COUNTRY REPORT

ON

PETROLEUM AND MINERAL RESOURCE CLASSIFICATION

KINGDOM OF CAMBODIA

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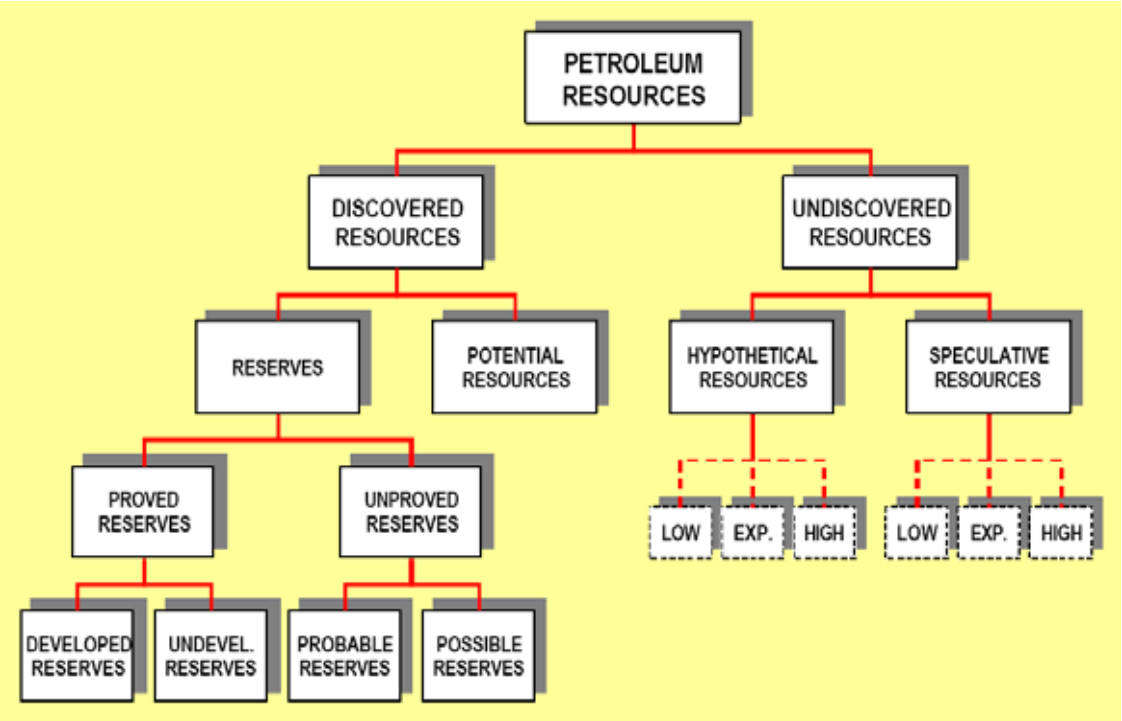
Petroleum Resource classification

In Cambodia, there has not been clarified yet the Petroleum Resource Classification system. However, the CCOP's Petroleum Resource Classification has been used in petroleum section since 1997, especially Cambodian National Petroleum Authority.

Petroleum Resources are defined as the total quantities of discovered (including hydrocarbon produced already from known accumulations) and undiscovered petroleum at a specific date in a given area.



(Fig.1): CCOP Petroleum Resource Classification Chart of Recoverable Resources

In order to have a consistent system the CCOP's Petroleum Resource Classification System is entirely based on recoverable petroleum resources. The classification system comprises the following two major parts (Fig.1): undiscovered recoverable resources and discovered recoverable resources.

Undiscovered Resources

Estimates of undiscovered resources are arrived at by means of geological, geophysical, and geochemical data. Based on compilation of these data into geological models and maps, hydrocarbon plays are defined. Discovery of petroleum accumulations in such plays is contingent upon that a set of geological factors is in place simultaneously.

Undiscovered petroleum resources can be subdivided into two categories: speculative resources and hypothetical resources.

Speculative resources

Speculative Resources is referred to the unmapped prospects that have not yet been mapped in the basin. The unmapped resources are estimated by play

assessment methods. The total resources of such plays comprise both discovered and undiscovered resources. The unmapped resources are the difference between the plays' total resources and the discovered and mapped resources. In general, most organisations carry out play assessments only on the undiscovered resources. A statistical aggregation of all play assessments will give the estimate of the total undiscovered resources.

Hypothetical resources

Hypothetical resources comprise resources which are mapped in the form of prospects, but which have not yet been discovered by drilling. It is uncertain if the estimated resources are actually in place. Prospects may be identified in undrilled frontier provinces as well as in reservoirs underlying or adjacent to producing fields. The resource estimates are given a probability of discovery. The estimates of the total hypothetical resources are given by statistic aggregation of the risk-weighted resource estimate of each prospect in a play or a basin.

Discovered Resources

The Discovered Petroleum Resources can be sub-divided into potential resources and reserves.

Potential Resources

Potential Resources is defined as the discovered resources that are recoverable but not economically producible at a specific date due to economic, political, environmental or technological reasons. Potential Resources include all volumes of known hydrocarbons that lack the technology to be produced or are economically unacceptable in today's environment. While these volumes do not meet the requirements to be classified as reserves, they are a potential resource to the country where they exist.

Reserves

Reserves are those quantities of petroleum, which are anticipated to be commercially recovered from known accumulations from a given date forward. All reserve estimates involve some degree of uncertainty. The uncertainty depends chiefly on the amount of reliable geologic and engineering data available at the time of the estimate and the interpretation of these data. The relative degree of uncertainty may be conveyed by placing reserves into one of two principal classifications, either proved or unproved. Unproved reserves are less certain to be recovered than proved reserves and may be further sub-classified as probable and possible reserves to denote progressively increasing uncertainty in their recoverability.

Estimation of reserves is done under conditions of uncertainty. The method of estimation is called deterministic if a single best estimate of reserves is made based on known geological, engineering, and economic data. The method of estimation is called probabilistic when the known geological, engineering, and economic data are used to generate a range of estimates and their associated probabilities. Identifying reserves as proved, probable, and possible has been the most frequent classification method and gives an indication of the probability of

recovery. Because of potential differences in uncertainty, caution should be exercised when aggregating reserves of different classifications.

Unproved reserves

Unproved reserves are based on geologic and/or engineering data similar to that used in estimates of proved reserves; but technical, contractual, economic, or regulatory uncertainties preclude such reserves being classified as proved. Unproved reserves may be further classified as probable reserves and possible reserves.

Unproved reserves may be estimated assuming future economic conditions different from those prevailing at the time of the estimate. The effect of possible future improvements in economic conditions and technological developments can be expressed by allocating appropriate quantities of reserves to the probable and possible classifications.

Possible reserves

Possible reserves are those unproved reserves which analysis of geologic and engineering data suggests are less likely to be recoverable than probable reserves.

Probable reserves

Probable reserves are those unproved reserves which analysis of geologic and engineering data suggests are more likely than not to be recoverable. In this context, when probabilistic methods are used, there should be at least a 50% probability that the quantities actually recovered will equal or exceed the sum of estimated proved plus probable reserves.

Proved reserves

Proved reserves are those quantities of petroleum which, by analysis of geological and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under current economic conditions, operating methods, and government regulations.

If deterministic methods are used, the term reasonable certainty is intended to express a high degree of confidence that the quantities will be recovered. If probabilistic methods are used, there should be at least 90% probability that the quantities actually recovered will equal or exceed the estimate.

Reserve status categories

Reserve status categories define the development and producing status of wells and reservoirs.

Undeveloped reserves*:*

Undeveloped reserves are expected to be recovered:

(1) From new wells on undrilled acreage.

(2) From deepening existing wells to a different reservoir, or

(3) Where a relatively large expenditure is required to

(a) Recomplete an existing well, or

(b) Install production or transportation facilities for primary or improved recovery projects.

Developed reserves:

Developed reserves are expected to be recovered from existing wells including reserves behind pipe. Improved recovery reserves are considered developed only after the necessary equipment has been installed, or when the costs to do so are relatively minor. Developed reserves may be subcategorised as producing or non-producing.

Producing: Reserves subcategorised as producing are expected to be recovered from completion intervals which are open and producing at the time of the estimate. Improved recovery reserves are considered producing only after the improved recovery project is in operation.

Non-producing: Reserves subcategorised as non-producing include shut-in and behind-pipe reserves. Shut-in reserves are expected to be recovered from (1) completion intervals which are open at the time of the estimate but which have not started producing, (2) wells which were shut-in for market conditions or pipeline connections, or (3) wells not capable of production for mechanical reasons. Behind- pipe reserves are expected to be recovered from zones in existing wells, which will require additional completion work or future recompletion prior to the start of production.

Definitions

Free and associated gas: There are several definitions of free and associated gas in the oil industry. Some organisations and companies define associated gas only as dissolved gas, which means that gas cap is regarded as free gas.

A prospect: is a mappable, possible petroleum accumulation that is relying on a reservoir entrapped by sealing rocks and charged with hydrocarbons. The prospect is called a lead if it is a very low probability of existence of one of the three factors.

A play: is a geographically and stratigraphically delimited area where a set of specific geological factors is in place simultaneously, thus making it possible to discover petroleum in producible quantities. Such geological factors are reservoir rocks, traps, mature source rocks and migration paths, plus the condition that the traps were formed before the migration of petroleum came to an end. All fields, discoveries and prospects within the same play are characterised by the play's specific set of geological factors and can therefore be distinguished from fields, discoveries and prospects of other plays.

Confirmed plays: contain a minimum of one discovery of producible quantities of petroleum. It is thus confirmed that the critical factors are in place simultaneously for these plays.

Unconfirmed plays: contain no discovered petroleum for the time being. This may be a result of having drilled only dry wells in the play, or of not having started exploration activities.

A petroleum deposit: is defined as an accumulation of petroleum in a geological unit limited by the rock characteristics by structural or stratigraphic boundaries, contact surface between petroleum and water in the formation, or a combination of these. All the petroleum comprised is in pressure communication through liquids or gas.

A discovery: is a petroleum deposit or several petroleum deposits combined (i.e. they have been discovered in the same exploration well) in which the existence of mobile petroleum has been made probable through testing, sampling or logging.

Mineral Resource Classification

As we get information from our friends worked for Ministry of Industry, Mines and Energy that different from Cambodian National Petroleum Authority they use United Nations Framework Classification for their mineral resources.

Basic principles

The total resources initially in-place of naturally occurring energy and mineral resources, are described in terms of:

- Produced quantities
- Remaining recoverable quantities
- Additional quantities remaining in-place

The main focus of the UNFC is on remaining recoverable quantities.

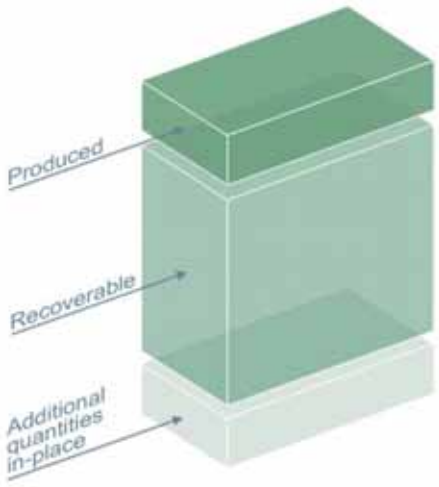


Figure 1. Total initial in-place resources.

For non-renewable resources, the total resources initially in-place is constant. In inventories, material balance is therefore maintained. If any change appears, this must be explained by a re-evaluation.

Remaining recoverable quantities

Remaining recoverable quantities are the sum of sales quantities and non-sales quantities estimated to be produced at the respective reference points from a given date and time forward.

Codification

Due to variation between terminologies in different systems and languages, it is recommended to use only three-digit numeric codes for individual categories, so that they will be universally understood. For this to be possible, the sequence is always fixed, so that the quantity characterized as E1;F1;G1 may be written in number form as 111, independent of languages. In practice, only a limited number of combinations (classes) are valid.

To illustrate, the UNFC for coal, uranium and other solid minerals, shown in Figure 5 may be expanded in Figure 4.

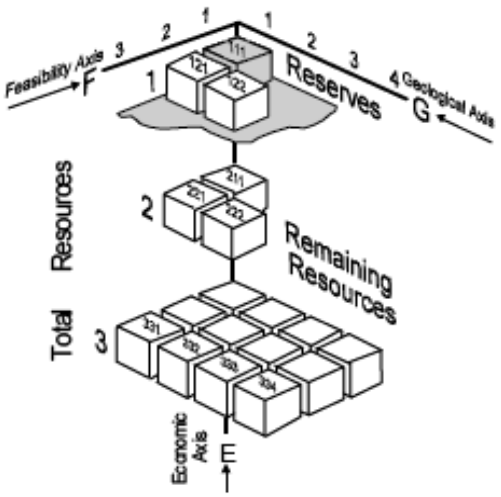


Figure 4. Three-digit codification

Class 111 is of prime interest to an investor. It refers to quantities that are: economically and commercially recoverable (number 1 as the first digit); have been justified by means of a feasibility study or actual production to be technically recoverable (number 1 as the second digit); and are based on reasonably assured geology (detailed exploration for solids) (number 1 as the third digit).

Subcategories may be added under the main categories when required. Categories and subcategories shall be numbered. A sub-category shall be separated from the main category number by a decimal point, e.g. E1.1. In such cases the categories have to be separated by a semicolon to distinguish the different categories that are included in the codified unit, e.g. 1.1;1;1 for the subcategory defined by E1.1, F1and G1.

A single geological deposit or accumulation of a recoverable quantity may be subject to production by several separate and distinct projects that are at different stages of exploration or development. The estimated remaining recoverable quantities obtained through each such project may be categorized separately.

Table 1 illustrates how information may be recorded in a matrix for coal, uranium and other solid minerals. The main consecutive stages of geological knowledge are shown on the horizontal axis. They define reserve/resource categories according to degree of geological and, where relevant, introduced as a yardstick to rank reserves/resources according to the amount of detail with which the feasibility assessment has been carried out. These reflect the degree of assurance of the reserve/resource figures with respect to economic viability. The actual result of the feasibility assessment, i.e. the economic viability of the deposit, is depicted using the third dimension.

Table 1. The UNFC in matrix form applied to coal, uranium and other solid minerals

UN International Framework / National System	Detailed Exploration	General Exploration	Prospecting	Reconnaissance
Feasibility Study and/or Mining Report	1 (111) 2 (211)	usually		
Prefeasibility Study	1 (121) + (122) 2 (221) + (222)		not relevant	
Geological Study*)	3 (331)	3 (332)	3 (333)	3 (334)

Economic Viability Categories: 1: economic; 2: potentially economic; 3: intrinsically economic (economic to potentially economic)

Categories

Figure 5 represents an expanded three-dimensional layout showing the codified classes, categories that are applicable in practice for coal, uranium and other solid minerals.

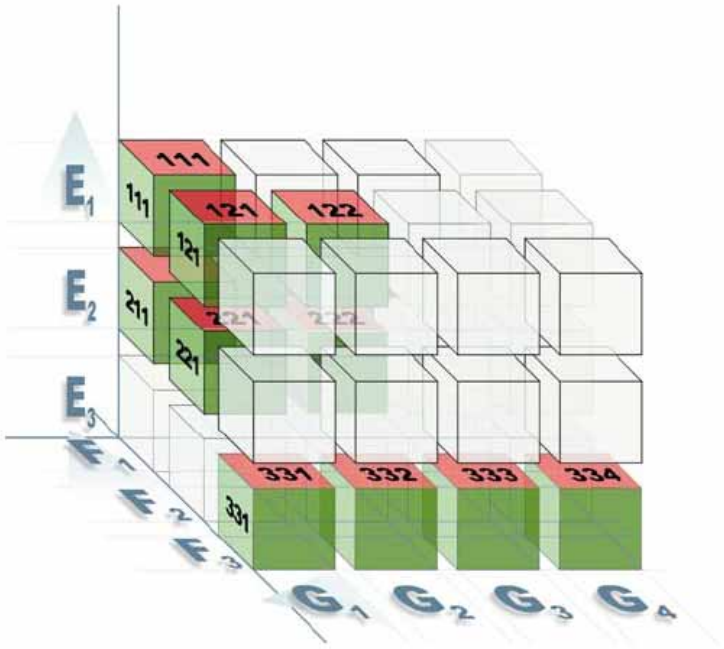


Figure 5. UNFC as applied to coal, uranium and other solid minerals

The following categories of the three sets of criteria shall be used for coal, uranium and other solid minerals:

Categories and subcategories		
E1		**Economic**
	E1.1	Normal Economic
	E1.2	Exceptional Economic
E2		**Potentially Economic**
	E2.1	Marginal Economic
	E2.2	Sub-Marginal Economic
E3		**Intrinsically Economic**
F1		**Mining Report and/or Feasibility Study**
	F1.1	Mining Report
	F1.3	Feasibility Study
F2		**Pre-feasibility Study**
F3		**Geological Study**
G1		**Detailed Exploration**
G2		**General Exploration**
G3		**Prospecting**
G4		**Reconnaissance Study**

Table 3. Categories for coal, uranium and other solid minerals

The purpose of the Feasibility Study is to assess the technical and economic viability of the project and to support a decision regarding project development.

A Feasibility Study must fulfill the following essential functions:

- Provide a comprehensive framework of established and detailed facts concerning the mineral project.
- Present an appropriate scheme of exploitation complete with plans, designs, equipment lists, etc., in sufficient detail for accurate cost estimation and associated economic results.
- Indicate the most likely profitability on investment in the project, assuming the project is equipped and operated as specified in the report.
- Provide an assessment of pertinent legal factors, financing alternatives, fiscal regimes, environmental regulations, and risk and sensitivity analyses on important technical, economic, political, and financial variables affecting the project.

Classes of remaining recoverable quantities

The following classes of recoverable coal, uranium and other solid mineral quantities are defined, though in practice not all will used in every case:

1. Mineral Reserves including:
    - Proved Mineral Reserves: code 111
    - Probable Mineral Reserves: codes 121 + 122
2. Mineral Resources (Additional or Remaining Resources) including:
    - Feasibility Mineral Resources: code 211
    - Pre-Feasibility Mineral Resources: codes 221+222
    - Measured Mineral Resources: code 331

- Indicated Mineral Resources: code 332
- Inferred Mineral Resources: code 333
- Reconnaissance Mineral Resources: code 334

Proved mineral reserves

Proved mineral reserves are the quantities defined by code 111.

A proved mineral reserve is the economically mineable part of a recoverable quantity assessed by a feasibility study or actual mining activity usually undertaken in areas of detailed exploration (measured recoverable quantity). It includes diluting materials and allowances for losses which may occur when material is mined and milled. Appropriate assessments, which include feasibility studies, have been carried out, and include consideration of, and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate, with a high degree of confidence at the time of reporting, that extraction is justified.

A feasibility study or actual mining activity, usually undertaken at the detailed exploration stage, may demonstrate a proved mineral reserve to be economically mineable.

Definition

Category	A category is a main subdivision in a set of criteria.
Class	A class is defined by a set of E, F and G categories. A quantity of a commodity is always associated with a class.
Commercial	When a quantity is commercial, this implies that the essential social, environmental and economic conditions are met, including political, legal, regulatory and contractual conditions.
Criteria	Standards for judging commodities. Three sets of criteria (E, F and G) are used.
Deposit	A concentration of a solid commodity in the subsoil. The equivalent term for petroleum is accumulation.
Field project status	Field project status refers to the status of a project to recover the commodity. It ranges from early exploration and research projects, to development, production and abandonment projects. The status of a project is normally defined in terms of a decision moving it from one status to another, such as a commitment to develop.
Initial time	A reference time marking the beginning of the record of produced quantities. Normally this is the time of production start. In instances where the records of historical recovery are not available, a different convenient time may be chosen, provided that the other information relating to the initial state of the deposit or accumulation relates to that time.
Mineral occurrence	An indication of mineralization, that is worthy of further investigation. The term mineral occurrence does not imply any measure of volume or tonnage, grade or quality and is thus not part of a mineral resource.
Non-sales quantities	Those quantities that have been, or are expected to be produced but not sold. This may include quantities that either have been or are expected to be used during the production process, such as for fuel gas, plus those quantities that are removed or lost during the production process (losses).
Sales quantities	Those quantities that have been sold to third parties or that are expected to be available for sale to third parties in the future.