

NPD's Resource Classification System, RNB Reporting, and Annual Status Report for Fields

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Introduction

The Norwegian Petroleum Directorate (NPD) receives various reporting from the operators in order to fulfil various regulatory requirements.

The NPD has its own resource classification system, and this article describes the development of this system. In addition, it provides some highlights regarding the RNB (Revised National Budget) Reporting and Annual Status Report for Fields, which are two of the important reporting requirements. The article is based on a presentation given at a meeting in SPE Oslo in October 2016.

Developments in petroleum resource classification

Resource classification systems for petroleum have developed over a long time. At first, they focused solely on oil and gas reserves, and less on important aspects like maturity and uncertainty.

Some important milestone influencing the development of the NPD system are listed below. (Several organisations has been involved in this kind of work, but only NPD, SPE and UNFC are included.)

- SPE 1988 Definitions of oil and gas reserves
 - Strict definition of reserves
- NPD 1994 Reserves in fields, resources in discoveries and undiscovered resources
- NPD 1997 Fields and discoveries can have resources (reserves) in several resource classes (different projects)
 - First introduction of the term project in resource classification
- NPD 2001 Resource classes and project status categories
 - Based on NPD 1997 with relative minor changes
- UNFC 2004 First framework classification including minerals and fossil fuels
- SPE 2007 Petroleum Resources Management System (PRMS)
 - First use of the term project by SPE
 - Most common system world-wide today
- UNFC 2009 Revised framework classification
 - Also being developed for renewables and CO2 storage
- SPE 2011 Guidelines for application of the Petroleum Resources Management System

- Definition of term project
- NPD 2016 Harmonize the description with terminology used in UNFC (and SPE PRMS)

As we can see from the list, updating of resource classifications is a never-ending story. SPE is planning an update in 2017 and the UNFC may be updated in 2018.

The recent update of the NPD's resource classification system

The NPD's Resource Classification System from 2001 was updated in 2016, but with only minor changes compared to the previous one, as all "boxes" are identical. The changes are mainly language improvements, including new names for some resource classes (boxes). The objective of the update was to harmonize the description with terminology used elsewhere, and clarify the relation to decision milestones used to define project maturation. We attempted, as much as possible, to use the same terminology as in international systems like UNFC and SPE PRMS. The new terminology will be implemented gradually, and will be used when the new resource account is published in February 2017. An overview of the system is shown below.

Definition of a project

A key term in the classification system is 'project'. This term has been used for a long time in resource classification without a proper definition, and was first defined in the SPE PRMS guidelines for 2011. We have used this definition for in this context:

- A project represents the link between the petroleum accumulation and the decision-making process, including budget allocation.
- A project may, for example, constitute the development of a single reservoir or field, or an incremental development in a producing field, or the integrated development of a group of several fields and associated facilities with a common ownership.
- In general, an individual project will represent a specific maturity level at which a decision is made on whether or not to proceed (i.e., spend money), and there should be an associated range of estimated recoverable resources for that project.

Decision milestones in the maturation of a project

There are a number of decision milestones in

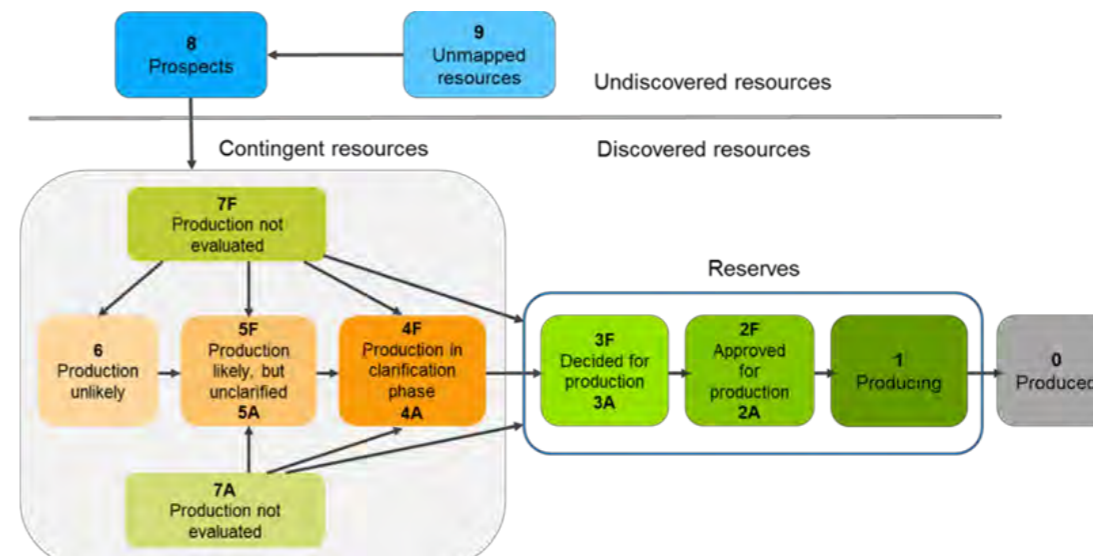


Figure 1. Schematic overview of the NPD 2016 resource classification system

the maturation of a project. These milestones are partly incorporated as terms and conditions in (newer) production licenses on the Norwegian continental shelf, and referred to in the PDO/PIO guidelines.

- Decision to initiate project - BOI: Start of feasibility studies.
- Decision to concretise - BOK: Milestone where the licensees have identified at least one technically and financially feasible concept that provides a basis for commencing studies that lead to concept selection.
- Decision to continue - BOV: Milestone where the licensees have selected a concept and make a decision to continue and initiate further studies that lead to a decision to implement.
- Decision to implement - BOG: Milestone where the licensees make an investment decision which results in the submission of a PDO or PIO.

In the project manuals in companies, these milestones may have different names and

abbreviations such as DG1, DG2 etc.

The outcome of all of these milestones could be a decision to take the project to the next phase and continue the work process. However, the decision could also be to shelve or postpone the project, or possibly to re-start the work with a different set of preconditions. In all instances, the classification will reflect relevant project maturation. Figure 2 below shows the connection between project maturation and resource classes, including a short description of the main activity in the phase leading up to the different milestones.

UNFC

UNFC stands for United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources. It is a universally acceptable and internationally applicable scheme for the classification and reporting of fossil energy and mineral reserves and resources developed by global expert group under the Committee on Sustainable Energy

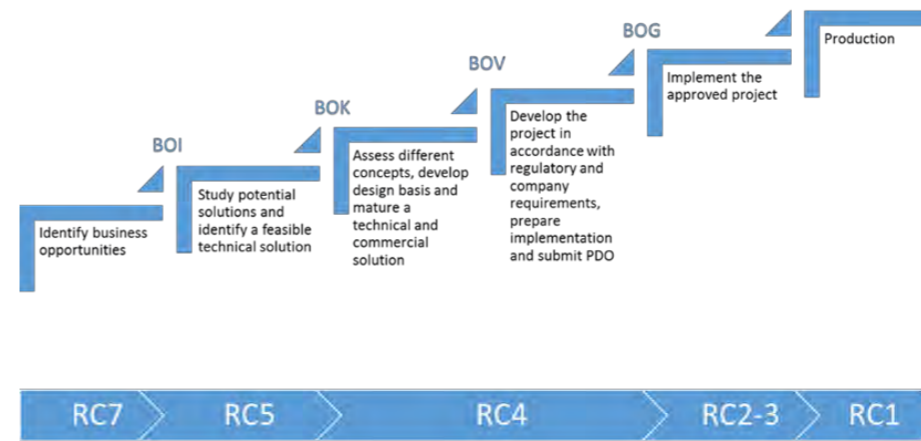


Figure 2. The connection between project maturation and resource classes

which is the main decision-making intergovernmental body at UNECE responsible for energy issues. And UNECE is the United Nations Economic Commission for Europe, which is based I Geneva.

UNFC-2009 is a generic principle-based system in which quantities are classified according to the three fundamental criteria of economic and social viability (E), field project status and feasibility (F), and geological knowledge (G), using a numerical and language independent coding scheme. Combinations of these criteria create a uniquely simple and applicable system.

The Expert Group that developed the UNFC comprises a broad range of stakeholders worldwide, including both UNECE and non-UNECE member countries, international organizations, industry, the financial community, professional societies and associations, and independent experts.

UNFC has been developed in close cooperation with the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) and the Society of Petroleum Engineers (SPE). UNFC maps directly to the CRIRSCO Template and the SPE-PRMS.

Reporting for the Revised National Budget (RNB)

According to Section 50a of the Petroleum Regulations, operators must submit data for the revised national budget (RNB).

Each autumn, all operating companies submit data and forecasts for their operated fields, discoveries, transportation- and utilization facilities (TUF). The reporting includes corporate financial data, projects, resource volumes and forecasts for production, costs and environmental discharges/emissions.

The reporting to the RNB contributes valuable data for the Government's oil and environmental policy, the fiscal and national budgets. Petroleum activities account for a substantial percentage of Norway's gross domestic product and total export. These forecasts are thus essential tools for the financial governance of Norway, and great emphasis is placed on ensuring that high-quality reporting is provided within the stated deadlines. NPD quality assures reported data, prepares its own estimates based on its own evaluations and assumptions, and prepares overall forecasts. The RNB-data

Geo Team Building

UNFC – The three criteria

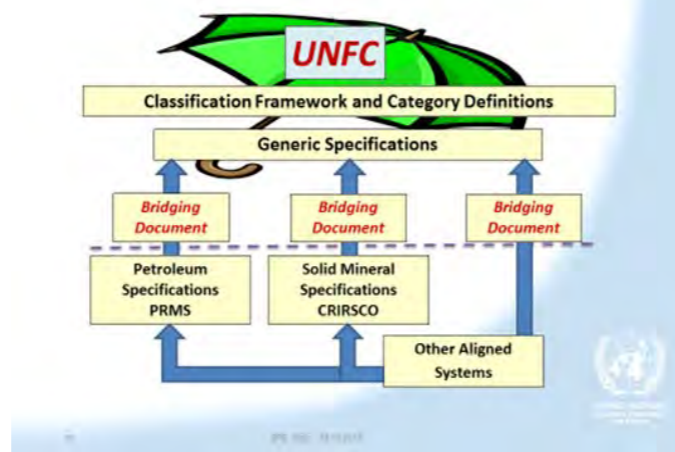
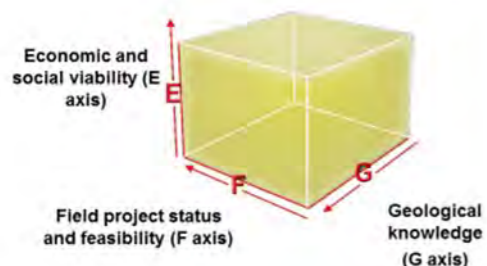


Figure 3. UNFC principles

Figure 4. Bridging from aligned systems to UNFC

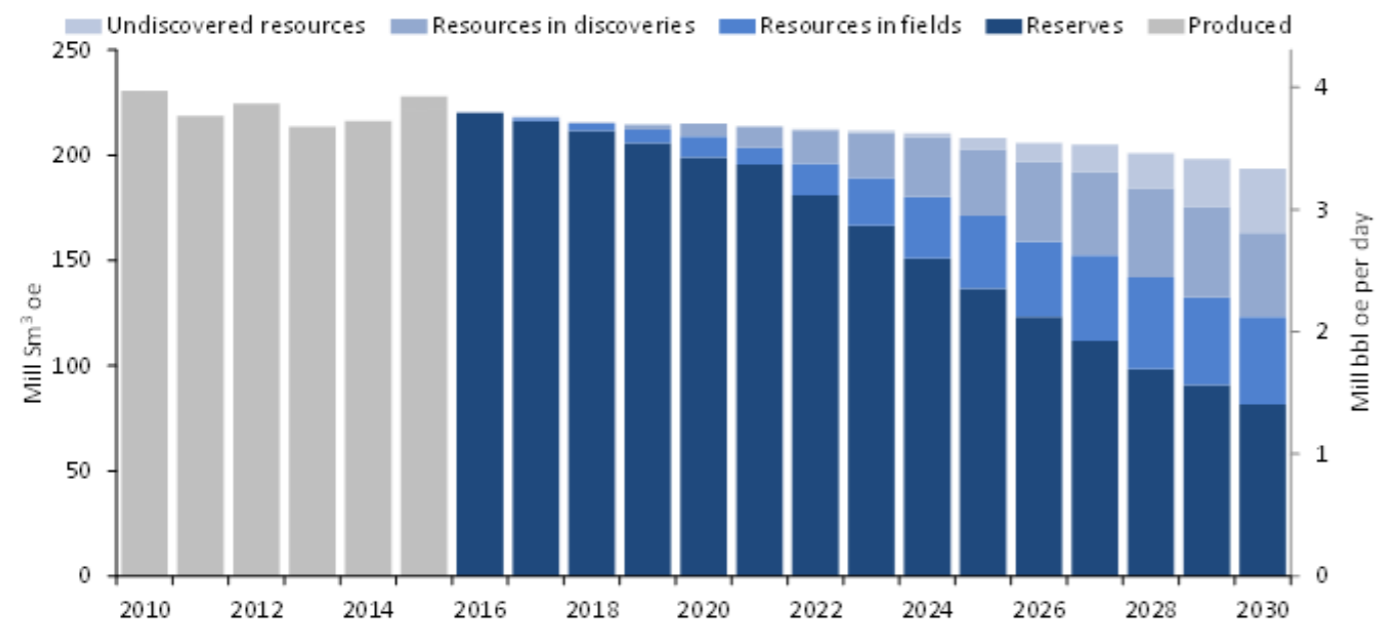


Figure 5 Production forecast (oil equivalents) based on RNB-2016 data from autumn 2015

are also a source for several other analysis and reports, both published and internal.

Annual status report for fields in production

The Annual Status Report (ASR) for fields in production shall be submitted to the NPD by November 1st each year. The information given in the ASR shall conform to, and include necessary explanations regarding prognoses and resource estimates given in the RNB-reporting.

Ministry of Petroleum and Energy. Also starting with the ASR for 2016, more emphasis is placed on governance, including risk management and time criticality for projects. The ASR forms the basis for the authorities' evaluation of whether a field is being operated in accordance with the preconditions specified in the legal framework. The ASR also form a basis for the application for production permit, including permit relating to flaring and cold venting.

Summary

Resource classification systems develop continuously. The NPD classification system has influenced and been influenced by the development of SPE PRMS. The systems are now

reasonable aligned. However, the NPD intends to keep a separate system due to advantages in separating what we call F (first) and A (additional) projects. Changing a system also implies changing in reporting forms and databases that may be complicated.

The operators reporting to the RNB Reporting and Annual Status Report for Fields are important, and provide valuable data for both the NPD and other governmental bodies in managing the petroleum sector. The reporting also comprise parts of the data that are shared with the industry and public through the NPD [Factpages](#) and the site [NorwegianPetroleum](#).

Geo Costa Rica



Costa Rica

is well-known around the world for its absence of army, high level of biodiversity and being one of the happiest countries in the world. Besides, Costa Rica is the limit of a convergent plate border between the Cocos and Caribbean Plates, causing an active volcanic arc with active tectonics associated and many other geological features. In other words, Costa Rica is a "playground" for geologists and explorers interested in solving the "geological puzzle". The oldest rocks here are around 180 million years old and are chunks of uplifted ocean floor called ophiolites. Various marine sedimentary rocks overlie the ophiolites and are in turn covered by younger volcanic rocks and recent deposits. Major volcanism ceased in southern Costa Rica around 8 million years ago and the intrusive rocks are mostly younger than 5 million years. The process of subduction would have resulted in metamorphism but there are almost no metamorphic rocks at the surface in Costa Rica. They are probably still buried deep in the crust. Many important deposits of hydrocarbons throughout the world are associated with karstified formations and exhibit highly varying properties (e.g., porosity, permeability, flow mechanisms). Hence, an interesting application is to use the hypogenic speleogenesis models in which H₂S dissolution mechanisms are involved, as well as analogous models for understanding carbonate reservoirs.

Volcanoes, caves, thermal energy and surfing ..

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Geo Altay



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"Altay", the "Gold Mountains" system of Asia, is located in the territory of Russia, Mongolia, China and Kazakhstan. You will see relics of the oceanic crust with pillow lava of Cambrian age and Ediacaran-Cambrian ophiolites; peridotites layers and gabbro (the very bottom of the Earth crust and upper Mantle metamorphosed to serpentinites and amphibolites). Igneous rocks: diorites with xenoliths of gabbro (Devonian), dolerite dikes (Permian) and epidote veins, mylonite. Huge deposits of glacial floods and mega floats. Tectonic mélange, hot contact zone of batholith and marbles, where skarns are formed on diopside-epidotot-garnet. Silurian sediments boundary. Different kinds of deformation. Ordovician clastic stratum, paleontological Devonian screes - corals and shells. Vermilion, mercury deposit (HgS). Geyser Lake. «Martian landscapes» of Devonian volcanic and sedimentary rocks and Cretaceous-Paleogene kaolin weathering crust with an angular unconformity. One kilometer of the Devonian outcrops. Neogene stromatolites – fossils cyanobacterial mats. Earthquake (2003). And much more... Also you will see barrows and petroglyphs at the Altay part of Great Silk Road going from eastern China! Mineralogical Museum, Archaeological Park. Mammoths and dinosaurs. Siberian cedars and flowering grasses. Altay and Mongolian local market.

Minimum 1 week trip.
In collaboration with Novosibirsk State University. Video of the trip is available on the website.

Plateau Putorana



The Great Permian extinction

The elevation of lava plateau (North Siberia) is a result of a huge mass of hot basalt outpouring. About 252 million years ago, a giant super volcano caused 96% marine and 70% terrestrial species extinction. The catastrophe is named "The Great Permian extinction", and it is the largest of five such extinctions in Earth's history. It is also considered as the end of the Paleozoic era and the beginning of the Mesozoic — a prosperous dinosaurs time. 34 mammals species live in the Putorana. The Putorana bighorn sheep is listed in the Red Book of Russia (state document of rare and endangered species). It was cut off from the general population and was formed as a separate subspecies about 15 thousands years ago.

1 week trip.
Minimum 1 week trip.
In collaboration with Novosibirsk State University. Wild nature, helicopter transfer.

Sailing in Fjords



Oslo and West Fjords, Norway

For engineer specialisations trip includes excursion to the shipyard and Norwegian offshore construction yards.

You will see the best parts of idyllic landscapes from the sea, offering a unique viewpoints. During the trip we will pass through narrow and deep bays, and a maze of islands, dotted with picturesque summer homes. Western Norway characterized by numerous fjords and valleys surrounded by high mountains. These steep mountainsides have led to several large rockslides and rock avalanches since the last glaciation. Regional and local geology is presented by Western Gneiss Region and offshore basement lineaments. You will see major faults areas, late Paleozoic and Mesozoic dike and near-shore Jurassic sediments.

The city of Oslo is located in a geologically interesting area in the middle of the Permian. Oslo Graben surrounded by Precambrian basement. Within the city and around the Oslo fjord you can find well exposed Permian igneous rocks and a down-faulted Lower Palaeozoic sequence preserved from erosion by the graben structure. The lower Palaeozoic marine shales and limestones form the low ground in the city centre and in Bærum and Asker to the SW while the Permian igneous rocks make up the high ground to the north and west.

1-2 days trip for Oslo Fjord, up to 1 week - West Fjords.

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