospecting, appraisal, exploration wells that yielded commercial oil or gas inflows (individual wells may be not tested but their productivity is inferred by well logging and mud logging data and core data). Those reserves are not yet supported by an Approved Designed document.
11. Reserves of deposits/parts of deposits, fields that have not been brought into commercial development, that are developed on the basis of a test operation plan for individual wells, studied by seismic or other high-accuracy methods, whose presence has been justified by data of geological and geophysical investigations and testing of individual wells while drilling are classified as the **Category C2** (estimated). Those reserves are not yet supported by an Approved Designed document.
12. In accordance with the rules and regulatory documents effective in the RF2013 /3/, for the deposits (fields) under production (reserves of Categories A, B1, B2), the recoverable reserves of oil, gas, condensate and associated commercial components should be determined as a result of technical and economic estimates for the recommended development scenario approved in accordance with the established procedure, oil recovery factor, gas recovery factor, condensate recovery factor estimated in Project Design Document for deposits (fields) development *during the cost-effective field life and during the period of reserves exhaustion*.
13. Hydrocarbon reserves of the mentioned categories that are *technically recoverable but non-profitable in terms of recovery* under current economic conditions will be referred to as A\*, B1\*, B2\*.
14. For the fields under exploration (Categories C1 and C2), assessment of oil, gas and condensate recoverable reserves should be carried out in the Field (Deposit) Test Production Design approved in accordance with the established procedure, and with expert appraisals or simplified statistical methods of recovery factor determination (empirical methods, coefficient-based method, analogy method).
15. Categories of *non-recoverable* (technically non-recoverable) reserves are designated as follows: A\*\*, B1\*\*, B2\*\*, C1\*\*, C2\*\*. Under UNFC-2009 these are classified as “additional quantities in place”.
16. **Undiscovered Resources** of oil, gas and condensate are subdivided by geological knowledge into Categories: D0 (prepared), DL (localized), D1 (potential), D2 (expected).
17. Resources of possibly pay formations in traps revealed by results of geological and geophysical prospecting operations within the areas with proved commercial oil/gas presence are classified as the **Category DL** (localized). Resources of **Category DO** (prepared) represent possibility of oil and gas discovery in a ready-to drill trap and are used to design prospecting works. Resources of lithology-stratigraphy complexes (plays) and horizons with commercial oil/gas presence proved within major regional structures are classified as the **D1 Category**. Resources of lithology-stratigraphy complexes whose commercial oil/gas presence has not yet been proved are classified as the **Category D2**.

18. As in the case of reserves, categories of *non-recoverable* (technically non-recoverable) resources are designated as follows: D0\*\*, DL\*\*, D1\*\*, D2\*\*. Under UNFC-2009 these are classified as *Additional quantities in place*.

### III. Direct mapping of categories and sub-categories

#### A. Application of the G-axis

19. In the UNFC-2009 classification of reserves, three levels of confidence are specified for known (already discovered) deposits: “**high**”, “moderate” and low”, represented by the G1, G2 and G3 Categories. For deposits that are known by indirect data only (at the stage of exploration projects), the G4 Category is used.

20. The RF2013 Categories represent segments of the total accumulation according to geological knowledge based primarily on the degree of offset to existing well control. Recoverable quantity estimates in A and B1 segments, containing producing wells and adjacent areas, have a high level of confidence (G1). The B2 segment being areas remote from well control have lower confidence levels in recoverable quantities. When considered at the segment level, confidence ranges from moderate to low (G2 + G3). Similarly, C1 has high confidence (G1) and C2 has confidence levels ranging moderate to low (G2 + G3). This aligns with the incremental assessment method as shown in Figure 1.

Figure 1  
**Comparison of RF2013 and UNFC-2009 in the geological knowledge**

	<i>UNFC-2009 category</i>	<i>RF2013 Categories</i>
G1	Quantities associated with a known deposit that can be estimated with a high level of confidence	A, B1, C1, A*, B1* A**, B1**, C1**
G2	Quantities associated with a known deposit that can be estimated with a moderate level of confidence	B2, C2, B2*, B2**, C2**
G3	Quantities associated with a known deposit that can be estimated with a low level of confidence	
G4	Estimated quantities associated with a potential deposit, based primarily on indirect evidence	D0, DL, D1, D2 D0**, DL**, D1**, D2**

21. In RF2013, a marginal (unprofitable) part of the deposit’s reserves are defined. Symbol “\*” is added to the name of the category: A\*, B1\*, B2\*. Profitability factor has no effect on the geological confidence scale, thus, A\* and B1\* have a high level of confidence while B2\* has a lower level of confidence. The same logic is applied to technically unrecoverable quantities, A\*\*, B1\*\*, B2\*\*, C1\*\* and C2\*\*.

22. With regard to Exploration Projects, while UNFC-2009 provides the option to sub-categorize DO, DL, D1 and D2 based on uncertainty, under RF2013 these categories should be mapped to G4 without sub-categorization and when used alone should represent the best estimate.

## B. Detailed mapping of the E and F axes

23. While the G-axis defines the confidence levels within each project, the allocation to UNFC-2009 Classes and Sub-classes is based on a matrix formed from Economic and Social Viability (E) and Field Project Status and Feasibility (F) axes. Figure.2 shows the mapping where optional sub-classes have not been used, while Figure 3 shows a mapping of the E-F Sub-category matrix to the RF2013 categories with a color-coded and numeric key. Note that the E and F Categories set minimum standards for UNFC-2009 classes. For example, a Potentially Commercial Project must be at least E2 and F2, but it could also be E2F1.

Figure 2

**Mapping of RF2013 and UNFC-2009 Classes and Categories** (see preceding paragraph for explanation of “minimum”)

<i>RF2013 Categories</i>		<i>UNFC-2009 “minimum” Categories</i>			<i>UNFC-2009 Class</i>
<i>Discovered</i>	A, B1, B2	E1	F1	G1,G2,G3	Commercial Projects
	A*, B1* B2* C1, C2	E2	F2	G1,G2,G3	Potentially Commercial Projects
	C1, C2	E3	F2	G1,G2,G3	Non-Commercial Projects
	A**, B1**, B2** , C1**, C2** (Non-recoverable)	E3	F4	G1,G2,G3	Additional Quantities in Place
<i>Undiscovered</i>	D0. DL, D1, D2	E3	F3	G4	Exploration Projects
	D0**, DL**, D1**, D2** (Non-recoverable)	E3	F4	G4	Additional Quantities in Place

24. Within each UNFC-2009 Class or Sub-class there is a range of uncertainty with regard to the quantity of in place and recoverable quantities from high confidence (G1) to low confidence (G3).

25. In many cases, RF2013 categories map to more than one location in the E-F matrix as shown in Figure 3. Section IV of this Bridging Document describes how the quantities within the RF2013 categories shall be assigned to the correct Sub-classes in UNFC-2009.

Figure 3  
**Mapping of the E-F Matrix to RF2013 classes and categories 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>Class</i>	<i>Sub-class</i>	<i>Code</i>	<i>RF2013 Category</i>
Commercial Projects	On Production	1	A
	Approved for Development	2	B1
	Justified for Development	3	B2
Potentially Commercial Projects	Development Pending	4	A* B1* B2* C1, C2
	Development on Hold	5	A* B1* B2* C1, C2
Non-Commercial Projects	Development Unclassified	6	C1, C2
	Development Not Viable	7	C1, C2
Additional Quantities in Place		11	A** B1** B2** C1** C2**
Exploration Projects	Prospect	8	D0
	Lead/High Risk Prospect	9	DL
	Play	10	D1, D2
Additional Quantities in Place		11	D0** DL** D1** D2**
Produced Not Sold		12	

Note that Code 12 refers to those quantities typically referred to as “fuel, flare and losses”. Fuel is that portion of production consumed in operations and thus not delivered to the sales reference point.

### C. Exploration projects

26. There are four cells within the E-F matrix that map to RF-2013 categories of undiscovered resources associated with exploration projects at different stages of maturity. UNFC-2009 encourages the use of E3.2 and G4 for classification of Exploration Projects. The logic to exclude E3.3 is that an exploration project would not be implemented where there is no prospect for economic extraction and sale in the foreseeable future. While UNFC-2009 provides the option (Generic Specification P) to expand G4 to account for uncertainty in recoverable quantities, RF2013 does not provide an uncertainty range. G4 when used alone shall reflect the best estimate.

### D. Additional Quantities in Place

27. In the context of petroleum, additional quantities in place under UNFC-2009 correspond to those quantities that are currently assessed as technically non-recoverable within discovered or undiscovered classes. Within UNFC-2009 the geologic uncertainty for discovered quantities is described using Categories G1 to G3, while the geologic uncertainty for undiscovered quantities is described using Category G4. While UNFC-2009 provides the option (Generic Specification P) to expand G4 to account for uncertainty in additional in-place quantities, RF2013 does not provide an uncertainty range. G4 when used alone shall reflect the best estimate.

## IV. Sub-division of RF2013 categories into multiple UNFC-2009 sub-categories

28. As UNFC-2009 contains more granularity than RF2013, it is expected that there will be many instances where a single RF2013 category could reflect multiple combinations of UNFC-2009 Sub-categories. This is evident in Figure 3. The criteria to be used to subdivide ~~to subdivide~~ RF2013 categories to utilize the full breadth of UNFC-2009 are described in the next two sections.

29. Classification of reserves on the basis of three sets of categories (E, F and G) in UNFC-2009 makes it possible to define Classes and Sub-classes with the corresponding definition of the level of preparedness of reserves for development for each type of project. Notwithstanding that the RF2013 Classification operates at the level of categories only, it is possible to establish interrelationship of these Categories and Classes and Sub-classes of UNFC-2009 (Figure 3).

30. In UNFC-2009, three classes are used for “Known deposits” (i.e. deposits that have already been discovered): “Commercial projects”, “Possible commercial projects” and “Non-commercial projects”. While not shown in Figure 3, an additional UNFC-2009 class is the quantities previously extracted divided into sales production and non-sales production (fuel, flare and losses).

### A. Commercial projects sub-categorization

31. Recoverable quantities from RF-2013 categories A, B1 and B2 map to the UNFC-2009 Class “Commercial projects” because extraction thereof is as planned in accordance with the approved economically justified project Design Document and sub-categorized as E1.1 in UNFC-2009.

32. Category A maps directly to the UNFC-2009 Sub-Class “On Production” (F1.1). Reserves of category B1 map to UNFC-2009 sub-class “Approved for Development”



because development thereof is provided for by the Project Design Document, but extraction is not yet underway. Reserves of the Category B1 differ from A reserves by development status and correspond to the sub-category F1.2 where “Capital funds have been committed and implementation of the development project or mining operation is underway”.

33. Category B2 reserves corresponds to a subclass of the UNFC-2009 “Justified for Development” (F1.3), as in the Project Design Document sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project. There are no doubts in technical feasibility of the project, and there is a reasonable expectation that all necessary approvals/contracts for the project to proceed will be forthcoming. At the same time, a production from this category of reserves may be authorized after their converting to the higher categories A and B1.

34. Quantities for which 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 are categorized as E1.2. Reserves of A, B1, and B2 categories of RF2013 Classification in the fields where hydrocarbon production has become marginal due to changes in economic conditions, but development continues because of the need to comply with various obligations, may map to this sub-category. Reserves of categories A, B1, and B2 can fall into this subcategory for a short period. In the case the unfavourable economic situation will continue for a longer time, reserves of categories A, B1, and B2 should be converted in non-profitable reserves of categories A\*, B1\*, and B2\*, and in the class “Potentially Commercial Projects” of UNFC-2009.

35. Associated quantities derived from categories A, B1, B2, A\*, B1\*, B2\*, and C1 and C2 that are forecast to be extracted, but which will not be available for sale are categorized as E3.1. The project sub-category (F-axis) will be the same as that associated with the quantities being extracted and sold from that project. The level of geologic uncertainty will similarly reflect the project uncertainty.

## **B. Potentially commercial and non-commercial project sub-categorization**

36. Two types of projects in RF2013 would be classed as Potentially Commercial:

- (i) Projects targeting those quantities within segments A, B1, B2 that are technically recoverable but cannot be commercially recovered without improvements in commercial conditions (product price, costs) or introduction of new technologies not envisaged in the approved project Design Document (currently categorized as A\* B1\* B2\*).
- (ii) Projects targeting those quantities in discovered accumulations (C1, C2) that are still under appraisal and have not been approved for development

37. At the same time, “projects targeting those quantities in discovered accumulations (C1, C2 categories in RF2013) that are still under appraisal and have not been approved for development” may also be classified as non-commercial in UNFC-2009. The mapping to UNFC-2009 categories and sub-classes is slightly more complex and each project needs to be reviewed for the level of socio-economic and technical maturity.

38. With regard to economics, either there are reasonable prospects for economic extraction and sale in the foreseeable future (E2), economic viability is cannot be determined due to insufficient information (E3.2), or based on 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 (E3.3).

39. With regard to project maturity, either there are project activities ongoing to justify development in the foreseeable future (F2.1), project activities are on hold (F2.2) or there are no current plans to develop or acquire additional data due to limited potential (F2.3).
40. Mapping to the UNFC-2009 Categories and Sub-categories shall be based on the following guidelines.
41. Development Pending projects must, as a minimum, satisfy the definitions of both F2.1 and E2. A project that meets all technical requirements but does not meet current economic thresholds (no approved Design Document) is sub-categorized as F1.3. Further, a project with remaining technical feasibility issues to be resolved is sub-categorized as F2.1 but, if there is no doubt about commercial viability, it could satisfy the definition of E1.1.
42. Sub-category E1.2 would not normally be expected to be associated with a project that is classified as Development Pending. The reason for this is that there has to be no doubt about commercial viability (as mentioned in the preceding paragraph) and this is unlikely to be the case at that point in time (when the project is still under evaluation) if it requires a subsidy. Projects On Hold are similar to 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 taking into account the current lack of activity progress.
43. Development Unclarified projects are those where there is currently an insufficient basis for concluding that there are reasonable prospects for eventual economic extraction. This is generally due to a lack of data to make the assessment, 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 commercial thresholds is sub-categorized as F1.3. A project with remaining technical and commercial 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.
44. Development Not Viable projects are technically feasible projects (based on existing technology or technology currently under development), but they have been assessed as being of insufficient potential to warrant any further data acquisition activities or any direct efforts to remove commercial contingencies at this point in 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 are not considered to have the potential for eventual commercial development as at the Effective Date, and are therefore always aligned with Sub-category E3.3 in UNFC-2009. Typically, the project will not have been 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 been matured to F1.3 and then commercial circumstances have changed significantly.
45. Consequently, reserves of the RF2013 categories A\*, B1\*, and B2\* of the fields prepared to commercial development where extraction and sale are not economic on the basis of factors external to the fields (unavailability of system of product transportation from the field; justified but not yet approved government subsidies, etc.), and this being the case, implementation of the project continues, map to the UNFC-2009 sub-class "Development Pending" with sub-categories E1.1 F2.1. Reserves of categories C1 and C2 of the fields under exploration where project activities are on-going to justify development in the foreseeable future and extraction and sale are economic based on a preliminary assessment, can also be mapped to sub-categories E1.1 F2.1. Reserves of categories A\*, B1\*, and B2\* of the fields under development, which are not economic, but feasibility studies with a view to show advisability of certain development project (F1.3) are already finished or implementation of a project with a view to justify development in the foreseeable future continues, can be

mapped to the sub-class “Development Pending” with category E2 and sub-categories F1.3 and F2.1. Similarly, depending on the project implementation stage, reserves of categories C1 and C2 of the fields under exploration map to sub-categories F1.3 and F2.1.

46. In the case when there are reasonable prospects for economic extraction and sale in the foreseeable future (E2), but project implementation is on hold, reserves of categories A\*, B1\*, and B2\* of the fields under production and C1 and C2 of the fields under exploration map to the UNFC-2009 sub-class “Development on Hold” with sub-category F2.2.

47. Fields under exploration with reserves of RF2013 categories C1 and C2 can be mapped to both sub-classes of the UNFC-2009 Class “Non-commercial projects”. In the case economic viability of extraction cannot be determined due to insufficient information (sub-category E3.2), these categories of reserves should map to sub-class “Development Unclassified”, and depending on the stage of the project on justification of economic viability of extraction they can be mapped to one of the categories F1.3, F2.1, and F2.2. Where based on 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 (sub-category E3.3), C1 and C2 reserves map to sub-class “Development Not Viable” with an appropriate sub-category F1.3, F2.1, F2.2, and F2.3, depending on the stage of the project on justification of economic viability of extraction.

## **V. Identification of quantities defined but not classified in RF2013**

48. As noted above, UNFC-2009 separately categorizes all non-sales quantities (lease fuel, flare and losses). Where there is a need to differentiate between lease fuel versus flare and losses within UNFC-2009, quantities of each non-sales type should be treated as a different product type (see Generic Specification D) and reported separately.

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