World Petroleum Council

Petroleum Resources Management System

Sponsored by:

Society of Petroleum Engineers (SPE)
American Association of Petroleum Geologists (AAPG)
World Petroleum Council (WPC)
Society of Petroleum Evaluation Engineers (SPEE)

World Petroleum Council

石油资源管理系统

Petroleum Resources Management System

根据 SPE 英文原版 PRMS 翻译

发起者：

石油工程师学会（SPE）

美国石油地质学家协会（AAPG）

世界石油大会（WPC）

石油评价工程师学会（SPEE）

翻译: 石油工程师学会石油天然气储量委员会 PRMS 英译中分会

本文是在 SPE 油气储量委员会(OGRC)指导之下翻译而成。英文版本是正式权威版本。如果译文中存有不当和疑问之处，皆以原文为主。

Table of Contents

PREAMBLE 3

1.0 BASIC PRINCIPLES AND DEFINITIONS 5

1.1 Petroleum Resources Classification Framework 5

1.2 Project-Based Resources Evaluations 10

2.0 CLASSIFICATION AND CATEGORIZATION GUIDELINES 13

2.1 Resources Classification 15

2.1.1 Determination of Discovery Status 15

2.1.2 Determination of Commerciality 15

2.1.3 Project Status and Commercial Risk 18

2.1.3.1 Project Maturity Sub-Classes 18

2.1.3.2 Reserves Status 21

2.1.3.3 Economic Status 23

2.2 Resources Categorization 23

2.2.1 Range of Uncertainty 23

2.2.2 Category Definitions and Guidelines 26

2.3 Incremental Projects 28

2.3.1 Workovers, Treatments, and Changes of Equipment 28

2.3.2 Compression 31

2.3.3 Infill Drilling 31

2.3.4 Improved Recovery 31

2.4 Unconventional Resources 31

3.0 EVALUATION AND REPORTING GUIDELINES 34

3.1 Commercial Evaluations 34

3.1.1 Cash-Flow-Based Resources Evaluations 34

3.1.2 Economic Criteria 37

3.1.3 Economic Limit 40

3.2 Production Measurement 40

3.2.1 Reference Point 40

3.2.2 Lease Fuel 42

3.2.3 Wet or Dry Natural Gas 42

3.2.4 Associated Non-Hydrocarbon Components 42

3.2.5 Natural Gas Re-Injection 42

3.2.6 Underground Natural Gas Storage 44

3.2.7 Production Balancing 44
3.3 Resources Entitlement and Recognition..... 44
3.3.1 Royalty 44
3.3.2 Production-Sharing Contract Reserves..... 47
3.3.3 Contract Extensions or Renewals..... 47

4.0 ESTIMATING RECOVERABLE QUANTITIES..... 49

4.1 Analytical Procedures 49
4.1.1 Analogs 49
4.1.2 Volumetric Estimate 51
4.1.3 Material Balance 51
4.1.4 Production Performance Analysis 54
4.2 Deterministic and Probabilistic Methods..... 54
4.2.1 Aggregation Methods..... 56
4.2.1.1 Aggregating Resources Classes..... 56

TABLE 1: RECOVERABLE RESOURCES CLASSES AND SUB-CLASSES..... 59

TABLE 2: RESERVES STATUS DEFINITIONS AND GUIDELINES..... 65

TABLE 3: RESERVES CATEGORY DEFINITIONS AND GUIDELINES 67

APPENDIX A: GLOSSARY OF TERMS USED IN RESOURCES EVALUATIONS 71

目　录

序言 4

1.0 基本原则和定义 6

1.1 石油资源分类框架 6

1.2 基于项目的资源评价 11

2.0 分级和分类准则 14

2.1 资源分级 16

2.1.1 发现状态的确定 16

2.1.2 商业性的确定 16

2.1.3 项目状态和商业风险 19

2.1.3.1 项目成熟度子级 19

2.1.3.2 储量状态 22

2.1.3.3 经济现状 24

2.2 资源分类 24

2.2.1 不确定性的范围 25

2.2.2 分类定义和准则 27

2.3 提高采收率项目 29

2.3.1 修井、产能处理和设备更换 29

2.3.2 压缩 32

2.3.3 加密井 32

2.3.4 提高采收 32

2.4 非常规资源 32

3.0 评价和报告准则 35

3.1 商业性评价 35

3.1.1 基于现金流的资源评价 35

3.1.2 经济标准 38

3.1.3 经济限度 41

3.2 产量计量 41

3.2.1 参考点 41

3.2.2 油田自用油气 43

3.2.3 湿气或干气 43

3.2.4 伴生非烃类组分 43

3.2.5 天然气回注 43

3.2.6 地下储气库 45

3.2.7 生产平衡 45

3.3 资源赋权和确认 45

3.3.1 采矿费 46

3.3.2 产品分成合同的储量 48

3.3.3 合同延期或续期 48

4.0 可采量估算 50

4.1 分析方法 50

4.1.1 类比法 50

4.1.2 容积法 52

4.1.3 物质平衡 52

4.1.4 生产动态分析 55

4.2 决定性法和概率法 55

4.2.1 汇总方法 57

4.2.1.1 各类资源汇总 58

表 1：可采资源级别和子级 60

表 2：储量状态的定义和准则 66

表 3：储量类别的定义和准则 68

附录A：资源评价使用的术语表 72

Chinese Translation Foreword

Petroleum resources and reserves represent important assets and values not only for oil and gas companies but also for many oil and gas producing nations. International efforts to standardize the definitions of petroleum resources and how they are estimated began in the 1930s. Several organizations, such as the Society of Petroleum Engineers (SPE), the Society of Petroleum Evaluation Engineers (SPEE), the American Association of Petroleum Geologists (AAPG), and the World Petroleum Council (WPC, formally known as the World Petroleum Congress), have made joint or independent efforts in formulating similar guidelines. In the last decade, several efforts converged from collaboration among the various organizations. The Petroleum Resources Management Systems (PRMS) was jointly sponsored and published by SPE, AAPG, WPC and SPEE in 2007. PRMS is quickly gaining increased recognition and adaptation worldwide by national and international organizations and regulatory bodies as well as internal applications for many oil companies. It was a major reference for the establishment of the new SEC reserves reporting rules that became effective January 2010.

Recognizing the wide acceptance and applications of PRMS, the SPE Oil and Gas Reserves Committee (OGRC) decided to translate the PRMS documents into other main languages to maintain the quality and integrity of the document as well as for the convenience of users who are more comfortable with their native languages. At the annual SPE OGRC meeting in October 2009, I was requested to lead the Chinese translation subcommittee. This is a multidisciplinary and complicated task. Like any other work in the society, it must rely on many volunteers to accomplish. The Chinese American Petroleum Association (CAPA) provided great support. In a short time, more than 20 volunteers heeded the call. All are experts in different areas covering all the disciplines in PRMS. At the same time, colleagues in China sent us two versions of their translation, one from PetroChina by Messrs Xin Jiang and Yongxiang Wang, the other from SinoChem by Messrs Shen Zhang and Dajing Zhang. We decided to start from the existing versions and go through several iterations of review and editing before finalizing. The translation criteria are set to be technical accuracy and linguistic fluency in that order. Though all of us on the translation subcommittee have done our best, it is unavoidable that some parts may not be most accurate and/or fluent. Users of this document are welcome to provide feedbacks. In case of any errors or misleading translations in the Chinese version, the original English version has the ultimate authority.

Acknowledgement

We thank SPE and OGRC for the opportunity to serve our Chinese readers of PRMS.

I cordially appreciated all the translation subcommittee members for sacrificing their time and effort and for their meticulous review and edit. The members are (not in any particular order): Bruce Zhucheng Shang, Anping Yang, David Chi, Xueying Xie, Liang-Biao Ouyang, John Yilin Wang, Kathy Wu, Doreen Chin, Chunmei Shi, Fengjun Zhang, Haiping Lu, Feng Liang, Baosheng Liang, Dengen Zhou, Dongjun (Taller) Fu, Yongsheng Zhu, Ying He, Scott Hou, Zhun Li.

We appreciate our colleagues in China: Xin Jiang, Yongxiang Wang, Shen Zhang and Dajing Zhang, whose translations have been great references for this work.

Bruce Z. Shang

PRMS英译中序言

石油资源及储量不仅是石油公司，而且也是油气生产国家财产和价值的重要代表．早在十九世纪三十年代，致力于石油资源的定义与评估标准化的努力在国际就已经开始了．有几家组织，像石油工程师学会(SPE) 、 石油评价工程师学会(SPEE)、 美国石油地质师协会(AAPG) 、和世界石油大会(WPC) 都曾联合、或单独编写过相似的指导纲领．在过去的十年中，各组织精心合作，汇总并于2007年由SPE、 AAPG、SPEE和WPC联合更新、并发表了石油资源管理系统(PRMS)． PRMS 一经发表，不仅世界上许多石油公司都在内部采用，而且各个国家和国际组织及立法机构也都纷纷接纳采用。 同时，它也是美国证卷交易委员会 (SEC) 新制订并于2010年一月已开始执行的油气储量报告规则的重要参考来源．

基于PRMS被广泛采用，SPE油气储量委员会(OGRC)决定将该文件译成其它主要语种，以方便各国同仁，同时确保翻译质量和忠实于原文并作为SPE的官方译本公布． 在2009年十月的SPE油气储量委员会年会上,委员会征求笔者发起并领导一个中文翻译分会．这是一项涉及多学科的非常复杂的任务．像学会的其它工作一样，都是需要依靠热心的志愿者来完成的． 该任务受到了美国华人石油协会的大力支持． 在很短的时间内，有二十多名志愿者积极参加翻译分会．志愿者们都是各个领域的专家，涵盖了油气资源管理系统所涉及的各个领域． 同时，我们也很快找到了国内同行的两个参考译本． 一是中国石油公司蒋新翻译、王永祥审核的版本，另一是中化公司的张申和张达景翻译的版本．我们决定从参考现有的译本，进行几轮的分工译审，最后定稿． 坚持准确性和流畅易读的标准．尽管各位参与者都很细心努力，但是仍然会有不妥之处．恳请各位读者不吝指正． 另外，凡有翻译不恰当之处，皆依原版英文文件为主．

鸣谢

感谢石油工程师学会及油气储量委员会提供给我们这次服务于石油业界中文读者的机会．

感谢各位PRMS中文翻译分会会员牺牲业余时间，积极认真的翻译和审核．会员名单如下(排名不分先后顺序) 尚柱成，杨安平，戚大鋭，谢雪英,欧阳良彪，王一林，吴心潮，覃耘,石春美，张风军，卢海萍，梁峰,梁保升，周登恩，傅东钧，朱永胜,贺莹，侯硕，李准．

感谢国内同仁提供的参考译本．特别鸣谢蒋新、王永祥、张申、张达景．

尚柱成

Petroleum Resources Management System

Preamble

Petroleum resources are the estimated quantities of hydrocarbons naturally occurring on or within the Earth's crust. Resource assessments estimate total quantities in known and yet-to-be- discovered accumulations; resources evaluations are focused on those quantities that can potentially be recovered and marketed by commercial projects. A petroleum resources management system provides a consistent approach to estimating petroleum quantities, evaluating development projects, and presenting results within a comprehensive classification framework.

International efforts to standardize the definitions of petroleum resources and how they are estimated began in the 1930s. Early guidance focused on Proved Reserves. Building on work initiated by the Society of Petroleum Evaluation Engineers (SPEE), SPE published definitions for all Reserves categories in 1987. In the same year, the World Petroleum Council (WPC, then known as the World Petroleum Congress), working independently, published Reserves definitions that were strikingly similar. In 1997, the two organizations jointly released a single set of definitions for Reserves that could be used worldwide. In 2000, the American Association of Petroleum Geologists (AAPG), SPE, and WPC jointly developed a classification system for all petroleum resources. This was followed by additional supporting documents: supplemental application evaluation guidelines (2001) and a glossary of terms utilized in resources definitions (2005). SPE also published standards for estimating and auditing reserves information (revised 2007).

These definitions and the related classification system are now in common use internationally within the petroleum industry. They provide a measure of comparability and reduce the subjective nature of resources estimation. However, the technologies employed in petroleum exploration, development, production, and processing continue to evolve and improve. The SPE Oil and Gas Reserves Committee works closely with other organizations to maintain the definitions and issues periodic revisions to keep current with evolving technologies and changing commercial opportunities.

This document consolidates, builds on, and replaces guidance previously contained in the 1997 Petroleum Reserves Definitions, the 2000 Petroleum Resources Classification and Definitions publications, and the 2001 "Guidelines for the Evaluation of Petroleum Reserves and Resources"; the latter document remains a valuable source of more detailed background information, and specific chapters are referenced herein. Appendix A is a consolidated glossary of terms used in resources evaluations and replaces those published in 2005.

These definitions and guidelines are designed to provide a common reference for the international petroleum industry, including 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. It is expected that this document will be supplemented with industry education programs and application guides addressing their implementation in a wide spectrum of technical and/or commercial settings.

It is understood that these definitions and guidelines allow flexibility for users and agencies to tailor application for their particular needs; however, any modifications to the guidance contained herein should be clearly identified. The definitions and guidelines contained in this document must not be construed as modifying the interpretation or application of any existing regulatory reporting requirements.

This SPE/WPC/AAPG/SPEE Petroleum Resources Management System document, including its Appendix, may be referred to by the abbreviated term "SPE-PRMS" with the caveat that the full title, including clear recognition of the co-sponsoring organizations, has been initially stated.

石油资源管理系统

序言

石油资源是地壳中自然形成的碳氢化合物即烃类。石油资源评估就是估算已知的和待发现的烃类总量；而资源评价则侧重于那些能被采出和出售的具有商业价值的的烃类数量。石油资源管理系统提供一套统一的方法用于估算石油资源量、评价开发项目，并在完整的资源分类框架下汇报评价结果。

国际上石油资源相关定义和评估方法标准化始于二十世纪三十年代。早期准则侧重在已证实储量。在石油评估工程师学会（SPEE）开创性工作的基础上，石油工程师学会（SPE）于 1987 年发布了储量分类的定义。同年，世界石油大会（WPC）独立制定并发布了与石油工程师学会惊人相似的储量定义。在 1997 年，这两个组织联合发布了一套统一的，可在世界上通用的储量定义。在 2000 年，美国石油地质协会（AAPG）、石油工程师学会（SPE）和世界石油大会（WPC）联合发布了石油资源的分类系统。随后，用于支持该分类系统的一些附加文件也陆续出版：如补充应用评价准则（2001 年）和资源定义相关术语汇编（2005 年）。石油工程师学会（SPE）还发布了评估和审计储量资料的标准（修订本 2007 年）。

目前，这些储量定义和相关的分类系统在世界石油界广泛使用。它们不仅提供了量度的可比性，而且降低资源估算的主观性。但是，石油勘探、开发、生产和加工处理所采用的技术还在不断发展和改进；因此，石油工程师学会（SPE）下属的石油和天然气储量委员会与其他组织密切合作，定期更新和修订相关定义及标准，以适应日新月异的技术和不断变化的商机。

本文件旨在改进并取代以前的有关准则，包括 1997 年的石油储量定义，2000 年的石油资源的分类及定义、和 2001 年的石油储量和资源评价准则。2001 年的石油储量和资源评价准则依然很有参考价值：它提供了很多详细的背景资料（本文件即参考了其中的一些特定章节）。附录 A 提供一套汇总的资源评价术语词表，这些词汇表取代 2005 年的相关版本。

本文中的定义和准则为国际石油工业、包括国家的报告和法规发布机构、提供了公用参考，并支持石油项目和资产组合管理的需求。它们旨在提高全球石油资源交流方面的透明度。预期将有工业教育课程和应用指南以辅助本文和推进在技术及商业领域的广泛实施。

Launch Windows Explorer.lnk 当然，这些定义和准则应允许用户和机构根据其特定需要，适当地修改或调整应用。但是，对于本文件的准则的任何修改都应清楚地标明。本文件的定义和准则绝不能理解成是对任何现有监管报告要求的解释或其应用的修改。

该 SPE/WPC/AAPG/SPEE 石油资源管理系统及其附录可被简称为“SPE-PRMS”，条件是必须事先明确标明该文件的全称及所有的发起组织。

1.0 Basic Principles and Definitions

The estimation of petroleum resource quantities involves the interpretation of volumes and values that have an inherent degree of uncertainty. These quantities are associated with development projects at various stages of design and implementation. Use of a consistent classification system enhances comparisons between projects, groups of projects, and total company portfolios according to forecast production profiles and recoveries**.** Such a system must consider both technical and commercial factors that impact the project's economic feasibility, its productive life, and its related cash flows.

1.1 Petroleum Resources Classification Framework

Petroleum is defined as a naturally occurring mixture consisting of hydrocarbons in the gaseous, liquid, or solid phase. Petroleum may also contain non-hydrocarbons, common examples of which are carbon dioxide, nitrogen, hydrogen sulfide and sulfur. In rare cases, non-hydrocarbon content could be greater than 50%.

The term "resources" as used herein is intended to encompass all quantities of petroleum naturally occurring on or within the Earth's crust, discovered and undiscovered (recoverable and unrecoverable), plus those quantities already produced. Further, it includes all types of petroleum whether currently considered "conventional" or "unconventional."

Figure 1-1 is a graphical representation of the SPE/WPC/AAPG/SPEE resources classification system. The system defines the major recoverable resources classes: Production, Reserves, Contingent Resources, and Prospective Resources, as well as Unrecoverable petroleum.

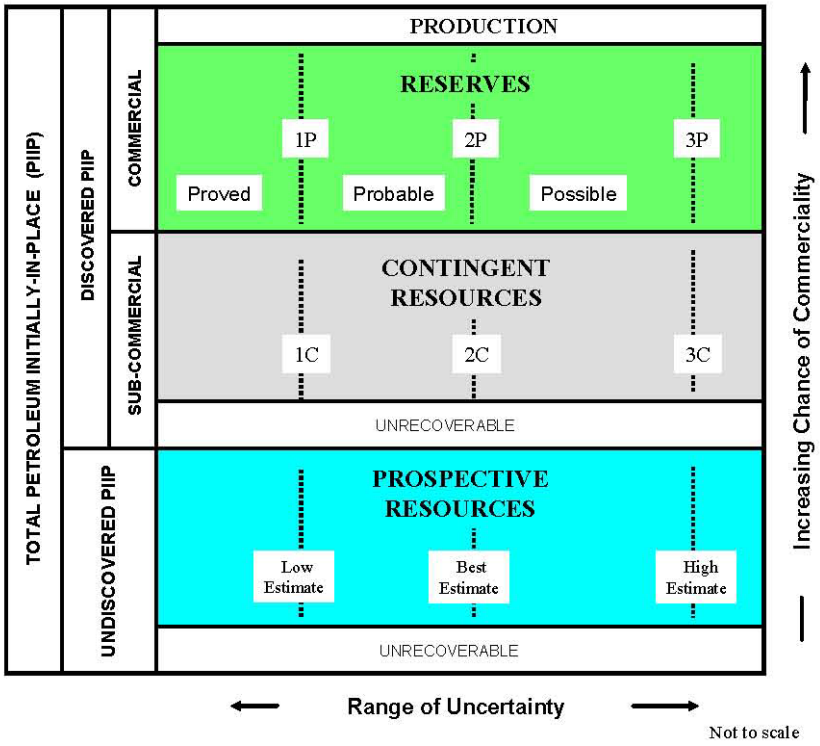


Figure 1-1: Resources Classification Framework.

The "Range of Uncertainty" reflects a range of estimated quantities potentially recoverable from an accumulation by a project, while the vertical axis represents the "Chance of Commerciality, that is, the chance that the project that will be developed and reach commercial producing status. The following definitions apply to the major subdivisions within the resources classification:

1.0 基本原则和定义

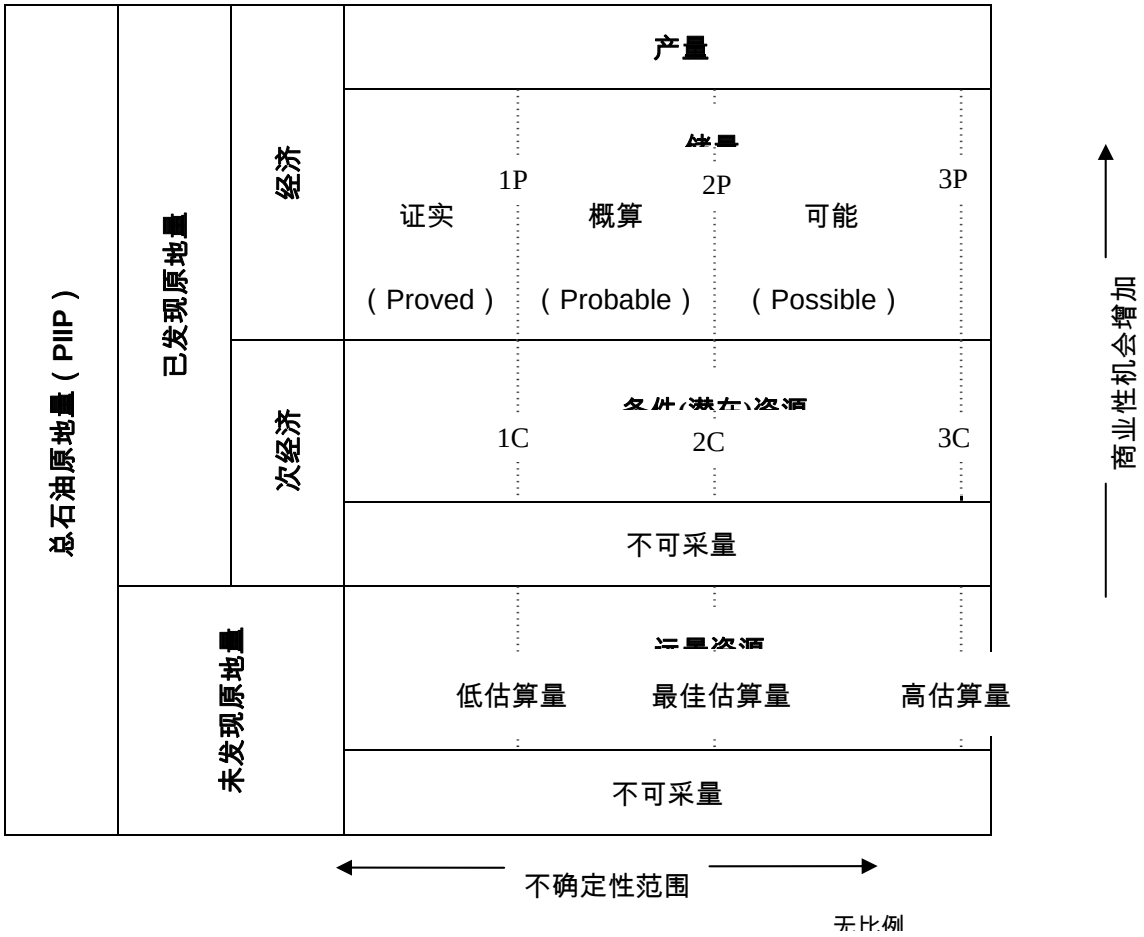
石油资源量的评估涉及对各种体积和数据的解释，这些体积和数据本身具有一定程度的不确定性。 石油资源量又与开发项目的设计和实施阶段联系在一起。根据预测的产量剖面和采油量，使用一致的分类体系可提高项目、项目组合和公司的总投资组合之间的可对比性。这一分类体系必须考虑到影响项目的经济可行性、生产年限和相关现金流的技术和商业因素。

1.1 石油资源分类框架

石油是指以气态、液态和固态自然存在的碳氢化合物。石油也可以含有非碳氢化合物。常见的有二氧化碳、氮、硫化氢和硫。这些非碳氢化合物的成分偶尔可以超过 50%。

本文使用的“资源（resources）”一词涵盖地壳中自然形成的所有石油量，包括已发现的，未发现的（可采的和不可采的），和已经产出的石油量。此外，它还包括所有类型的石油，无论目前被视为“常规”或“非常规”的石油。

图 1-1 显示了SPE/WPC/AAPG/SPEE的资源分类体系。该体系定义了主要的可采资源类别：产量（Production）、储量（Reserves）、有条件潜在资源 [1]（Contingent Resources）和远景资源（Prospective Resources），以及不可采的石油量（Unrecoverable petroleum）。



[1] Contingent Resources 的内涵是指钻探发现油气以后，由于存在市场、开采技术和商业性规模等不确定因素，暂不完全符合储量四个要素的那部分储量，我国现行的资源/储量分类也无法涵盖这一类别。从储量分类研究的发展趋势的角度，我们译为“条件潜在储量”因为 Contingent 强调开发条件而非强调油气是否存在的可能性.

图 1-1 资源分类框架

“不确定性范围（Range of Uncertainty）”反映了一个项目从某一石油聚集中潜在可采数量的评估范围。图 1-1 的纵轴表示“商业性的概率（Chance of Commerciality）”，即该项目投入开发和达到商业生产状态的概率。下列定义适用于资源分类的主要组成部分：

TOTAL PETROLEUM INITIALLY-IN-PLACE is that quantity of petroleum that is estimated to exist originally in naturally occurring accumulations. It includes that quantity of petroleum that is estimated, as of a given date, to be contained in known accumulations prior to production plus those estimated quantities in accumulations yet to be discovered (equivalent to "total resources").

DISCOVERED PETROLEUM INITIALLY-IN-PLACE is that quantity of petroleum that is estimated, as of a given date, to be contained in known accumulations prior to production.

PRODUCTION is the cumulative quantity of petroleum that has been recovered at a given date. While all recoverable resources are estimated and production is measured in terms of the sales product specifications, raw production (sales plus non-sales) quantities are also measured and required to support engineering analyses based on reservoir voidage (see Production Measurement, section 3.2).

Multiple development projects may be applied to each known accumulation, and each project will recover an estimated portion of the initially-in-place quantities. The projects shall be subdivided into Commercial and Sub-Commercial, with the estimated recoverable quantities being classified as Reserves and Contingent Resources respectively, as defined below.

RESERVES are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. Reserves must further satisfy four criteria: they must be discovered, recoverable, commercial, and remaining (as of the evaluation date) based on the development project(s) applied. Reserves are further categorized in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by development and production status.

CONTINGENT RESOURCES are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations, but the applied project(s) are not yet considered mature enough for commercial development due to one or more contingencies. Contingent Resources may include, for example, projects for which there are currently no viable markets, or where commercial recovery is dependent on technology under development, or where evaluation of the accumulation is insufficient to clearly assess commerciality. Contingent Resources are further categorized in accordance with the level of certainty associated with the estimates and may be subclassified based on project maturity and/or characterized by their economic status.

UNDISCOVERED PETROLEUM INITIALLY-IN-PLACE is that quantity of petroleum estimated, as of a given date, to be contained within accumulations yet to be discovered.

PROSPECTIVE RESOURCES are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects. Prospective Resources have both an associated chance of discovery and a chance of development. Prospective Resources are further subdivided in accordance with the level of certainty associated with recoverable estimates assuming their discovery and development and may be sub-classified based on project maturity.

UNRECOVERABLE is that portion of Discovered or Undiscovered Petroleum Initially-in-Place quantities which is estimated, as of a given date, not to be recoverable by future development projects. A portion of these quantities may become recoverable in the future as commercial circumstances change or technological developments occur; the remaining portion may never be recovered due to physical/chemical constraints represented by subsurface interaction of fluids and reservoir rocks.

总石油原地量（TOTAL PETROLEUM INITIALLY-IN-PLACE）是指原始存在于自然形成的石油聚集中的油气估算量。它包括在某给定日期所估算的生产之前油藏中存在的石油量以及尚未发现的石油量(相当于总资源量)。

已发现石油原地量（DISCOVERED PETROLEUM INITIALLY-IN-PLACE）已发现**石油原地量**是在某给定日期所估算的、在生产之前存在于已知聚集中的石油**量**。

产量是在某一时间之前累计产出的石油。虽然所有可采资源和产量都是以商业出售量作为计量单位，但是原始产量(销售量和非销售量)也需要计量的,以便进行油藏亏空的工程分析（见 3.2 节，产量计量）。

一个石油聚集可以有多个开发项目，每个开发项目可开采原始原地资源量的一部分。开发项目可划分为商业性的和次商业性的，相应资源则分为储量和条件潜在资源量。定义如下:

储量是在规定的条件下，从一个给定日期开始，通过对已知的石油聚集实施开发而预期可商业开采的石油量。储量必须进一步满足四个标准：已发现的、可开采的、具商业价值的和从既定开发项目实施起截止到评估日期而尚未产出的剩余量。依据评估的确定性程度，储量可进一步分类; 以项目成熟度, 储量再进一步分级; 还可以根据开发及生产状态对项目进行描述。

条件潜在资源(条件资源)是截止一个给定日期,通过实施开发项目,从已知的石油聚集中潜在可采出的油气估算量，但由于一个或多个条件，实施商业开发项目还尚未成熟。例如，潜在储量可以包括：目前没有可行市场的，或商业开采需依靠技术的进一步发展，以及对油气聚集的评价还不能充分地确认其商业性。依据评估的确定性程度，条件储量可进一步分类; 以项目成熟度可进一步分级; 也可根据经济状态对其进一步描述。

未发现石油原地量（UNDISCOVERED PETROLEUM INITIALLY-IN-PLACE）是截止一个给定日期在未发现石油聚集中的石油估算量。

远景资源是截止一个给定日期，通过未来开发项目的实施，未发现的石油聚集中潜在可开采的石油估算量。远景资源有相关的发现概率和开发概率两个因素。假设远景资源可发现和可开发，按照可开采的评估确定性程度可进一步分类, 也可按项目成熟度进一步分级。

不可采量（UNRECOVERABLE）是截止一个给定日期估计的未来开发项目不能采出的已发现或未发现的油气藏中原地资源量.一部分不可采量在将来由于经济和技术条件的变化,可能转化为可采量，但剩余部分则由于地下流体和储层的相互作用所代表的物理和化学方面的限制,可能永远都不会被采出。

Estimated Ultimate Recovery (EUR) is not a resources category, but a term that may be applied to any accumulation or group of accumulations (discovered or undiscovered) to define those quantities of petroleum estimated, as of a given date, to be potentially recoverable under defined technical and commercial conditions plus those quantities already produced (total of recoverable resources).

In specialized areas, such as basin potential studies, alternative terminology has been used; the total resources may be referred to as Total Resource Base or Hydrocarbon Endowment. Total recoverable or EUR may be termed Basin Potential. The sum of Reserves, Contingent Resources, and Prospective Resources may be referred to as "remaining recoverable resources." When such terms are used, it is important that each classification component of the summation also be provided. Moreover, these quantities should not be aggregated without due consideration of the varying degrees of technical and commercial risk involved with their classification.

1.2 Project-Based Resources Evaluations

The resources evaluation process consists of identifying a recovery project, or projects, associated with a petroleum accumulation(s), estimating the quantities of Petroleum Initially-in- Place, estimating that portion of those in-place quantities that can be recovered by each project, and classifying the project(s) based on its maturity status or chance of commerciality.

This concept of a project-based classification system is further clarified by examining the primary data sources contributing to an evaluation of net recoverable resources (see Figure 1-2) that may be described as follows:

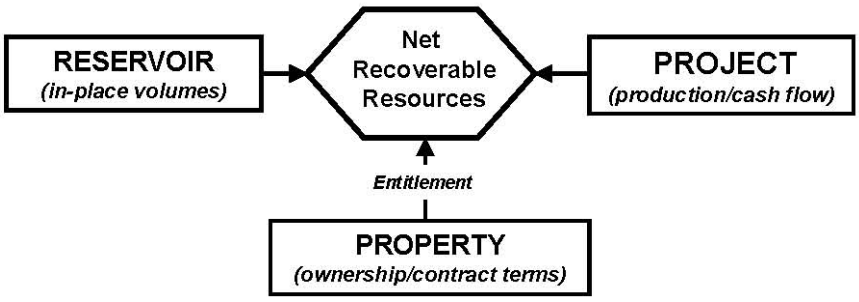


Figure 1-2: Resources Evaluation Data Sources.

- The Reservoir (accumulation): Key attributes include the types and quantities of Petroleum Initially-in-Place and the fluid and rock properties that affect petroleum recovery.
- The Project: Each project applied to a specific reservoir development generates a unique production and cash flow schedule. The time integration of these schedules taken to the project's technical, economic, or contractual limit defines the estimated recoverable resources and associated future net cash flow projections for each project. The ratio of EUR to Total Initially-in-Place quantities defines the ultimate recovery efficiency for the development project(s). A project may be defined at various levels and stages of maturity; it may include one or many wells and associated production and processing facilities. One project may develop many reservoirs, or many projects may be applied to one reservoir.
- The Property (lease or license area): Each property may have unique associated contractual rights and obligations including the fiscal terms. Such information allows definition of each participant's share of produced quantities (entitlement) and share of investments, expenses, and revenues for each recovery project and the reservoir to which it is applied. One property may encompass many reservoirs, or one reservoir may span several different properties. A property may contain both discovered and undiscovered accumulations.

估算最终可采量（Estimated Ultimate Recovery，EUR）不是一个资源类别，但这个术语可以适用于任何一个或一组油气聚集（发现的或未发现的），用来定义在给定日期和特定技术及商业条件下，潜在可采油气估算量加上已产出量（可采资源的总量）。

在一些特定的领域，如在盆地潜力研究中，也使用不同的术语，例如总资源可以称为总资源基数或烃类赋存。总可采量或最终可采量（EUR）可以称为盆地潜力。储量、条件储量和远景资源的总和可以称为“剩余可采资源”。在使用这些术语时，同时提供每个类别组成部分是非常重要的。此外，如果没有适当考虑各类别所包含的不同程度的技术和商业风险，这些不同类别的数量不应混合使用。

1.2 基于项目的资源评价

资源评价过程包括确定与某油气聚集相关的一个或多个项目，评估石油原地量和每个开发项目的可采量，以及根据成熟程度或商业概率对项目分级。

通过分析净可采资源评价的主要数据来源，我们可以进一步阐明以项目为基础的分级体系概念，如下所述（见图 1-2）。

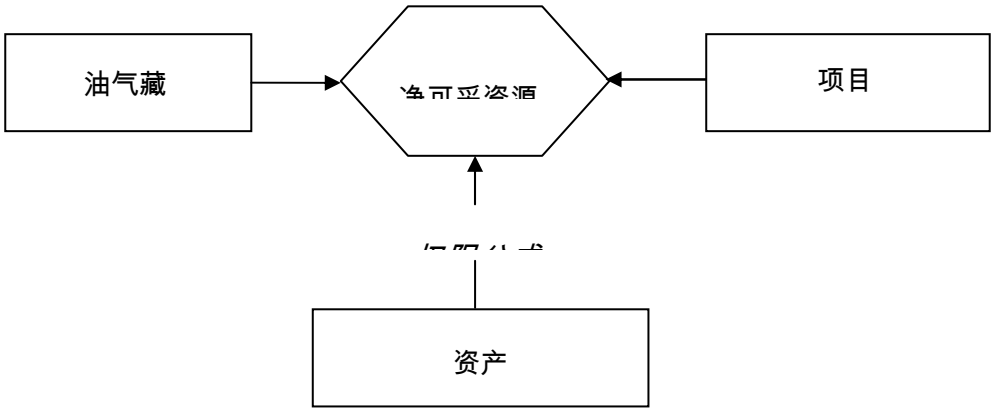


图 1-2 资源评价数据来源

- 油藏（油气聚集）：关键属性包括油气类型和原地量以及影响油气开采的流体和岩石性质。

- 项目：每个开发项目产生一个特定的生产计划和现金流量。这些生产计划和现金流量受制于项目的技术、经济或合同限度，其时间整合将决定每个项目的可采资源估算量和未来相应的净现金流量。 EUR 占总原地量的比例则是开发项目的最终采收率。一个项目可以定义在不同成熟水平和阶段，它可以包括一口或多口井、包括与这些井有关的产量和处理设施。一个项目可以开发多个油藏，或者多个项目开发一个油藏。

- 资产（租赁或**许可区**）：每个资产都可能有独特的相关合同权利与义务，包括财政条款。这些条款规定了各参与者的权益产量、投资份额、费用和每一个油藏开发项目的收入。一个资产可包括多个油藏，或者一个油藏可形成多个资产，资产可以是已发现油藏，也可以是未发现油藏。

In context of this data relationship, "project" is the primary element considered in this resources classification, and net recoverable resources are the incremental quantities derived from each project. Project represents the link between the petroleum accumulation and the decision-making process. A project may, for example, constitute the development of a single reservoir or field, or an incremental development for a producing field, or the integrated development of several fields and associated facilities with a common ownership. In general, an individual project will represent the level at which a decision is made whether or not to proceed (i.e., spend more money) and there should be an associated range of estimated recoverable quantities for that project.

An accumulation or potential accumulation of petroleum may be subject to several separate and distinct projects that are at different stages of exploration or development. Thus, an accumulation may have recoverable quantities in several resource classes simultaneously.

In order to assign recoverable resources of any class, a development plan needs to be defined consisting of one or more projects. Even for Prospective Resources, the estimates of recoverable quantities must be stated in terms of the sales products derived from a development program assuming successful discovery and commercial development. Given the major uncertainties involved at this early stage, the development program will not be of the detail expected in later stages of maturity. In most cases, recovery efficiency may be largely based on analogous projects. In-place quantities for which a feasible project cannot be defined using current or reasonably forecast improvements in, technology are classified as Unrecoverable.

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.

The resource quantities being estimated are those volumes producible from a project as measured according to delivery specifications at the point of sale or custody transfer (see Reference Point, section 3.2.1). The cumulative production from the evaluation date forward to cessation of production is the remaining recoverable quantity. The sum of the associated annual net cash flows yields the estimated future net revenue. When the cash flows are discounted according to a defined discount rate and time period, the summation of the discounted cash flows is termed net present value (NPV) of the project (see Evaluation and Reporting Guidelines, section 3.0).

The supporting data, analytical processes, and assumptions used in an evaluation should be documented in sufficient detail to allow an independent evaluator or auditor to clearly understand the basis for estimation and categorization of recoverable quantities and their classification.

2.0 Classification and Categorization Guidelines

To consistently characterize petroleum projects, evaluations of all resources should be conducted in the context of the full classification system as shown in Figure 1-1. These guidelines reference this classification system and support an evaluation in which projects are "classified" based on their chance of commerciality (the vertical axis) and estimates of recoverable and marketable quantities associated with each project are "categorized" to reflect uncertainty (the horizontal axis). The actual workflow of classification vs. categorization varies with individual projects and is often an iterative analysis process leading to a final report. "Report," as used herein, refers to the presentation of evaluation results within the business entity conducting the assessment and should not be construed as replacing guidelines for public disclosures under guidelines established by regulatory and/or other government agencies.

在此数据关系的背景下的，“项目”是该资源分类中首要考虑的元素，而净可采资源量是来自每个项目所产生的增量。项目代表油气聚集和决策过程之间的联系，举例来说，一个项目可能是一个单一的油藏或油田的开发，或者是对于一个生产中的油田逐步开发，又或者是在一个共有的多个油田及相关设施的综合开发。一般而言，一个独立的项目不仅代表该项目是否要实施这一决策层面（例如，花更多的钱），而且还代表其可采量的估算范围。

一个石油聚集或潜在石油聚集可能属于若干分开的和不同的项目，这些项目处于不同勘探或开发阶段。因此，一个石油聚集可能同时有几个资源级别的可采量。

为了确定某级别的可采资源量，我们需要制定一个由一个或多个项目构成的开发计划。即使是远景资源量，可采石油的估计也必须是基于假定能够成功发现的、商业开发的和出售的产品。由于早期阶段的不确定性很大，这种开发方案将不如成熟阶段的开发方案所期望的那样详细。在许多情况下，采收率主要是依据类比结果。使用当前和合理预期的未来技术不能立项开采的原地资源量应划分为不可采量。

并非所有在技术上可行的开发计划都能够商业化。一个开发项目的商业可行性依赖于项目执行期间的预测条件（见第 3.1 商业性评价）。“条件”包括技术的、经济的、法律的、环境的、社会的和政府因素。而经济因素可以概括为预测成本和产品价格，潜在的影响因素包括（但不仅限于）市场条件、运输及基础加工设施、财政条款和税金。

估算资源量是开发项目中能够用销售点或输油监测点（见第3.2.1基准点）的交货条款衡量出的产量。从评估日期开始到停止生产期间累计产量是剩余可采量。相应的年度净现金流量总和就是未来净收入。当现金流以某一折现率和折现期折现后，折现现金流的总和就是项目的净现值(NPV)。

在一个资源评估中应足够详细地记录所使用的支持数据、分析过程和假定条件，以便能让独立的评估师或审计师清楚地理解可采量分类、评估和分级的依据。

2.0 分级和分类准则

为了对石油项目有一致的描述，所有资源的评价应在图 1-1 所示的完整分类系统中进行。这些准则参照这个分类系统以帮助资源评价。其中，项目按商业机会（纵轴）进行“分级”，并按每个项目涉及的可采及市场估算量进行“分类”，以反映其不确定性（横轴）。实际的分类与分级工作流程随具体项目而变化，往往经过反复的分析过程才能得到最终报告。此处所用的“报告（Report）”一词是指在商业实体内部进行评估时，对评价结果的展示，不应该视其能取代公众披露准则。公众披露准则是在监管和其他政府机构的法规下设立的。

Additional background information on resources classification issues can be found in Chapter 2 of the 2001 SPE/WPC/AAPG publication: "Guidelines for the Evaluation of Petroleum Reserves and Resources," hereafter referred to as the "2001 Supplemental Guidelines."

2.1 Resources Classification

The basic classification requires establishment of criteria for a petroleum discovery and thereafter the distinction between commercial and sub-commercial projects in known accumulations (and hence between Reserves and Contingent Resources).

2.1.1 Determination of Discovery Status

A discovery is one petroleum accumulation, or several petroleum accumulations collectively, for which one or several exploratory wells have established through testing, sampling, and/or logging the existence of a significant quantity of potentially moveable hydrocarbons.

In this context, "significant" implies that there is evidence of a sufficient quantity of petroleum to justify estimating the in-place volume demonstrated by the well(s) and for evaluating the potential for economic recovery. Estimated recoverable quantities within such a discovered (known) accumulation(s) shall initially be classified as Contingent Resources pending definition of projects with sufficient chance of commercial development to reclassify all, or a portion, as Reserves. Where in-place hydrocarbons are identified but are not considered currently recoverable, such quantities may be classified as Discovered Unrecoverable, if considered appropriate for resource management purposes; a portion of these quantities may become recoverable resources in the future as commercial circumstances change or technological developments occur.

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.

To be included in the Reserves class, a project must be sufficiently defined to establish its commercial viability. There must be a reasonable expectation that all required internal and external approvals will be forthcoming, and there is evidence of firm intention to proceed with development within a reasonable time frame. A reasonable time frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. 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.

To be included in the Reserves class, there must be a high confidence in the commercial producibility of the reservoir as supported by actual production or formation tests. In certain cases, Reserves may be assigned on the basis of well logs and/or core analysis that indicate that the subject reservoir is hydrocarbon-bearing and is analogous to reservoirs in the same area that are producing or have demonstrated the ability to produce on formation tests.

有关资源分类问题的附加背景资料可以在2001年SPE/WPC/AAPG出版物的第2章中查到:"关于石油储量和资源评价的准则"，以下简称为"2001年补充准则"。

2.1 资源分级

基本分级需要建立石油发现的判别标准，以及后续的已知油气聚集的商业和次商业项目（储量和条件储量之间）的界限标准。

2.1.1 发现状态的确定

发现（discovery）是一个石油聚集或几个石油聚集的集合，通过一口或几口探井的测试，采样，和/或测井，已经证实相当数量的潜在可流动烃类的存在。

此处，"相当数量的"意味着有证据表明有足够油气、从而有必要对探井所显示的油气原地量进行评估并评价是否有经济开采的潜力。对此类发现的（已知的）石油聚集中评估出的可采量应首先归为条件潜在储量级，等待具有足够商业开发机会的项目来对其所有或部分重新分级为储量。如果确认有原地石油但不认为当前可开发，为了适当的资源管理可归为不可采发现。随着未来的商业环境变化或技术发展，这些数量的一部分有可能成为可采资源量。

2.1.2 商业性的确定

已经发现的可采量(条件潜在资源量)如果被认为可以商业开采就可能划分为储量，但拥有这些资源的公司一定要显示出坚定的开发意向，而且这种意向必须满足下列所有判别标准：

- 有受证据支持的一个合理的开发时间表
- 对此类开发项目未来经济效益的一个合理的评估，经济效益必须满足规定的投资和作业标准
- 对其全部石油或对至少可以支持项目开发的部分石油有一个合理的销售市场期望
- 有证据表明必需的生产和运输设施已经具备或可以具备
- 有证据表明在法律、合同、环境和其他社会及经济等有关方面将允许开发和实施此项目。

为了能够被划分为储量，一个项目必须是充分界定而具有商业可行性的，并有合理的期望能够得到所有内部和外部的批准，而且有证据表明（拥有这些资源的公司）有坚定的意向在一个合理期限内投入开发。启动开发的合理期限取决于项目的具体情况， 并根据项目的规模而改变。通常5年可以作为一个推荐的基准。但在某些情况下，例如，由于市场原因生产商决定推迟开发、或为了满

足合同或战略目标，也可允许更长一点的时间。但在所有的情况下，都必须清楚地记录将资源划分为储量的理由。

为了能够划分成储量，油藏的商业生产能力必须有高置信度，可以通过实际生产或地层测试对其支持。在一些情况下，如果测井资料或岩芯分析表明含油，并且本区的可类比油藏正在生产或者已通过地层测试显示出生产能力，这些油藏也可以划分为储量。

2.1.3 Project Status and Commercial Risk

Evaluators have the option to establish a more detailed resources classification reporting system that can also provide the basis for portfolio management by subdividing the chance of commerciality axis according to project maturity. Such sub-classes may be characterized by standard project maturity level descriptions (qualitative) and/or by their associated chance of reaching producing status (quantitative).

As a project moves to a higher level of maturity, there will be an increasing chance that the accumulation will be commercially developed. For Contingent and Prospective Resources, this can further be expressed as a quantitative chance estimate that incorporates two key underlying risk components:

- The chance that the potential accumulation will result in the discovery of petroleum. This is referred to as the "chance of discovery."
- Once discovered, the chance that the accumulation will be commercially developed is referred to as the "chance of development."

Thus, for an undiscovered accumulation, the "chance of commerciality" is the product of these two risk components. For a discovered accumulation where the "chance of discovery" is 100%, the "chance of commerciality" becomes equivalent to the "chance of development."

2.1.3.1 Project Maturity Sub-Classes

As illustrated in Figure 2-1, development projects (and their associated recoverable quantities) may be sub-classified according to project maturity levels and the associated actions (business decisions) required to move a project toward commercial production.

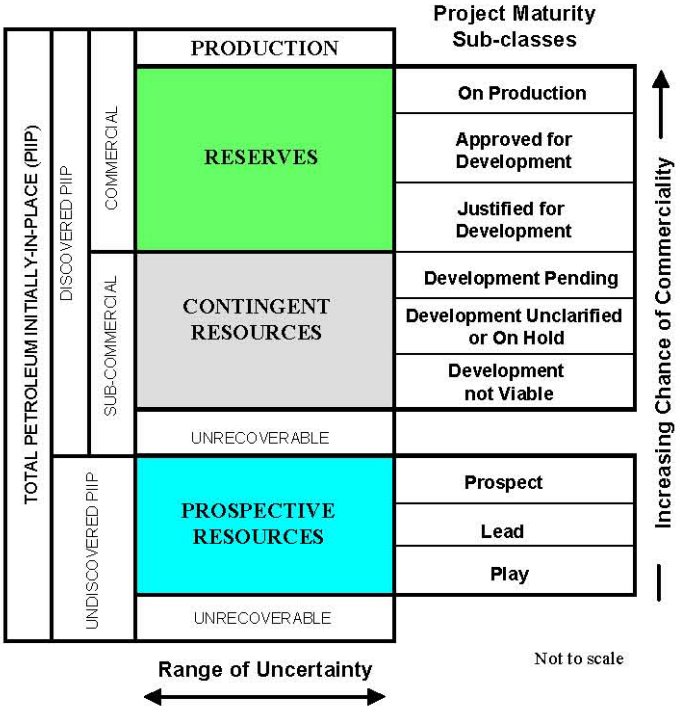


Figure 2-1: Sub-classes based on Project Maturity.

2.1.3 项目状态和商业风险

评估师可以选择根据项目成熟度进一步细分商业概率坐标轴而建立一个更详细的资源分类报告系统,从而为资源组合管理提供基础。这一次级分级可根据标准的项目成熟水平特征(定性的) 或者根据能达到开采状态的概率 (定量的), 也可二者兼用。

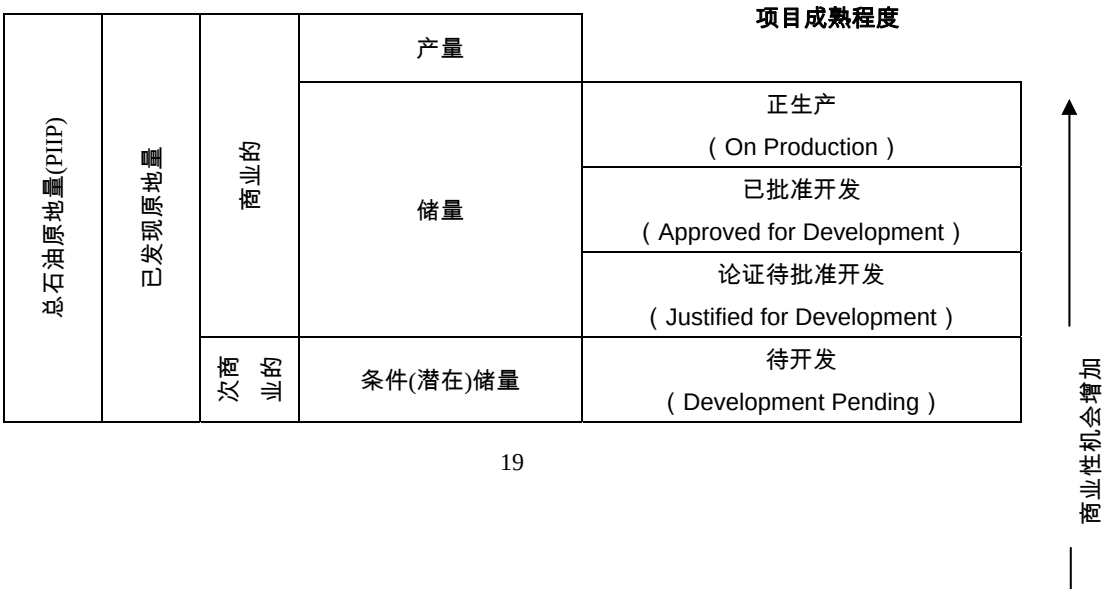
随着项目的不断成熟，油藏将被商业开发的概率增加。对于条件潜在资源量和远景资源量来说，也可以进一步用定量的概率来表示，其中所包括的两个关键的根本风险因素是：

- 潜在的油藏可能被发现的概率, 被称为“发现概率.”
- 一旦被发现，这个油藏能够被商业开发的机会，被称为“开发概率.”

因此，对于一个未被发现的油藏，它的“商业概率”是这两个因素的乘积。对于一个已经发现的油藏，由于它的发现概率已经是 100%，因此，已发现油藏的“商业概率”与它的开发概率相同。

2.1.3.1 项目成熟度子级

如图 2-1 所示，开发项目（及其相应的可采量）可以分为子级，子级的划分是根据项目成熟度水平和项目向商业生产运行所需的相关活动（业务决策）。



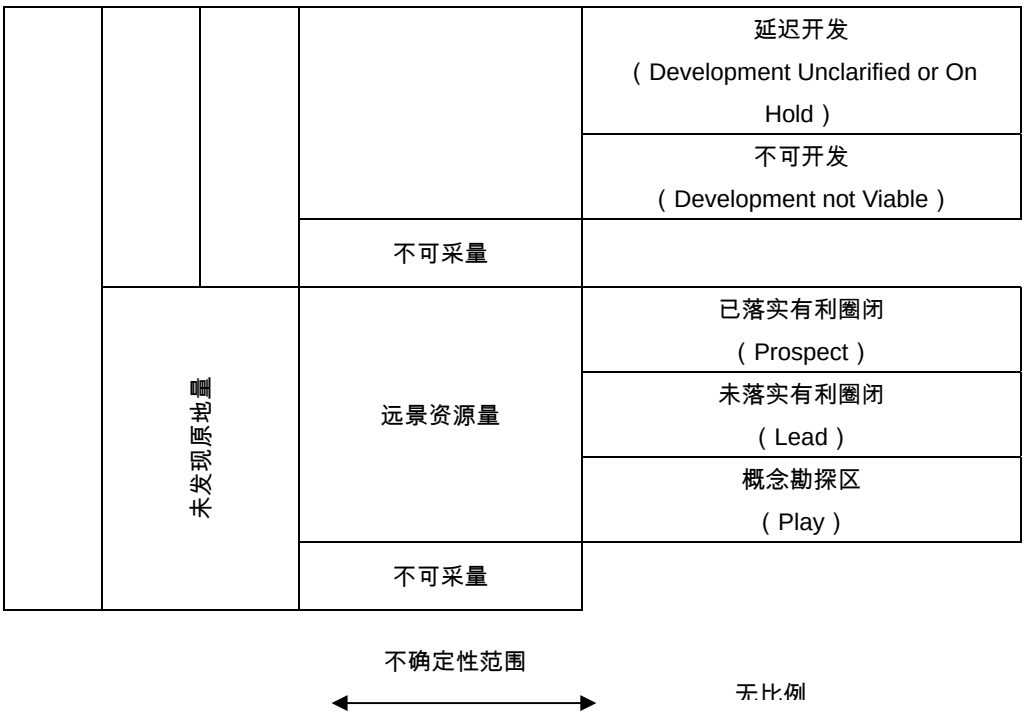


图 2-1 基于项目成熟度的子级

Project Maturity terminology and definitions have been modified from the example provided in the 2001 Supplemental Guidelines, Chapter 2. Detailed definitions and guidelines for each Project Maturity sub-class are provided in Table I. This approach supports managing portfolios of opportunities at various stages of exploration and development and may be supplemented by associated quantitative estimates of chance of commerciality. The boundaries between different levels of project maturity may be referred to as "decision gates."

Decisions within the Reserves class are based on those actions that progress a project through final approvals to implementation and initiation of production and product sales. For Contingent Resources, supporting analysis should focus on gathering data and performing analyses to clarify and then mitigate those key conditions, or contingencies, that prevent commercial development.

For Prospective Resources, these potential accumulations are evaluated according to their chance of discovery and, assuming a discovery, the estimated quantities that would be recoverable under appropriate development projects. The decision at each phase is to undertake further data acquisition and/or studies designed to move the project to a level of technical and commercial maturity where a decision can be made to proceed with exploration drilling.

Evaluators may adopt alternative sub-classes and project maturity modifiers, but the concept of increasing chance of commerciality should be a key enabler in applying the overall classification system and supporting portfolio management.

2.1.3.2 Reserves Status

Once projects satisfy commercial risk criteria, the associated quantities are classified as Reserves. These quantities may be allocated to the following subdivisions based on the funding and operational status of wells and associated facilities within the reservoir development plan (detailed definitions and guidelines are provided in Table 2):

- 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.
- Undeveloped Reserves are quantities expected to be recovered through future investments.

Where Reserves remain undeveloped beyond a reasonable timeframe, or have remained undeveloped due to repeated postponements, evaluations should be critically reviewed to document reasons for the delay in initiating development and justify retaining these quantities within the Reserves class. While there are specific circumstances where a longer delay (see Determination of Commerciality, section 2.1.2) is justified, a reasonable time frame is generally considered to be less than 5 years.

Development and production status are of significant importance for project management. While Reserves Status has traditionally only been applied to Proved Reserves, the same concept of Developed and Undeveloped Status based on the funding and operational status of wells and producing facilities within the development project are applicable throughout the full range of Reserves uncertainty categories (Proved, Probable and Possible).

Quantities may be subdivided by Reserves Status independent of sub-classification by Project Maturity. If applied in combination, Developed and/or Undeveloped Reserves quantities may be identified separately within each Reserves sub-class (On Production, Approved for Development, and Justified for Development).

2001 年补充准则第二章所提供实例的项目成熟度术语和定义已经被修改。表 1 提供了每个项目成熟度子级的详细定义和准则。此方案有助于管理不同勘探和开发阶段的投资机会组合，也可辅之以相关的商业性机会的定量评估。不同项目成熟度级别之间界面可称为“决策门（decision gates）”。

储量级别内的决策是基于项目的进展行动，包括一个项目通过最终审批到实施、生产启动和产品销售。对于条件潜在储量的支持应侧重于收集数据并进行分析，以阐明和应对那些阻碍商业开发的关键条件和不确定因素。

对于远景资源，这些潜在石油聚集是根据其发现概率，和假设已发现而在适当开发项目下所估算可采量来评价的。在每一阶段的决策是着手进一步的数据采集和/或研究，旨在把项目运行到一个能够作出开始钻探决策的商业成熟度和技术级别。

评估师可能会采用其他的子级和项目成熟度修饰语，但加强商业性机会的概念应该是将其用于整体分类系统和支持投资组合管理的一个关键推动力。

2.1.3.2 储量状态

一旦项目满足商业风险的判别标准，相关的评估量被分类为储量。基于油藏开发方案内的资金到位及钻井和设施的操作状态，这些储量可如下细分（表 2 提供了详细定义和准则）：

- 已开发储量（Developed Reserves）是通过现已钻的井和设施，预计可采出的储量。
  - 已开发正生产储量是从评估时开井和正生产的完井层段，预计可采出的储量。
  - 已开发未生产储量包括关井和管外储量。
- 未开发储量（Undeveloped Reserves）是通过未来的投资，预计可采出的储量。

如果储量未开发超出一个合理的期限，或由于反复延期而继续保持未开发，评估应审慎复查. 应将延迟启动开发的原因说明在案，并给出证据保留这些石油数量为储量级别。尽管在具体的情况下，较长的延迟（见第 2.1.2 节，商业性的确定）是可以证明合理的，但合理的期限普遍被视为少于五年。

开发和生产的状态对于项目管理具有重要意义。尽管储量状态按惯例只适用于证实储量，但同样已开发和未开发状态的概念，和基于油田开发方案内的钻井及设施的资金及操作状态，也适用于储量不确定性分类的整个范围（证实、概算和可能）。

无论哪个项目成熟度子级，其储量均可以根据储量状态细分。 如果结合成熟度，已开发和未开发储量可以分别在每个储量子级中确认出来(正生产，已批准开发和经论证待批准开发).

2.1.3.3 Economic Status

Projects may be further characterized by their Economic Status. All projects classified as Reserves must be economic under defined conditions (see Commercial Evaluations, section 3.1). Based on assumptions regarding future conditions and their impact on ultimate economic viability, projects currently classified as Contingent Resources may be broadly divided into two groups:

- Marginal Contingent Resources are those quantities associated with technically feasible projects that are either currently economic or projected to be economic under reasonably forecasted improvements in commercial conditions but are not committed for development because of one or more contingencies.
- Sub-Marginal Contingent Resources are those quantities associated with discoveries for which analysis indicates that technically feasible development projects would not be economic and/or other contingencies would not be satisfied under current or reasonably forecasted improvements in commercial conditions. These projects nonetheless should be retained in the inventory of discovered resources pending unforeseen major changes in commercial conditions.

Where evaluations are incomplete such that it is premature to clearly define ultimate chance of commerciality, it is acceptable to note that project economic status is "undetermined." Additional economic status modifiers may be applied to further characterize recoverable quantities; for example, non-sales (lease fuel, flare, and losses) may be separately identified and documented in addition to sales quantities for both production and recoverable resource estimates (see also Reference Point, section 3.2.1). Those discovered in-place volumes for which a feasible development project cannot be defined using current, or reasonably forecast improvements in, technology are classified as Unrecoverable.

Economic Status may be identified independently of, or applied in combination with, Project Maturity sub-classification to more completely describe the project and its associated resources.

2.2 Resources Categorization

The horizontal axis in the Resources Classification (Figure 1.1) defines the range of uncertainty in estimates of the quantities of recoverable, or potentially recoverable, petroleum associated with a project. These estimates include both technical and commercial uncertainty components as follows:

- The total petroleum remaining within the accumulation (in-place resources).
- That portion of the in-place petroleum that can be recovered by applying a defined development project or projects.
- Variations in the commercial conditions that may impact the quantities recovered and sold (e.g., market availability, contractual changes).

Where commercial uncertainties are such that there is significant risk that the complete project (as initially defined) will not proceed, it is advised to create a separate project classified as Contingent Resources with an appropriate chance of commerciality.

2.2.1 Range of Uncertainty

The range of uncertainty of the recoverable and/or potentially recoverable volumes may be represented by either deterministic scenarios or by a probability distribution (see Deterministic and Probabilistic Methods, section 4.2).

When the range of uncertainty is represented by a probability distribution, a low, best, and high estimate shall be provided such that:

2.1.3.3 经济现状

项目可以依据其经济状态来进一步地描述。所有具有储量的项目必须在确定的条件下是经济可行的(参阅第3.1节，商业性评估)。在假设的未来条件和它们对最终经济可行性影响的基础上，目前分级为条件潜在储量的项目可以概括性地分为下面两类：

边际潜在资源量

边际潜在资源量是技术上可行的，它们或者目前就是经济的，或者是合理预期商业条件改善的情况下是经济的，但由于一种或多种条件的限制目前尚未被承诺进行开发的资源量。

次边际潜在资源量

次边际潜在资源量是那些已发现的、经过分析表明在技术上可以开发的油气资源量，但目前在经济上或因其它不确定因素是不可行的，或者是合理预测商业条件的改善也不能满足开发的必要条件。但这些项目还是应该归于已发现的资源量，等待商业条件中不可预见的重大变化。

在评估不完整，例如在不具备条件能清楚地定义最终的商业机会的情况下，可以标明项目的经济状态是“不确定的”。可用其它一些经济状态的术语来对可采量进行描述，例如，除了在产和可采资源量中销售量外，非销售量(燃料油、燃烧的气和损失等)也可以分开进行确认记录(参阅第3.2.1节，参考点)。那些已经发现的、但在目前或可预期的未来技术条件下不能开发的原地资源量应被划分为不可采量。

经济状态可以独立地、或与项目成熟度一起用于详细分级，以便更全面地描述项目及相关资源。

2.2 资源分类

在资源分类(图 1.1)中的横轴定义对项目石油可采量或潜在可采量评估的不确定性范围，这些评估包括如下技术的和商业的不确定成分：

- 保留在石油聚集中的总石油量（原地资源量）。
- 通过限定开发项目可以采出的那部分石油原地量。
- 变化的商业条件可能会影响可采量和销售量（例如，市场供给状况，合同变更）。

当商业不确定性很大，以致（最初限定的）项目将不会完全进行时，建议设立一个单独的项目，归类到与商业性机会相应的条件潜在储量中。

2.2.1 不确定性的范围

可采量和/或潜在可采量的不确定性范围，可以通过各种决定性情景或概率分布来表示（见第 4.2 节决定性和概率法）。

当不确定性的范围通过一个概率分布来表示时，低估算量、最佳估算量和高估算量应按如下给出：

- There should be at least a 90% probability (P90) that the quantities actually recovered will equal or exceed the low estimate.
- There should be at least a 50% probability (P50) that the quantities actually recovered will equal or exceed the best estimate.
- There should be at least a 10% probability (P10) that the quantities actually recovered will equal or exceed the high estimate.

When using the deterministic scenario method, typically there should also be low, best, and high estimates, where such estimates are based on qualitative assessments of relative uncertainty using consistent interpretation guidelines. Under the deterministic incremental (risk-based) approach, quantities at each level of uncertainty are estimated discretely and separately (see Category Definitions and Guidelines, section 2.2.2).

These same approaches to describing uncertainty may be applied to Reserves, Contingent Resources, and Prospective Resources. While there may be significant risk that sub-commercial and undiscovered accumulations will not achieve commercial production, it useful to consider the range of potentially recoverable quantities independently of such a risk or consideration of the resource class to which the quantities will be assigned.

2.2.2 Category Definitions and Guidelines

Evaluators may assess recoverable quantities and categorize results by uncertainty using the deterministic incremental (risk-based) approach, the deterministic scenario (cumulative) approach, or probabilistic methods. (see "2001 Supplemental Guidelines," Chapter 2.5). In many cases, a combination of approaches is used.

Use of consistent terminology (Figure 1.1) promotes clarity in communication of evaluation results. For Reserves, the general cumulative terms low/best/high estimates are denoted as 1P/2P/3P, respectively. The associated incremental quantities are termed Proved, Probable and Possible. Reserves are a subset of, and must be viewed within context of, the complete resources classification system. While the categorization criteria are proposed specifically for Reserves, in most cases, they can be equally applied to Contingent and Prospective Resources conditional upon their satisfying the criteria for discovery and/or development.

For Contingent Resources, the general cumulative terms low/best/high estimates are denoted as 1C/2C/3C respectively. For Prospective Resources, the general cumulative terms low/best/high estimates still apply. No specific terms are defined for incremental quantities within Contingent and Prospective Resources.

Without new technical information, there should be no change in the distribution of technically recoverable volumes and their categorization boundaries when conditions are satisfied sufficiently to reclassify a project from Contingent Resources to Reserves. All evaluations require application of a consistent set of forecast conditions, including assumed future costs and prices, for both classification of projects and categorization of estimated quantities recovered by each project (see Commercial Evaluations, section 3.1).

Table III presents category definitions and provides guidelines designed to promote consistency in resource assessments. The following summarizes the definitions for each Reserves category in terms of both the deterministic incremental approach and scenario approach and also provides the probability criteria if probabilistic methods are applied.

- 实际采出量等于或超过低估算量的概率至少应为 90%（P90）。
- 实际采出量等于或超过最佳估算量的概率至少应为 50%（P50）。
- 实际采出量等于或超过高估算量的概率至少应为 10%（P10）。

当使用决定性情景法时，通常也应该有低估算量、最佳估算量和高估算量，这些评估使用一致的解释准则对相对不确定性进行定性评估。根据决定性增量（以风险为基础）方法，对应不确定性的每个级别数量都要分开单独评估（见第 2.2.2 节分级定义和准则）。

同样，这些描述不确定性的方法可以适用于储量、条件潜在储量和远景资源。尽管次经济和未发现石油聚集有重大风险而且可能达不到商业化生产，但独立于这些风险之外，而考虑潜其可采量的范围或考虑将其分配到不同资源类别的数量仍然是有益的。

2.2.2 分类定义和准则

评估师可用不确定性来评估可采量并对其分类，所用方法有决定性增量（以风险为基础）法、决定性情景法（累积）或概率法。（见“2001 补充准则”，第 2.5 章）。在许多情况下，几种方法可结合使用。

采用一致的术语（图 1.1），可以促进评估结果的清晰交流。对于储量，一般的累积性术语是低/最佳/高估算量，分别表示为 1P/2P/3P。对应的增量称为证实、概算和可能。储量是完整资源分类系统的一个子集，并且必须在完整资源分类系统的背景下来考虑。尽管该分类标准是为储量专门制订的，但在大多数情况下，这些分类判别标准可以同样适用于条件潜在储量和远景资源，只要它们满足发现和/或开发的判别标准。

对于条件潜在储量，一般的累积性用语，即低/最佳/高估算量，分别用 1C/2C/3C 表示。对于远景资源，一般的累积性用语，即低/最佳/高估算量，仍然适用。没有具体的术语用于条件潜在储量和远景资源的增量。

当有充分条件把一个项目从条件潜在储量重新分类到储量时，没有新的技术资料，不应该改变项目的技术可采量和可采量的分类界限。对于项目的分级和每个项目可采估算量的分类，所有的评估都要用一套一致的预测条件，包括假定的未来成本和价格（见第 3.1 节商业评价）。

表 III 介绍了分类的定义，旨在促进资源评价使用一致性的准则。下面根据决定性增量方法和决定性情景法，概述每个类别储量的定义，如果应用概率法，还提供了概率准则。

- Proved Reserves are those quantities of petroleum, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined 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 a 90% probability that the quantities actually recovered will equal or exceed the estimate.
- Probable Reserves are those additional Reserves which analysis of geoscience and engineering data indicate are less likely to be recovered than Proved Reserves but more certain to be recovered than Possible Reserves. It is equally likely that actual remaining quantities recovered will be greater than or less than the sum of the estimated Proved plus Probable Reserves (2P). In this context, when probabilistic methods are used, there should be at least a 50% probability that the actual quantities recovered will equal or exceed the 2P estimate.
- Possible Reserves are those additional reserves which analysis of geoscience and engineering data suggest are less likely to be recoverable than Probable Reserves. The total quantities ultimately recovered from the project have a low probability to exceed the sum of Proved plus Probable plus Possible (3P) Reserves, which is equivalent to the high estimate scenario. In this context, when probabilistic methods are used, there should be at least a 10% probability that the actual quantities recovered will equal or exceed the 3P estimate.

Based on additional data and updated interpretations that indicate increased certainty, portions of Possible and Probable Reserves may be re-categorized as Probable and Proved Reserves.

Uncertainty in resource estimates is best communicated by reporting a range of potential results. However, if it is required to report a single representative result, the "best estimate" is considered the most realistic assessment of recoverable quantities. It is generally considered to represent the sum of Proved and Probable estimates (2P) when using the deterministic scenario or the probabilistic assessment methods. It should be noted that under the deterministic incremental (risk-based) approach, discrete estimates are made for each category, and they should not be aggregated without due consideration of their associated risk (see "2001 Supplemental Guidelines," Chapter 2.5).

2.3 Incremental Projects

The initial resource assessment is based on application of a defined initial development project. Incremental projects are designed to increase recovery efficiency and/or to accelerate production through making changes to wells or facilities, infill drilling, or improved recovery. Such projects should be classified according to the same criteria as initial projects. Related incremental quantities are similarly categorized on certainty of recovery. The projected increased recovery can be included in estimated Reserves if the degree of commitment is such that the project will be developed and placed on production within a reasonable timeframe.

Circumstances where development will be significantly delayed should be clearly documented. If there is significant project risk, forecast incremental recoveries may be similarly categorized but should be classified as Contingent Resources (see Determination of Commerciality, section 2.1.2).

2.3.1 Workovers, Treatments, and Changes of Equipment

Incremental recovery associated with future workover, treatment (including hydraulic fracturing), re-treatment, changes of equipment, or other mechanical procedures where such projects have routinely been successful in analogous reservoirs may be classified as Developed or Undeveloped Reserves depending on the magnitude of associated costs required (see Reserves Status, section 2.1.3.2).

- 证实储量是通过地球科学和工程数据分析，在规定的经济条件、作业方法和政府制度下，从一个给定日期之后，以合理的确定性评估从已知油藏可商业开采的石油量。如果采用决定性法，“合理的确定性”用来表示可采量具有高置信度。如果采用的是概率法，实际的采出量等于或超过估算量的概率至少有 90%。

- 概算储量是那些通过地学和工程数据分析表明其采出的可能性小于证实储量的递增储量，但它比可能储量有更多的确定性被采出。实际剩余的可采量有同等的可能性会大于或小于证实储量加上概算储量之和（2P）。因此，当采用概率法时，实际采出量等于或超过 2P 估算量的概率应至少有 50%。

- 可能储量是那些通过地球科学和工程数据表明其采出的可能性小于概算储量的递增储量。项目的最终总可采量有低概率会超过证实储量加上概算储量加上可能储量之和（3P）. 这相当于高估算量的情景。因此，当采用概率法时，实际的采出量等于或超过 3P 估算量的概率应至少有 10%。

在数据增加和更新解释能表明确定性增加的基础上，部分可能储量和概算储量可以重新分类为概算和证实储量。

资源评价的不确定性最好通过报告可能的结果范围来表达。然而，如果需要报告一个单一的有代表性的结果，“最佳估算量”被认为是可采量的最现实的评估。当采用决定性情景法或概率评估法时，“最佳估算量”被普遍认为是代表证实储量和概算储量（2P）的总和。应该指出的是，根据确定性增量（基于风险的）方法，每个类别的储量是分别评估的。在没有充分考虑它们的相关风险时（见“2001 补充准则”第 2.5 章），不应该把它们汇总。

2.3 提高采收率项目

初始资源量是根据既定的初期开发项目进行评估的。而增产项目旨在通过改进井和设施、打加密井或加强开采来提高采收率并提高产量。这种项目应该以初期开发项目同样的标准进行分类。相应增加的储量根据采收的确定性进行划分。如果增产项目能够在合理的时间内实施投产，预期增加的采收量可以划分为储量。

如果提高采收率项目将要延迟较长的时间，则需要提供清楚的文件进行说明。如果项目的风险较大，预计的提高采收率增加的量可以与储量相似地进行分类，但应该划分为条件储量(参阅第 2.1.2 节，商业化的确定)。

2.3.1 修井、产能处理和设备更换

由将来的修井、产能处理(包括压裂)、重复产能处理、改变设施或其它机械流程(所有这些措施在类似油藏都是成功的)产生的提高采收率获得的储量，可以依据所需的相关成本的规模分类为已开

发储量或未开发储量（见储量状态第 2.1.3.2 ）。

2.3.2 Compression

Reduction in the backpressure through compression can increase the portion of in-place gas that can be commercially produced and thus included in Reserves estimates. If the eventual installation of compression was planned and approved as part of the original development plan, incremental recovery is included in Undeveloped Reserves. However, if the cost to implement compression is not significant (relative to the cost of a new well), the incremental quantities may be classified as Developed Reserves. If compression facilities were not part of the original approved development plan and such costs are significant, it should be treated as a separate project subject to normal project maturity criteria.

2.3.3 Infill Drilling

Technical and commercial analyses may support drilling additional producing wells to reduce the spacing beyond that utilized within the initial development plan, subject to government regulations (if such approvals are required). Infill drilling may have the combined effect of increasing recovery efficiency and accelerating production. Only the incremental recovery can be considered as additional Reserves; this additional recovery may need to be reallocated to individual wells with different interest ownerships.

2.3.4 Improved Recovery

Improved recovery is the additional petroleum obtained, beyond primary recovery, from naturally occurring reservoirs by supplementing the natural reservoir performance. It includes waterflooding, secondary or tertiary recovery processes, and any other means of supplementing natural reservoir recovery processes.

Improved recovery projects must meet the same Reserves commerciality criteria as primary recovery projects. There should be an expectation that the project will be economic and that the entity has committed to implement the project in a reasonable time frame (generally within 5 years; further delays should be clearly justified).

The judgment on commerciality is based on pilot testing within the subject reservoir or by comparison to a reservoir with analogous rock and fluid properties and where a similar established improved recovery project has been successfully applied.

Incremental recoveries through improved recovery methods that have yet to be established through routine, commercially successful applications are included as Reserves only after a favorable production response from the subject reservoir from either (a) a representative pilot or (b) an installed program, where the response provides support for the analysis on which the project is based.

These incremental recoveries in commercial projects are categorized into Proved, Probable, and Possible Reserves based on certainty derived from engineering analysis and analogous applications in similar reservoirs**.**

2.4 Unconventional Resources

Two types of petroleum resources have been defined that may require different approaches for their evaluations:

- Conventional resources exist in discrete petroleum accumulations related to a localized geological structural feature and/or stratigraphic condition, typically with each accumulation bounded by a downdip contact with an aquifer, and which is significantly affected by hydrodynamic influences such as buoyancy of petroleum in water. The petroleum is recovered through wellbores and typically requires minimal processing prior to sale.

2.3.2 压缩

通过压缩减少背压可能增加天然气的原地资源的商业可采量，这部分可采量可以划分为储量。如果压缩机安装已经包含在已经批准的原始开发方案中，这部分由于压缩增加的储量可归为未开发储量。但是，如果增加压缩装置的成本不高(相对于钻新井)，这部分储量可归为开发储量。如果压缩装置并未包括在已经批准的开发方案里，而且成本较高，它应该作为一个新的项目并按照正常的项目成熟度标准来处理。

2.3.3 加密井

技术和商业分析可能支持缩小初始设计井距以便钻额外的生产井，如需审批就要在政府制度之内进行。加密井可能有既提高采收率又加速生产的综合效果。只有增加的可采量可以划为储量，而这些增加的可采量可能需要按不同的权益重新分配到各个生产单井。

2.3.4 提高采收

提高采收是在初始采收的基础上通过提高油气藏产能多采出的油气。提高采收包括注水、二次和三次采收、以及其它帮助自然采收的各种措施。

提高采收项目必须符合一次采收项目相同的储量商业标准。提高采收项目应该预期是经济的，并且提高采收项目的公司已经承诺在合理的时间内(通常是在5年内，进一步的延迟必须被批准)实施该项目。

对于其商业性判断的根据是目标油气藏的先导试验，或者是有相似岩石和流体性质的那些类比油藏已经成功地实施了提高采收项目。

在常规的、成功的商业性应用还没有建立时，提高采收方法获得的增加的采出量必须在目标油藏得到有利的生产结果以后才可以划为储量，这些结果来自能为目标油藏的项目分析提供支持的(a)有代表性的先导实验，或(b)已实施的方案。

以工程分析和相似油藏类比应用的确定性为基础，商业性项目的递增可采量可分类为证实储量、概算储量和可能储量。

2.4 非常规资源

我们定义两种不同类型的油气资源，它们可能需要以不同的方法进行评价：

- 常规油气藏是存在于不连续的局部地质构造和地层单位中的油气藏，一般在下倾方向由一个油气水界面限定、明显受水动力影响例如油气漂浮在水之上。油气通过井筒流出，一般在出售前需要很少的处理。

- Unconventional resources exist in petroleum accumulations that are pervasive throughout a large area and that are not significantly affected by hydrodynamic influences (also called "continuous-type deposits"). Examples include coalbed methane (CBM), basin-centered gas, shale gas, gas hydrates, natural bitumen, and oil shale deposits. Typically, such accumulations require specialized extraction technology (e.g., dewatering of CBM, massive fracturing programs for shale gas, steam and/or solvents to mobilize bitumen for in-situ recovery, and, in some cases, mining activities). Moreover, the extracted petroleum may require significant processing prior to sale (e.g., bitumen upgraders).

For these petroleum accumulations that are not significantly affected by hydrodynamic influences, reliance on continuous water contacts and pressure gradient analysis to interpret the extent of recoverable petroleum may not be possible. Thus, there typically is a need for increased sampling density to define uncertainty of in-place volumes, variations in quality of reservoir and hydrocarbons, and their detailed spatial distribution to support detailed design of specialized mining or in-situ extraction programs.

It is intended that the resources definitions, together with the classification system, will be appropriate for all types of petroleum accumulations regardless of their in-place characteristics, extraction method applied, or degree of processing required.

Similar to improved recovery projects applied to conventional reservoirs, successful pilots or operating projects in the subject reservoir or successful projects in analogous reservoirs may be required to establish a distribution of recovery efficiencies for non-conventional accumulations. Such pilot projects may evaluate both extraction efficiency and the efficiency of unconventional processing facilities to derive sales products prior to custody transfer.

3.0 Evaluation and Reporting Guidelines

The following guidelines are provided to promote consistency in project evaluations and reporting. "Reporting" refers to the presentation of evaluation results within the business entity conducting the evaluation and should not be construed as replacing guidelines for subsequent public disclosures under guidelines established by regulatory and/or other government agencies, or any current or future associated accounting standards.

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.)

3.1.1 Cash-Flow-Based Resources Evaluations

Resources evaluations are based on estimates of future production and the associated cash flow schedules for each development project. The sum of the associated annual net cash flows yields the estimated future net revenue. When the cash flows are discounted according to a defined discount rate and time period, the summation of the discounted cash flows is termed net present value (NPV) of the project. The calculation shall reflect:

- 非常规油气藏是连续地存在于一个大范围内的油气藏并且不受明显的水动力影响(通常称这为“连续沉积”)。这种类型油气藏的例子有煤层气（CBM）、盆地中心气、页岩气、天然气水合物、天然沥青和油页岩。典型情况下，这些油气聚集需要专门的提取技术（例如，煤层气脱水、页岩气的大规模压裂、使用现场蒸汽和/或溶剂以使沥青流动，和某些情况下的采矿活动）。此外，提取出的油气在出售前可能需要大量的处理（例如，沥青改质）。

对于那些基本不受水动力影响的油气藏,不能依靠连续的油气水界面和压力梯度分析来解释可采量。因此，一般来说需要增加取样密度来定义原地资源量的不确定性、油气藏和油气质量的变化、油气藏的详细空间分布等来支持特殊矿采或原地抽采的详细设计。

资源定义和分类系统旨在应用于所有类型的油气藏，不论它们的油气藏特征、采收方法和处理程度怎样。

与增产项目应用于常规油气藏类似,对于非常规油气藏,需要有成功的先导实验或操作项目，或类比油气藏的成功例子来确定有效的采收率。这些先导项目既可以评估非常规油气藏的采收效率，还可以评估售前的非常规处理设施的效率。

3.0 评价和报告准则

下列提供的准则用以促进项目评估和报告的一致性。 这里“报告”是指商业实体进行评估的结果之内部呈现，不应视其为能取代后续的监管机构和其他政府机构建立的公众披露准则或任何当前及未来的相关会计标准。

3.1 商业性评价

公司的投资决策取决于它对将来影响油气项目开发可行性(开发承诺)和生产/现金流的商业条件的认识。这些商业条件包括，但不限于，财务条件(成本、油价、财税条款，税收)、市场、法律、环境、社会和政府因素等。项目价值可以通过几个方式进行评估（如历史成本法，市场价值比较法等），此准则只应用于基于现金流方法做出的评估。而且，这里忽略掉可以进一步影响投资决策的修正因素(如合同和政治风险)。(对商业因素的附加详述可参考 2001 年补充准则的第 4 章)。

3.1.1 基于现金流的资源评价

基于现金流的资源评估是根据对每个开发项目的将来产量和相应现金流的估计而做出的。每一年净现金流的总和就是估算的将来净价值。现金流根据确定的折现率和时间进行折现，折现后现金流的

总和称为项目的净现值(NPV)。净现值的计算应该反映：

- The expected quantities of production projected over identified time periods.
- The estimated costs associated with the project to develop, recover, and produce the quantities of production at its Reference Point (see section 3.2.1), including environmental, abandonment, and reclamation costs charged to the project, based on the evaluator's view of the costs expected to apply in future periods.
- The estimated revenues from the quantities of production based on the evaluator's view of the prices expected to apply to the respective commodities in future periods including that portion of the costs and revenues accruing to the entity.
- Future projected production and revenue related taxes and royalties expected to be paid by the entity.
- A project life that is limited to the period of entitlement or reasonable expectation thereof.
- The application of an appropriate discount rate that reasonably reflects the weighted average cost of capital or the minimum acceptable rate of return applicable to the entity at the time of the evaluation.

While each organization may define specific investment criteria, a project is generally considered to be "economic" if its "best estimate" case has a positive net present value under the organization's standard discount rate, or if at least has a positive undiscounted cash flow.

3.1.2 Economic Criteria

Evaluators must clearly identify the assumptions on commercial conditions utilized in the evaluation and must document the basis for these assumptions.

The economic evaluation underlying the investment decision is based on the entity's reasonable forecast of future conditions, including costs and prices, which will exist during the life of the project (forecast case). Such forecasts are based on projected changes to current conditions; SPE defines current conditions as the average of those existing during the previous 12 months.

Alternative economic scenarios are considered in the decision process and, in some cases, to supplement reporting requirements. Evaluators may examine a case in which current conditions are held constant (no inflation or deflation) throughout the project life (constant case).

Evaluations may be modified to accommodate criteria imposed by regulatory agencies regarding external disclosures. For example, these criteria may include a specific requirement that, if the recovery were confined to the technically Proved Reserves estimate, the constant case should still generate a positive cash flow. External reporting requirements may also specify alternative guidance on current conditions (for example, year-end costs and prices).

There may be circumstances in which the project meets criteria to be classified as Reserves using the forecast case but does not meet the external criteria for Proved Reserves. In these specific circumstances, the entity may record 2P and 3P estimates without separately recording Proved. As costs are incurred and development proceeds, the low estimate may eventually satisfy external requirements, and Proved Reserves can then be assigned.

While SPE guidelines do not require that project financing be confirmed prior to classifying projects as Reserves, this may be another external requirement. In many cases, loans are conditional upon the same criteria as above; that is, the project must be economic based on Proved Reserves only. In general, if there is not a reasonable expectation that loans or other forms of financing (e.g., farm-outs) can be arranged such that the development will be initiated within a reasonable timeframe, then the project should be classified as Contingent Resources. If financing is reasonably expected but not yet confirmed, the project may be classified as Reserves, but no Proved Reserves may be reported as above.

- 在指定时间内的预期产量分布
- 与项目开发、恢复和采出在参照点的产量（参阅3.2.1节）有关的估算成本，包括评估师根据未来一定时期的成本预测得出的项目之环境、废弃和复原成本。
- 根据评估师预测的价格而估算出的将来从项目生产的各种石油产品获得的收入，这些收入包括公司应摊的费用和应得的收入。
- 公司在将来需要支出的与其产量和收入相应的所得税及采矿税
- 被采矿赋权或相应的合理期望期所限定的项目年限
- 使用能够合理地反映资本折现率加权平均、或者公司在评估期内可接受的最低回报率。

尽管各个组织有自己具体的投资标准，但是通常情况下，一个项目如果在公司规定的折现率下，其“最佳估计”净现值为正或者至少其未折现现金流为正时就被认为是“经济的”。

3.1.2 经济标准

评估师必须清楚地说明在评估中使用的有关商业条件的各种假设，并且必须记录这些假设的根据。

支撑投资决策的经济评价是根据实体对项目生命期内未来各种条件做出的，包括对费用和油价的合理预测。这些预测建立在对当前各种条件的预期变化之上。SPE把之前十二个月内存在的各种条件之平均定义为目前条件。

在决策过程中需要考虑其它各种经济情形，在某些情况下，这也是处于补充报告内容的需要。评估师可能仔细分析检查目前条件在整个项目周期中保持不变的情形（无通货膨胀或通货紧缩）。

评估可能需要修改，以适应监管机构对公众报告所施加的各种规定和标准。例如，这些标准可

能包含具体的要求：如果采出量只限于技术上可采的证实储量，不考虑通胀和通缩的情况下应仍有正现金流。对外报告的要求也可能规定其它关于目前条件的准则(例如年末成本和油价) 。

可能有时根据预测情况,项目符合储量的分类标准，但不符合对于证实储量的外部标准。这时，公司可以记录2P和3P估算量而不再另行记录证实储量。随着成本的投入和开发的向前推进，原来低的估计可能逐渐满足对外报告的要求，从而被划分为证实储量。

尽管 SPE 准则不要求项目的资金筹措得到证实后才能把项目划分为储量 ,但这也可能是另一个外部要求。在许多情况下，贷款是有同样的条件，即仅以证实储量为基础，项目必须是经济的。通常，如果不能预期安排贷款和/或其它形式融资（例如售出权益），以致无法在在一个合理的期限内开发项目，那么该项目就应该被划分为条件潜在资源。如果有合理预期的资金筹措，但尚未确认，可将该项目划分为储量，但不能报告为证实储量。

3.1.3 Economic Limit

Economic limit is defined as the production rate beyond which the net operating cash flows from a project, which may be an individual well, lease, or entire field, are negative, a point in time that defines the project's economic life. Operating costs should be based on the same type of projections as used in price forecasting. Operating costs should include only those costs that are incremental to the project for which the economic limit is being calculated (i.e., only those cash costs that will actually be eliminated if project production ceases should be considered in the calculation of economic limit). Operating costs should include fixed property-specific overhead charges if these are actual incremental costs attributable to the project and any production and property taxes but, for purposes of calculating economic limit, should exclude depreciation, abandonment and reclamation costs, and income tax, as well as any overhead above that required to operate the subject property itself. Operating costs may be reduced, and thus project life extended, by various cost-reduction and revenue-enhancement approaches, such as sharing of production facilities, pooling maintenance contracts, or marketing of associated nonhydrocarbons (see Associated Non-Hydrocarbon Components, section 3.2.4).

Interim negative project net cash flows may be accommodated in short periods of low product prices or major operational problems, provided that the longer-term forecasts must still indicate positive economics.

3.2 Production Measurement

In general, the marketable product, as measured according to delivery specifications at a defined Reference Point, provides the basis for production quantities and resources estimates. The following operational issues should be considered in defining and measuring production. While referenced specifically to Reserves, the same logic would be applied to projects forecast to develop Contingent and Prospective Resources conditional on discovery and development. (Additional detail on operational issues that impact resources estimation can be found in the "2001 Supplemental Guidelines," Chapter 3.)

3.2.1 Reference Point

Reference Point is a defined location(s) in the production chain where the produced quantities are measured or assessed. The Reference Point is typically the point of sale to third parties or where custody is transferred to the entity's downstream operations. Sales production and estimated Reserves are normally measured and reported in terms of quantities crossing this point over the period of interest.

The Reference Point may be defined by relevant accounting regulations in order to ensure that the Reference Point is the same for both the measurement of reported sales quantities and for the accounting treatment of sales revenues. This ensures that sales quantities are stated according to their delivery specifications at a defined price. In integrated projects, the appropriate price at the Reference Point may need to be determined using a netback calculation.

Sales quantities are equal to raw production less non-sales quantities, being those quantities produced at the wellhead but not available for sales at the Reference Point. Non-sales quantities include petroleum consumed as fuel, flared, or lost in processing, plus non-hydrocarbons that must be removed prior to sale; each of these may be allocated using separate Reference Points but when combined with sales, should sum to raw production. Sales quantities may need to be adjusted to exclude components added in processing but not derived from raw production. Raw production measurements are necessary and form the basis of engineering calculations (e.g., production performance analysis) based on total reservoir voidage.

3.1.3 经济限度

经济限度是指一口井、一个区块或整个油田的净作业现金流不为负值时的最小产量，该时刻定义了项目的经济期限。作业成本应该使用与预测油价相同的方法。作业成本应该只包括计算经济限度的那些项目的成本增量（即，如果项目停止生产，实际上只有这些现金成本会被排除）。如果与具体资产相关的固定费用和任何生产及资产税的增加可归因于本项目，其增量应包括在作业成本内。但是，出于计算经济限度的目的，作业成本不包括折旧、弃井和复原费、所得税及其它额外的固定费用。通过各种增收和减支措施，例如共享生产设施、集中油藏维护或者出售伴生的非烃产品(参阅3.2.4 非烃组分那节)，作业成本可能减少，这样项目的期限就会延长。

在低油价或出现主要作业问题的短期内，项目可允许出现暂时的负现金流，但长期的预测必须是经济正值。

3.2 产量计量

一般情况下，符合参考点的交货规格并可在市场出售的产品是产量和资源评估的根据。在定义和计量产量时，应该考虑一下的作业因素。尽管这些是具体针对储量而定的，但一旦条件资源量和远景资源被发现，同样的逻辑也适用。(关于影响资源评价的操作问题的附加细节见“2001 补充准则”，第 3 章)。

3.2.1 参考点

参考点是生产环节上计量和评估产量的一个或多个特定位置。通常参考点是销售点或将产品的权利转移给公司下游作业的地点。出售的产量和估计的储量都是以某一时间期限内通过这个点的量为依据进行计量和报告的。

为了保证报告的销售量与财务报表中登记的量是在同一个参考点上，参考点可以根据相关的会计准则来定义。这样就确保了销售量是以规定的价格按产品交货规格而申报的。对于一些综合项目，在参考点的适当价格需要使用净回值算法来确定。

销售量等于原始产量减去非销售量，非销售量是井口产出、但未能在参考点出售的量。非销售量包括燃料、火炬或处理损耗量，再加上销售前必须清理掉的非烃类。上述各类非出售量可以在不同的参考点计量，但销售量累加应该等于原始产量。有时销售量可能需要调整，以排除处理中加入的、并非来自毛产品的成分。原始产量的计量是必要的，它是油藏总亏空工程计算(例如，生产动态分析)的基础。

3.2.2 Lease Fuel

Lease fuel is that portion of produced natural gas, crude oil, or condensate consumed as fuel in production and lease plant operations.

For consistency, lease fuel should be treated as shrinkage and is not included in sales quantities or resource estimates. However, some regulatory guidelines may allow lease fuel to be included in Reserves estimates where it replaces alternative sources of fuel and/or power that would be purchased in their absence. Where claimed as Reserves, such fuel quantities should be reported separately from sales, and their value must be included as an operating expense. Flared gas and oil and other losses are always treated as shrinkage and are not included in either product sales or Reserves.

3.2.3 Wet or Dry Natural Gas

The Reserves for wet or dry natural gas should be considered in the context of the specifications of the gas at the agreed Reference Point. Thus, for gas that is sold as wet gas, the volume of the wet gas would be reported, and there would be no associated or extracted hydrocarbon liquids reported separately. It would be expected that the corresponding enhanced value of the wet gas would be reflected in the sales price achieved for such gas.

When liquids are extracted from the gas prior to sale and the gas is sold in dry condition, then the dry gas volume and the extracted liquid volumes, whether condensate and/or natural gas liquids, should be accounted for separately in resource assessments. Any hydrocarbon liquids separated from the wet gas subsequent to the agreed Reference Point would not be reported as Reserves.

3.2.4 Associated Non-Hydrocarbon Components

In the event that non-hydrocarbon components are associated with production, the reported quantities should reflect the agreed specifications of the petroleum product at the Reference Point. Correspondingly, the accounts will reflect the value of the petroleum product at the Reference Point. If it is required to remove all or a portion of non-hydrocarbons prior to delivery, the Reserves and production should reflect only the residual hydrocarbon product.

Even if the associated non-hydrocarbon component (e.g., helium, sulfur) that is removed prior to the Reference Point is subsequently and separately marketed, these quantities are not included in petroleum production or Reserves. The revenue generated by the sale of non-hydrocarbon products may be included in the economic evaluation of a project.

3.2.5 Natural Gas Re-Injection

Natural gas production can be re-injected into a reservoir for a number of reasons and under a variety of conditions. It can be re-injected into the same reservoir or into other reservoirs located on the same property for recycling, pressure maintenance, miscible injection, or other enhanced oil recovery processes. In such cases, assuming that the gas will eventually be produced and sold, the gas volume estimated as eventually recoverable can be included as Reserves.

If gas volumes are to be included as Reserves, they must meet the normal criteria laid down in the definitions including the existence of a viable development, transportation, and sales marketing plan. Gas volumes should be reduced for losses associated with the re-injection and subsequent recovery process. Gas volumes injected into a reservoir for gas disposal with no committed plan for recovery are not classified as Reserves. Gas volumes purchased for injection and later recovered are not classified as Reserves.

3.2.2 油田自用油气

油田自用油气是在生产和设备运作中作为燃料消耗的那部分天然气、石油和凝析油。为求一致性，油田自用油气应该作为损耗来处理，它不应该包括在销售量和资源计算中。但是，当这部分量能够替代其它形式的能源/电力，而且否则这些电力需要额外购买时，一些管理准则可能会允许将这部分石油包括在储量估算量中。当这部分石油包括在储量内时，需要与销售量分开报告，其价值必须包括在作业费用中。用火炬燃烧掉的气、油和其它损失都作为损耗处理，既不包括在销售量也不包括在储量中。

3.2.3 湿气或干气

湿气或干气的储量必须以议定的参考点的规格为准。因此，对于以湿气形式出售的天然气，需要报告湿气量，而不应该另报伴生的或者提取的烃类液体。其相应湿气增值可以反映在销售价格中。

如果在出售前，从气体中提取了液体，且气体以干气的形式出售，那么干气的体积和所提取的液体(不论是凝淅油或天然气液)的体积在资源评估中应该单独核算。离开参考点后从湿气中分离出来的任何烃类液体都不能报告成储量。

3.2.4 伴生非烃类组分

当产出的石油含有伴生非烃组分时，报告的产量应该符合石油产品在参考点上的议定规格并相应地反映该产品在此参考点的对应价值。如果有必要在交货前把部分或全部非烃类成分清除，储量和产量都应仅反映清除后的产量。

即使在参考点之前提取出非烃组分(如氦、硫)可以单独出售，这些量也不应该包括在石油产量或储量中。非烃产品的收入可包括在项目的经济评价中。

3.2.5 天然气回注

因多种原因和不同条件，天然气可回注到油藏中。天然气可回注到本油藏或本区块的其它油藏，以便用于循环、压力维持、混相驱和其它提高采收率的过程。在这些情况中，假定这些天然气最终可被产出和出售，这部分产量可计入储量。

如果被包括在储量中，它们必须满足有可行的计划进行开发、传输和出售的正常标准。天然气的储量应该减去由于回注和再采出产生的损失。没有承诺再采出，而只是回注的那部分天然气不应划分为储量。购入用于回注的气，即使随后采出也不应划分为储量。

3.2.6 Underground Natural Gas Storage

Natural gas injected into a gas storage reservoir to be recovered at a later period (e.g., to meet peak market demand periods) should not be included as Reserves.

The gas placed in the storage reservoir may be purchased or may originate from prior production. It is important to distinguish injected gas from any remaining native recoverable volumes in the reservoir. On commencing gas production, its allocation between native gas and injected gas may be subject to local regulatory and accounting rulings. Native gas production would be drawn against the original field Reserves. The uncertainty with respect to original field volumes remains with the native reservoir gas and not the injected gas.

There may be occasions, such as gas acquired through a production payment, in which gas is transferred from one lease or field to another without a sale or custody transfer occurring. In such cases, the re-injected gas could be included with the native reservoir gas as Reserves. The same principles regarding separation of native resources from injected quantities would apply to underground oil storage.

3.2.7 Production Balancing

Reserves estimates must be adjusted for production withdrawals. This may be a complex accounting process when the allocation of production among project participants is not aligned with their entitlement to Reserves. Production overlift or underlift can occur in oil production records because of the necessity for participants to lift their production in parcel sizes or cargo volumes to suit available shipping schedules as agreed among the parties. Similarly, an imbalance in gas deliveries can result from the participants having different operating or marketing arrangements that prevent gas volumes sold from being equal to entitlement share within a given time period.

Based on production matching the internal accounts, annual production should generally be equal to the liftings actually made by the participant and not on the production entitlement for the year. However, actual production and entitlements must be reconciled in Reserves assessments. Resulting imbalances must be monitored over time and eventually resolved before project abandonment.

3.3 Resources Entitlement and Recognition

While assessments are conducted to establish estimates of the total Petroleum Initially-in-Place and that portion recovered by defined projects, the allocation of sales quantities, costs, and revenues impacts the project economics and commerciality. This allocation is governed by the applicable contracts between the mineral owners (lessors) and contractors (lessees) and is generally referred to as “entitlement.” For publicly traded companies, securities regulators may set criteria regarding the classes and categories that can be “recognized” in external disclosures.

Entitlements must ensure that the recoverable resources claimed/reported by individual stakeholders sum to the total recoverable resources; that is, there are none missing or duplicated in the allocation process. (The “2001 Supplemental Guidelines,” Chapter 9, addresses issues of Reserves recognition under production-sharing and non-traditional agreements.)

3.3.1 Royalty

Royalty refers to payments that are due to the host government or mineral owner (lessor) in return for depletion of the reservoirs by the producer (lessee/contractor) having access to the petroleum resources.

3.2.6 地下储气库

注入到地下储气库中以备将来采出使用(例如用于满足高峰期需求)的天然气不应该包括在储量内。

这部分天然气可以是外购的，也可以是来自于以前的生产。重要的是要把注入的气和原储层中可采的天然气区别开来。在天然气开始生产时，要依据当地的法规和会计准则对原始气和储存气进行批分。原始气来自于原始气田的储量，因此原始气田储量的不确定性只与原始储层中的气有关而与注入的气无关。

有时有些气是通过生产交换的方式从其它气田转输到本气田的，这些气往往不需要通过销售或更换所有权而获得。在这些情况下，回注的气可以被包括在储量内。同样，关于区分原始资源和回注流体的原则也适用于地下储油库。

3.2.7 生产平衡

储量评估必须根据产出量进行调整。当项目合作伙伴之间产量分配与他们的储量赋权不一致时，这可能是非常复杂的会计计算过程。在生产记录中可以出现石油超产或欠产，因为项目合作伙伴有必要提高他们的产量以满足项目参与者之间已达成的可行运输量的需求。同样，天然气销售的不平衡可以来自于不同合作伙伴有不同的运作与市场安排，这就使得在某一时期内天然气销售量与各自的赋权储量不一致。

根据产量与内部账目相匹配的原则,年度产量通常等于合作伙伴当年实际所得到的产量而不是其应得产量。然而，实际产量与应得产量在储量评估中必需要一致的，因此必须随时监测由此产生的不平衡，并在项目废弃前解决这种不平衡。

3.3 资源赋权和确认

尽管评估是旨在对原始原地油气量及可采量的估算，但是销售量、成本和收入的分配影响项目的经济性和商业性。这一分配是由矿产所有者（出租人）和合同生产者（承租人）之间的适当合同所支配，并且一般简称为“赋权或所有权（Entitlements）”。对于公开交易的公司，证券监管机构可能设立关于可以在外部披露中被“确认”的分类及分级的标准。

所有权必须确保由各个利益所有者申报的可采资源量共计为总可采资源量；即在分配的过程中没有遗漏或重复。(“2001 补充准则”，第 9 章，陈述了在产品分成和非传统协议中储量确认的问题)。

3.3.1 采矿费

采矿费（Royalty）是指作为油藏消耗对东道国政府或矿产所有者（出租人）的回报，通过支付采矿费，生产者（承租人/合同者）得以使用石油资源。

Many agreements allow for the lessee/contractor to lift the royalty volumes and sell them on behalf of, and pay the proceeds to, the royalty owner/lessor. Some agreements provide for the royalty to be taken only in-kind by the royalty owner. In either case, royalty volumes must be deducted from the lessee's entitlement to resources. In some agreements, royalties owned by the host government are actually treated as taxes to be paid in cash. In such cases, the equivalent royalty volumes are controlled by the contractor who may (subject to regulatory guidance) elect to report these volumes as Reserves and/or Contingent Resources with appropriate offsets (increase in operating expense) to recognize the financial liability of the royalty obligation.

Conversely, if a company owns a royalty or equivalent interest of any type in a project, the related quantities can be included in Resources entitlements.

3.3.2 Production-Sharing Contract Reserves

Production-Sharing Contracts (PSCs) of various types replace conventional tax-royalty systems in many countries. Under the PSC terms, the producers have an entitlement to a portion of the production. This entitlement, often referred to as "net entitlement" or "net economic interest," is estimated using a formula based on the contract terms incorporating project costs (cost oil) and project profits (profit oil).

Although ownership of the production invariably remains with the government authority up to the export point of the project, the producers may take title to their share of the net entitlement at that point and may claim that share as their Reserves.

Risked-Service Contracts (RSCs) are similar to PSCs, but in this case, the producers are paid in cash rather than in production. As with PSCs, the Reserves claimed are based on the parties' net economic interest. Care needs to be taken to distinguish between an RSC and a "Pure Service Contract." Reserves can be claimed in an RSC on the basis that the producers are exposed to capital at risk, whereas no Reserves can be claimed for Pure Service Contracts because there are no market risks and the producers act as contractors.

Unlike traditional royalty-lease agreements, the cost recovery system in production-sharing, riskservice, and other related contracts typically reduce the production share and hence Reserves obtained by a contractor in periods of high price and increase volumes in periods of low price. While this ensures cost recovery, it introduces a significant price-related volatility in annual Reserves estimates under cases using "current" economic conditions. Under a defined "forecast conditions case," the future relationship of price to Reserves entitlement is known.

The treatment of taxes and the accounting procedures used can also have a significant impact on the Reserves recognized and production reported from these contracts.

3.3.3 Contract Extensions or Renewals

As production-sharing or other types of agreements approach maturity, they can be extended by negotiation for contract extensions, by the exercise of options to extend, or by other means. Reserves should not be claimed for those volumes that will be produced beyond the ending date of the current agreement unless there is reasonable expectation that an extension, a renewal, or a new contract will be granted. Such reasonable expectation may be based on the historical treatment of similar agreements by the license-issuing jurisdiction. Otherwise, forecast production beyond the contract term should be classified as Contingent Resources with an associated reduced chance of commercialization. Moreover, it may not be reasonable to assume that the fiscal terms in a negotiated extension will be similar to existing terms.

许多协议允许承租人/合同者代表矿区所有者/出租人产出与采矿费相当的产量，并将其销售所得支付给矿区所有者/出租人。另一些协议规定采矿费由其所有者仅以实物方式获得。无论哪种情况，采矿费的产量必须从承租人的资源赋权中扣除。在一些协议中，采矿费被东道国视为税收，以现金支付。在这种情况下，与采矿费相当的数量由合同者控制，合同者在符合法规的情况下可以选择将其申报成储量或条件储量，但是必须以对等量的运营成本增加来抵消采矿费之财务责任.。

相反地，如果一个公司拥有采矿费或在任何类型的项目中等价的权益，相当的数量可以包括在资源赋权中。

3.3.2 产品分成合同的储量

在许多国家，多种类型的产品分成合同（PSCs）取代传统的税收-采矿费制度。根据产品分成合同条款，生产者具有一部分产量的所有权。这项所有权通常被称为“净所有权”或“净经济权益”。该所有权是根据合同规定的项目成本（成本油）和项目利润（利润油）使用一个公式来估算的。

虽然一直到项目的出口点，产量的所有权总是属于东道国的，但生产者在出口地点可以获得净所有权中所应有的份额，并可以声明该份额作为其储量。

风险服务合同（RSCs）类似于产品分成合同，但在这种情况下，以现金支付给生产者而不是以产量。与产品分成合同类似，声明的储量是基于各参与方的净经济权益。需要注意区别风险服务合同与“纯服务合同”之间的不同。在以受到资本风险为基础的一个风险服务合同中，生产者可以申报储量，反之，纯服务合同因为没有市场风险并且生产者是作为承包商，就没有储量可以声明。

与传统的采矿费-租赁协议不同，在产品分成合同、风险服务合同和其他相关合同中的成本回收体系中，通常在油气价格高时产量份额以及承包商获得的储量会降低，在价格低时相应储量会增加。尽管这将确保收回成本，但却导致了使用“当前”经济条件下每年估算储量随价格明显地波动。在给定的“预测条件”下，价格与储量所有权的未来关系是已知的。

税收的处理和所使用的会计程序也可以对这些合同中的储量确认和产量报告有明显的影响。

3.3.3 合同延期或续期

当产品分成合同或其他类型的协议趋近成熟时，通过合同延长谈判、选择性延长的行使或其他方式，可以延长合同。

超出当前协议的结束日期的产量，不应被声明为储量，除非对合同延长、合同续期或新合同将被授予有合理的期望。这些合理的期望可以是来源于许可证-签发司法机构对类似协议的历史处理方式。否则，随着相关的商业性机会的减少，超出合同条款的预测产量应被分类为条件潜在储量。此外，假设合同经谈判延长后的财政条款与现有的条款类似也不是合理的。

Similar logic should be applied where gas sales agreements are required to ensure adequate markets. Reserves should not be claimed for those quantities that will be produced beyond those specified in the current agreement or reasonably forecast to be included in future agreements.

In either of the above cases, where the risk of cessation of rights to produce or inability to secure gas contracts is not considered significant, evaluators may choose to incorporate the uncertainty by categorizing quantities to be recovered beyond the current contract as Probable or Possible Reserves.

4.0 Estimating Recoverable Quantities

Assuming that projects have been classified according to their project maturity, the estimation of associated recoverable quantities under a defined project and their assignment to uncertainty categories may be based on one or a combination of analytical procedures. Such procedures may be applied using an incremental (risk-based) and/or scenario approach; moreover, the method of assessing relative uncertainty in these estimates of recoverable quantities may employ both deterministic and probabilistic methods.

4.1 Analytical Procedures

The analytical procedures for estimating recoverable quantities fall into three broad categories: (a) analogy, (b) volumetric estimates, and (c) performance-based estimates, which include material balance, production decline, and other production performance analyses. Reservoir simulation may be used in either volumetric or performance-based analyses. Pre- and early postdiscovery assessments are typically made with analog field/project data and volumetric estimation. After production commences and production rates and pressure information become available, performance-based methods can be applied. Generally, the range of EUR estimates is expected to decrease as more information becomes available, but this is not always the case.

In each procedural method, results are not a single quantity of remaining recoverable petroleum, but rather a range that reflects the underlying uncertainties in both the in-place volumes and the recovery efficiency of the applied development project. By applying consistent guidelines (see Resources Categorization, section 2.2.), evaluators can define remaining recoverable quantities using either the incremental or cumulative scenario approach. The confidence in assessment results generally increases when the estimates are supported by more than one analytical procedure.

4.1.1 Analogs

Analogs are widely used in resources estimation, particularly in the exploration and early development stages, when direct measurement information is limited. The methodology is based on the assumption that the analogous reservoir is comparable to the subject reservoir regarding reservoir and fluid properties that control ultimate recovery of petroleum. By selecting appropriate analogs, where performance data based on comparable development plans (including well type, well spacing and stimulation) are available, a similar production profile may be forecast.

Analogous reservoirs are defined by features and characteristics including, but not limited to, approximate depth, pressure, temperature, reservoir drive mechanism, original fluid content, reservoir fluid gravity, reservoir size, gross thickness, pay thickness, net-to-gross ratio, lithology, heterogeneity, porosity, permeability, and development plan. Analogous reservoirs are formed by the same, or very similar, processes with regard to sedimentation, diagenesis, pressure, temperature, chemical and mechanical history, and structural deformation.

类似的逻辑应该适用于确保有足够市场的天然气销售协议。对于那些超出目前协议的规定，或合理预测会包括在未来协议中的产量，不应申报为储量。

在上述任一情况下，如果生产权利停止的风险或无法保证取得天然气合同的风险是不大的，评估师可以选择将超出当前合同的不确定性具体通过分级归为概算或可能储量。

4.0 可采量估算

假设项目已根据其成熟程度来划分，那么可以根据一种或多种分析的组合来估算某一特定项目中的可采量以及划定其不确定性的类别。这些分析方法可通过增量法（基于风险）和/或情景法来实现。此外，这些可采量估算的相对不确定性可以采用决定性法和概率法来评估。

4.1 分析方法

估算可采量的分析方法可分为三大类：(a) 类比法 (analogy), (b) 容积法 (volumetric estimates)，及(c)动态法 (performance-based estimates), 动态法又包括物质平衡法(material balance)、产量递减法 (production decline) 和其他生产动态分析方法。油气藏模拟可以用在容积法和动态法中。在油气藏发现前或在油气发现后的早期，一般采用类比法和容积法。开始生产后，有了产量和压力等资料，可以采用动态法。一般来说，在获得更多资料后，估算的最终采收量(EUR)的范围将缩少，但并非总是如此。

在每一类方法中，剩余可采量不是一个单一的数值，而是一个范围，该范围反映了开发项目的原始地质储量和采收率的潜在的不确定性。通过使用统一的准则（见资源分类，第 2.2 节），评估师可以使用增量或累积情景法来确定剩余可采量。当一个以上的分析方法都支持所得的估算结果时，其置信度通常会增加。

4.1.1 类比法

类比法广泛应用于资源评价中，尤其是在资料有限的勘探和开发早期阶段。该方法的前提是类比油气藏与评估的目标油气藏在控制油气藏最终采收率的油气藏特征与流体特性等方面是可以类比的。选择适当的类比油藏后，可以得到在类似的开发方案（包括井型，井距与增产措施）下的动态资料，从而就可以预测一个类似的生产剖面。

类比油气藏是根据其油气藏特征来选择的，它们包括但不限于：相似的埋深、压力、温度、油气驱动机理、原始流体含量、油气流体重度、油藏规模、储层毛厚度、储层净厚度、净毛比、岩性、非均质性、孔隙度、渗透率、开发方案等。类比油气藏是在同样或非常相似的沉积过程、成岩作用、压力、温度、化学和物理变化史及构造变形作用下形成的。

Comparison to several analogs may improve the range of uncertainty in estimated recoverable quantities from the subject reservoir. While reservoirs in the same geographic area and of the same age typically provide better analogs, such proximity alone may not be the primary consideration. In all cases, evaluators should document the similarities and differences between the analog and the subject reservoir/project. Review of analog reservoir performance is useful in quality assurance of resource assessments at all stages of development.

4.1.2 Volumetric Estimate

This procedure uses reservoir rock and fluid properties to calculate hydrocarbons in-place and then estimate that portion that will be recovered by a specific development project(s). Key uncertainties affecting in-place volumes include:

- Reservoir geometry and trap limits that impact gross rock volume.
- Geological characteristics that define pore volume and permeability distribution.
- Elevation of fluid contacts.
- Combinations of reservoir quality, fluid types, and contacts that control fluid saturations.

The gross rock volume of interest is that for the total reservoir. While spatial distribution and reservoir quality impact recovery efficiency, the calculation of in-place petroleum often uses average net-to-gross ratio, porosity, and fluid saturations. In more heterogeneous reservoirs, increased well density may be required to confidently assess and categorize resources.

Given estimates of the in-place petroleum, that portion that can be recovered by a defined set of wells and operating conditions must then be estimated based on analog field performance and/or simulation studies using available reservoir information. Key assumptions must be made regarding reservoir drive mechanisms.

The estimates of recoverable quantities must reflect uncertainties not only in the petroleum inplace but also in the recovery efficiency of the development project(s) applied to the specific reservoir being studied.

Additionally, geostatistical methods can be used to preserve spatial distribution information and incorporate it in subsequent reservoir simulation applications. Such processes may yield improved estimates of the range of recoverable quantities. Incorporation of seismic analyses typically improves the underlying reservoir models and yields more reliable resource estimates. [Refer to the “2001 SPE Supplemental Guidelines” for more detailed discussion of geostatistics (Chapter 7) and seismic applications (Chapter 8)].

4.1.3 Material Balance

Material balance methods to estimate recoverable quantities involve the analysis of pressure behavior as reservoir fluids are withdrawn. In ideal situations, such as depletion-drive gas reservoirs in homogeneous, high-permeability reservoir rocks and where sufficient and high quality pressure data is available, estimation based on material balance may provide very reliable estimates of ultimate recovery at various abandonment pressures. In complex situations, such as those involving water influx, compartmentalization, multiphase behavior, and multilayered or low permeability reservoirs, material balance estimates alone may provide erroneous results. Evaluators should take care to accommodate the complexity of the reservoir and its pressure response to depletion in developing uncertainty profiles for the applied recovery project.

Computer reservoir modeling or reservoir simulation can be considered a sophisticated form of material balance analysis. While such modeling can be a reliable predictor of reservoir behavior under a defined development program, the reliability of input rock properties, reservoir geometry, relative permeability functions, and fluid properties are critical. Predictive models are most reliable in estimating recoverable quantities when there is sufficient production history to validate the model through history matching.

用多个油气藏进行类比，可以改善目标油气藏可采量评估的不确定性范围。尽管一般来说在同一个地区和具有相同年代的油气藏提供较好的类比，但这种相似性还不能作为主要的考虑因素。在所有情况下，评估师应该记录类比油气藏与目标油气藏（或项目）之间的相似性与不同点。在各个开发阶段的资源评估中，复查类比油气藏生产动态对于保证资源评估的质量是有益的。

4.1.2 容积法

该方法是用油气藏岩石和流体特征计算原始地质储量，然后估算通过特定的开发方案可以开采出的部分。影响原始地质储量的主要不确定因素包括：

- 影响储层总体积的油气藏几何形态与圈闭范围。
- 确定孔隙体积和渗透率分布的地质特征。
- 流体接触界面的高度。
- 控制流体饱和度的油气藏性质、流体类型和流体接触界面的不同组合。

我们关注的岩石总体积是整个油藏的体积。尽管其空间分布和油气藏质量影响着采收率，原始地质油气储量经常用平均净毛比、平均孔隙度以及平均流体饱和度等参数来计算。对于非均质性强的油气藏，可能需要增加井密度来获得更为可信的评估与资源分类。

在确定了石油原始地质储量后，在一个特定的布井和生产条件下，可采部分必须依据类比油气田的动态资料和/或使用现有的油藏数据进行油藏模拟来估算。关键的假设是油气藏的驱动机理。

可采量的估算不仅仅要反映原始地质储量的不确定性而且也要反映所研究油气藏的采收率的不确定性。

此外，地质统计学方法可以用来描述空间分布的信息并结合到油气藏模拟中。这样可以改进可采量估算范围的评估。通常情况下，结合地震资料的分析可改善地下油气藏模型，并可得到更可靠的资源估算（关于地质统计学的更详细的讨论和地震应用，参阅“2001 SPE 补充准则”）。

4.1.3 物质平衡

物质平衡法是分析压力随流体被采出时的变化规律。在理想情况下，如在均质、高渗储集岩并有充分的高质量压力资料的衰竭式驱动的气藏，用物质平衡法可得到不同废弃压力条件下非常可靠的最终采收量。但在复杂情况下，如那些涉及到水浸入、区块分隔、多相、多层或低渗透等的油气

藏，单独使用物质平衡法估算可能会得出错误的评估结果。评估师在做开发项目的不确定性剖面时应该仔细考虑油气藏的复杂性和压力随衰竭开发的变化特征。

计算机油气藏模型或油气藏模拟是一种复杂精确的物质平衡分析方法。虽然数值模拟可对油气藏特征能做出可靠预测，但是，输入模型的岩性特性、油气藏几何形态、相对渗透率函数、流体特征等参数的可靠程度至为关键。当有足够的生产历史数据使模型通过历史拟合得以验证时，可采量的预测模型会更可靠。

4.1.4 Production Performance Analysis

Analysis of the change in production rates and production fluids ratios vs. time and vs. cumulative production as reservoir fluids are withdrawn provides valuable information to predict ultimate recoverable quantities. In some cases, before decline in production rates is apparent, trends in performance indicators such as gas/oil ratio (GOR), water/oil ratio (WOR), condensate/gas ratio (CGR), and bottomhole or flowing pressures can be extrapolated to an economic limit condition to estimate reserves.

Reliable results require a sufficient period of stable operating conditions after wells in a reservoir have established drainage areas. In estimating recoverable quantities, evaluators must consider complicating factors affecting production performance behavior, such as variable reservoir and fluid properties, transient vs. stabilized flow, changes in operating conditions, interference effects, and depletion mechanisms. In early stages of depletion, there may be significant uncertainty in both the ultimate performance profile and the commercial factors that impact abandonment rate. Such uncertainties should be reflected in the resources categorization. For very mature reservoirs, the future production forecast may be sufficiently well defined that the remaining uncertainty in the technical profile is not significant; in such cases, the "best estimate" 2P scenario may also be used for the 1P and 3P production forecasts. However, there may still be commercial uncertainties that will impact the abandonment rate, and these should be accommodated in the resources categorization.

4.2 Deterministic and Probabilistic Methods

Regardless of the analytical procedure used, resource estimates may be prepared using either deterministic or probabilistic methods. A deterministic estimate is a single discrete scenario within a range of outcomes that could be derived by probabilistic analysis.

In the deterministic method, a discrete value or array of values for each parameter is selected based on the estimator's choice of the values that are most appropriate for the corresponding resource category. A single outcome of recoverable quantities is derived for each deterministic increment or scenario.

In the probabilistic method, the estimator defines a distribution representing the full range of possible values for each input parameter. These distributions may be randomly sampled (typically using Monte Carlo simulation software) to compute a full range and distribution of potential outcome of results of recoverable quantities (see "2001 Supplemental Guidelines," Chapter 5, for more detailed discussion of probabilistic reserves estimation procedures). This approach is most often applied to volumetric resource calculations in the early phases of an exploitation and development projects. The Resources Categorization guidelines include criteria that provide specific limits to parameters associated with each category. Moreover, the resource analysis must consider commercial uncertainties. Accordingly, when probabilistic methods are used, constraints on parameters may be required to ensure that results are not outside the range imposed by the category deterministic guidelines and commercial uncertainties.

Deterministic volumes are estimated for discrete increments and defined scenarios. While deterministic estimates may have broadly inferred confidence levels, they do not have associated quantitatively defined probabilities. Nevertheless, the ranges of the probability guidelines established for the probabilistic method (see Range of Uncertainty, section 2.2.1) influence the amount of uncertainty generally inferred in the estimate derived from the deterministic method.

Both deterministic and probabilistic methods may be used in combination to ensure that results of either method are reasonable.

4.1.4 生产动态分析

油气藏流体在采出过程中，产量和生产的各种流体比率随时间和累计产量的变化分析为预测最终可采量提供了有价值的资料。在某些情况下，当产量递减明显出现以前，气/油比（GOR）、水/油比（WOR）、凝析油/气比（CGR）和井底压力或流动压力等动态指示趋势可以外推到经济极限用以估算储量。

在油气藏内多口开发井建立泄油面积后，需要有足够长的稳定开采期才能得出可靠的分析结果。在评估可采量时，评估师必须考虑影响生产动态特征的复杂因素，如不同的油气藏和流体特征，非稳态流与稳态流、作业条件变化、井间干扰、驱动类型等。在初衰期(开发早期)，最终产能剖面和影响废弃率的商业因素等都可能存在很大的不确定性。这种不确定性应该反映在资源分类中。对那些非常成熟的油气藏，能够较准确地预测未来产量，所以技术不确定性并不大；在这样情况下，“最佳估算量”2P的方案也可以用来预测1P和3P产量。然而，仍存在着影响废弃率的商业不确定性，这些不确定性都应该在资源分类中得到反映。

4.2 决定性法和概率法

无论哪种种油气资源评估程序都可使用决定性法或概率法。决定性法估算结果是个单值，该值包含于概率法结果范围值内。

在决定性法中，根据相应资源类别，对每一个参数选择一个或多个合适数值，对应每一个决定性增量或情景都会产生一个单一的可采量。

在概率法中，评估师界定每一个输入参数的分布范围。这些分布可能是用随机抽样（一般用蒙托卡洛法模拟软件）而得到并用来计算可采量可能的分布范围和分布特征。（关于概率储量评估程序更详细的讨论，参阅“2001 补充准则”，第 5 章）。这种方法最常用于一个详探和开发项目的早期阶段的容积法资源计算。资源分类准则包括与每一资源类别相关的各种参数的具体界限标准。此外，资源分析必须考虑到商业的不确定性。据此，当利用概率法时，需要限制某些参数的范围来确保评估结果不在各资源类别的决定性准则和商业不确定性范围之外。

决定性法估算量是对离散增量和界定情景的估算。尽管决定性法的估算可能会大概推算出一个置信区间，但是它不能给出该区间内相应的定量概率。 然而，为概率法建立的概率范围准则（参阅不确定性的范围，第 2.2.1 节）却影响决定性法评估中所推断出的不确定性的大小。

决定性法和概率法可结合使用，以保证任一方法的结果都是合理的。

4.2.1 Aggregation Methods

Oil and gas quantities are generally estimated and categorized according to certainty of recovery within individual reservoirs or portions of reservoirs; this is referred to as the "reservoir level" assessment. These estimates are summed to arrive at estimates for fields, properties, and projects. Further summation is applied to yield totals for areas, countries, and companies; these are generally referred to as "resource reporting levels." The uncertainty distribution of the individual estimates at each of these levels may differ widely, depending on the geological settings and the maturity of the resources. This cumulative summation process is generally referred to as "aggregation."

Two general methods of aggregation may be applied: arithmetic summation of estimates by category and statistical aggregation of uncertainty distributions. There is typically significant divergence in results from applying these alternative methods. In statistical aggregation, except in the rare situation when all the reservoirs being aggregated are totally dependent, the P90 (high degree of certainty) quantities from the aggregate are always greater than the arithmetic sum of the reservoir level P90 quantities, and the P10 (low degree of certainty) of the aggregate is always less than the arithmetic sum P10 quantities assessed at the reservoir level. This "portfolio effect" is the result of the central limit theorem in statistical analysis. Note that the mean (arithmetic average) of the sums is equal to the sum of the means; that is, there is no portfolio effect in aggregating mean values.

In practice, there is likely to be a large degree of dependence between reservoirs in the same field, and such dependencies must be incorporated in the probabilistic calculation. When dependency is present and not accounted for, probabilistic aggregation will overestimate the low estimate result and underestimate the high estimate result. (Aggregation of Reserves is discussed in Chapter 6 of the "2001 Supplemental Guidelines.")

The aggregation methods utilized depends on the business purpose. It is recommended that for reporting purposes, assessment results should not incorporate statistical aggregation beyond the field, property, or project level. Results reporting beyond this level should use arithmetic summation by category but should caution that the aggregate Proved may be a very conservative estimate and aggregate 3P may be very optimistic depending on the number of items in the aggregate. Aggregates of 2P results typically have less portfolio effect that may not be significant in mature properties where the statistical median approaches the mean of the resulting distribution.

Various techniques are available to aggregate deterministic and/or probabilistic field, property, or project assessment results for detailed business unit or corporate portfolio analyses where the results incorporate the benefits of portfolio size and diversification. Again, aggregation should incorporate degree of dependency. Where the underlying analyses are available, comparison of arithmetic and statistical aggregation results may be valuable in assessing impact of the portfolio effect. Whether deterministic or probabilistic methods are used, care should be taken to avoid systematic bias in the estimation process.

It is recognized that the monetary value associated with these recoveries is dependent on the production and cash flow schedules for each project; thus, aggregate distributions of recoverable quantities may not be a direct indication of corresponding uncertainty distributions of aggregate value.

4.2.1.1 Aggregating Resources Classes

Petroleum quantities classified as Reserves, Contingent Resources, or Prospective Resources should not be aggregated with each other without due consideration of the significant differences in the criteria associated with their classification. In particular, there may be a significant risk that accumulations containing Contingent Resources and/ or Prospective Resources will not achieve commercial production.

Where the associated discovery and commerciality risks have been quantitatively defined, statistical techniques may be applied to incorporate individual project risk estimates in portfolio analysis of volume and value.

4.2.1 汇总方法

通常，油气资源是根据在各个油气藏或其某一部分可采量的确定性进行评估和分类的；这称为“油藏级别”的评估。对油藏级别的资源量进行累加就成为油气田、资产或项目级别的储量评估。进一步的相加就成为一个地区、一个国家和公司储量的评估；这些通常被称为“资源报告级别”。取决于其地质环境和资源的成熟程度，在每一个级别中各个评估的不确定性分布可能大不相同。这些累加的过程通常称为汇总。

主要有两种汇总方法：同类资源算术加和法和不确定性分布统计汇总法。这两种方法评估结果有明显的不同。除了要汇总的所有油气藏完全相关这种极少数情况之外，统计汇总法的P90值（高可信度值）总是大于算术累加法的P90值，而P10（低可信度值）则正好相反。这一“组合效应”是统计分析法中心极限定理的结果。值得注意的是，总的算术平均值等于所有平均值之和，即平均值汇总时没有“组合效应”。

在实践中，位于相同油田中的油藏之间可能具有很大程度的相关性，而且在概率法计算中必需考虑这种相关性。当存在相关性但未加考虑时，概率汇总法将会高估估算低值，低估估算高值。（“2001补充准则”的第6章讨论了储量的汇总）。

使用哪种汇总方法取决于商业目的。如果是为了做资源估算报告，建议超出油气田、资产或项目范围级别的评估结果不应使用统计汇总。超出这些级别的报告结果应按照类别使用算术加和法，但应该警告的是这样汇总的已证实可采储量是非常保守的评估，而这样汇总的3P储量可能是非常乐观的，这些取决于汇总在一起的项目个数。汇总的2P结果通常具有较小的“组合效应”，在成熟资产中这种效应可能不明显，这是由于统计的中值接近于结果分布的平均值。

有多种技术可用于油田、资产或项目的决定性法和/或概率法的评估结果的汇总，以进行详细的单位或公司的投资组合分析，并能体现投资组合的规模和多样化的带来的好处。 再强调汇总还应该

体现相关程度。 如果基础分析结果可以得到的话， 对算术加和与统计汇总结果进行比较有利于对“组合效应”的评估。不论是使用决定性法还是概率法，在评估过程中都要小心避免系统偏差。

人们认识到与这些开采量相关的货币价值是依赖于每个项目的生产量和现金流量的安排;因此，可采量的汇总分布并不能直接指示相应价值汇总的不确定性分布。

4.2.1.1 各类资源汇总

油气资源划分为储量、条件资源量或者远景资源量，不同级别的资源量因分级的标准明显不同而不能互相汇总。特别是，当条件潜在资源与远景资源达不到商业生产时，汇总可能会带来显著的风险。

在对相应的发现和商业风险进行量化后，可以应用统计法把单个项目风险纳入总的资源量和价值分析中。

Table 1: Recoverable Resources Classes and Sub-Classes

Class/Sub-Class	**Definition**	**Guidelines**
Reserves	Reserves are those quantities of petroleum anticipated to be commercially ecoverable by application of development projects to known accumulations from a given date forward under defined conditions.	Reserves must satisfy four criteria: they must be discovered, recoverable, commercial, and remaining based on the development project(s) applied. Reserves are further subdivided in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by their development and production status. To be included in the Reserves class, a project must be sufficiently defined to establish its commercial viability. There must be a reasonable expectation that all required internal and external approvals will be forthcoming, and there is evidence of firm intention to proceed with development within a reasonable time frame. A reasonable time frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. 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. To be included in the Reserves class, there must be a high confidence in the commercial producibility of the reservoir as supported by actual production or formation tests. In certain cases, Reserves may be assigned on the basis of well logs and/or core analysis that indicate that the subject reservoir is hydrocarbonbearing and is analogous to reservoirs in the same area that are producing or have demonstrated the ability to produce on formation tests.
On Production	The development project is currently producing and selling petroleum to market.	The key criterion is that the project is receiving income from sales, rather than the approved development project necessarily being complete. This is the point at which the project “chance of commerciality” can be said to be 100%. The project “decision gate” is the decision to initiate commercial production from the project.
Approved for Development	All necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is under way.	At this point, it must be certain that the development project is going ahead. The project must not be subject to any contingencies such as outstanding regulatory approvals or sales contracts. Forecast capital expenditures should be included in the reporting entity’s current or following year’s approved budget. The project “decision gate” is the decision to start investing capital in the construction of production facilities and/or drilling development wells.

表 1：可采资源级别和子级

级/子级	定义	准则
储量	储量是在规定的条件下,从一个给定日期之后,通过对已知的石油聚集实施开发项目,预期可商业开采的石油数量。	储量必须符合四项标准：已发现的、可采的、其开发项目是商业的而其可采量是剩余的。根据相应的评估确定程度，储量级别可进一步细分，根据项目成熟度划分子级和在其开发及生产状态特征基础上划分子类。 包括在储量级别中的项目必须是充分定义好的，以便确定其商业可行性。必须有合理的期望即将通过必要的内部和外部审批，并证明有坚定的意向在一个合理期限内进行开发。 启动开发的合理期限取决于项目所涉及范围和具体情况及其变化。尽管五年期限是一个建议的基准，某种情形下，较长的期限可以适用，例如，生产者因市场关系而选择推迟项目的经济开发，或因满足合同或战略目标及其它因由. 在所有情形中，划分为储量的理由应明确表述在案。 要想能包括在储量级别内，油藏的商业生产能力必须有高的置信度，能受实际生产或地层测试的支持。在特定情况下，储量可以在测井和/或岩心分析基础上给定，这是由于测井和/或岩心分析表明目标油藏是含油气的,并且与同一地区的正在生产或经地层测试已证实有生产能力的油藏是可类比的。
正生产	开发项目目前正在生产并把石油销售到市场。	关键的标准是该项目正在从销售中获得收入，而不是获批准的开发项目正在完成。此时，项目的“商业性机率”可以说是 100%。 该项目的“决策门”是决定从该项目中起动商业生产。
已批准开发	已经取得所有必需的批准,投资资金已有承诺,以及开发项目正在实施进行。	此时，开发项目继续进行是肯定的，绝不会受到任何意外不确定因素的影响，诸如未完成监管机构的批准或没有销售合同。预测的投资费用应包括在实体的当年或后继年的核定预算报告中。 该项目的“决定门”是决定开始在生产设施的建设和/或钻开发井方面开始投资。

Class/Sub-Class	**Definition**	**Guidelines**
Justified for Development	Implementation of the development project is justified on the basis of reasonable forecast commercial conditions at the time of reporting, and there are reasonable expectations that all necessary approvals/contracts will be obtained.	In order to move to this level of project maturity, and hence have reserves associated with it, the development project must be commercially viable at the time of reporting, based on the reporting entity's assumptions of future prices, costs, etc. ("forecast case") and the specific circumstances of the project. Evidence of a firm intention to proceed with development within a reasonable time frame will be sufficient to demonstrate commerciality. There should be a development plan in sufficient detail to support the assessment of commerciality and a reasonable expectation that any regulatory approvals or sales contracts required prior to project implementation will be forthcoming. Other than such approvals/contracts, there should be no known contingencies that could preclude the development from proceeding within a reasonable timeframe (see Reserves class). The project "decision gate" is the decision by the reporting entity and its partners, if any, that the project has reached a level of technical and commercial maturity sufficient to justify proceeding with development at that point in time.
Contingent Resources	Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations by application of development projects, but which are not currently considered to be commercially recoverable due to one or more contingencies.	Contingent Resources may include, for example, projects for which there are currently no viable markets, or where commercial recovery is dependent on technology under development, or where evaluation of the accumulation is insufficient to clearly assess commerciality. Contingent Resources are further categorized in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by their economic status.
Development Pending	A discovered accumulation where project activities are ongoing to justify commercial development in the foreseeable future.	The project is seen to have reasonable potential for eventual commercial development, to the extent that further data acquisition (e.g. drilling, seismic data) and/or evaluations are currently ongoing with a view to confirming that the project is commercially viable and providing the basis for selection of an appropriate development plan. The critical contingencies have been identified and are reasonably expected to be resolved within a reasonable time frame. Note that disappointing appraisal/evaluation results could lead to a re-classification of the project to "On Hold" or "Not Viable" status. The project "decision gate" is the decision to undertake further data acquisition and/or studies designed to move the project to a level of technical and commercial maturity at which a decision can be made to proceed with development and production.

级/子级	定义	准则
经论证待批准开发	在报告时，合理预测的商业条件，开发项目的实施是论证合理的，并且有合理的期望将会获得所有必需的批准及合同。	为了进展到这一项目成熟度水平，并因此具有相应的储量。在报告时，根据报告实体对未来价格、成本等 (“预测的情况”) 的假设和项目的具体情况，开发项目必须是商业可行的。在合理的期限内有坚定的意向进行开发的证据是足以表明其商业性的。应有一个足够详细的开发方案以支持商业性评估，以及有一个合理期望会在项目实施之前能获得所需要的任何监管机构的批准和销售合同。除这些批准与合同以外，不应该有已知可能事件会妨碍在合理期限内进行开发（见储量级别）。 该项目的“决策门”是报告实体和其合作伙伴(若有的话)决定该项目所达到的技术及商业成熟水平足以充分证明此时可进行开发。
条件潜在储量	截止一个给定日期，通过开发项目的实施，从已知油气聚集中潜在可采出的石油估算量，但由于一个或多个不确定条件，目前还不能考虑商业开采。	条件潜在储量可以包括象目前没有可行市场的项目，或商业开发有赖于技术改进的项目，或对油气聚集的评价不足以明确评估其商业性的项目。根据相应的评估确定程度，潜在储量可以进一步分类，并根据项目成熟度进一步划分子级和/或根据其经济状态加以描述。
待开发	一个已发现的石油聚集，其项目活动正在进行，以便合理证明在可预见的将来可以进行商业开发。	该项目被认为具有合理的潜力达到最终商业开发，因而正在进一步采集数据（如钻井、地震资料）和/或进行评价，以期确认该项目在商业上是可行的，同时为选择一个适当的开发方案提供依据。关键的不确定条件已经查明，且在一个合理的期限内有合理的预期对其进行解决。请注意，令人失望的评价/评估结果可能导致项目重新分类到“延迟”或“不可行”的状态。 该项目的“决策门”是决定进一步采集数据和/或研究，旨在使项目达到一定的技术和商业成熟度，以便能够作出进行开发和生产决定。

Class/Sub-Class	**Definition**	**Guidelines**
Development Unclarified or on Hold	A discovered accumulation where project activities are on hold and/or where justification as a commercial development may be subject to significant delay.	The project is seen to have potential for eventual commercial development, but further appraisal/evaluation activities are on hold pending the removal of significant contingencies external to the project, or substantial further appraisal/evaluation activities are required to clarify the potential for eventual commercial development. Development may be subject to a significant time delay. Note that a change in circumstances, such that there is no longer a reasonable expectation that a critical contingency can be removed in the foreseeable future, for example, could lead to a reclassification of the project to "Not Viable" status. The project "decision gate" is the decision to either proceed with additional evaluation designed to clarify the potential for eventual commercial development or to temporarily suspend or delay further activities pending resolution of external contingencies.
Development Not Viable	A discovered accumulation for which there are no current plans to develop or to acquire additional data at the time due to limited production potential.	The project is not seen to have potential for eventual commercial development at the time of reporting, but the theoretically recoverable quantities are recorded so that the potential opportunity will be recognized in the event of a major change in technology or commercial conditions. The project "decision gate" is the decision not to undertake any further data acquisition or studies on the project for the foreseeable future.
Prospective Resources	Those quantities of petroleum which are estimated, as of a given date, to be potentially recoverable from undiscovered accumulations.	Potential accumulations are evaluated according to their chance of discovery and, assuming a discovery, the estimated quantities that would be recoverable under defined development projects. It is recognized that the development programs will be of significantly less detail and depend more heavily on analog developments in the earlier phases of exploration.
Prospect	A project associated with a potential accumulation that is sufficiently well defined to represent a viable drilling target.	Project activities are focused on assessing the chance of discovery and, assuming discovery, the range of potential recoverable quantities under a commercial development program.
Lead	A project associated with a potential accumulation that is currently poorly defined and requires more data acquisition and/or evaluation in order to be classified as a prospect.	Project activities are focused on acquiring additional data and/or undertaking further evaluation designed to confirm whether or not the lead can be matured into a prospect. Such evaluation includes the assessment of the chance of discovery and, assuming discovery, the range of potential recovery under feasible development scenarios.
Play	A project associated with a prospective trend of potential prospects, but which requires more data acquisition and/or evaluation in order to define specific leads or prospects.	Project activities are focused on acquiring additional data and/or undertaking further evaluation designed to define specific leads or prospects for more detailed analysis of their chance of discovery and, assuming discovery, the range of potential recovery under hypothetical development scenarios.

级/子级	定义	准则
不明或延迟开发	一个已发现的油气聚集,其项目活动延迟和/或认为其作为商业开发的论证可能会受到重大延迟.	该项目被认为具有最终商业开发的潜力，但进一步的评价/评估活动暂停以等待排除项目外部的重大不确定因素，或需要重大实质性的进一步评价/评估活动以阐明最终可商业开发的潜力。开发可能受到重大延迟。请注意，情况的变化可能导致该项目重新分级到“不可行”的状态。 例如，不再有一个合理的期望能在可预见的将来把关键的不确定因素排除. 该项目的“决策门”是决定要么进行额外的评价以阐明最终商业开发的潜力，要么暂停或延迟进一步的活动以待外部不确定性因素的解决。
不可行开发	一个已发现的石油聚集,由于其有限的生产潜力，目前没有计划对其开发或采集更多的数据，	该项目在报告时没有发现有最终商业开发的潜力，但记录了理论上的可采量，以便在技术或商业条件发生重大变化时，其潜在的机会将会得到承认。 该项目的“决策门”是决定在可预见的未来不进一步采集数据或对其研究。
远景资源	截止一个给定日期，对未发现的油气聚集中潜在可采油气的估算量。	潜在油气聚集根据其发现的机会加以评估，以及假定油气聚集得到发现，在界定的开发项目下其可采出的估算量。需要认识到，开发方案不会很详细，而是更多地依赖于勘探早期的类比开发。
落实有利圈闭	与被充分界定的，可钻探的潜在油气聚集有关的项目。	项目活动的重点是评估发现概率，以及假定已发现石油聚集后，在商业开发情形下其潜在可采量的范围。
未落实有利圈闭	与潜在油气聚集有关的项目,目前没有足以被界定,需要更多的数据采集和/或评价才可归类为落实有利圈闭。	项目活动的重点是采集额外的数据和/或采取进一步的评价，目的在于确认是否未落实有利圈闭可以成熟到成为落实有利圈闭。这些评价包括发现概率的评估，以及假设已发现石油聚集，在可行的开发方案下潜在可采的范围。
概念勘探区	与可能存有多个实有利圈闭的远景区带有关的项目,但为了界定落实或未落实有利圈闭还需要更多的数据采集和/或评价。	项目活动的重点是采集更多的数据和/或进一步评价，旨在对发现概率进行更详细的分析，和界定落实或未落实有利圈闭，以及假定已发现油气聚和在假设开发情景下潜在可采量的范围。

Table 2: Reserves Status Definitions and Guidelines

Status	Definition	Guidelines
Developed Reserves	Developed Reserves are expected quantities to be recovered from existing wells and facilities.	Reserves are considered developed only after the necessary equipment has been installed, or when the costs to do so are relatively minor compared to the cost of a well. Where required facilities become unavailable, it may be necessary to reclassify Developed Reserves as Undeveloped. Developed Reserves may be further sub-classified as Producing or Non-Producing.
Developed Producing Reserves	Developed Producing Reserves are expected to be recovered from completion intervals that 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.
Developed Non-Producing Reserves	Developed Non-Producing Reserves 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 yet 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 start of production. In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.
Undeveloped Reserves	Undeveloped Reserves are quantities expected to be recovered through future investments:	(1) from new wells on undrilled acreage in known accumulations, (2) from deepening existing wells to a different (but known) reservoir, (3) from infill wells that will increase recovery, or (4) where a relatively large expenditure (e.g. when compared to the cost of drilling a new well) is required to (a) recomplete an existing well or (b) install production or transportation facilities for primary or improved recovery projects.

表 2：储量状态的定义和准则

状态	定义	准则
已开发储量	已开发储量是预计从现有井或设施可采出的数量。	只有当必需的设备已经安装后，或者其安装成本相比于一口井的成本是微不足道的情况下，才可认为储量是已开发的。如果必要的设施变得不可用时，则可能有必要重新把已开发储量分级为未开发储量。已开发储量可以进一步分为正生产和未生产子级。
已开发正生产储量	已开发正生产储量是做评估时预计从开启且正生产的完井层段可采出的数量。	只有提高采收率项目在实施之后，才可认为提高采收率储量是正生产。
已开发未生产储量	已开发未生产储量包括关井和管外储量。	关井储量是预计从（1）评估时开启但尚未生产的完井层段，（2）由于市场条件或管线连接的原因而关闭的井，或（3）由于机械原因而不能够生产的井等采出的数量。管外储量是预计从现有井的层段可采出的数量，该层段在开始生产之前，需要进一步的完井工作或将来要重新完井。 在所有情况下，起始或恢复生产的费用比钻新井成本都相对较低。
未开发储量	未开发储量是需要通过未来投资预计可采出的数量。	（1）在已知石油聚集的未钻井面积中钻新井，（2）把现有井加深到不同的（但已知）油藏，（3）用加密井，增加可采量，或（4）需要相对较大的费用（例如，相比于钻一口新井的成本）来（a）对现有井重新完井或（b）安装一次采油项目或提高采收率项目生产或传输设施。

Table 3: Reserves Category Definitions and Guidelines

Category	Definition	Guidelines
Proved Reserves	Proved Reserves are those quantities of petroleum, which by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined 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 a 90% probability that the quantities actually recovered will equal or exceed the estimate. The area of the reservoir considered as Proved includes (1) the area delineated by drilling and defined by fluid contacts, if any, and (2) adjacent undrilled portions of the reservoir that can reasonably be judged as continuous with it and commercially productive on the basis of available geoscience and engineering data. In the absence of data on fluid contacts, Proved quantities in a reservoir are limited by the lowest known hydrocarbon (LKH) as seen in a well penetration unless otherwise indicated by definitive geoscience, engineering, or performance data. Such definitive information may include pressure gradient analysis and seismic indicators. Seismic data alone may not be sufficient to define fluid contacts for Proved reserves (see "2001 Supplemental Guidelines," Chapter 8). Reserves in undeveloped locations may be classified as Proved provided that: • The locations are in undrilled areas of the reservoir that can be judged with reasonable certainty to be commercially productive. • Interpretations of available geoscience and engineering data indicate with reasonable certainty that the objective formation is laterally continuous with drilled Proved locations. For Proved Reserves, the recovery efficiency applied to these reservoirs should be defined based on a range of possibilities supported by analogs and sound engineering judgment considering the characteristics of the Proved area and the applied development program.
Probable Reserves	Probable Reserves are those additional Reserves which analysis of geoscience and engineering data indicate are less likely to be recovered than Proved Reserves but more certain to be recovered than Possible Reserves.	It is equally likely that actual remaining quantities recovered will be greater than or less than the sum of the estimated Proved plus Probable Reserves (2P). In this context, when probabilistic methods are used, there should be at least a 50% probability that the actual quantities recovered will equal or exceed the 2P estimate. Probable Reserves may be assigned to areas of a reservoir adjacent to Proved where data control or interpretations of available data are less certain. The interpreted reservoir continuity may not meet the reasonable certainty criteria. Probable estimates also include incremental recoveries associated with project recovery efficiencies beyond that assumed for Proved.

表 3：储量类别的定义和准则

类别	定义	准则
证实储量	证实储量是通过地球科学和工程数据分析,在规定的经济条件、作业方法和政府制度下,从一个给定日期之起,能合理确定地从已知油藏可商业开采的估计油气量。	如果采用决定性法,“合理的确定性”旨在表示有高置信度可采出的数量。如果采用的是概率法，实际的采出量等于或超过估算量的概率至少有 90%。 被认为是证实储量的油藏面积包括(1)由钻井所区划和流体界面(若有的话)所界定的面积,(2)与该油藏相邻的未钻部分。根据现有的地学和工程数据，该部分可以被合理判断为与该油藏是连续的，并具有商业生产性。 在没有流体接触资料时，油藏的证实储量由一口井所钻遇的最低已知烃（LKH）所限定，除非地学、工程或动态生产数据明确地另有所示。这些明确的数据可包括压力梯度分析和地震数据显示。单独的地震数据可能不足以界定证实储量的流体界面（见“2001 年补充准则”, 第 8 章）。 在未开发地段的储量可以被分类为证实储量如果： •该地段是能合理确定有商业性油藏的未钻部分。 •现有的地学和工程数据的解释可以合理地确定目标地层与已钻井的证实储量面积内的地层在横向上是连续。 对于证实储量，用于这些油藏的采收率应根据类比油藏和可靠的工程判断能支持的可能性范围进行界定，这些判断要考虑证实储量区域的特点和所采用的开发方案。
概算储量	概算储量是通过地学和工程数据分析表明其采出的可能性小于证实储量的附加储量,但相比可能储量其有更多被采出的确定性。	实际剩余的可采量有同等的可能性会大于或小于证实储量加上概算储量之和（2P）。因而，当采用概率法时，实际采出量等于或超过 2P 估算量的概率应至少有 50%。 概算储量可以被分配到与证实储量相邻的油藏区域。在该区域，数据控制或现有数据的解释不够确定。解释的油藏连续性可能不满足合理确定性的标准。 概算储量也可以包括超过证实储量项目采收率之上的增加采收量。

Category	Definition	Guidelines
Possible Reserves	Possible Reserves are those additional reserves which analysis of geoscience and engineering data indicate are less likely to be recoverable than Probable Reserves.	The total quantities ultimately recovered from the project have a low probability to exceed the sum of Proved plus Probable plus Possible (3P), which is equivalent to the high estimate scenario. When probabilistic methods are used, there should be at least a 10% probability that the actual quantities recovered will equal or exceed the 3P estimate. Possible Reserves may be assigned to areas of a reservoir adjacent to Probable where data control and interpretations of available data are progressively less certain**.** Frequently, this may be in areas where geoscience and engineering data are unable to clearly define the area and vertical reservoir limits of commercial production from the reservoir by a defined project. Possible estimates also include incremental quantities associated with project recovery efficiencies beyond that assumed for Probable.
Probable and Possible Reserves	(See above for separate criteria for Probable Reserves and Possible Reserves.)	The 2P and 3P estimates may be based on reasonable alternative technical and commercial interpretations within the reservoir and/or subject project that are clearly documented, including comparisons to results in successful similar projects. In conventional accumulations, Probable and/or Possible Reserves may be assigned where geoscience and engineering data identify directly adjacent portions of a reservoir within the same accumulation that may be separated from Proved areas by minor faulting or other geological discontinuities and have not been penetrated by a wellbore but are interpreted to be in communication with the known (Proved) reservoir. Probable or Possible Reserves may be assigned to areas that are structurally higher than the Proved area. Possible (and in some cases, Probable) Reserves may be assigned to areas that are structurally lower than the adjacent Proved or 2P area. Caution should be exercised in assigning Reserves to adjacent reservoirs isolated by major, potentially sealing, faults until this reservoir is penetrated and evaluated as commercially productive. Justification for assigning Reserves in such cases should be clearly documented. Reserves should not be assigned to areas that are clearly separated from a known accumulation by non-productive reservoir (i.e., absence of reservoir, structurally low reservoir, or negative test results); such areas may contain Prospective Resources. In conventional accumulations, where drilling has defined a highest known oil (HKO) elevation and there exists the potential for an associated gas cap, Proved oil Reserves should only be assigned in the structurally higher portions of the reservoir if there is reasonable certainty that such portions are initially above bubble point pressure based on documented engineering analyses. Reservoir portions that do not meet this certainty may be assigned as Probable and Possible oil and/or gas based on reservoir fluid properties and pressure gradient interpretations.

类别	定义	准则
可能储量	可能储量是通过地学和工程数据表明其采出的可能性小于概算储量的附加储量。	项目的最终总可采量超过证实储量加上概算储量加上可能储量的和(3P)具有低的概率,这相当于高估算量的情景。当用概率法时,实际的采出量等于或超过 3P 估算量的概率应至少有 10%。 可能储量可以被分配到与概算储量相邻的油藏区域,在该区域,数据控制或现有数据的解释趋向于更加不确定。经常地,这可能是因为地学和工程数据不能够明确界定一个具体的商业性油藏项目的横纵向边界。 可能储量也可以包括与超过概算储量项目采收率之上的增加采收量。
概算和可能储量	(见上文,分别对概算储量和可能储量的标准)	2P 和 3P 储量可能是基于对油藏应用合理的变通技术和商业解释,或基于明确记录在案的、可与相似项目的成功结果类比的目标项目。 在常规的石油聚集,概算和/或可能储量可以被分配到地学和工程数据能确定的直接相邻的同一石油聚集内的油藏之一部分,该部分可以通过小断层或其他地质不连续性与证实储量区域分隔,而且还没有被井眼钻穿,但被解释为与已知(证实)油藏是连通的。概算储量或可能储量可以被分配到高于证实储量区域的构造区域。可能(在某些情况下,概算)储量可以被分配到低于紧邻的证实储量或 2P 区域的构造区域。 在分配储量到被主要的、潜在封闭的断层所隔离的邻近油藏时,在其被钻穿和被评估为具有商业生产性之前,应谨慎行事。在这种情况下,分配储量的理由应明确表术在案。储量不应被分配到明显与已知石油聚集被非生产性油藏所分隔的区域(即,缺失储层、构造低部储层或不利的测试结果);尽管这些区域可能含有远景资源。 在常规油气聚集中,如果钻井已确定了最高已知油气高度(HKO),但有可能存在相关气顶,只有当工程分析有合理的确定性表明初始压力高于泡点压力时,证实油储量才可以被分配到油藏构造更高部位的部位。不满足这一确定性的油藏部分可以在对油藏流体特性和压力梯度解释的基础上分配为石油和/或天然气概算和可能储量。

Appendix A: Glossary of Terms Used in Resources Evaluations

Originally published in January 2005, the SPE/WPC/AAPG Glossary has herein been revised to align with the 2007 SPE/WPC/AAPG/SPEE Petroleum Resources Management System document. The glossary provides high-level definitions of terms use in resource evaluations. Where appropriate, sections and/or chapters within the 2007 and/or 2001 documents are referenced to best show the use of selected terms in context.

TERM	Reference	DEFINITION
1C	2007 - 2.2.2	Denotes low estimate scenario of Contingent Resources.
2C	2007 - 2.2.2	Denotes best estimate scenario of Contingent Resources.
3C	2007 - 2.2.2	Denotes high estimate scenario of Contingent Resources.
1P	2007 - 2.2.2	Taken to be equivalent to Proved Reserves; denotes low estimate scenario of Reserves.
2P	2007 - 2.2.2	Taken to be equivalent to the sum of Proved plus Probable Reserves; denotes best estimate scenario of Reserves.
3P	2007 - 2.2.2	Taken to be equivalent to the sum of Proved plus Probable plus Possibl e Reserves; denotes high estimate scenario of reserves.
Accumulation	2001 - 2.3	An individual body of naturally occurring petroleum in a reservoir.
Aggregation	2007 - 3.5.1 2001 - 6	The process of summing reservoir (or project) level estimates of resource quantities to higher levels or combinations such as field, country or company totals. Arithmetic summation of incremental categories may yield different results from probabilistic aggregation of distributions.
Approved for Development	2007 - Table I	All necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is underway.
Analogous Reservoir	2007 - 3.4.1	Analogous reservoirs, as used in resources assessments, have similar rock and fluid properties, reservoir conditions (depth, temperature and pressure) and drive mechanisms, but are typically at a more advanced stage of development than the reservoir of interest and thus may provide concepts to assist in the interpretation of more limited data and estimation of recovery.
Assessment	2007 - 1.2	See Evaluation.
Associated Gas		Associated Gas is a natural gas found in contact with or dissolved in crude oil in the reservoir. It can be further categorized as Gas-Cap Gas or Solution Gas.
Barrels of Oil Equivalent (BOE)	2001 - 3.7	See Crude Oil Equivalent.
Basin-Centered Gas	2007 - 2.4	An unconventional natural gas accumulation that is regionally pervasive and characterized by low permeability, abnormal pressure, gas saturated reservoirs and lack of a down-dip water leg.

附录A：资源评价使用的术语表

最初发表于 2005 年 1 月的 SPE/WPC/AAPG 术语表在此已经作出修改，以配合 2007 年的 SPE/WPC/AAPG/SPEE 石油资源管理系统文件。该术语表提供了资源评价过程中使用术语的概述性的定义。为了更好地说明这些术语在上下文中的应用，在适当情况下注明了在 2001 或 2007 版本中出现的章节号。

术语	参考文献	定义
1C	2007-2.2.2	表示条件潜在储量的低估算量方案。
2C	2007-2.2.2	表示条件潜在储量的最佳估算量方案。
3C	2007-2.2.2	表示条件潜在储量的高估算量方案。
1P	2007-2.2.2	等同于证实储量；表示储量的低估算量方案。
2P	2007-2.2.2	等同于证实储量与可能储量的和；表示储量的最佳估算量方案。
3P	2007-2.2.2	等同于证实储量加上可能储量加上潜在（可采）储量的和；表示储量的高估算量方案。
聚集	2001-2.3	一个油气藏中自然形成的石油单独体。
汇总	2007-3.5.12 2001-6	油气藏（或项目）级别的资源估算量汇总到高级别或组合的求和过程，诸如汇总到油田、国家或公司总计。按类别的算术求和可能会与概率分布汇总结果不同。
已批准开发	2007-表 1	已经获得所有批准和资金承诺、开发项目正在实施。
类比油气藏	2007-3.4.1	用在资源评估的类比油气藏，与评估中的油气藏具有相似的岩石及流体性质、储集条件（深度、温度和压力）和驱动机理，一般处在开发的更高阶段，因此可以有助于解释较有限的数据和估算采收率等等。
评估	2007-1.2	参阅评价
伴生气		伴生气包括与原油接触和溶解在原油中的天然气，可以进一步划分为气顶气和溶解气。
桶油当量	2001-3.7	参阅原油当量
盆地中心气	2007-2.4	一种非常规天然气聚集，特点是在区域内广为分布，低渗透、异常压力、饱和天然气藏和缺乏下倾含水区。

TERM	Reference	DEFINITION
Behind-Pipe Reserves	2007 - 2.1.3.1	Behind-pipe reserves are expected to be recovered from zones in existing wells, which will require additional completion work or future re-completion prior to the start of production. In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.
Best Estimate	2007 - 2.2.2 2001 - 2.5	With respect to resource categorization, this is considered to be the best estimate of the quantity that will actually be recovered from the accumulation by the project. It is the most realistic assessment of recoverable quantities if only a single result were reported. If probabilistic methods are used, there should be at least a 50% probability (P50) that the quantities actually recovered will equal or exceed the best estimate.
Bitumen	2007 - 2.4	See Natural Bitumen.
Buy Back Agreement		An agreement between a host government and a contractor under which the host pays the contractor an agreed price for all volumes of hydrocarbons produced by the contractor. Pricing mechanisms typically provide the contractor with an opportunity to recover investment at an agreed level of profit.
Carried Interest	2001 - 9.6.7	A carried interest is an agreement under which one party (the carrying party) agrees to pay for a portion or all of the pre-production costs of another party (the carried party) on a license in which both own a portion of the working interest.
Chance	2007 - 1.1	Chance is 1- Risk. (See Risk)
Coalbed Methane (CBM)	2007 - 2.4	Natural gas contained in coal deposits, whether or not stored in gaseous phase. Coalbed gas, although usually mostly methane, may be produced with variable amounts of inert or even non-inert gases. (Also termed Coal Seam Gas, CSG, or Natural Gas from Coal, NGC)
Commercial	2007 - 2.1.2 and Table 1	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.
Committed Project	2007 - 2.1.2 and Table 1	Projects are committed only when it can be demonstrated that there is a firm intention to develop them and bring them to production. Intention may be demonstrated with funding/financial plans and declaration of commerciality based on realistic expectations of regulatory approvals and reasonable satisfaction of other conditions that would otherwise prevent the project from being developed and brought to production.

术语	参考文献	定义
管外储量	2007-2.1.3.1	管外储量是预计从现有井的层段需要额外的完井或将来的重新完井才可采出的储量。在所有情况下，投产或恢复生产比钻新井的成本相对更低。
最佳估算量	2007-2.2.2 2001-2.5	在资源分类中，最佳估算量是将从该项目油气藏中实际采出量的最佳估值。如果只报告一个资源数值的话，这就是一个最实际的可采量评估值。如果使用概率法，实际采出量等于或超过最佳估算量的概率至少应为 50%（P50）。
沥青	2007-2.4	参阅天然沥青。
回购协议		主权国政府和合同者之间的一种协议，根据该协议，政府向合同者按商定价格回购所有产出的石油。通常定价机制使合同者能够回有收投资的机会并获得一定水平的利润。
干股	2001-9.6.7	干股是一种合同条款，在共同拥有经营权益的许可证区，合同一方（给股方）同意支付另一方（受股方）投产前成本费用的一部分或全部。
机会	2007-1.1	机会 = 1 - 风险（参阅风险）
煤层气 （CBM）	2007-2.4	包含在煤矿床中的以气态或非气态储存的天然气。 煤层气通常大多是甲烷，可能有不定数量的惰性，甚至非惰性气体。（也称为煤层气: CSG，或来自煤的天然气: NGC）
商业性	2007-2.1.2 和表 1	一个项目是商业性的意味着基本的社会、环境和经济条件得到满足，包括政治、法律、管理规定及合同条件。并且承诺在合理期限内进行开发和生产。虽然五年期限被建议作为一个基准，有些情形下较长的期限也可以适用，例如，经济的项目推迟开发是因为与市场有关的原因，或以满足合同或战略目标的原因。在所有情形中，分类为储量的理由应明确评述。
承诺项目	2007-2.1.2 和表 1	项目是承诺的意味着可以证明有确定的意向将项目投入开发和生产。意向可以用资金/财务计划和商业性声明来表明，对政府的各种批准和能够解决限制油田开发生产的其它条件有合理的预期。

TERM	Reference	DEFINITION
Completion		Completion of a well. The process by which a well is brought to its final classification—basically dry hole, producer, injector, or monitor well. A dry hole is normally plugged and abandoned. A well deemed to be producible of petroleum, or used as an injector, is completed by establishing a connection between the reservoir(s) and the surface so that fluids can be produced from, or injected into, the reservoir. Various methods are utilized to establish this connection, but they commonly involve the installation of some combination of borehole equipment, casing and tubing, and surface injection or production facilities.
Completion Interval		The specific reservoir interval(s) that is (are) open to the borehole and connected to the surface facilities for production or injection, or reservoir intervals open to the wellbore and each other for injection purposes.
Concession	2001 - 9.6.1	A grant of access for a defined area and time period that transfers certain entitlements to produced hydrocarbons from the host country to an enterprise. The enterprise is generally responsible for exploration, development, production, and sale of hydrocarbons that may be discovered. Typically granted under a legislated fiscal system where the host country collects taxes, fees, and sometimes royalty on profits earned.
Condensate	2001 - 3.2	Condensates are a mixture of hydrocarbons (mainly pentanes and heavier) that exist in the gaseous phase at original temperature and pressure of the reservoir, but when produced, are in the liquid phase at surface pressure and temperature conditions. Condensate differs from natural gas liquids (NGL) on two respects: (1) NGL is extracted and recovered in gas plants rather than lease separators or other lease facilities; and (2) NGL includes very light hydrocarbons (ethane, propane, butanes) as well as the pentanes-plus that are the main constituents of condensate.
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).
Constant Case	2007 - 3.1.1	Modifier applied to project resources estimates and associated cash flows when such estimates are based on those conditions (including costs and product prices) that are fixed at a defined point in time (or period average) and are applied unchanged throughout the project life, other than those permitted contractually. In other words, no inflation or deflation adjustments are made to costs or revenues over the evaluation period.
Contingency	2007 - 3.1 and Table 1	See Conditions.
Contingent Project	2007 - 2.1.2	Development and production of recoverable quantities has not been committed due to conditions that may or may not be fulfilled.
Contingent Resources	2007 - 1.1 and Table 1	Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations by application of development projects but which are not currently considered to be commercially recoverable due to one or more contingencies. Contingent Resources are a class of discovered recoverable resources.

术语	参考文献	定义
完井		井的完成过程，通过此过程一口井得以最终定类-干井、生产井、注入井或监测井。干井一般是打水泥塞和弃井。生产井和注入井的完井是通过建立油气藏和地表的联系，使之能够生产或注入。完井有各种方式，但通常包括安装一些井下装置、套管或油管、地面注入或生产设施等。
完井层段		油气藏在井下打开并与地表设施相通能够进行生产和注入的层段，或者是井下为了注入目的而打开互相连通的层段。
租让	2001-9.6.1	主权国把某一区域的一段时间的权利授予企业以生产石油。企业通常有勘探、开发生产和销售石油的责任。通常，租让是基于主权国法律财税系统，主权国收取税收、费用、有时从利润中提取采矿费。
凝析油	2001-3.2	凝析油是一种碳氢化合物的混合物（主要是戊烷和更重的组分），其在油气藏原始温度和压力下以气相存在，当产出地表时，在地面的温度和压力下是液相的。凝析油不同于天然气液（NGL）在两个方面：（1）NGL 的提取和回收是在天然气处理厂，而不是在矿场的分离器或其他矿场设施；（2）NGL 除了戊烷以上的组分还包括非常轻质的碳氢化合物（乙烷，丙烷，丁烷），而凝析油的主要成分是戊烷以上的组分。
条件	2007-3.1	经济、市场、法律、环境、社会和政府等因素预计在项目周期内存在和影响正在评估的项目（也称为潜在条件）。
无通胀情况	2007-3.1.1	修饰语适用于项目资源估算量及相关的现金流，条件是将平均值或某时间的固定值（包括成本和产品价格）应用于整个项目的期限，而不是按合同的允许随时间改变。换言之，在整个评估期成本和收入没有对通货膨胀或通货紧缩作出调整。
潜在条件	2007-3.1 和表 1	参阅条件
有条件潜在项目	2007-2.1.2	由于条件可能不会得到满足，没有承诺开发和生产某一可采量的项目。
有条件潜在储量	2007-1.1 和表 1	有条件潜在资源量是在某一给定时间估计的，通过实施开发项目，从已知的石油聚集中潜在可采出的石油估算量，但由于一个或多个潜在条件，目前不被视为是商业可采的。有条件潜在储量是已发现可采资源的一个类别。

TERM	Reference	DEFINITION
Continuous-Type Deposit	2007 - 2.4 2001 - 2.3	A petroleum accumulation that is pervasive throughout a large area and which is not significantly affected by hydrodynamic influences. Such accumulations are included in Unconventional Resources. Examples of such deposits include "basin-centered" gas, shale gas, gas hydrates, natural bitumen and oil shale accumulations.
Conventional Crude Oil	2007 - 2.4	Crude oil flowing naturally or capable of being pumped without further processing or dilution (see Crude Oil).
Conventional Gas	2007 - 2.4	Conventional Gas is a natural gas occurring in a normal porous and permeable reservoir rock, either in the gaseous phase or dissolved in crude oil, and which technically can be produced by normal production practices.
Conventional Resources	2007 - 2.4	Conventional resources exist in discrete petroleum accumulations related to localized geological structural features and/or stratigraphic conditions, typically with each accumulation bounded by a downdip contact with an aquifer, and which is significantly affected by hydrodynamic influences such as buoyancy of petroleum in water**.**
Conveyance	2001 - 9.6.9	Certain transactions that are in substance borrowings repayable in cash or its equivalent and shall be accounted for as borrowings and may not qualify for the recognition and reporting of oil and gas reserves.
Cost Recovery	2001 - 9.6.2, 9.7.2	Under a typical production-sharing agreement, the contractor is responsible for the field development and all exploration and development expenses. In return, the contractor recovers costs (investments and operating expenses) out of the gross production stream. The contractor normally receives payment in oil production and is exposed to both technical and market risks.
Crude Oil	2001 - 3.1	Crude oil is the portion of petroleum that exists in the liquid phase in natural underground reservoirs and remains liquid at atmospheric conditions of pressure and temperature. Crude oil may include small amounts of non-hydrocarbons produced with the liquids but does not include liquids obtained from the processing of natural gas.
Crude Oil Equivalent	2001 - 3.7	Converting gas volumes to the oil equivalent is customarily done on the basis of the nominal heating content or calorific value of the fuel. There are a number of methodologies in common use. Before aggregating, the gas volumes first must be converted to the same temperature and pressure. Common industry gas conversion factors usually range between 1 barrel of oil equivalent (BOE) = 5,600 standard cubic feet (scf) of gas to 1 BOE = 6,000 scf. (Many operators use 1 BOE = 5,620 scf derived from the metric unit equivalent 1 m^3 crude oil = 1,000 m^3 natural gas). (Also termed Barrels of Oil Equivalent.)
Cumulative Production	2007 - 1.1	The sum of production of oil and gas to date (see also Production).
Current Economic Conditions	2007 - 3.1.1	Establishment of current economic conditions should include relevant historical petroleum prices and associated costs and may involve a defined averaging period. The SPE guidelines recommend that a 1-year historical average of costs and prices should be used as the default basis of "constant case" resources estimates and associated project cash flows.

术语	参考文献	定义
连续型油藏（矿床）	2007-2.4 2001-2.3	大面积广泛分布的一种石油聚集，它不受水动力效应的明显影响。这些聚集包括在非常规资源中。例如这些沉积包括“盆地中心”气、页岩气，天然气水合物、天然沥青和油页岩等聚集。
常规原油	2007-2.4	不需要其它处理和稀释能够自然流动和泵出的石油（见原油）。
常规天然气	2007-2.4	存在于正常孔隙和渗透储层中，以气态或溶解在原油中、可由常规技术正常产出的天然气。
常规资源	2007-2.4	常规资源是存在于不连续的局部地质构造和地层单位中的油气藏，一个典型常规油气藏是在下倾方向由一个油水界面限定、受水动力重要影响,例如石油漂浮在水之上的。
转让	2001-9.6.9	某些交易， 其实质是以现金或者其等价物形式的可偿还的借款，应计作借款而没有资格认可为油气储量，也不能作为油气储量来报告。
成本回收	2001-9.6.2，9.7.2	在典型的产品分成合同中，合同者负责油田开发和所有勘探和开发的费用。作为回报，合同者从总产量中回收成本（投资及作业费用）。合同者通常以原油产量形式接收报酬，并承受技术和市场的双重风险。
原油	2001-3.1	原油是石油的一部分，其在自然的地下油气藏中以液态存在，并在地表条件的压力和温度下仍然是液态的。原油可包括随液体产出的少量非烃类，但不包括从天然气加工获得的液体。
原油当量	2001-3.7	转换天然气体积量至原油当量的惯用做法是换算为相当热值的原油。有多种方法进行这种换算。汇总以前，天然气体积量必须首先被转换为相同的温度和压力条件下。通常 1 原油当量桶 = 5600 - 6000 标准立方英尺(scf)(一些作业者使用 1 当量桶 = 5620scf,这是从公制单位当量 1 立方米原油 = 1000 立方米气换算而来）
累积产量	2007-1.1	到此日期为止，石油和天然气产量的总和（也见产量）。
当前经济条件	2001-3.1.1	当前经济条件的建立应包括有关的历史石油价格和相关的成本费用，和相应的规定时期的平均值。在资源评估和现金流评价时 SPE 准则推荐使用 1 年作为无通胀情况的成本费用和油价的平均期。

TERM	Reference	DEFINITION
Cushion Gas Volume		With respect to underground natural gas storage, Cushion Gas Volume (CGV) is the gas volume required in a storage field for reservoir management purposes and to maintain adequate minimum storage pressure for meeting working gas volume delivery with the required withdrawal profile. In caverns, the cushion gas volume is also required for stability reasons. The cushion gas volume may consist of recoverable and non-recoverable in-situ gas volumes and injected gas volumes.
Deposit	2007 - 2.4	Material laid down by a natural process. In resource evaluations, it identifies an accumulation of hydrocarbons in a reservoir (see Accumulation).
Deterministic Estimate	2007 - 3.5	The method of estimation of Reserves or Resources is called deterministic if a discrete estimate(s) is made based on known geoscience, engineering, and economic data.
Developed Reserves	2007 - 2.1.3.2 and Table 2	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 compared to the cost of a well. Developed Reserves may be further sub-classified as Producing or Non-Producing.
Developed Producing Reserves	2007 - 2.1.3.2 and Table 2	Developed Producing Reserves are expected to be recovered from completion intervals that 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.
Developed Non-Producing Reserves	2007 - 2.1.3.2 and Table 2	Developed Non-Producing Reserves 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 yet 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 also those expected to be recovered from zones in existing wells which will require additional completion work or future recompletion prior to start of production. In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.
Development Not Viable	2007 - 2.1.3.1 and Table 1	A discovered accumulation for which there are no current plans to develop or to acquire additional data at the time due to limited production potential. A project maturity sub-class that reflects the actions required to move a project towards commercial production.
Development Pending	2007 - 2.1.3.1 and Table 1	A discovered accumulation where project activities are ongoing to justify commercial development in the foreseeable future. A project maturity sub-class that reflects the actions required to move a project towards commercial production.
Development Plan	2007 - 1.2	The design specifications, timing and cost estimates of the development project including, but not limited to, well locations, completion techniques, drilling methods, processing facilities, transportation and marketing. (See also Project.)

术语	参考文献	定义
气垫气体积		对于天然气地下储气库，气垫气体积（CGV）是为气藏管理满足所需供气量维持适当的最低储存压力所需的气量。对溶洞来说，气垫气也是为了稳定性的原因。气垫气可以包括原生气和注入气，可采和非可采气量。
沉积（矿床）	2007-2.4	由自然形成过程中留下的物质。在资源评价中，它表示油气藏中的一个含油聚集（见聚集）。
决定性评估	2007-3.5	根据已知的地学、工程和经济资料进行资源评估，并得出具体的离散结果的估算方法。
开发储量	2007-2.1.3.2 和表 2	开发储量是预计从现有井（包括未完井井段）中采出的量。提高采收率项目储量只有在所需设施已经安装，或者安装成本费用比钻新井小得多时才能被认为是"开发储量"。开发储量可进一步划分为开发生产储量和开发未生产储量。
开发生产储量	2007-2.1.3.2 和表 2	开发生产储量是从现有已打开正在生产的完井层段中能采出的储量。提高采收率项目只有已经开始作业才能划分为开发生产储量。
开发未生产储量	2007-2.1.3.2 和表 2	开发未生产储量包括关井和未完井井段的储量。关井储量有以下 3 两种情况：（1）井段已完井，但未开始生产；（2）由于市场原因和管线原因关井；（3）由于机械原因不能生产的井。未完井段储量包括已有井的未完井层段的储量，这些井段需要进行完井或者重新完井才能开始生产。 在所有情况下，起始或恢复生产均比钻新井的成本更低。
不可开发	2007-2.1.3.1 和表 1	一个已发现的石油聚集，由于产能较小目前没有计划开发或采集更多的数据。它是一个项目的成熟度子级，反映项目向商业化生产转化所需的活动。
待开发	2007-2.1.3.1 和表 1	一个已发现的石油聚集，正在进行作业活动以论证其在近期的商业性。它是一个项目的成熟度子级，反映项目向商业化生产转化所需的活动。
开发方案	2007-1.2	开发项目的设计、时间和成本评估，包括但不限于：井位、完井技术、钻井方法、处理设施、输送和销售。（参阅项目）。

TERM	Reference	DEFINITION
Development Unclarified or On Hold	2007 - 2.1.3.1 and Table 1	A discovered accumulation where project activities are on hold and/or where justification as a commercial development may be subject to significant delay. A project maturity sub-class that reflects the actions required to move a project toward commercial production.
Discovered	2007 - 2.1.1	A discovery is one petroleum accumulation, or several petroleum accumulations collectively, for which one or several exploratory wells have established through testing, sampling, and/or logging the existence of a significant quantity of potentially moveable hydrocarbons. In this context, "significant" implies that there is evidence of a sufficient quantity of petroleum to justify estimating the inplace volume demonstrated by the well(s) and for evaluating the potential for economic recovery. (See also Known Accumulations.)
Discovered Petroleum Initially-in-Place	2007 - 1.1	Discovered Petroleum Initially-in-Place is that quantity of petroleum that is estimated, as of a given date, to be contained in known accumulations prior to production. Discovered Petroleum Initially-in-Place may be subdivided into Commercial, Sub-Commercial, and Unrecoverable, with the estimated commercially recoverable portion being classified as Reserves and the estimated sub-commercial recoverable portion being classified as Contingent Resources.
Dry Gas	2001 - 3.2	Dry Gas is a natural gas remaining after hydrocarbon liquids have been removed prior to the reference point. The dry gas and removed hydrocarbon liquids are accounted for separately in resource assessments. It should be recognized that this is a resource assessment definition and not a phase behavior definition. (Also called Lean Gas.)
Dry Hole	2001 - 2.5	A well found to be incapable of producing either oil or gas in sufficient quantities to justify completion as an oil or gas well.
Economic	2007 - 3.1.2 2001 - 4.3	In relation to petroleum Reserves and Resources, economic refers to the situation where the income from an operation exceeds the expenses involved in, or attributable to, that operation.
Economic Interest	2001 - 9.4.1	An Economic Interest is possessed in every case in which an investor has acquired any Interest in mineral in place and secures, by any form of legal relationship, revenue derived from the extraction of the mineral to which he must look for a return of his capital.
Economic Limit	2007 - 3.1.2 2001 - 4.3	Economic limit is defined as the production rate beyond which the net operating cash flows (after royalties or share of production owing to others) from a project, which may be an individual well, lease, or entire field, are negative.
Entitlement	2007 - 3.3	That portion of future production (and thus resources) legally accruing to a lessee or contractor under the terms of the development and production contract with a lessor.
Entity	2007 - 3.0	Entity is a legal construct capable of bearing legal rights and obligations. In resources evaluations this typically refers to the lessee or contractor, which is some form of legal corporation (or consortium of corporations). In a broader sense, an entity can be an organization of any form and may include governments or their agencies.

术语	参考文献	定义
未阐明或延迟开发	2007-2.1.3.1 和表 1	一个已发现的石油聚集，其项目活动暂停或者获得作为商业开发的依据可能会受到重大延迟。它是一个项目的成熟度子级，反映项目向商业化生产转化所需的活动。
发现	2007-2.1.1	发现是一个或几个石油聚集的集合，通过一口或几口探井的测试，采样，和/或测井，已经证实有相当数量的可流动的烃类。这里“相当数量的”是表示有证据表明探井发现了足够的石油 ,有必要对其资源和经济性进行评估(参阅已知油气藏)。
已发现石油地质储量	2007-1.1	已发现石油地质储量是在某一给定时间估计的、在生产之前存在于已知油气藏中的石油。已发现石油地质储量可以进一步分为商业的、次商业的和不可采的，同时，评估为商业可采的部分被分类作为可采储量和评估为次商业的可采部分被分类作为有条件潜在(可采)储量。
干气	2001-3.2	干气是在参照点之前已经去除烃类液体的天然气。干气和被脱离的烃类液体在资源评价分别核算。应该注意这是一个资源评估的定义，而不是一个相态特性的定义。(干气也称为贫气)。
干井	2001-2.5	干井不能生产足够的油气，因此不作为油气井完井。
经济的	2007-3.1.2 2001-4.3	在石油资源评估中，经济的是指作业的收入超过支出。
经济权益	2001-9.4.1	经济权益是投资者以任何法律形式获得的对矿产储量的权利，这种权利允许投资者从采矿中获得收入，并期望得到资本回报。
经济极限	2007-3.1.2 2001-4.3	经济界限的定义是一口井、一个区块或整个油田的一个产量值，当小于这个产量值时，它的净作业现金流(扣除采矿税和其它所欠产量份额后)为负值。
(资源)赋权或所有权	2007-1.2	开发和生产合同条款规定的法律上属于租赁者或合同者的将来的那部分产量(资源)。
实体	2007-3.0	实体是有能力承受法律权利和义务的一个合法机构。在资源评价中，主要是指租赁者或合同者，以及某些形式的合法公司(或公司联盟)。在更广意义上，一个实体可以是一个任何形式的组织，可以包括政府或其代表机构。

TERM	Reference	DEFINITION
Estimated Ultimate Recovery (EUR)	2007 - 1.1	Those quantities of petroleum which are estimated, on a given date, to be potentially recoverable from an accumulation, plus those quantities already produced therefrom.
Evaluation	2007- 3.0	The geosciences, engineering, and associated studies, including economic analyses, conducted on a petroleum exploration, development, or producing project resulting in estimates of the quantities that can be recovered and sold and the associated cash flow under defined forward conditions. Projects are classified and estimates of derived quantities are categorized according to applicable guidelines. (Also termed Assessment.)
Evaluator	2007 - 1.2, 2.1.2	The person or group of persons responsible for performing an evaluation of a project. These may be employees of the entities that have an economic interest in the project or independent consultants contracted for reviews and audits. In all cases, the entity accepting the evaluation takes responsibility for the results, including Reserves and Resources and attributed value estimates.
Exploration		Prospecting for undiscovered petroleum.
Field	2001 - 2.3	An area consisting of a single reservoir or multiple reservoirs all grouped on, or related to, the same individual geological structural feature and/or stratigraphic condition. There may be two or more reservoirs in a field that are separated vertically by intervening impermeable rock, laterally by local geologic barriers, or both. The term may be defined differently by individual regulatory authorities.
Flare Gas	2007 - 3.2.2 2001 - 3.1	Total volume of gas vented or burned as part of production and processing operations.
Flow Test	2007 - 2.1.1	An operation on a well designed to demonstrate the existence of moveable petroleum in a reservoir by establishing flow to the surface and/or to provide an indication of the potential productivity of that reservoir (such as a wireline formation test).
Fluid Contacts	2007 - 2.2.2	The surface or interface in a reservoir separating two regions characterized by predominant differences in fluid saturations. Because of capillary and other phenomena, fluid saturation change is not necessarily abrupt or complete, nor is the surface necessarily horizontal.
Forecast Case	2007 - 3.1.1	Modifier applied to project resources estimates and associated cash flow when such estimates are based on those conditions (including costs and product price schedules) forecast by the evaluator to reasonably exist throughout the life of the project. Inflation or deflation adjustments are made to costs and revenues over the evaluation period.
Forward Sales	2001 - 9.6.6	There are a variety of forms of transactions that involve the advance of funds to the owner of an interest in an oil and gas property in exchange for the right to receive the cash proceeds of production, or the production itself, arising from the future operation of the property. In such transactions, the owner almost invariably has a future performance obligation, the outcome of which is uncertain to some degree. Determination as to whether the transaction represents a sale or financing rests on the particular circumstances of each case.

术语	参考文献	定义
估算的最终采收量	2007-1.1	在某一个给定日期，估算的从一个石油聚集中潜在可采出的石油数量加上已从该石油聚集中产出的量。
评价		对石油勘探、开发和生产项目进行地学，工程和其它相关的研究，包括经济分析。研究结果包括给定的将来条件下可采和可售的石油量、现金流等，并根据评估准则对项目划分和对资源分类。(也称为评估)。
评估师	2007-1.2,2.1.2	负责项目评价的个人或小组。这些人可以是在该项目拥有经济权益的实体之员工，或者受雇来审查和审计的独立咨询公司。在所有情况下，承担评价的实体对评价结果负责，包括储量和资源的估算值。
勘探		寻找未发现的石油。
油田	2001-2.3	由具有相同构造或地层特征的单一或多个油气藏组成的区域。一个油田在纵向上可以由不渗透层分隔开的两个或更多油气藏，横向上也可以由局部的地质阻挡分隔开多个油气藏。这个术语各监管机构可能有不同的定义。
火炬气	2007-3.2.2 2001-3.1	生产和处理排出或被烧掉的天然气总量。
测试	2007-2.1.1	在一口井上的作业。通过将石油开采到地面，以显示油气藏中可动油的存在，或者提供该油气藏有潜在的生产能力的指示(如电缆式地层测试)。
流体界面	2007-2.2.2	在油气藏中用以区别两个区域的表面或界面，这两个区域的区别性特征主要为流体饱和度的不同。由于毛细管及其他现象，流体饱和度的变化不一定是突然的或完全的，界面也不一定是水平的。
预测情况	2007-3.1.1	基于评估师对整个项目期限内合理存在的条件(包括成本和产品价格计划表)的预测，对于项目资源估算量及相关的现金流量的修饰。对评价期的成本和收入作出通货膨胀或通货紧缩的调整。
期货出售	2001-9.6.6	有若干形式的交易是先向油气权利人付款，从而获得将来产量的现金收入或者实物油。在这些形式的交易中，油气权利人总是有未来要做的义务，但结果有某种程度的不确定性。该交易是出售还是筹款取决于每种情况具体情形。

TERM	Reference	DEFINITION
Fuel Gas	2007 - 3.2.2	See Lease Fuel.
Gas Balance	2007 - 3.2.7 2001 - 3.10	In gas production operations involving multiple working interest owners, an imbalance in gas deliveries can occur. These imbalances must be monitored over time and eventually balanced in accordance with accepted accounting procedures.
Gas Cap Gas	2001 - 6.2.2	Gas Cap Gas is a free natural gas which overlies and is in contact with crude oil in the reservoir. It is a subset of Associated Gas.
Gas Hydrates	2007 - 2.4	Gas hydrates are naturally occurring crystalline substances composed of water and gas, in which a solid water lattice accommodates gas molecules in a cagelike structure, or clathrate. At conditions of standard temperature and pressure (STP), one volume of saturated methane hydrate will contain as much as 164 volumes of methane gas. Because of this large gas-storage capacity, gas hydrates are thought to represent an important future source of natural gas. Gas hydrates are included in unconventional resources, but the technology to support commercial production has yet to be developed.
Gas Inventory		With respect to underground natural gas storage, “gas inventory” is the sum of Working Gas Volume and Cushion Gas Volume.
Gas/Oil Ratio	2007 - 3.4.4	Gas to oil ratio in an oil field, calculated using measured natural gas and crude oil volumes at stated conditions. The gas/oil ratio may be the solution gas/oil , symbol R_s; produced gas/oil ratio, symbol R_p; or another suitably defined ratio of gas production to oil production.
Gas Plant Products		Gas Plant Products are natural gas liquids (or components) recovered from natural gas in gas processing plants and, in some situations, from field facilities. Gas Plant Products include ethane, propane, butanes, butanes/propane mixtures, natural gasoline and plant condensates, sulfur, carbon dioxide, nitrogen, and helium.
Gas-to-Liquids (GTL) Projects		Gas-to-Liquids projects use specialized processing (e.g., Fischer-Tropsch synthesis) to convert natural gas into liquid petroleum products. Typically, these projects are applied to large gas accumulations where lack of adequate infrastructure or local markets would make conventional natural gas development projects uneconomic.
Geostatistical Methods	2001 - 7.1	A variety of mathematical techniques and processes dealing with the collection, methods, analysis, interpretation, and presentation of masses of geoscience and engineering data to (mathematically) describe the variability and uncertainties within any reservoir unit or pool, specifically related here to resources estimates, including the definition of (all) well and reservoir parameters in 1, 2, and 3 dimensions and the resultant modeling and potential prediction of various aspects of performance.
High Estimate	2007 - 2.2.2 2001 - 2.5	With respect to resource categorization, this is considered to be an optimistic estimate of the quantity that will actually be recovered from an accumulation by a project. If probabilistic methods are used, there should be at least a 10% probability (P10) that the quantities actually recovered will equal or exceed the high estimate.
Hydrocarbons	2007 - 1.1	Hydrocarbons are chemical compounds consisting wholly of hydrogen and carbon.

术语	参考文献	定义
燃料气	2007-1.1	参阅自用燃料。
天然气（集输，产销）配平	2007-3.2.7 2001-3.10	在包括多个开采权益者的天然气生产作业中，天然气交付可能发生不平衡。必须监督这些不平衡并根据相关会计程序使之平衡。
气顶气	2001-6.2.2	气顶气是一种自由的天然气，与油层接触，位于油藏顶部。是伴生气的一种。
天然气水合物	2007-2.4	天然气水合物是自然出现的水和气的结晶物。固体水分子晶格包含气体分子而形成笼状构造。在标准温度和压力条件（STP），一立方单位体积的饱和甲烷水合物包含多达 164 立方单位体积的甲烷气。因为这个大的天然气存储容量，天然气水合物被认为是代表天然气的重要未来资源。天然气水合物是包括在非常规资源中，但支持商业化生产的技术还有待发展。
天然气库存量		对于地下储气库，天然气库存量是工作气量和气垫气量的总和。
气油比	2007-3.4.4	油田重在规定条件下测量的天然气和原油量之比。气油比可能是溶解气油比，符号 Rs；生产气油比，符号 Rp；或其它适当界定的天然气产量与石油产量的比例。
天然气处理厂产品		天然气处理厂产品是天然气处理厂或油田设施从天然气中回收的液体（或组分）。天然气处理厂产品包括乙烷、丙烷、丁烷、丁烷/丙烷混合物、天然汽油及处理厂凝析油、硫、二氧化碳、氮和氦。
气转液（GTL）项目		气转液项目用专门的处理过程（例如，Fischer-Tropsch 合成）将天然气转换为液化石油产品。这种项目一般位于缺乏基础设施和市场、常规天然气开发不经济的大型气田。
地质统计方法	2001-7.1	多种数学方法，用于收集、分析、解释和报告大量的地学和工程资料来描述一个油气藏的变异性和不确定性，在这里特别与资源评估有关的是包括所有井的和油气藏的参数在一维、二维和三维的定义以及由此产生的地质模型，还可能进行生产动态预测。
高估算量	2007-2.2.2 2001-2.5	在资源分类中，对一个项目的油气藏中能够实际采出量的乐观估计。如果使用概率法，实际采出量等于或超过高估算量的概率至少应为 10%（P10）。
烃	2007-1.1	烃是完全由氢元素和碳元素组成的化合物。

TERM	Reference	DEFINITION
Improved Recovery (IR)	2007 - 2.3.4	Improved Recovery is the extraction of additional petroleum, beyond Primary Recovery, from naturally occurring reservoirs by supplementing the natural forces in the reservoir. It includes waterflooding and gas injection for pressure maintenance, secondary processes, tertiary processes and any other means of supplementing natural reservoir recovery processes. Improved recovery also includes thermal and chemical processes to improve the in-situ mobility of viscous forms of petroleum. (Also called Enhanced Recovery.)
Injection	2001 - 3.5 2007 - 3.2.5	The forcing, pumping, or free flow under vacuum, of substances into a porous and permeable subsurface rock formation. Injected substances can include either gases or liquids.
Justified for Development	2007 - 2.1.3.1 and Table 1	Implementation of the development project is justified on the basis of reasonable forecast commercial conditions at the time of reporting and that there are reasonable expectations that all necessary approvals/contracts will be obtained. A project maturity sub-class that reflects the actions required to move a project toward commercial production.
Kerogen		The naturally occurring, solid, insoluble organic material that occurs in source rocks and can yield oil upon heating. Kerogen is also defined as the fraction of large chemical aggregates in sedimentary organic matter that is insoluble in solvents (in contrast, the fraction that is soluble in organic solvents is called bitumen). (See also Oil Shales.)
Known Accumulation	2007 - 2.1.1 2001 - 2.2	An accumulation is an individual body of petroleum-in-place. The key requirement to consider an accumulation as "known," and hence containing Reserves or Contingent Resources, is that it must have been discovered, that is, penetrated by a well that has established through testing, sampling, or logging the existence of a significant quantity of recoverable hydrocarbons.
Lead	2007 - 2.1.3.1 and Table 1	A project associated with a potential accumulation that is currently poorly defined and requires more data acquisition and/or evaluation in order to be classified as a prospect. A project maturity sub-class that reflects the actions required to move a project toward commercial production.
Lease Condensate		Lease Condensate is condensate recovered from produced natural gas in gas/liquid separators or field facilities.
Lease Fuel	2007 - 3.2.2	Oil and/or gas used for field and processing plant operations. For consistency, quantities consumed as lease fuel should be treated as shrinkage. However, regulatory guidelines may allow lease fuel to be included in Reserves estimates. Where claimed as Reserves, such fuel quantities should be reported separately from sales, and their value must be included as an operating expense.
Lease Plant		A general term referring to processing facilities that are dedicated to one or more development projects and the petroleum is processed without prior custody transfer from the owners of the extraction project (for gas projects, also termed "Local Gas Plant").
Liquefied Natural Gas (LNG) Project		Liquefied Natural Gas projects use specialized cryogenic processing to convert natural gas into liquid form for tanker transport. LNG is about 1/614 the volume of natural gas at standard temperature and pressure.

术语	参考文献	定义
提高采收率	2007-2.3.4	采用在油气藏中补充天然能量方法，比一次开采多采出石油。这些方法包括注水、注气、二次采油、三次采油或其它方法。提高采收率也包括那些改善高粘石油地下流动性的热采和化学方法（也称为强化开采）。
注入	2001-3.5 2007-3.2.5	通过加压、泵送或空吸自流使物质进入地下渗透岩层孔隙。注入的物质可以包括气体或液体。
论证通过的开发（项目）	2007-2.1.3 和表 1	开发项目的实施对商业条件的合理预期经过论证，而且，有合理的预期会获得所有必须的批准和合同。它是项目的成熟度子类，反映项目向商业化生产转化所需的活动。
干酪根		在烃源岩中天然出现的固态不溶物质，加热后可产出石油。干酪根也常被定义为沉积有机物中大型化学聚合物中的不溶解部分(溶解的部分为沥青)。（也见油页岩）。
已知油气藏	2007-2.1.1 2001-2.2	油气藏是拥有石油地质储量的地质体。要认为一个油气藏是作为“已知的”,因此含有储量或者有条件潜在储量,关键的必要条件是它必须是已发现的，就是说，通过钻井的测试、采样、和/或测井，已经证实相当数量的可采烃类的存在。
未落实有利圈闭	2007-2.1.3.1 和表 1	与潜在的、没有圈定好的石油聚集有关的项目，需要更多的数据采集和/或评价才能归类为落实有利圈闭。它是项目的成熟度子类，反映项目向商业化生产转化所需的活动。
矿场凝析油		矿场凝析油是从气液生产分离器或油田设施产出的天然气中回收的凝析油。
自用燃料	2007-3.2.2	自用燃料是油田和处理厂作业时作为燃料消耗的那部分油气。为了保持一致性，自用燃料应该作为损耗来处理。但是，法规准则也可允许这部分石油被包括在储量内。当这部分石油包括在储量内时，矿场燃料与销售量应分开单独报告，矿场燃料的价值必须被包括在作业费用中。
矿区处理厂		用于一个或多个开发项目的处理设施。石油在处理前不需要从操作者手里转手。(对于天然气项目，经常称为“现场处理厂”)。
液化（天然）气（LNG）项目		液化天然气项目使用专门的低温流程把天然气转化为液体以便用液化气轮运输。LNG 大约是在标准温度和压力下天然气体积的 1/614。

TERM	Reference	DEFINITION
Loan Agreement	2001 - 9.6.5	A loan agreement is typically used by a bank, other investor, or partner to finance all or part of an oil and gas project. Compensation for funds advanced is limited to a specified interest rate.
Low/Best/High Estimates	2007 - 2.2.1, 2.2.2	The range of uncertainty reflects a reasonable range of estimated potentially recoverable volumes at varying degrees of uncertainty (using the cumulative scenario approach) for an individual accumulation or a project.
Low Estimate	2007 - 2.2.2 2001 - 2.5	With respect to resource categorization, this is considered to be a conservative estimate of the quantity that will actually be recovered from the accumulation by a project. If probabilistic methods are used, there should be at least a 90% probability (P90) that the quantities actually recovered will equal or exceed the low estimate.
Lowest Known Hydrocarbons	2007 - 2.2.2	The deepest occurrence of a producible hydrocarbon accumulation as interpreted from well log, flow test, pressure measurement, or core data.
Marginal Contingent Resources	2007 - 2.1.3.3	Known (discovered) accumulations for which a development project(s) has been evaluated as economic or reasonably expected to become economic but commitment is withheld because of one or more contingencies (e.g., lack of market and/or infrastructure).
Measurement	2007 - 3.0	The process of establishing quantity (volume or mass) and quality of petroleum products delivered to a reference point under conditions defined by delivery contract or regulatory authorities.
Mineral Interest	2001 - 9.3	Mineral Interests in properties including (1) a fee ownership or lease, concession, or other interest representing the right to extract oil or gas subject to such terms as may be imposed by the conveyance of that interest; (2) royalty interests, production payments payable in oil or gas, and other non-operating interests in properties operated by others; and (3) those agreements with foreign governments or authorities under which a reporting entity participates in the operation of the related properties or otherwise serves as producer of the underlying reserves (as opposed to being an independent purchaser, broker, dealer, or importer).
Monte Carlo Simulation	2001 – 5 2007 - 3.5	A type of stochastic mathematical simulation that randomly and repeatedly samples input distributions (e.g., reservoir properties) to generate a resulting distribution (e.g., recoverable petroleum volumes).
Natural Bitumen	2007 - 2.4	Natural Bitumen is the portion of petroleum that exists in the semisolid or solid phase in natural deposits. In its natural state, it usually contains sulfur, metals, and other non-hydrocarbons. Natural Bitumen has a viscosity greater than 10,000 milliPascals per second (mPa.s) (or centipoises) measured at original temperature in the deposit and atmospheric pressure, on a gas free basis. In its natural viscous state, it is not normally recoverable at commercial rates through a well and requires the implementation of improved recovery methods such as steam injection. Natural Bitumen generally requires upgrading prior to normal refining. (Also called Crude Bitumen.)

术语	参考文献	定义
贷款协议	2007-9.6.5	贷款协议典型的是用于银行、其他投资者或合作伙伴为石油和天然气项目筹措全部或部分资金。预付资金的补偿只限于指定的利息。
低/最佳/高估算量	2007-2.2.1，2.2.2	不确定性的范围，反映不同程度的不确定性情况下，对于一个油气藏或项目所评估的潜在可采量的一个合理的范围（使用累积方法）。
低估算量	2007-2.2.2 2001-2.5	对于资源分类，这被认为是将通过一个项目从石油聚集中实际可采出的保守估算量。如果使用概率法，实际采出量等于或超过低估算量的概率至少应为 90%（P90）。
已知最低油/气底	2007-2.2.2	按照测井解释、试油、压力测量或岩心数据确定的含烃的最深深度。
边际条件潜在储量	2007-2.1.3.3	已知的（已发现的）石油聚集，其开发项目是经济的或者合理预期将是经济的，但因为一个或多个条件的限制（如缺乏市场或基础设施），没有承诺开发。
计量	2007-3.0	根据销售合同或监管当局规定的条件，确定交付到一个参照点的石油产品数量（体积或质量）和品质的过程。
矿产权益	2001-9.3	资产的矿产利益，包括（1）收费的所有权或租借权、特许权或者其他权益，在转让条款范围内，有权提取原油或天然气。（2）矿区使用费权益，产量支付应缴纳的原油或天然气，以及在资产由其他人作业时的其它非作业权益；及（3）与外国政府或当局的合同，在这些合同中，实体参加油气资产的作业或者是储量的生产者（而不是独立的购买商、经纪人、批发商和进口商）。
蒙特卡罗模拟	2001-5 2007-3.5	一种随机数学模拟方法，对输入的分布（如油气藏物性）进行随机取样以产生结果的数学分布（如可采石油量）。
天然沥青	2007-2.4	以半固体或固体状自然存在于沉积中的石油，通常含有硫、金属矿物和其它非烃组分。在原始温度和常压下，天然沥青在不含气的情况下粘度大于 10000 毫帕斯卡每秒（mPa.s，或厘泊）。在其自然粘度的状态，通常不能通过井以商业产量进行开采，它需要提高采收率方法的实施，如注蒸汽。天然沥青通常需要在正常炼制前进行改质处理。（也称为原始沥青）。

TERM	Reference	DEFINITION
Natural Gas	2007 - 3.2.3 2001 - 6.6, 9.4.4	Natural Gas is the portion of petroleum that exists either in the gaseous phase or is in solution in crude oil in natural underground reservoirs, and which is gaseous at atmospheric conditions of pressure and temperature. Natural Gas may include some amount of non-hydrocarbons.
Natural Gas Inventory		With respect to underground natural gas storage operations "inventory" is the total of working and cushion gas volumes.
Natural Gas Liquids	2007 - A13 2001 - 3.2, 9.4.4	Natural Gas Liquids (NGL) are a mixture of light hydrocarbons that exist in the gaseous phase and are recovered as liquids in gas processing plants. NGL differs from condensate in two principal respects: (1) NGL is extracted and recovered in gas plants rather than lease separators or other lease facilities, and (2) NGL includes very light hydrocarbons (ethane, propane, butanes) as well as the pentanes-plus that are the main constituents of condensates.
Natural Gas Liquids to Gas Ratio		Natural gas liquids to gas ratio in an oil or gas field, calculated using measured natural gas liquids and gas volumes at stated conditions.
Net-Back	2007 - 3.2.1	Linkage of input resource to the market price of the refined products.
Net Profits Interest	2001 - 9.4.4	An interest that receives a portion of the net proceeds from a well, typically after all costs have been paid.
Net Working Interest	2001 - 9.6.1	A company's working interest reduced by royalties or share of production owing to others under applicable lease and fiscal terms. (Also called Net Revenue Interest.)
Non-Hydrocarbon Gas	2007 - 3.2.4 2001 - 3.3	Natural occurring associated gases such as nitrogen, carbon dioxide, hydrogen sulfide, and helium. If non-hydrocarbon gases are present, the reported volumes should reflect the condition of the gas at the point of sale. Correspondingly, the accounts will reflect the value of the gas product at the point of sale.
Non-Associated Gas		Non-Associated Gas is a natural gas found in a natural reservoir that does not contain crude oil.
Normal Production Practices		Production practices that involve flow of fluids through wells to surface facilities that involve only physical separation of fluids and, if necessary, solids. Wells can be stimulated, using techniques including, but not limited to, hydraulic fracturing, acidization, various other chemical treatments, and thermal methods, and they can be artificially lifted (e.g., with pumps or gas lift). Transportation methods can include mixing with diluents to enable flow, as well as conventional methods of compression or pumping. Practices that involve chemical reforming of molecules of the produced fluids are considered manufacturing processes.
Oil Sands		Sand deposits highly saturated with natural bitumen. Also called "Tar Sands." Note that in deposits such as the western Canada "oil sands," significant quantities of natural bitumen may be hosted in a range of lithologies including siltstones and carbonates.
Oil Shales	2007 - 2.4	Shale, siltstone and marl deposits highly saturated with kerogen. Whether extracted by mining or in situ processes, the material must be extensively processed to yield a marketable product (synthetic crude oil).

术语	参考文献	定义
天然气	2007-3.2.3 2001-6.6 ， 9.4.4	以气态或溶解方式存在于地下油气藏中、在常温常压条件下气态的石油。天然气可以包括一些非烃组分。
天然气库存量		对于地下储气库作业，天然气库存量是工作气量和气垫气量的总和。
天然气液	2007-A13 2001-3.2， 9.4.4	天然气液（NGL）是一种轻质烃的混合物，这些轻质烃以气态存在，但在天然气处理厂这些轻质烃作为液体回收。NGL 不同于凝析油在两个方面：(１)NGL 被提取和回收是在天然气处理厂，而不是在矿场的分离器或其他矿场设施；和（２）NGL 除戊烷以上的组分外还包括非常轻质的碳氢化合物（乙烷，丙烷，丁烷），而戊烷以上的组分是凝析油的主要组分。
天然气液与天然气的比例		油田或气田中天然气液与天然气的比例是使用在规定条件下测量的天然气液量和天然气量来计算。
净回值	2007-3.2.1	投入资源与炼油产品的市场价格的关联。
净利润权益	2007-9.4.4	一种权益，即接收一口井的一部分净收益，通常所有成本已经支付以后的一部分净收益。
净工作权益	2001-9.6.1	根据可适用的租契和财政条款，公司的工作权益减去采矿费和属于其他人的份额产量。（也称为净收入权益）
非烃气体	2007-3.2.4 2001-3.3	天然形成的伴生气体，如氮、二氧化碳、氢化硫和氦。如果非烃类气体，所报告的体积应反映气体在销售点的情况。相应地，帐目将反映气体产品在销售点的价值。
非伴生气		非伴生气是在不含原油的天然气藏中的天然气。
正常生产活动		正常生产活动涉及流体通过井流到地面设施，这些地面设施只涉及流体的物理分离，如有必要，也涉及固体的物理分离。井可以采用技术手段来激发，包括但不仅限于，水力压裂、酸化、其他各种化学处理和热力方法，以及可以采取人工举升(例如，泵或气举)。运输方法可包括添加稀释剂使使其可流动，以及压缩或泵抽的常规方法。如果作业活动用化学方法改变了油气分子，要当作化学加工过程。
油砂		富含天然沥青的砂岩沉积。也称为“焦油砂”。注意在这些沉积中，如加拿大西部“油砂”，大量的天然沥青可能在各种岩性中，包括粉砂岩和碳酸盐岩。
油页岩	2007-2.4	富含干酪根的页岩、粉砂岩和泥灰岩沉积。无论是通过采矿或井中采出，都必须进行复杂的处理才能获得可出售的产品（人造原油）。

TERM	Reference	DEFINITION
Offset Well Location		Potential drill location adjacent to an existing well. The offset distance may be governed by well spacing regulations. In the absence of well spacing regulations, technical analysis of drainage areas may be used to define the spacing. For Proved volumes to be assigned to an offset well location there must be conclusive, unambiguous technical data which supports the reasonable certainty of production of hydrocarbon volumes and sufficient legal acreage to economically justify the development without going below the shallower of the fluid contact or the lowest known hydrocarbon.
On Production	2007 - 2.1.3.1 and Table 1	The development project is currently producing and selling petroleum to market. A project status/maturity sub-class that reflects the actions required to move a project toward commercial production.
Operator		The company or individual responsible for managing an exploration, development, or production operation.
Overlift/Underlift	2007 - 3.2.7 2001 - 3.9	Production overlift or underlift can occur in annual records because of the necessity for companies to lift their entitlement in parcel sizes to suit the available shipping schedules as agreed among the parties. At any given financial year-end, a company may be in overlift or underlift. Based on the production matching the company's accounts, production should be reported in accord with and equal to the liftings actually made by the company during the year, and not on the production entitlement for the year.
Penetration	2007 - 1.2	The intersection of a wellbore with a reservoir.
Petroleum	2007 - 1.0	Petroleum is defined as a naturally occurring mixture consisting of hydrocarbons in the gaseous, liquid, or solid phase. Petroleum may also contain nonhydrocarbon compounds, common examples of which are carbon dioxide, nitrogen, hydrogen sulfide, and sulfur. In rare cases, non-hydrocarbon content could be greater than 50%.
Petroleum Initially-in-Place	2007 - 1.1	Petroleum Initially-in-Place is the total quantity of petroleum that is estimated to exist originally in naturally occurring reservoirs. Crude Oil-in-place, Natural Gasin- place and Natural Bitumen-in-place are defined in the same manner (see Resources). (Also referred as Total Resource Base or Hydrocarbon Endowment.)
Pilot Project	2007 - 2.3.4, 2.4	A small-scale test or trial operation that is used to assess the suitability of a method for commercial application.
Play	2007 - 2.1.3.1 and Table 1	A project associated with a prospective trend of potential prospects, but which requires more data acquisition and/or evaluation in order to define specific leads or prospects. A project maturity sub-class that reflects the actions required to move a project toward commercial production.
Pool		An individual and separate accumulation of petroleum in a reservoir.
Possible Reserves	2007 - 2.2.2 and Table 3	An incremental category of estimated recoverable volumes associated with a defined degree of uncertainty. Possible Reserves are those additional reserves which analysis of geoscience and engineering data suggest are less likely to be recoverable than Probable Reserves. The total quantities ultimately recovered from the project have a low probability to exceed the sum of Proved plus Probable plus Possible (3P), which is equivalent to the high estimate scenario. When probabilistic methods are used, there should be at least a 10% probability that the actual quantities recovered will equal or exceed the 3P estimate.

术语	参考文献	定义
邻井位		邻近现有井的潜在的钻井井位。井距由井距规则控制。在没有井距规则情况下，井距可由泄油面积分析确定。对于探明储量的井距，必须有结论性的、清楚的技术资料，这些资料证实油气生产有足够确定性，还需要有充分的法定面积以经济地论证没有开发位于油水界面或已知最低油底/气底以下的部分。
正在生产	2007-2.1.3.1 和表 1	开发项目前正在生产并销售石油到市场。它是项目的成熟度子类，反映项目向商业化生产转化所需的活动。
作业者		负责勘探、开发和生产作业的公司或个人。
过量提取/不足提取	2007-3.2.7 2001-3.9	超提油和欠提油可在年报中出现，因为公司提取的油量必须满足和其它伙伴共同达成的运输计划。在任一给定的财务年未，公司或者是超提油或者是欠提油。根据生产与公司财务相符的原则，产量应该与公司当年实际提取的油量一致而不是与公司当年的权利一致。
穿透	2007-1.2	一井筒与油气藏的交汇。
石油	2007-1.0	石油被界定为自然形成的由烃类组成的气态、液态或固态的混合物。石油也可以包含非烃类化合物，其中常见的例子是二氧化碳、氮、氢化硫和硫。在极少的情况下，非烃含量可能大于 50%。
石油地质储量	2007-1.1	石油地质储量是对原始存在于自然形成的油气藏中的总石油数量的评估。以相同方式界定原地原油、原地天然气和原地天然沥青。（见资源）。（也称为总资源或总烃）。
先导项目	2007-2.3.4，2.4	小型的试验性作业，用于评价一种方法是否可商业应用。
概念勘探区	2007-2.1.3.1 和表 1	与远景区带中的勘探目标相应项目，如要界定出明确的未落实有利圈闭或者落实有利圈闭，还需要更多的数据采集和/或评价。它是项目的成熟度子类，反映项目向商业化生产转化所需的活动。
独立油气聚集		油气藏中一个独立和隔离的石油聚集。
潜在（可采）储量	2007-2.2.2 和表 3	与规定的不确定性程度有关的、估计的可采石油的一个增量分类。潜在（可采）储量是通过地学和工程数据表明其采出的可能性小于可能储量的递增储量。项目的总最终可采量超过证实储量加上可能储量加上潜在（可采）储量的和（3P）具有低的概率，这相当于高估算量的情况。当采用概率法，实际的采出量等于或超过 3P 估算量的概率应至少有 10%。

TERM	Reference	DEFINITION
Primary Recovery		Primary recovery is the extraction of petroleum from reservoirs utilizing only the natural energy available in the reservoirs to move fluids through the reservoir rock to other points of recovery.
Probability	2007 - 2.2.1	The extent to which an event is likely to occur, measured by the ratio of the favorable cases to the whole number of cases possible. SPE convention is to quote cumulative probability of exceeding or equaling a quantity where P90 is the small estimate and P10 is the large estimate. (See also Uncertainty.)
Probabilistic Estimate	2007 - 3.5	The method of estimation of Resources is called probabilistic when the known geoscience, engineering, and economic data are used to generate a continuous range of estimates and their associated probabilities.
Probable Reserves	2007 - 2.2.2 and Table 3	An incremental category of estimated recoverable volumes associated with a defined degree of uncertainty. Probable Reserves are those additional Reserves that are less likely to be recovered than Proved Reserves but more certain to be recovered than Possible Reserves. It is equally likely that actual remaining quantities recovered will be greater than or less than the sum of the estimated Proved plus Probable Reserves (2P). In this context, when probabilistic methods are used, there should be at least a 50% probability that the actual quantities recovered will equal or exceed the 2P estimate.
Production	2007 - 1.1	Production is the cumulative quantity of petroleum that has been actually recovered over a defined time period. While all recoverable resource estimates and production are reported in terms of the sales product specifications, raw production quantities (sales and non-sales, including non-hydrocarbons) are also measured to support engineering analyses requiring reservoir voidage calculations.
Production-Sharing Contract	2007 - 3.3.2 2001 - 9.6.2	In a production-sharing contract between a contractor and a host government, the contractor typically bears all risk and costs for exploration, development, and production. In return, if exploration is successful, the contractor is given the opportunity to recover the incurred investment from production, subject to specific limits and terms. Ownership is retained by the host government; however, the contractor normally receives title to the prescribed share of the volumes as they are produced.
Profit Split	2001 - 9.6.2	Under a typical production-sharing agreement, the contractor is responsible for the field development and all exploration and development expenses. In return, the contractor is entitled to a share of the remaining profit oil or gas. The contractor receives payment in oil or gas production and is exposed to both technical and market risks.
Project	2007 - 1.2 2001 - 2.3	Represents the link between the petroleum accumulation and the decisionmaking 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. (See also Development Plan.)

术语	参考文献	定义
一次采油		一次采油是只使用油气藏本身的天然能量采出的石油。
概率	2007-2.2.1	一个事件可能发生的程度，以有利案例个数与所有案例个数之比的形式出现。SPE 习惯是引述超过或等于某一量的累积概率，既 P90 为低估算量，P10 为高估算量。(参阅不确定性)
概率法	2007-3.5	一种资源评估方法，该方法用已知的地学、工程和经济资料产生一个连续的范围和相关的概率。
可能储量	2007-2.2.2 和表 3	与规定的不确定性程度有关的、估计的可采石油的一个增量类别。可能储量是通过地学和工程数据分析表明其采出的可能性小于证实储量的递增储量，但相比潜在（可采）储量其有更多被采出的确定性。实际剩余的可采量大于或小于证实储量加上可能储量(2P)之和是有相同的可能性。因此，当采用概率方法，实际采出量等于或超过 2P 估算量的概率应至少有 50%。
产量	2007-1.1	产量是在整个规定的时间期已经实际采出的石油。虽然所有可采储量和产量都是以商业出售的条件作为计量标准，但也需要计量井口原始产量（销售部分和非销售部分，包括非烃类的产量），以进行总油藏亏空计算的工程分析。
产品分成合同	2007-3.3.2 2001-9.6.2	在合同者与政府签订的产品分成合同中，通常合同者承担勘探、开发和生产的费用风险。如果勘探成功，根据合同条款，合同者有机会从石油产量中回收投资。石油的所有权仍属于政府,但是通常合同者有权得到合同规定的石油分成。
利润分割	2001-9.6.2	在典型的产品分成合同中，合同者负责油田开发和所有勘探和开发费用。因此，合同者有权获得部分油气的权益。合同者投资以油气产品的形式得到回报，并承担技术和市场风险。
项目	2007-1.2 2001-2.3	项目代表石油聚集和决策过程之间的联系，包括预算分配，举例来说，一个项目可能会构成一个单一的油气藏或油田的开发，或者对于一个正生产油田的一个增产措施，或者在一个共同的所有权中几个油田及相关设施的综合开发。一般而言，一个独立项目将代表在一个层面上决定项目是否进行（例如，花更多的钱）以及对于这一项目应该有一个相应的可采估算量范围（开发方案）。

TERM	Reference	DEFINITION
Property	2007 - 1.2 2001 - 9.4	A volume of the Earth's crust wherein a corporate entity or individual has contractual rights to extract, process, and market a defined portion of specified in-place minerals (including petroleum). Defined in general as an area but may have depth and/or stratigraphic constraints. May also be termed a lease, concession, or license.
Prorationing		The allocation of production among reservoirs and wells or allocation of pipeline capacity among shippers, etc.
Prospect	2007 - 2.1.3.1 and Table 1	A project associated with a potential accumulation that is sufficiently well defined to represent a viable drilling target. A project maturity sub-class that reflects the actions required to move a project toward commercial production.
Prospective Resources	2007 - 1.1 and Table 1	Those quantities of petroleum which are estimated, as of a given date, to be potentially recoverable from undiscovered accumulations.
Proved Economic	2007 - 3.1.1	In many cases, external regulatory reporting and/or financing requires that, even if only the Proved Reserves estimate for the project is actually recovered, the project will still meet minimum economic criteria; the project is then termed as "Proved Economic."
Proved Reserves	2007 - 2.2.2 and Table 3	An incremental category of estimated recoverable volumes associated with a defined degree of uncertainty Proved Reserves are those quantities of petroleum which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined 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 a 90% probability that the quantities actually recovered will equal or exceed the estimate. Often referred to as 1P, also as "Proven."
Purchase Contracts	2001 - 9.6.8	A contract to purchase oil and gas provides the right to purchase a specified volume of production at an agreed price for a defined term.
Pure-Service Contract	2001 - 9.7.5	A pure-service contract is an agreement between a contractor and a host government that typically covers a defined technical service to be provided or completed during a specific period of time. The service company investment is typically limited to the value of equipment, tools, and expenses for personnel used to perform the service. In most cases, the service contractor's reimbursement is fixed by the terms of the contract with little exposure to either project performance or market factors.
Range of Uncertainty	2007 - 2.2 2001 - 2.5	The range of uncertainty of the recoverable and/or potentially recoverable volumes may be represented by either deterministic scenarios or by a probability distribution. (See Resource Uncertainty Categories.)

术语	参考文献	定义
资产	2007-1.2 2001-9.4	地壳内的一个区。在这个区内，某公司或个人已取得合同权利来开发、处理和出售矿物（包括石油）。通常定义为一个面积区域但可以包括深度和层位方面的定义。可以称为租让区、矿区、许可证区等。
配额		油气藏和井之间的产量分配或交运货物者之间的管输能力分配等。
落实有利圈闭	2007-2.1.3.1 和表 1	与潜在石油聚集有关的项目，其被充分的界定以表示一个可行的钻井目标。它是项目的成熟度子类，反映项目向商业化生产转化所需的活动。
远景资源	2007-1.1 和表 1	截止一个给定日期，从未发现的石油聚集中潜在可采出的石油估算量。
证实经济的	2007-3.1.1	在许多情况下，外部监管报告和/或融资的需要，如果项目只采出证实储量也是经济的，这种项目称为“证实经济的”。
证实储量	2007-2.2.2 和表 3	与一定程度的不确定性对应的、所估计出的可采体积的增量类别。证实储量是根据地学和工程资料分析、有足够确定性、能在某个日期以后、从已知的油气藏、在确定的经济条件、作业方法和政府规定等条件下能够经济地采出的石油。如果使用决定性法，有足够确定性表示对于能够采出这些量有很高的信心。如果采用概率法，实际采出的量等于或超过估计量的概率至少是 90%。常简写为 1P 或证实的
购买合同	2001-9.6.8	购买石油和天然气的合同，它提供在规定期限内按商定价格购买指定产量的权利。
纯服务合同	2001-9.7.5	一个纯服务合同是合同者和东道国政府之间的一种协议，典型内容涵盖了在某一特定时期提供或完成的规定技术服务，服务合同者的投资是典型的仅限于设备的价值、工具和用来履行该服务的人员费用。在多数情况下，服务合同者的成本费用回收是由合同的条款固定的，补偿很少受到任何项目执行情况或市场因素的影响。
不确定性范围	2007-2.2 2001-2.5	可采量或潜在可采量的不确定性范围可由各种决定性的情景或概率分布来表示。（参阅资源不确定性类别）

TERM	Reference	DEFINITION
Raw Natural Gas	2007 - 3.2.1	Raw Natural Gas is natural gas as it is produced from the reservoir. It includes water vapor and varying amounts of the heavier hydrocarbons that may liquefy in lease facilities or gas plants and may also contain sulfur compounds such as hydrogen sulfide and other non-hydrocarbon gases such as carbon dioxide, nitrogen, or helium, but which, nevertheless, is exploitable for its hydrocarbon content. Raw Natural Gas is often not suitable for direct utilization by most types of consumers.
Reasonable Certainty	2007 - 2.2.2	If deterministic methods for estimating recoverable resource quantities are used, then reasonable certainty is intended to express a high degree of confidence that the estimated quantities will be recovered.
Reasonable Expectation	2007 - 2.1.2	Indicates a high degree of confidence (low risk of failure) that the project will proceed with commercial development or the referenced event will occur.
Reasonable Forecast	2007 - 3.1.2	Indicates a high degree of confidence in predictions of future events and commercial conditions. The basis of such forecasts includes, but is not limited to, analysis of historical records and published global economic models.
Reasonable Resources	2007 - 1.2	Those quantities of hydrocarbons that are estimated to be producible from discovered or undiscovered accumulations.
Recovery Efficiency	2007 - 2.2	A numeric expression of that portion of in-place quantities of petroleum estimated to be recoverable by specific processes or projects, most often represented as a percentage.
Reference Point	2007 - 3.2.1	A defined location within a petroleum extraction and processing operation where quantities of produced product are measured under defined conditions prior to custody transfer (or consumption). Also called Point of Sale or Custody Transfer Point.
Reserves	2007 - 1.1	Reserves are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. Reserves must further satisfy four criteria: They must be discovered, recoverable, commercial, and remaining (as of a given date) based on the development project(s) applied.
Reservoir	2001 - 2.3	A subsurface rock formation containing an individual and separate natural accumulation of moveable petroleum that is confined by impermeable rocks/formations and is characterized by a single-pressure system.
Resources	2007 - 1.1	The term “resources” as used herein is intended to encompass all quantities of petroleum (recoverable and unrecoverable) naturally occurring on or within the Earth’s crust, discovered and undiscovered, plus those quantities already produced. Further, it includes all types of petroleum whether currently considered “conventional” or “unconventional” (see Total Petroleum Initially-in-Place). (In basin potential studies, it may be referred to as Total Resource Base or Hydrocarbon Endowment.)
Resources Categories	2007 - 2.2 and Table 3	Subdivisions of estimates of resources to be recovered by a project(s) to indicate the associated degrees of uncertainty. Categories reflect uncertainties in the total petroleum remaining within the accumulation (in-place resources), that portion of the in-place petroleum that can be recovered by applying a defined development project or projects, and variations in the conditions that may impact commercial development (e.g., market availability, contractual changes)

术语	参考文献	定义
原始天然气	2007-3.2.1	原始天然气是从油气藏中产出时的天然气。它包括水汽，以及会在矿场设施或天然气工厂液化的不同数量的较重烃类，并也可能包含硫化物，如氢化硫和其他非烃类气体，如二氧化碳、氮或氦，但尽管如此，它的烃类内容是可利用的。原始天然气往往是不适合直接由大多数类型的消费者利用。
合理确定性	2007-2.2.2	使用决定性法评估可采资源时，有足够确定性是指对估计的量能被采出有高度的信心。
合理期望	2007-2.1.2	表示将对该项目进行商业开发或所指事件出现具有高置信度（低失败风险）。
合理预测	2007-3.1.2	表示对未来事件和商业条件的预测具有高置信度。这些预测的基础包括对历史记录和公布的全球经济模式的分析。
合理可采资源	2007-1.2	评估的从已发现和未发现聚集中可生产烃类数量。
采收率	2007-2.2	通过特定的过程或项目，评估的石油地质储量中可采出部分的数值表达，其最常表示为一个百分比。
参照点	2007-3.2.1	石油开采和处理作业中的一个规定位置。在此位置上交接或消费之前对石油产品按规定条件进行计量，也称为销售点或输油监测点。
可采储量	2007-1.1	可采储量是从某一时刻以后在确定的条件下实施开发方案期望能够商业开采出的石油。可采储量必须满足以下四个标准：储量是根据开发方案已经发现、可以采出、具商业价值和（在评估之日）剩余的石油。
油气藏	2001-2.3	具有单一压力系统，由非渗透性岩石分开的、含有可动烃类的地下岩层集合。
资源	2007-1.1	本文使用的“资源”一词意指涵盖地壳中自然形成的所有石油量，包括已发现的和未发现的（可采的和不可采的）石油量，加上已经产出的石油量。此外，它包括所有类型的石油，无论是否目前被视为“常规”或“非常规”的石油（见石油地质储量）。（在盆地潜力研究中，它被称为总资源或总烃）
资源类别	2007-2.2 和表 3	项目能够采出的资源估算量的细分，以表示相关的不确定性程度。类别反映地质储量的不确定性、应用开发项目采出量的不确定性和影响商业开发的各种条件（如有无市场、合同变化）的不确定性。

TERM	Reference	DEFINITION
Resources Classes	2007 - 1.1, 2.1 and Table 1	Subdivisions of Resources that indicate the relative maturity of the development projects being applied to yield the recoverable quantity estimates. Project maturity may be indicated qualitatively by allocation to classes and sub-classes and/or quantitatively by associating a project's estimated chance of reaching producing status.
Revenue-Sharing Contract	2001 - 9.6.3	Revenue-sharing contracts are very similar to the production-sharing contracts described earlier, with the exception of contractor payment. With these contracts, the contractor usually receives a defined share of revenue rather than a share of the production.
Reversionary Interest		The right of future possession of an interest in a property when a specified condition has been met.
Risk	2001 - 2.5	The probability of loss or failure. As "risk" is generally associated with the negative outcome, the term "chance" is preferred for general usage to describe the probability of a discrete event occurring.
Risk and Reward	2001 - 9.4	Risk and reward associated with oil and gas production activities stems primarily from the variation in revenues due to technical and economic risks. Technical risk affects a company's ability to physically extract and recover hydrocarbons and is usually dependent on a number of technical parameters. Economic risk is a function of the success of a project and is critically dependent on cost, price, and political or other economic factors.
Risked-Service Contract	2007 - 3.3.2 2001 - 9.7.4	These agreements are very similar to the production-sharing agreements with the exception of contractor payment, but risk is borne by the contractor. With a risked-service contract, the contractor usually receives a defined share of revenue rather than a share of the production.
Royalty	2007 - 3.3.1 2001 - 3.8	Royalty refers to payments that are due to the host government or mineral owner (lessor) in return for depletion of the reservoirs and the producer (lessee/contractor) for having access to the petroleum resources. Many agreements allow for the producer to lift the royalty volumes, sell them on behalf of the royalty owner, and pay the proceeds to the owner. Some agreements provide for the royalty to be taken only in kind by the royalty owner.
Sales	2007 - 3.2	The quantity of petroleum product delivered at the custody transfer (reference point) with specifications and measurement conditions as defined in the sales contract and/or by regulatory authorities. All recoverable resources are estimated in terms of the product sales quantity measurements.
Shut-in Reserves	2007 - 2.1.3.2 and Table 2	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.
Solution Gas		Solution Gas is a natural gas which is dissolved in crude oil in the reservoir at the prevailing reservoir conditions of pressure and temperature. It is a subset of Associated Gas.

术语	参考文献	定义
资源级别	2007-1.1 ,2.1 和表 1	这一资源细分表示了为采出估算可采资源量正在实施的项目的相对成熟度，项目成熟度可以定性地用划级别和次级别表示，也可定量地用其达到生产状态的几率表示。
收入分成合同	2001-9.6.3	与产品分成合同类似的合同形式，只是支付方式不同。合同者从这种合同得到的是出售油气收入的分成而不是实物油气。
将来条件权益		在未来当指定的条件已得到满足而拥有资产权益的权利。
风险	2001-2.5	损失或失败的概率。由于风险通常与负面结果有关，一般根倾向用“机会”这一术语来描述离散事件发生的概率。
风险和回报	2001-9.4	与油气生产有关的风险和回报主要是由于技术风险和经济风险引起的收入上的变化。技术上的风险影响公司开采石油的能力，这通常取决于一些技术因素。经济风险是项目成功的函数，它主要取决于成本、价格和政治或其它经济因素。
风险服务合同	2007-3.3.2 2001-9.7.4	除了费用的支付外，风险服务合同与产品分成合同非常相似，但合同者要承担风险。在风险服务合同中，合同者收入通常是规定的收入份额而非产量份额。
采矿费	2007-3.3.1 2001-3.8	采矿费是指由于生产者（承租方或合同者）进入或开采油气藏而支付给政府或矿主（出租方）的费用。很多协议允许生产者将矿主那部分石油采出、代表矿主出售然后将卖得的钱给矿主。一些协议会规定矿区使用费必须以实物油气的形式给矿主。
销售	2007-3.2	根据销售合同和/或监管当局制定的规格和计量条件 ,在参照点交付的石油产品数量。可采资源量所有评估值都要按照产品销售计量。
关井储量	2007-2.1.3.2 和表 2	关井储量是期望从以下情况采出的储量：（1）在评估时已经开启的完井层段，但还没有开始生产 ;（2）因为市场条件或管道连接，井被关闭或（3）由于机械的原因，井没有能力生产。
溶解气		在油藏的主导温度压力条件下溶解于原油中的天然气。它是伴生气的一种。

TERM	Reference	DEFINITION
Sour Natural Gas	2001 - 3.4	Sour Natural Gas is a natural gas that contains sulfur, sulfur compounds, and/or carbon dioxide in quantities that may require removal for sales or effective use.
Stochastic	2001 - 5	Adjective defining a process involving or containing a random variable or variables or involving chance or probability such as a stochastic stimulation.
Sub-Commercial	2007 - 2.1.2	A project is Sub-Commercial if the degree of commitment is such that the accumulation is not 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. Discovered sub-commercial projects are classified as Contingent Resources.
Sub-Marginal Contingent Resources	2007 - 2.1.3.3	Known (discovered) accumulations for which evaluation of development project(s) indicated they would not meet economic criteria, even considering reasonably expected improvements in conditions.
Sweet Natural Gas	2001 - 3.3	Sweet Natural Gas is a natural gas that contains no sulfur or sulfur compounds at all, or in such small quantities that no processing is necessary for their removal in order that the gas may be sold.
Synthetic Crude Oil (SCO)	2001 - A12, A13	A mixture of hydrocarbons derived by upgrading (i.e., chemically altering) natural bitumen from oil sands, kerogen from oil shales, or processing of other substances such as natural gas or coal. SCO may contain sulfur or other nonhydrocarbon compounds and has many similarities to crude oil.
Taxes	2001 - 9.4.2	Obligatory contributions to the public funds, levied on persons, property, or income by governmental authority.
Technical Uncertainty	2007 - 2.2	Indication of the varying degrees of uncertainty in estimates of recoverable quantities influenced by range of potential in-place hydrocarbon resources within the reservoir and the range of the recovery efficiency of the recovery project being applied.
Total Petroleum Initially-in-Place	2007 - 1.1	Total Petroleum Initially-in-Place is generally accepted to be all those estimated quantities of petroleum contained in the subsurface, as well as those quantities already produced. This was defined previously by the WPC as “Petroleum-in-place” and has been termed “Resource Base” by others. Also termed “Original-in-Place” or “Hydrocarbon Endowment.”
Uncertainty	2007 - 2.2 2001 - 2.5	The range of possible outcomes in a series of estimates. For recoverable resource assessments, the range of uncertainty reflects a reasonable range of estimated potentially recoverable quantities for an individual accumulation or a project. (See also Probability.)
Unconventional Resources	2007 - 2.4	,Unconventional resources exist in petroleum accumulations that are pervasive throughout a large area and that are not significantly affected by hydrodynamic influences (also called “continuous-type deposits”). Examples include coalbed methane (CBM), basin-centered gas, shale gas, gas hydrate, natural bitumen (tar sands), and oil shale deposits. Typically, such accumulations require specialized extraction technology (e.g., dewatering of CBM, massive fracturing programs for shale gas, steam and/or solvents to mobilize bitumen for in-situ recovery, and, in some cases, mining activities). Moreover, the extracted petroleum may require significant processing prior to sale (e.g., bitumen upgraders). (Also termed “Non-Conventional” Resources and “Continuous Deposits.”)

术语	参考文献	定义
酸气	2001-3.4	高含硫、硫化物或二氧化碳、需要在出售或使用前进行处理的天然气。
随机的	2001-5	界定一个过程的形容词，该过程涉及或包含一个或一组随机变量，或涉及机会或概率，如随机模拟。
次商业	2007-2.1.2	一个项目，如果预期它不能在合理的时间内开发和生产就认为是次商业的，推荐 5 年作为一个合理的时间，但如果由于市场原因或为了满足合同和战略目标，生产者可以选择更长一些该时间。已发现的次商业性项目属于有条件潜在储量。
次边际条件潜在储量	2007-2.1.3.3	次边际条件潜在储量是一些发现的石油资源量，经过分析表明不能满足经济开发标准，或者是在目前或合理预测的时间内商业条件的改善也不会满足它们被开发的必要条件。
无硫天然气（甜气）	2001-3.3	不含或者含极少量硫和硫化物、在出售前不需要处理的天然气。
合成原油（SCO）	2001-A12，A13	通过提高品位（即化学改变），从处理油砂的天然沥青，油页岩的干酪根，或其他物质，如天然气或煤，而得到的烃类混合物。SCO 可能含有硫或其他非烃化合物，与原油有许多相似性。
税	2001-9.4.2	对公共资金的责任贡献，由政府机构根据个人、财产或收入来征收。
技术不确定性	2007-2.2	表示可采估算量的不同程度的不确定性，其受油气藏地质储量和目前采用的开采项目的采收率范围的影响。
总石油地质储量	2007-1.1	总石油地质储量普遍接受的是所有包含在地下的石油估算量，以及已经产出的数量。WPC 在以前这是定义为“石油原地量”，也叫做总资源或总烃， 原地资源或烃类秉赋。
不确定性	2007-2.2 2001-2.5	一系列评估结果的可能性范围，对于可采资源评估，不确定性的范围反映独立聚集或项目的潜在可采估算量的一个合理的范围。（也见概率）。
非常规资源	2007-2.4	非常规资源存在于大面积遍布的石油聚集中，它不受水动力效应的明显影响（也称为“连续型沉积矿”）。实例包括煤层气（CBM）、盆地中心气、页岩气、天然气水合物、天然沥青和油页岩。典型情况下，这些石油聚集需要专门的开发技术（例如，煤层气脱水、页岩气的大规模压裂、对沥青矿进行蒸汽或溶剂驱动或者在某些情况下进行露天开采等）。此外，提取出的石油在出售前还可能需要大量的处理（例如，沥青提高品位）。（也称为“非常规”资源和“连续沉积矿”）。

TERM	Reference	DEFINITION
Undeveloped Reserves	2001 - 2.1.3.1 and Table 2	Undeveloped Reserves are quantities expected to be recovered through future investments: (1) from new wells on undrilled acreage in known accumulations, (2) from deepening existing wells to a different (but known) reservoir, (3) from infill wells that will increase recovery, or (4) where a relatively large expenditure (e.g., when compared to the cost of drilling a new well) is required to (a) recomplete an existing well or (b) install production or transportation facilities for primary or improved recovery projects.
Unitization		Process whereby owners group adjoining properties and divide reserves, production, costs, and other factors according to their respective entitlement to petroleum quantities to be recovered from the shared reservoir(s).
Unproved Reserves	2001 - 5.1.1	Unproved Reserves are based on geoscience and/or engineering data similar to that used in estimates of Proved Reserves, but technical or other uncertainties preclude such reserves being classified as Proved. Unproved Reserves may be further categorized as Probable Reserves and Possible Reserves.
Unrecoverable Resources	2007 - 1.1	That portion of Discovered or Undiscovered Petroleum Initially-in-Place quantities which are estimated, as of a given date, not to be recoverable. A portion of these quantities may become recoverable in the future as commercial circumstances change, technological developments occur, or additional data are acquired.
Upgrader	2007 - 2.4	A general term applied to processing plants that convert extra-heavy crude oil and natural bitumen into lighter crude and less viscous synthetic crude oil (SCO). While the detailed process varies, the underlying concept is to remove carbon through coking or to increase hydrogen by hydrogenation processes using catalysts.
Well Abandonment		The permanent plugging of a dry hole, an injection well, an exploration well, or a well that no longer produces petroleum or is no longer capable of producing petroleum profitably. Several steps are involved in the abandonment of a well:permission for abandonment and procedural requirements are secured from official agencies; the casing is removed and salvaged if possible; and one or more cement plugs and/or mud are placed in the borehole to prevent migration of fluids between the different formations penetrated by the borehole. In some cases, wells may be temporarily abandoned where operations are suspended for extended periods pending future conversions to other applications such as reservoir monitoring, enhanced recovery, etc.
Wet Gas	2001 - 3.2 2007 - 3.2.3	Wet (Rich) Gas is natural gas from which no liquids have been removed prior to the reference point. The wet gas is accounted for in resource assessments, and there is no separate accounting for contained liquids. It should be recognized that this is a resource assessment definition and not a phase behavior definition.
Working Gas Volume		With respect to underground natural gas storage, Working Gas Volume (WGV) is the volume of gas in storage above the designed level of cushion gas which can be withdrawn/injected with the installed subsurface and surface facilities (wells, flowlines, etc.) subject to legal and technical limitations (pressures, velocities, etc.). Depending on local site conditions (injection/withdrawal rates, utilization hours, etc.), the working gas volume may be cycled more than once a year.
Working Interest	2001 - 9	A company's equity interest in a project before reduction for royalties or production share owed to others under the applicable fiscal terms.

术语	参考文献	定义
未开发储量	2001-2.1.3.1 和表 2	未开发储量是预计通过未来投资可采出的数量：(1)从已知石油聚集的未钻井面积中钻新井，(2)从加深现有井到不同的(但已知)油气藏地层，(3)从加密井增加可采量，或(4)需要相对大的成本费用(如与钻一口新井的成本相比)用于(a)一口现有井的重新完井或(b)为一次采油项目或提高采收率项目安装生产或传输设施。
联合经营		实现联合经营的过程是由所有者聚合毗邻的资产，根据所有者各自对共享油气藏石油可采量的所有权来分割储量、产量、成本等等。
未证实储量	2001-5.1.1	未证实储量是基于类似在证实储量评估中所使用的地学和/或工程数据，但技术或其他不确定因素妨碍将这种储量归类为证实储量。未证实储量可进一步分类为可能储量和潜在储量。
不可采资源量	2007-1.1	不可采资源量是在某一给定时间估计的、在已发现或未发现的油气藏地质储量中在将来的开发方案中不能被采出的量。一部分不可采量在将来由于经济和技术条件的变化或者获得更多资料后可能转化为可采储量。
提高品位	2007-2.4	一种通用术语适用于加工厂，该加工厂转换超重原油和天然沥青到较轻的原油和较低粘性的合成原油(SCO)。尽管详细的过程不同，但基本概念是通过焦化消除碳或通过使用催化剂的氢化过程增加氢。
弃井		干井、注水井、探井或不再有利润的生产井的永久堵塞。弃井要经过下列步骤：从政府或者管理部门获得弃井的批准；提去可打捞的套管；在井下下入数个水泥塞以防止不同层位的流体运移。在一些情况下，在作业停止较长时间时，可以临时弃井以备该井可将来做监测井和提高采收率井等用途。
湿气	2001-3.2 2007-3.2.3	湿(富)气是一种天然气，在参照点以前没有液体从该天然气中分离。湿气被记入在资源评估中，并没有分开核算所包含的液体。应该承认这是一个资源评估的定义，而不是一个相态的定义。
工作气量		对于地下储气库，工作气量(WGV)是在气垫气设计水平以上的储气量，该气量在法律和技术上的限制(压力、速度等)范围内通过地下和地面设施(井、管线等)可被回收/注入。根据当地的现场条件(注入/回收比率，利用时间等)，工作气量可实现每年一次以上的循环。
工作权益	2001-9	在规定的财税条款下，公司在缴采矿费或减除所欠第三方产量份额前的权益。

某些英文单词的翻译

下列词语在一般文章中，可能有多种译法，但在 PRMS 上下文中，分委会认为下列译法更确切。

assessment	评估
carried interest	干股
categories	分类、类别
classes	级别
completion interval	完井层段
constant Case	无通胀情况
contingency	不确定因素(条件)
contingent	有条件潜在,简称条件(潜在储量).
contractor	合同者
cost	成本
depletion mechanisms	衰竭机理
deterministic	决定性的
development unclarified or on hold	不明确或延迟开发
estimate	估算（量）
Estimated Ultimate Recovery (EUR)	估算的最终采收量
evaluation	评价
flared gas	火炬气
fluid gravity	流体重度
gas balance	天然气(集输,产销)配平
geoscience	地学

geostatistical methods	地质统计方法
high-level	概述性的
incremental (risk-based) and/or scenario approach	增量法（基于风险）或情景法
initially in place	地质（储量）
Justified for Development	论证通过的开发(项目)
lead	未落实有利圈闭
lease fuel	自用燃料
lowest known hydrocarbons	已知最深油/气底
miscible injection	混相注入
netback	净回值(法)
offset well Location	邻井位
play	概念勘探区
pool	独立油气聚集
possible reserve	潜在(可采)储量
probable reserve	可能储量
prospect	落实有利圈闭
proved (proven) reserve	证实储量
reasonable certainty	有足够确定性
reference point	参照点
regulatory guidelines	法规准则
reservoir	油气藏
resources	资源
stochastic	随机的

total reservoir voidage	总油藏亏空
uncertainty	不确定性
volumetric estimate	容积法
(well) treatment	产能处理