AICPA

Audit and Accounting Guide

Entities With Oil and Gas Producing Activities

August 1, 2018

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Preface

PREPARED BY THE ENTITIES WITH OIL AND GAS PRODUCING ACTIVITIES TASK FORCE

(Updated as of August 1, 2018)

About AICPA Audit and Accounting Guides

This AICPA Audit and Accounting Guide has been developed by the AICPA Entities With Oil and Gas Producing Activities Task Force to assist practitioners in performing and reporting on their audit engagements and to assist management in the preparation of their financial statements in conformity with U.S. generally accepted accounting principles (GAAP).

An AICPA Guide containing auditing guidance related to generally accepted auditing standards (GAAS) is recognized as an interpretive publication as defined in AU-C section 200, *Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance With Generally Accepted Auditing Standards*.[1] Interpretive publications are recommendations on the application of GAAS in specific circumstances, including engagements for entities in specialized industries.

Interpretive publications are issued under the authority of the AICPA's Auditing Standards Board (ASB) after all ASB members have been provided an opportunity to consider and comment on whether the proposed interpretive publication is consistent with GAAS. The members of the ASB have found the auditing guidance in this guide to be consistent with existing GAAS.

Although interpretive publications are not auditing standards, AU-C section 200 requires the auditor to consider applicable interpretive publications in planning and performing the audit because interpretive publications are relevant to the proper application of GAAS in specific circumstances. If the auditor does not apply the auditing guidance in an applicable interpretive publication, the auditor should document how the requirements of GAAS were complied with in the circumstances addressed by such auditing guidance.

The ASB is the designated senior committee of the AICPA authorized to speak for the AICPA on all matters related to auditing. Conforming changes made to the auditing guidance contained in this guide are approved by the ASB Chair (or his or her designee) and the Director of the AICPA Audit and Attest Standards Staff. Updates made to the auditing guidance in this guide exceeding that of conforming changes are issued after all ASB members have been provided an opportunity to consider and comment on whether the guide is consistent with the Statements on Auditing Standards (SASs).

Any auditing guidance in a guide appendix or exhibit (whether a chapter or back matter appendix or exhibit), though not authoritative, is considered an "other auditing publication." In applying such guidance, the auditor should, exercising professional judgment, assess the relevance and appropriateness of such guidance to the circumstances of the audit. Although the auditor determines the relevance of other auditing guidance, auditing guidance in a guide

[1] All AU-C sections can be found in AICPA *Professional Standards*.

appendix or exhibit has been reviewed by the AICPA Audit and Attest Standards staff and the auditor may presume that it is appropriate.

The Financial Reporting Executive Committee (FinREC) is the designated senior committee of the AICPA authorized to speak for the AICPA in the areas of financial accounting and reporting. Conforming changes made to the financial accounting and reporting guidance contained in this guide are approved by the FinREC Chair (or his or her designee). Updates made to the financial accounting and reporting guidance in this guide exceeding that of conforming changes are approved by the affirmative vote of at least two-thirds of the members of FinREC.

This guide does the following:

- Identifies certain requirements set forth in the FASB *Accounting Standards Codification*® (ASC).
- Describes FinREC's understanding of prevalent or sole industry practice concerning certain issues. In addition, this guide may indicate that FinREC expresses a preference for the prevalent or sole industry practice, or it may indicate that FinREC expresses a preference for another practice that is not the prevalent or sole industry practice; alternatively, FinREC may express no view on the matter.
- Identifies certain other, but not necessarily all, industry practices concerning certain accounting issues without expressing FinREC's views on them.
- Provides guidance that has been supported by FinREC on the accounting, reporting, or disclosure treatment of transactions or events that are not set forth in FASB ASC.

Accounting guidance for nongovernmental entities included in an AICPA Guide is a source of nonauthoritative accounting guidance. As discussed later in this preface, FASB ASC is the authoritative source of U.S. accounting and reporting standards for nongovernmental entities, in addition to guidance issued by the SEC.

AICPA Guides may include certain content presented as "Supplement," "Appendix," or "Exhibit." A supplement is a reproduction, in whole or in part, of authoritative guidance originally issued by a standard setting body (including regulatory bodies) and applicable to entities or engagements within the purview of that standard setter, independent of the authoritative status of the applicable AICPA Guide. Both appendixes and exhibits are included for informational purposes and have no authoritative status.

Recognition

AICPA Senior Committees
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The AICPA gratefully acknowledges Diane Kirk, Megan McFarland, Brian Matlock, and Josh Sherman, who reviewed or otherwise contributed to the development of this edition of the guide.

The AICPA also thanks Jeffrey Washington for his invaluable assistance in updating the 2018 edition of the guide.

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Guidance Considered in This Edition

This edition of the guide has been modified by the AICPA staff to include certain changes necessary due to the issuance of authoritative guidance since the guide was originally issued, as well as other revisions as deemed appropriate. Relevant guidance issued through August 1, 2018, has been considered in the development of this edition of the guide. However, this guide does not include all audit, accounting, reporting, regulatory, and other requirements applicable to an entity or a particular engagement. This guide is intended to be used in conjunction with all applicable sources of relevant guidance.

Relevant guidance that is issued and effective on or before August 1, 2018, is incorporated directly in the text of this guide. Relevant guidance issued but not yet effective as of August 1, 2018, but becoming effective on or before December 31, 2018, is also presented directly in the text of the guide, but shaded gray and accompanied by a footnote indicating the effective date of the new guidance. The distinct presentation of this content is intended to aid the reader in differentiating content that may not be effective for the reader's purposes (as part of the guide's "dual guidance" treatment of applicable new guidance).

Relevant guidance issued but not yet effective as of the date of the guide and not becoming effective until after December 31, 2018, is referenced in a "guidance update" box; that is, a box that contains summary information on the guidance issued but not yet effective.

In updating this guide, all guidance issued up to and including the following was considered, but not necessarily incorporated, as determined based on applicability:

- FASB Accounting Standards Update (ASU) No. 2018-08, *Not-For-Profit Entities (Topic 958): Clarifying the Scope and the Accounting Guidance for Contributions Received and Contributions Made*
- SAS No. 133, *Auditor Involvement With Exempt Offering Documents* (AU-C sec. 945)
- Interpretation No. 4, "Reporting on Audits Conducted in Accordance With Auditing Standards Generally Accepted in the United States of America and the Standards of the PCAOB" (AU-C sec. 9700 par. .04), of AU-C section 700, *Forming an Opinion and Reporting on Financial Statements*

- Statement of Position 17-1, *Performing Agreed-Upon Procedures Related to Rated Exchange Act Asset-Backed Securities Third-Party Due Diligence Services* (AUD sec. 60)[2]
- PCAOB Release No. 2017-01, *The Auditor's Report on an Audit of Financial Statements when the Auditor Expresses an Unqualified Opinion and Related Amendments to PCAOB Standards*

Users of this guide should consider guidance issued subsequent to those items listed previously to determine their effect on entities covered by this guide. In determining the applicability of recently issued guidance, its effective date should also be considered.

The changes made to this edition of the guide are identified in the Schedule of Changes appendix. The changes do not include all those that might be considered necessary if the guide was subjected to a comprehensive review and revision.

FASB ASC Pending Content

Presentation of Pending Content in FASB ASC

Amendments to FASB ASC (issued in the form of ASUs) are initially incorporated into FASB ASC in "pending content" boxes below the paragraphs being amended with links to the transition information. The pending content boxes are meant to provide users with information about how the guidance in a paragraph will change as a result of the new guidance.

Pending content applies to different entities at different times due to varying fiscal year-ends, and because certain guidance may be effective on different dates for public and nonpublic entities. As such, FASB maintains amended guidance in pending content boxes within FASB ASC until the "roll-off" date. Generally, the "roll-off" date is six months following the latest fiscal year end for which the original guidance being amended could still be applied.

Presentation of FASB ASC Pending Content in AICPA Audit and Accounting Guides

Amended FASB ASC guidance that is included in pending content boxes in FASB ASC on August 1, 2018, is referenced as "pending content" in this guide. Readers should be aware that "pending content" referenced in this guide will eventually be subjected to FASB's roll-off process and no longer be labeled as "pending content" in FASB ASC (as discussed in the previous paragraph).

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[2] All AUD sections can be found in AICPA *Professional Standards*.

Terms Used to Define Professional Requirements in This AICPA Audit and Accounting Guide

Any requirements described in this guide are normally referenced to the applicable standards or regulations from which they are derived. Generally the terms used in this guide describing the professional requirements of the referenced standard setter (for example, the ASB) are the same as those used in the applicable standards or regulations (for example, *must* or *should*). However, where the accounting requirements are derived from FASB ASC, this guide uses *should*, whereas FASB uses *shall*. In its resource document "About the Codification" that accompanies FASB ASC, FASB states that it considers the terms *should* and *shall* to be comparable terms and to represent the same concept — the requirement to apply a standard.

Readers should refer to the applicable standards and regulations for more information on the requirements imposed by the use of the various terms used to define professional requirements in the context of the standards and regulations in which they appear.

Certain exceptions apply to these general rules, particularly in those circumstances where the guide describes prevailing or preferred industry practices for the application of a standard or regulation. In these circumstances, the applicable senior committee responsible for reviewing the guide's content believes the guidance contained herein is appropriate for the circumstances.

Applicability of Generally Accepted Auditing Standards and PCAOB Standards

Appendix A, "Council Resolution Designating Bodies to Promulgate Technical Standards," of the AICPA Code of Professional Conduct recognizes both the ASB and the PCAOB as standard setting bodies designated to promulgate auditing, attestation, and quality control standards. Paragraph .01 of the "Compliance With Standards Rule" (ET sec. 1.310.001 and 2.310.001)[3] requires an AICPA member who performs an audit to comply with the applicable standards.

Audits of the financial statements of those entities not subject to the oversight authority of the PCAOB (that is, those audit reports within the PCAOB's jurisdiction as defined by the Sarbanes-Oxley Act of 2002, as amended) are to be conducted in accordance with standards established by the PCAOB, a private sector, nonprofit corporation created by the Sarbanes-Oxley Act of 2002. The SEC has oversight authority over the PCAOB, including the approval of its rules, standards, and budget. Inciting the auditing standards of the PCAOB, references generally use section numbers within the reorganized PCAOB auditing standards and not the original standard number, as appropriate. Audits of the financial statements of those entities not subject to the oversight authority of the PCAOB (that is, those audit reports not within the PCAOB's jurisdiction as defined by the Sarbanes-Oxley Act of 2002, as amended) — hereinafter referred to as *nonissuers*[4] — are to be conducted in accordance with GAAS as issued by the ASB. The ASB develops and issues standards in the form of SASs through

[3] All ET sections can be found in AICPA *Professional Standards*.

[4] See the definition of the term *nonissuer* in the AU-C Glossary.

a due process that includes deliberation in meetings open to the public, public exposure of proposed SASs, and a formal vote. The SASs and their related interpretations are codified in AICPA *Professional Standards*. In citing GAAS and their related interpretations, references generally use section numbers within the codification of currently effective SASs and not the original statement number, as appropriate.

The auditing content in this guide primarily discusses GAAS issued by the ASB and is applicable to audits of nonissuers. Users of this guide may find the tool developed by the PCAOB's Office of the Chief Auditor helpful in identifying comparable PCAOB Standards. The tool is available at pcaobus.org/standards/auditing/pages/findanalogousstandards.aspx.

Considerations for audits of entities in accordance with PCAOB standards may also be discussed within this guide's chapter text. When such discussion is provided, the related paragraphs are designated with the following title: *Considerations for Audits Performed in Accordance With PCAOB Standards*. PCAOB guidance included in an AICPA Guide has not been reviewed, approved, disapproved, or otherwise acted upon by the PCAOB and has no official or authoritative status.

Applicability of Quality Control Standards

QC section 10, *A Firm's System of Quality Control*,[5] addresses a CPA firm's responsibilities for its system of quality control for its accounting and auditing practice. A system of quality control consists of policies that a firm establishes and maintains to provide it with reasonable assurance that the firm and its personnel comply with professional standards, as well as applicable legal and regulatory requirements. The policies also provide the firm with reasonable assurance that reports issued by the firm are appropriate in the circumstances.

QC section 10 applies to all CPA firms with respect to engagements in their accounting and auditing practice. In paragraph .06 of QC section 10, an *accounting and auditing practice* is defined as "a practice that performs engagements covered by this section, which are audit, attestation, compilation, review, and any other services for which standards have been promulgated by the AICPA ASB or the AICPA Accounting and Review Services Committee under the "General Standards Rule (ET sec. 1.300.001) or the "Compliance With Standards Rule" (ET sec. 1.310.001) of the AICPA Code of Professional Conduct. Although standards for other engagements may be promulgated by other AICPA technical committees, engagements performed in accordance with those standards are not encompassed in the definition of an *accounting and auditing practice*."

In addition to the provisions of QC section 10, readers should be aware of other sections within AICPA *Professional Standards* that address quality control considerations, including the following provisions that address engagement level quality control matters for various types of engagements that an accounting and auditing practice might perform:

- AU-C section 220, *Quality Control for an Engagement Conducted in Accordance With Generally Accepted Auditing Standards*

[5] All QC sections can be found in AICPA *Professional Standards*.

- AT-C section 105, *Concepts Common to All Attestation Engagements*[6]
- AR-C section 60, *General Principles for Engagements Performed in Accordance With Statements on Standards for Accounting and Review Services*[7]

Because of the importance of engagement quality, this guide includes appendix C, *Overview of Statements on Quality Control Standards*. This appendix summarizes key aspects of the quality control standard. This summarization should be read in conjunction with QC section 10, AU-C section 220, AT-C section 105, AR-C section 60, and the quality control standards issued by the PCAOB, as applicable.

AICPA.org Website

The AICPA encourages you to visit its website at aicpa.org and the Financial Reporting Center at www.aicpa.org/frc. The Financial Reporting Center supports members in the execution of high-quality financial reporting. Whether you are a financial statement preparer or a member in public practice, this center provides exclusive member-only resources for the entire financial reporting process and provides timely and relevant news, guidance, and examples supporting the financial reporting process. Another important focus of the Financial Reporting Center is keeping those in public practice up to date on issues pertaining to preparation, compilation, review, audit, attestation, assurance and advisory engagements. Certain content on the AICPA's websites referenced in this guide may be restricted to AICPA members only.

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[6] All AT-C sections can be found in AICPA *Professional Standards*.
[7] All AR-C sections can be found in AICPA *Professional Standards*.

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Chapter 1

Overview of the Industry

The Industry's History

1.01 To gain an understanding of oil and gas producing activities, a brief review of the history of the industry is helpful. The following discussion is intended to be basic, and the interested reader is encouraged to refer to other available sources, as necessary.

Development of the Oil Industry

1.02 The first commercial oil drilling venture occurred near Titusville, Pennsylvania, in 1859. A steam powered, cable tool drilling rig, which lifted and dropped a heavy piece of metal to pound a hole into the earth, was used to drill a 59-foot well, which yielded 5 barrels of oil per day. At that time, the price of crude oil was about $10 per barrel. This well set off a boom of sorts, and the cable tool drilling rig was used to drill other wells in the area. Oil soon sold for about $0.10 per barrel because of the dramatic increase in supply.

1.03 In the 1850s and early 1860s, oil was used chiefly as fuel for lamps. The Industrial Revolution and the Civil War greatly increased the uses of oil and, therefore, the demand — so much so that annual production in 1870 exceeded 25 million barrels. Early transportation of crude oil was cumbersome, requiring (*a*) wooden barrels (each with a capacity of 42 gallons, which is the present measurement of a barrel of crude oil); (*b*) horse-drawn wagons; (*c*) river barges; and (*d*) the railroads. The first pipeline, completed in the 1860s, was made of wood and was less than 1,000 feet long.

1.04 One of the first persons to rise to power in this infant industry was John D. Rockefeller. In 1870, Rockefeller merged his firm with four others to form the Standard Oil Company. During the 1880s, Standard Oil dominated the global production industry and controlled approximately 90 percent of the refining industry in the United States. Standard Oil's market dominance eventually led to its forced dissolution in 1911 because of federal and state antitrust legislation that had been enacted as a response to its size.

1.05 The U.S. oil industry began exploration internationally (the Middle East, South America, Africa, and the Far East) in the 1920s as a result of increased demand. However, the East Texas oil field discovery of 1930 ultimately created an oil surplus that caused entities to cut back foreign operations. During and after World War II, the worldwide demand again increased, and enormous capital investments were made to develop the Persian Gulf area, other Middle East countries, Africa, South America, and the Far East.

1.06 In 1960, the Organization of Petroleum Exporting Countries (OPEC) was formed by five countries. The original founding members were Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela. The stated objective of the organization is to "coordinate and unify the policies of member countries, in order to secure fair and stable prices for petroleum producers; an efficient, economic and regular supply of petroleum to consuming nations; and a fair return on capital to those investing in the industry." Since that time, OPEC membership and

influence has continued to increase. The 2018 membership is shown in the following table:

Country	*Year Joined*	*Country*	*Year Joined*
Algeria	1969	Libya	1962
Angola	2007	Nigeria	1971
Ecuador	2007	Qatar	1961
Gabon	2016	Equatorial Guinea	2017
Iran	1960	Saudi Arabia	1960
Iraq	1960	United Arab Emirates	1967
Kuwait	1960	Venezuela	1960

The members of OPEC have controlled a substantial portion of the world's oil reserves, production, and excess productive capacity and, as a result, OPEC has been able to exercise a great deal of control over oil prices by decreasing or increasing the output of member nations through a production quota system.

1.07 Even with new technology and the emergence of shale oil and gas production in North America, the geopolitical landscape of OPEC's control of oil reserves has remained constant into recent years. Large oil reserves have been discovered in Africa, Russia and the former Soviet states, on-shore North America, the Gulf of Mexico, and the North Sea; however, OPEC members continue to have significant influence over the world oil market.

Development of the Natural Gas Industry

1.08 Natural gas demand increased significantly in the United States in the 1960s and has continued to increase, facilitated by improved transportation systems. In the United States, electricity generation, the growth of the petrochemical industry (which produces plastics and synthetics), and the heating of large scale office buildings create the primary demand for natural gas.

1.09 The use of natural gas has continued to grow throughout the world, although the lack of pipelines has impeded growth of production and consumption of natural gas in many areas of the world. One of the primary issues facing the international natural gas industry is that many of the largest discoveries are in countries that are remote from the primary consuming markets in North America, Europe, and Japan, as well as the growing markets in China and India. Efforts to resolve this issue have been made through the development of improved techniques for liquefying natural gas, converting natural gas to synthetic fuels, and transporting the resulting liquids, with liquefied natural gas playing a more critical role in worldwide supply and demand balance.

1.10 A recent important source of natural gas in the United States is shale gas, a natural gas that is found trapped within shale formations. Although shale gas is not new, the advancements of new technologies, such as horizontal drilling and hydraulic fracturing have enabled the exploration of unconventional resources. Since 1998, the date of the first economical shale fracture, natural gas from shale has been the fastest growing contributor to total primary energy in the United States and prompted other countries across the globe to

assess their unconventional natural gas resources. Shale gas contributed about 60 percent of total U.S. dry natural gas production in 2017, compared to only 1 percent in 2000. The U.S. Energy Information Administration estimates that in 2017 about 16.76 trillion cubic feet of gas was produced from shale resources. 1 trillion cubic feet of natural gas will heat approximately 15 million homes for one year, the equivalent of generating 100 billion kilowatt hours of electricity.

Prices for Oil and Gas

1.11 One of the most important factors in the development of the industry has been changes in oil and gas prices. The Arab oil embargo of 1973 focused public attention on the industry, largely because of its effect on previously stable prices. In 1973, before the embargo, the average barrel of crude oil sold for about $3. By December 1973, crude oil prices had risen to over $11 per barrel. In the United States, oil prices were placed under federal government control in late 1973. In 1975, the US congress passed the Energy Policy and Conservation act, which banned the export of crude oil which was lifted in December 2015 allowing for renewed oil exports.

1.12 In 1979, the Iranian revolution resulted in a sharp increase in oil prices to $42 per barrel. In late 1979, the U.S. government announced "phased decontrol" of oil prices, and in January 1981, all price controls on crude oil were lifted. Natural gas prices continued to be subject to controls created by the Natural Gas Policy Act of 1978, but initial deregulation of gas prices began on January 1, 1985, with complete deregulation occurring on January 1, 2003.

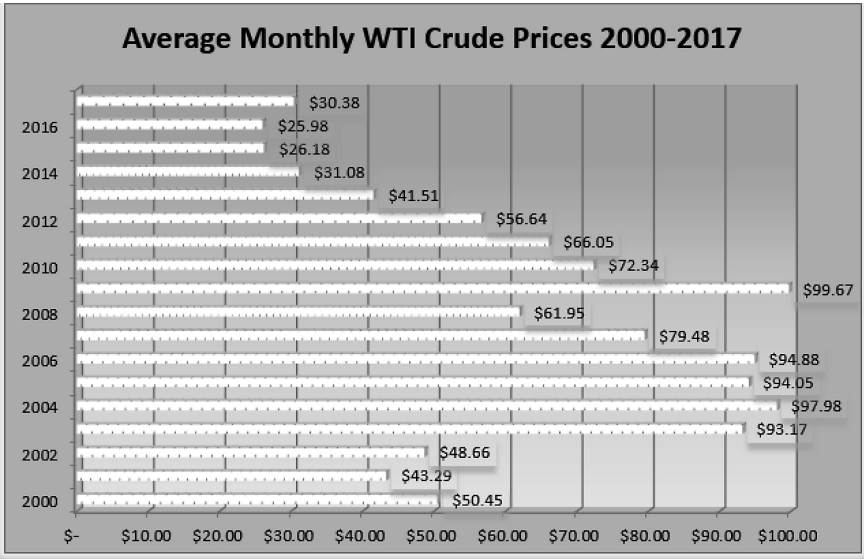
1.13 By the early 1980s, the price for a barrel of oil ranged from $30 to $40 (and sometimes higher), but prices declined in the mid-1980s in the face of a world oil surplus. These fluctuations were further complicated by the U.S. government's earlier price controls that designated different prices for different grades of oil and created a complex pricing structure. As a result, producing entities grew increasingly reluctant to explore and drill. This reluctance may have stemmed from the fact that a barrel of domestically produced oil often had a sale price significantly less than the price of imported oil. In the decades of the 1990s and 2000s, crude oil prices have fluctuated from a low of $13 per barrel to a high well in excess of $100 per barrel. North American natural gas prices also have fluctuated significantly, ranging from a low of about $1 per million British thermal units (MMBTUs) in 1992 to more than $15 per MMBTUs in late 2005. Since that date, natural gas prices have continued to fluctuate. As a result of the increase in supply of shale gas production, for the past several years they have been below $3 per MMBTU.

Recent Developments in the Oil and Gas Industry

1.14 *Increase in demand.* For a number of years, countries like China and India have seen double-digit demand growth and are expected to continue growing at a high pace. The rapid economic expansion in much of the world, including China and India, has led to increased demands for energy and changes in the competition for new hydrocarbon resources. In particular, China and India are actively pursuing opportunities in their geographic region, as well as in Africa and South America.

1.15 The decline in traditional sources of natural gas in Western Europe, together with Russia's significant oil and gas reserves, have led to an increased dependence in Western Europe on the supply of hydrocarbons (especially gas) from Russia.

1.16 *Problems with supply of hydrocarbons.* In recent years, the global crude oil market supply has seen a number of disruptions. These include war and security issues in the Middle East (particularly Iran and Iraq) and political issues in Russia, the newer republics of the former Soviet Union, Nigeria, and Venezuela. These factors, combined with a weaker dollar (global oil trade is primarily dollar based), have led to instability in oil prices beginning in 2015 when crude oil prices began to drop sharply lower. Crude prices rebounded in the first half of 2018 in part due to production limits imposed by OPEC member nations, continued political instability in Libya, and U.S sanctions imposed on Venezuela.



1.17 *New opportunities — offshore drilling.* Although offshore wells were drilled before 1900, including the use of piers and pilings in the Baku region of Azerbaijan in the Caspian Sea and piers extending into the Pacific Ocean in California, significant technological advancements have occurred in recent years. Such technology allows wells to be drilled in water depths greater than 9,000 feet and over 175 miles from shore. In more recent times, companies have invested billions of dollars in deep water drilling projects off the coasts of Africa, Australia, Brazil, the U.S. Gulf of Mexico, and the North Sea. Africa remains a bright spot for hydrocarbon opportunities. Offshore West Africa has been one of the most active areas in the world for new discoveries and significant projects. The oil discoveries have been sizeable, and the offshore operating conditions have been relatively mild and, due to the distance from the shore, somewhat insulated from the political and security unrest that occurs in onshore areas. In addition, significant hydrocarbon discoveries have been made in Offshore East Africa, as well as in the Mediterranean Sea.

1.18 *Further development of offshore technologies.* Offshore drilling and production technology has advanced at a steady pace. For many decades, offshore oil and gas operations were restricted primarily to platforms affixed to the seafloor, with some limited use of subsea wells tied back to those platforms. Platform costs increase rapidly with water depth, but floating platform

concepts, such as tension leg platforms and spars, have been used successfully in deeper water. Deepwater discoveries are now being developed with subsea wells with production being piped either to floating production, storage, and offloading tankers; central production hubs serving multiple fields; or directly to shore.

1.19 *Alternative sources of hydrocarbons.* As markets and producers have reacted to imbalances in demand and supply, the perceived need for alternative sources of energy also has boosted the prospects for alternative production techniques and technology. As a result, resources produced from oil sands, oil shales, coal, and several improved recovery techniques have become more important sources of hydrocarbons in recent years. Activities to extract these alternative or nontraditional resources are now considered to be oil and gas producing activities under the new oil and gas reporting requirements of the SEC and, therefore, hydrocarbons extracted from oil sands, shales, coal beds, and other nonrenewable natural resources, which are intended to be upgraded into synthetic oil or gas, are now deemed to be oil and gas reserves.

1.20 *Modernization of oil and gas reporting.* On December 31, 2008 (effective fiscal 2010), the SEC issued Final Rule No. 33-8995, *Modernization of Oil and Gas Reporting,* adopting revisions to oil and gas reporting requirements and disclosures that existed in Regulation S-K under the Securities Act of 1933 and in Regulation S-X under the Securities Exchange Act of 1934. The Final Rule also eliminated Industry Guide 2 and incorporated certain of these disclosure requirements in Subpart 1200 of Regulation S-K. In 2010, FASB issued Accounting Standards Update (ASU) No. 2010-03, *Extractive Activities—Oil and Gas (Topic 932): Oil and Gas Reserve Estimation and Disclosures*. ASU No. 2010-03 includes changes to accounting and disclosure requirements that are consistent with SEC Final Rule 33-8995.

Origin and Accumulation of Oil and Gas

1.21 An oil or gas reservoir is often erroneously viewed as a large cave containing liquids or gas beneath the earth, like a subterranean pond. In reality, an oil or gas reservoir is porous rock capable of containing oil, gas, or water in the microscopic pore spaces of the rock. For an oil or gas reservoir to be formed, the following features must be present:

- There must have been an original source bed of organic material subjected to the proper temperature and pressure over sufficient time.
- There must be a reservoir rock filled with pores (having porosity) so the oil, gas, or both, can collect.
- The rock's pores must be interconnected (having permeability) so the oil or gas can move or migrate.
- There must be a trap that will cause the oil or gas to collect and prevent the hydrocarbons from moving upward.

1.22 Oil and gas originated from organic matter in sedimentary rocks. Layer upon layer of sediment and animal and plant deposits were buried successively until the accumulation became thick, sometimes thousands of feet. Bacteria took oxygen from the trapped organic residues and gradually broke down the matter into substances rich in carbon and hydrogen. The weight created high pressure and temperature, compacted and squeezed the sediment

into hard shales, turned the organic material into oil and gas, and expelled the oil and gas from the shale into porous and permeable reservoir beds.

1.23 Source rocks, in which the organic material was originally trapped, are fine grained and relatively impermeable. The oil and gas normally move from the source rock into more porous rocks; they then migrate upward through the porous rocks until reaching a structural closure or an impermeable barrier. These closures and barriers are called *traps*, and they cause oil and gas to accumulate into a pool or field.

1.24 Oil and gas traps may be classified in several different ways. One commonly used system for classifying traps is based on the one of two ways in which they were formed: (*a*) structural traps and (*b*) stratigraphic traps.

1.25 Structural traps formed by vertical or horizontal movement, or both, in the earth's crust, are the most important sources of hydrocarbons. A common structural trap is the anticline, which has been the most productive type of structure for oil and gas production. An anticline is a dome usually formed by upthrusts from below. Anticlines containing oil and gas are covered by an impervious cap rock layer. Oil, gas, and water migrate upward through porous layers until they reach the cap rock and are trapped.

1.26 Another structural trap of special importance as a source of oil and gas is the fault. Faults are created by shifts in the earth's crust that cause a porous strata containing hydrocarbons to shift and break so that a strata on one side of the fault is higher than the strata on the other side of the break. At the fault line, the strata containing hydrocarbons is sealed off by an impervious layer, trapping the oil, gas, and water.

1.27 A third common form of a structural trap is the salt dome. In these structures, a nonporous salt bed pushes upward and pierces porous strata, causing an uplifting of the strata and faults along the sides of the dome. Also, some of the impervious overriding formations are merely bent, creating anticlines at the top of the domes. Both faults and anticlines are excellent traps for hydrocarbons.

1.28 Another common structural trap is an unconformity or truncation trap, in which a portion of reservoir strata has been eroded away and replaced with impermeable sediments to form a trap. Different forms of truncation are involved in the large oil fields in Saudi Arabia and the Prudhoe Bay field in Alaska.

1.29 Stratigraphic traps are created by abrupt changes in the porosity of the strata. Areas of strata containing oil and gas may be cut off by irregular dispositions of sand and shale or changes in the rocks in the strata, causing the oil and gas to be trapped.

Oil and Gas Reserves

1.30 The discovery and preparation for production of oil and gas reserves is the primary objective of exploration and development activities. In addition, reserve information is critical to an oil and gas producer's financial statements.

1.31 Historically, only reserves classified as proved were disclosed in accordance with accounting principles generally accepted in the United States of America (GAAP) and the disclosure requirements of the SEC. However, for internal purposes, entities generally identify proved and unproved categories of

reserves. The most common additional categories are known as *probable* and *possible reserves*. In connection with the SEC reporting requirements contained in Final Rule No. 33-8995, probable and possible reserves are now permitted (although not required) to be disclosed outside of the financial statements in filings with the SEC. Proved reserves are required to be disclosed in accordance with the disclosure requirements of the SEC.

1.32 Reserve determinations have a significant effect on an entity's results of operations and financial position because they are used in the calculation of the amortization of capitalized costs, the assessment of impairments, and the estimation of the timing of settlements of asset retirement obligations. GAAP generally requires that only proved reserves be used for accounting purposes (such as the amortization of capitalized costs.) However, probable and possible reserves are used (after adjusting for the risk of uncertainty of existence) in evaluating impairment of oil and gas properties for entities following the successful efforts method of accounting. Such reserves also are used in the determination of the fair value of assets in acquisition and disposition transactions.

The SEC's Definition of *Proved Reserves*

1.33 The definition of *proved reserves* used by the SEC is found in Final Rule 33-8995 and FASB ASC 932. This definition is the only definition currently acceptable under both the successful efforts method and the full cost method of accounting when preparing financial statements and disclosures in accordance with GAAP.

1.34 Determination of proved reserves is based on whether the estimated oil and gas quantities are reasonably certain to be recoverable under existing economic and operating conditions. The concept of reasonable certainty of recovery under existing economic and operating conditions is subject to many interpretations and judgments, including, but not limited to, having the necessary transportation infrastructure; the existence of a market or market arrangements, or both; sufficient resources to fund development costs; and other criteria, each of which would need to be addressed. The inability of an entity to demonstrate that these criteria are reasonably certain to occur may affect its ability to recognize proved reserves.

1.35 Certain key terms used in the definition of *proved reserves* include the following:

- The economic recoverability assessment of proved reserves is based on a 12-month average price used to determine reserves (including proved reserves), calculated as the unweighted arithmetic average of the first day of the month price for each month within the company's 12-month period prior to the end of the reporting period, unless prices are affected by contractual arrangements, as defined.
- The definition of *oil and gas producing activities* includes the extraction of nontraditional resources, such as bitumen extracted from oil sands and hydrocarbons extracted from coal beds and shales, which are intended to be upgraded into synthetic oil or gas.
- The use of new reliable technologies is allowed to establish proved, probable, and possible reserve estimates. *Reliable technology* is defined as technology (including computational methods) that has

been field tested and has demonstrated consistency and repeatability in the formation being evaluated or in an analogous formation.

Additional SEC staff guidance related to the determination of reserves can be found on the SEC's website at www.sec.gov/divisions/corpfin/guidance/oilandgas-interp.htm. This guidance is in the form of Compliance and Disclosure Interpretations (C&DIs) on the oil and gas rule of the SEC. These C&DIs comprise the interpretations of the SEC's Division of Corporation Finance.

The SEC reporting requirements contained in Final Rule No. 33-8995 also can be found on the SEC's website at www.sec.gov/rules/final/2008/33-8995.pdf.

1.36 Proved, probable, and possible reserves can be classified as *developed* and *undeveloped*, in accordance with the following definitions:

- *Developed oil and gas reserves* are reserves of any category that can be expected to be recovered
  - — through existing wells with existing equipment and operating methods or in which the cost of the required equipment is relatively minor compared to the cost of a new well and
  - — through installed extraction equipment and infrastructure operational at the time of the reserves estimate if the extraction is by means not involving a well.
- *Undeveloped oil and gas reserves* are reserves of any category that are expected to be recovered from new wells on undrilled acreage or from existing wells where a relatively major expenditure is required for recompletion.

1.37 The SEC definition of *undeveloped oil and gas reserves* includes the following provision: "Undrilled locations can be classified as having undeveloped reserves only if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances justify a longer time."

In addition, the disclosures required under Item 1203 of Subpart 1200 of Regulation S-K require disclosure for proved undeveloped reserves, including the reasons why material amounts of proved undeveloped reserves have remained undeveloped for five years or more after disclosure as proved undeveloped reserves. See the "SEC Disclosures—Subpart 1200 of Regulation S-K" section of chapter 4, "Successful Efforts Method and General Accounting for Oil and Gas Activities," for further information regarding disclosure requirements. Additional guidance related to the definition of *undeveloped oil and gas reserves* has been provided by the SEC in Section 131 of its C&DIs. In particular, question 131.03 provides guidance regarding the SEC's views about the "specific circumstances" that would justify a time period longer than five years to begin development of proved undeveloped reserves.

The Society of Petroleum Engineers' Definitions of *Reserves*

1.38 In March 2007, the Society of Petroleum Engineers, the World Petroleum Council, the American Association of Petroleum Geologists, and the Society of Petroleum Evaluation Engineers announced a new framework for determining oil and gas resources: the Petroleum Resources Management System

(PRMS). The PRMS provides a definition for *proved reserves*, as well as other resource categories, such as *probable* and *possible reserves*. The PRMS definitions are not acceptable for use in the preparation of financial statements in accordance with GAAP; however, entities may utilize them for internal purposes. The PRMS defines *proved reserves* as

> 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.

1.39 Historically, although the PRMS and SEC definitions of *proved reserves* were consistent across many areas, certain differences did exist between the two sets of definitions. The SEC definitions provided in Final Rule No. 33-8995 were significantly influenced by the PRMS and have eliminated some of these historical differences. However, differences do remain, including the fact that proved reserves under the PRMS are determined based on management's "defined" economic and operating conditions (that is, management's own pricing assumptions) as opposed to the "existing" economic and operating conditions required by the SEC (that is, historical 12-month average). Many companies still use the PRMS definition in their own internal reserves analyses.

1.40 For further information, readers can refer to the 2007 PRMS on the SPE's website at www.spe.org/industry/docs/Petroleum_Resources_Management_System_2007.pdf.

Determination of Reserves

1.41 Reserve estimates are prepared by persons with the requisite specialized knowledge and experience to estimate oil and gas reserve quantities, such as petroleum reservoir engineers and geologists. The reserve estimators may either be employees of the oil and gas entity or consulting engineers. When reserve estimates are prepared by employees of the entity, consulting engineers will often be hired to audit or review the estimates.

1.42 The assumptions that may vary include fixed or escalated prices, different price and cost scenarios, different development scenarios, probability based or deterministic methods of reserves estimates, and so on.

1.43 Reserve estimates or studies are widely used in managerial decisions. They also are used in financial statement information or supplemental disclosures to the financial statements. The most common uses are the following:

- A basis for computing the depreciation, depletion, and amortization rates used
- A basis to assign capitalized costs to oil and gas properties
- Disclosure of proved reserve quantities and discounted present value of future net cash flows information about a producing entity's proved reserves, in accordance with GAAP for publicly traded entities

- A basis for preparing cost ceiling test calculations for entities following the full cost method of accounting
- Undiscounted and discounted cash flow calculations for asset impairment purposes for entities following the successful efforts method of accounting

1.44 The initial evaluation of a well or wells is made to determine whether sufficient reserves have been discovered to justify developing the property. This evaluation is usually prepared by employees of the entity based on well log and formation core data, drill stem tests, and other available information.

1.45 Oil and gas entities should revise reserve estimates at least annually or whenever an indication of the need for revision exists, such as significant differences in actual production versus earlier estimates, changes in ownership, or significant decreases in cash flows.

1.46 The following is only a part of the supply of information that may be used to develop reserve quantity information:

- Area and thickness of the productive zone
- Porosity of the reservoir rock
- Permeability of the reservoir rock to fluids
- Oil, gas, and water saturation
- Physical characteristics of oil and gas
- Depth to the producing formation
- Reservoir pressure and temperature
- Production history of the reservoir
- Ownership of the oil and gas property

1.47 The methods used to estimate recoverable reserves vary with the amount and nature of the preceding information that is available. Estimates of the reserve quantities that are economically recoverable are made for internal use. Estimates for internal use may be based on estimated selling prices, development costs, and production costs; however, those used for financial reporting purposes are required to be based on historical prices and production costs, as required by the SEC.

1.48 *Precision of estimates*. According to the SPE, the reliability of reserve information is affected considerably by several factors. It is important to note that reserve information is imprecise because of the inherent uncertainties in, and the limited nature of, the data upon which the reserve estimate is predicated. Moreover, the methods and data used in estimating reserve information are necessarily often indirect or analogical in character rather than direct or deductive. The persons estimating reserve information make numerous judgments based solely on their educational background, training, and experience. The extent and significance of the judgments to be made are, in themselves, sufficient to render reserve information inherently imprecise.

Operations in the Upstream Petroleum Industry

1.49 Financial statements of an oil and gas producing entity will include many transactions and accounts not commonly found in other types of economic enterprises. This is a result of the unique nature of the principal assets — oil

and gas reserves — and the ways in which these reserves are acquired, developed, and produced. The high risks and high costs of acquiring, developing, and producing oil and gas and the unique nature of the ownership rights result in unique contractual relationships between oil and gas producing entities and owners of mineral rights. Chapter 2, "Primary Business Activities of the Industry," provides fundamental information about the most important contracts and operations encountered in the United States. Some of the most important contracts frequently encountered in petroleum activities in other countries are discussed in greater detail in chapter 6, "Accounting for International Oil and Gas Activities."

1.50 Operating activities in the oil and gas industry are commonly divided into the following categories: upstream activities and midstream and downstream activities. Upstream activities, which are the subject of this guide, may be broadly described as the following:

- Acquiring mineral rights
- Exploring for oil and gas
- Drilling wells and installing production equipment
- Lifting the oil, gas, and water from the wells to the surface
- Separating the oil, gas, and water sufficiently to prepare the hydrocarbons for transport to pipelines or oil refineries

Midstream and downstream activities include the following:

- Transporting the petroleum from the producing wells to the processing plants and refineries
- Refining and processing activities necessary to produce marketable products, such as natural gas, gasoline, and petrochemicals
- Transporting, distributing, and storing the refined products
- Marketing activities, which get the refined products, natural gas liquids, and natural gas into the hands of consumers

The activities involved in transporting the petroleum to processing plants and refineries are generally referred to as *midstream activities*, and the other activities are generally referred to as *downstream activities*.

1.51 Entities engaged in both upstream and downstream activities are referred to as *vertically integrated entities*, with the largest of these integrated entities often referred to as *majors*. A common term used in the industry to describe entities solely or primarily engaged in upstream activities is *independents*.

1.52 Within the petroleum industry, there have been continuing changes in entity structures and identities. Throughout the industry, mergers and acquisitions occur at all size levels. These transactions are entered into in order to acquire reserves, gain efficiencies, reduce costs, and gain operations in new areas.

1.53 The accounting and auditing principles and procedures related to refining activities, most gas processing activities, petrochemical operations, distribution, storage, and retail marketing activities are similar to those applicable to other manufacturing and marketing activities. As a result, this guide deals almost solely with accounting for, and reporting on, upstream activities, with only limited discussion of other related industry activities.

Oil Sands

1.54 Beginning in the late 1990s and early 2000s, the industry began to partner with joint venture partners in Canada in order to develop oil sand deposits. Potentially, oil sand projects can have a productive life that covers multiple decades. Many of these nonconventional operations involve the production of bitumen, which is transported from the mining operation via pipeline to an upgrader or directly to a refinery that processes heavy oil. An upgrader processes the bitumen into a lighter degree of synthetic crude oil that can be sold to the marketplace as-is or further refined and converted into an array of refined products. Bitumen is a tar-like form of crude petroleum that is so viscous that it must be heated before it will flow.

1.55 The production techniques used to extract bitumen can be a mixture of nonconventional production techniques (referred to as *truck and shovel* or *surface mining* operations) and conventional drilling techniques, such as steam assisted gravity drainage (SAGD or in-situ operations). The surface mining operations can be used to recover only a certain percentage of the total resource volume. Conventional drilling techniques, such as SAGD, are applied in order to produce the resource volumes that are located on deeper horizons and not available for the mining type of production. Historically, oil and gas entities have accounted for and disclosed truck and shovel operations as mining activities and SAGD operations as oil and gas producing activities.

1.56 In SEC Rule No. 33-8995 and ASU No. 2010-03, the definition of *oil- and gas-producing activities* was expanded to include the extraction of saleable hydrocarbons, in the solid, liquid, or gaseous state, from oil sands, shale, coalbeds, or other nonrenewable natural resources that are intended to be upgraded into synthetic oil or gas, and activities undertaken with a view to such extraction. Accordingly, the accounting guidance for nonconventional production meeting the preceding criteria are now within the scope of FASB *Accounting Standards Codification* (ASC) 932, *Extractive Activities—Oil and Gas*.

Sources of Capital and Organizational Structure of Oil and Gas Entities

1.57 Oil and gas producing entities require large amounts of capital, especially in their exploration and development activities. As in most industries, the traditional sources of capital are internal financing and equity and other forms of external financing. However, the various and sometimes unique adaptations in the oil and gas industry warrant discussion.

1.58 In the past, oil and gas entities, especially those that were large and financially strong, were able to fund a large amount of their exploration and development activities with internally generated funds. Increased competition among entities for exploration rights to undeveloped properties, increased risks related to exploration and development of oil and gas properties, as well as rising acquisition and development costs, have resulted in entities turning more frequently to external sources of funds.

1.59 Oil and gas entities use a variety of ownership arrangements for sharing risks. These arrangements may be in the form of undivided interests, unincorporated entities (joint ventures), corporations, limited liability companies, partnerships, and others. The oil and gas entity determines the appropriate

