

Safety and Soundness

Capital
Adequacy
(C)

Asset
Quality
(A)

Management
(M)

Earnings
(E)

Liquidity
(L)

Sensitivity to
Market Risk
(S)

Other
Activities
(O)

Oil and Gas Exploration and Production Lending

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Introduction

The Office of the Comptroller of the Currency's (OCC) *Comptroller's Handbook* booklet, "Oil and Gas Exploration and Production Lending," is prepared for use by OCC examiners in connection with their examination and supervision of national banks, federal savings associations, and federal branches and agencies of foreign banking organizations (collectively, banks). Each bank is different and may present specific issues. Accordingly, examiners should apply the information in this booklet consistent with each bank's individual circumstances. When it is necessary to distinguish between them, national banks¹ and federal savings associations (FSA) are referred to separately. (Updated October 15, 2018)

The "Oil and Gas Exploration and Production Lending" booklet is one of several specialized lending booklets and augments guidance contained in the "Loan Portfolio Management," "Large Bank Supervision," "Community Bank Supervision," "Federal Branches and Agencies Supervision," and "Rating Credit Risk" booklets of the *Comptroller's Handbook*. The "Oil and Gas Exploration and Production Lending" booklet addresses the risks associated with lending to upstream oil and gas (O&G) exploration and production (E&P) companies and provides examiner guidance on prudent risk management of this lending activity. The booklet also includes expanded examination procedures for examiners to use when warranted by the risks associated with this type of lending activity. (Updated October 15, 2018)

Overview

Business Description

The O&G industry is cyclical, mature, and vital to the proper functioning of a modern economy. The industry provides the fuels needed for transportation and heating as well as the key raw materials used in construction, paving, and manufacturing chemicals. It is a global industry, although the natural gas segment is regional because natural gas transportation and distribution to customers is largely dependent on pipelines. Natural gas can be liquefied and transported longer distances. Such transportation, however, requires specialized port facilities and higher cost to the producer.

The O&G industry is highly regulated because of its economic importance, significance to national security, and potential for environmental concerns. In numerous countries, the government owns O&G mineral rights exclusively through national oil companies and government-sponsored enterprises. The location and state of industry infrastructure and changing technology sometimes have a significant impact on regulation, production costs, commodity prices, and industry profitability.

¹ References to "national banks" throughout this booklet generally also apply to federal branches and agencies of foreign banking organizations unless otherwise specified. Refer to 12 USC 3102(b) and the "Federal Branches and Agencies Supervision" booklet of the *Comptroller's Handbook* for more information regarding applicability of laws, regulations, and guidance to federal branches and agencies.

The O&G industry comprises three segments—upstream, midstream, and downstream:

- **Upstream** companies—also known as E&P companies—find, develop, and produce oil, natural gas, and natural gas liquids (NGL). The upstream business model is analogous to mining for raw materials. Upstream companies manage their development and production costs and emphasize production volume to generate profit margins, which are sensitive to commodities market prices. This price risk can cause volatility in company cash flow and the value of O&G reserves.

Upstream companies make up-front investments to obtain and develop reserves from which they expect to generate satisfactory investment returns based on their expectations for production costs, production volumes, and future market prices. Once production begins, the existing O&G reserves start to deplete. Therefore, upstream companies require high levels of ongoing capital expenditures (capex) to maintain or increase reserves to offset depletion. Sustained periods of capital investment can reduce the amount of cash flow available for debt service or distributions. Upstream companies are typically C corporations and are taxed separately from their owners.

- **Midstream** companies gather, process, store, and transport crude oil, raw natural gas, NGLs, and refined petroleum products and chemicals. The midstream business model is similar to a toll road that charges fees for the movement or intermediate processing of O&G. Midstream companies require large up-front investments in long-lived infrastructure and then generate medium to low profit margins by collecting fees for services. These companies frequently are structured as master limited partnerships, which are not subject to income tax. The master limited partnerships typically distribute a large portion of income to unit holders, with distributed income taxed at the unit holder's personal income tax rate.
- **Downstream** companies refine petroleum products and engage in the manufacturing, marketing, and distribution of refined petroleum products such as gasoline, jet fuel, heating oil, asphalt, motor oil, and lubricants. The downstream business model is similar to value-added manufacturing that earns low to medium profit margins from refining raw materials, turning them into products with valuable uses, and marketing and delivering finished goods to wholesale customers and end users. Developing the capacity to do so requires high capital investment up front. Downstream companies are typically C corporations. Larger downstream companies may incorporate elements of upstream and midstream businesses.

O&G service companies provide support to upstream, midstream, and downstream operations. E&P and integrated O&G companies, specifically, are supported by various types of service companies that provide geological surveys, engineering, drilling, extraction, processing, transporting, wastewater disposal, and other services. These service companies are capital intensive and can be highly complex and technologically advanced. Some service companies are large and multinational, and others are quite small, such as local trucking companies, small engineering firms, and small maintenance firms.

Integrated O&G companies, also known as majors, are involved in almost every aspect of the O&G business: upstream, midstream, and downstream. This structure may better enable such companies to successfully manage business cycle risks and price risks. Most of these companies also manufacture and sell petrochemicals. International integrated O&G companies conduct their operations worldwide and are among the largest and most recognized companies in the world. The largest such companies are referred to as the super majors.

Smaller E&P companies, referred to as independents, are not directly associated with any of the major O&G companies. Some independent E&P companies have evolved from spin-offs of larger corporations, such as railroads, integrated O&G companies, pipeline companies, or utilities. A number of companies began with a single O&G field and grew by acquiring smaller competitors or individual properties from larger competitors. Compared with majors and super majors, smaller upstream companies have less diversification and may exhibit greater vulnerability to commodity price volatility, cost overruns, production delays, disruptions, and economic cycles.

This booklet addresses only E&P lending to upstream companies because their financing structures are more specialized than financing structures used by midstream, downstream, and service companies. Loan policies and underwriting standards applied to midstream, downstream, and service companies are similar to traditional commercial and industrial loans.

Price Considerations

Commodity prices can be highly volatile and cause upstream borrower profitability and liquidity to change rapidly, in contrast with midstream and downstream businesses. Although well-managed and conservatively underwritten E&P transactions have historically experienced low losses compared with other sectors, given commodity volatility and other specialized risks, lending to the industry can pose higher credit risk without strong expertise and risk management practices.

Global events and new technologies dramatically affect O&G price volatility (short term) and trends (long term). Volatility comes from shorter-term or one-time incidents, such as geopolitical events (for example, circumstances in the Middle East or other large O&G-producing regions that threaten to disrupt supply) and supply disruptions from major weather events, or sharp recessions in major economies that temporarily reduce demand.

Over the long term, rising industrial production and larger automotive fleets in emerging economies support increased demand prospects, while increased production from horizontal drilling combined with hydraulic fracturing (known as fracking) in North America and elsewhere has increased supply. Supply increases and economic slowdown of major world economies can lead to rapid and significant price declines.

Because natural gas is difficult and costly to transport and export without dedicated pipelines, natural gas markets are regional, meaning price volatility within each geographic market

reflects events within that region. The crude oil market, on the other hand, is global, and oil price volatility reflects global events. Geopolitical risks in any of the top oil-producing and oil-exporting countries can have a greater potential effect on companies with drilling and extraction operations in unstable regions. Multinational oil companies, with overseas operations, have greater exposure to global risks than non-multinational oil companies do. Independents are key players in North American natural gas and oil. Independents tend to be more geographically concentrated than majors and also have more flexibility in making strategic decisions. This flexibility sometimes gives independents the ability to produce O&G at a lower cost than larger competitors. North American natural gas is a commodity, and independent E&P companies have historically been cost-competitive because of lack of competition from low-cost imports.

Reserve Depletion

O&G assets deplete as E&P operators extract the oil and natural gas from their reserves. Operators need to replace reserves and economically produce those reserves to maintain future revenue, grow in size, and remain a going concern. To sustain profitable production, E&P companies need to replace reserves at a reasonable cost. As a result of this dynamic, E&P costs are a large portion of an E&P company's expenditures. Exploration, however, does not always result in successful replacement. Because of the high cost and elevated risk of exploration, some E&P companies supplement internal development with acquisitions to replace reserves. Alternatively, start-up E&P companies have very high operating costs because of significant investment in projects that often have long lead times before becoming productive.

Distinguishing Between Oil and Gas Reserves

There are differences between crude oil and natural gas that significantly affect the markets for each. Crude oil, which is refined to produce transportation fuels and fuel oils, is a globally traded commodity, and there are many different grades. The most commonly referenced grades of crude oil are West Texas Intermediate (WTI), which is the primary U.S. oil price benchmark against which other grades of crude are priced, and Brent, which is used as a more global oil price benchmark. While WTI and Brent prices have diverged at times, they have exhibited nearly perfect correlation over the last 30 years. Both WTI and Brent are "light, sweet" grade crude oils, indicating low density and low sulfur content. This consistency allows oil refineries to convert a higher percentage of the oil into fuel than "heavy, sour" grade crude oils. Sweet crude tends to trade at a premium over heavy crude. Within broad markets, there are submarkets for oil that do not perfectly correlate to changes in the broader market, because of the differences in costs to transport the oil to refineries and eventually fuel to the retail market.

The primary uses of natural gas are electricity production; home and building heating; and as a base ingredient for industrial products, such as plastics, fertilizers, and chemicals. The price of natural gas does not perfectly correlate to oil. Natural gas markets are regional and are subject to regional supply and demand because transportation and distribution to customers is largely dependent on pipelines. Natural gas also can take liquid form. Conversion of natural

gas to liquefied natural gas (LNG) has increased rapidly in recent years. Producers of LNG hope to sell their product overseas in areas where natural gas production is not readily available. Both the conversion process and specialized transport equipment, however, are costly relative to the amount of energy produced, which diminishes international trading of LNG.

Petroleum Reserves

The primary assets of E&P companies are their reserves.² Reserves are quantities of petroleum³ that E&P companies anticipate they will recover from known accumulations from a given date forward. All reserve estimates involve some degree of uncertainty. The uncertainty depends chiefly on the amount of reliable geologic and engineering data available at the time of the estimate and the interpretation of the data. The relative degree of uncertainty results in placing reserves into one of two principal classifications, either proved or unproved. The recovery of unproved reserves is less certain than proved reserves and may be further subcategorized as probable and possible reserves to denote progressively increasing uncertainty of their recoverability. Similarly, proved reserves are further subcategorized based on the status of well development and production.

Reserves derived under these definitions rely on the integrity, skill, and judgment of the evaluator; the effects of geological complexity, stage of development, and degree of depletion of the reservoirs; and the amount of available data. These definitions enhance the distinction among the various classifications and help provide consistent reserve reporting. Identifying reserves as proved, probable, and possible has been the most frequently used classification method and indicates the probability of recovery.

There are two basic methods of reserve estimations. One method, called deterministic, is a single best estimate of reserves made based on known geological, engineering, and economic data. The second method, called probabilistic, is used when the known geological, engineering, and economic data generate a range of estimates and their associated probabilities. Reserve estimates are revised as additional geologic or engineering data become available or as economic conditions change. Reserve estimates do not include quantities of petroleum being held in inventory and may be reduced for usage or processing losses if required for financial reporting.

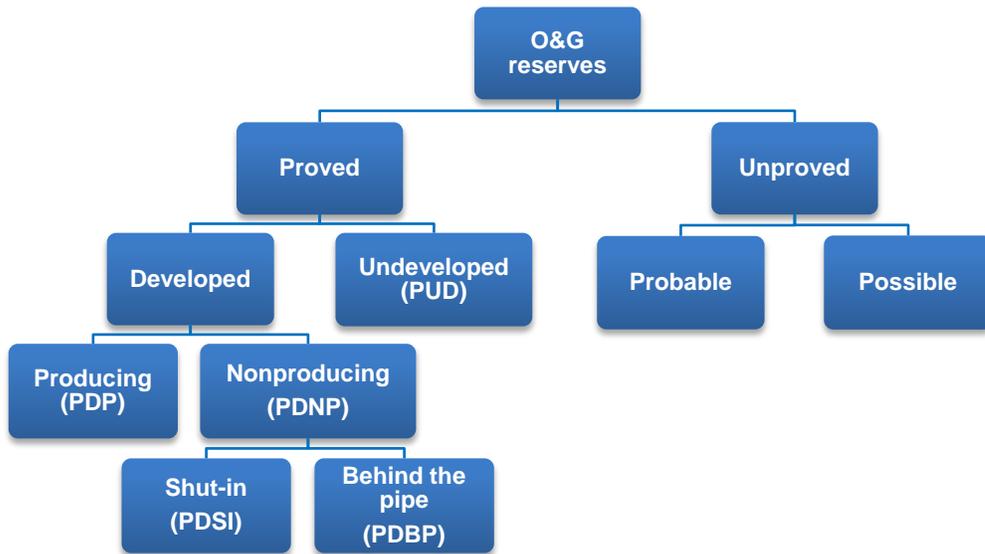
Reserve estimates may be attributable to either natural energy or improved recovery methods. Improved recovery methods include all methods for supplementing natural energy

² This booklet uses commonly accepted definitions and terminology used in the O&G E&P industry and by banks engaging in related lending activities. Examiners should be familiar with these definitions and terms, many of which are defined by, set by, or adapted from definitions of the Society of Petroleum Engineers (SPE), the World Petroleum Council (WPC), the American Association of Petroleum Geologists (AAPG), or the Society of Petroleum Evaluation Engineers (SPEE) in the SPE/WPC/AAPG/SPEE Petroleum Resources Management System and the WPC's Petroleum Resources Classification System and Definitions. The use of these definitions and terminology does not imply endorsement of this booklet by the SPE, the WPC, the AAPG, or SPEE. Refer to appendix C of this booklet for an expanded discussion of recoverable resource classes.

³ Petroleum consists of hydrocarbons in the gaseous, liquid, or solid phase, including crude oil and natural gas.

or altering natural forces in the reservoir to increase ultimate recovery. Examples of such methods are pressure maintenance, cycling, water flooding, thermal, chemical flooding, and the use of miscible and immiscible displacement fluids. Figure 1 shows the relationships among different types of reserve classifications.

Figure 1: Relationships Among O&G Reserve Classifications



Source: OCC

Note: PUD means proved undeveloped. PDP means proved developed reserves subcategorized as producing. PDNP means proved developed reserves subcategorized as nonproducing. PDSI means proved developed shut-in. PDBP means proved developed behind the pipe.

The company's undeveloped reserves should be economically and technically viable. When estimating the amount of O&G that is recoverable from a particular reservoir, a company can make three types of estimates:

- Proved (1P): Reasonably certain.
- Proved plus probable (2P): As likely as not to be achievable.
- Proved plus probable plus possible (3P): Might be achievable, but only under more favorable circumstances than are likely.

Proved Reserves

Proved O&G reserves are quantities of petroleum that, by analyzing geological and engineering data, are reasonably certain to be commercially recoverable from a given date forward from known reservoirs and under current economic conditions, operating methods, and government regulations. If the deterministic method is used, the term “reasonably certain” expresses a high degree of confidence that the quantities are recoverable. If the probabilistic method is used, there should be at least a 90 percent probability that the quantities actually recovered will equal or exceed the estimate.

Establishing current economic conditions should include relevant historical petroleum prices and associated costs and may involve an averaging period that is consistent with the purpose of the reserve estimate, appropriate contract obligations, corporate procedures, and government regulations involved in reporting the reserves.

Proved reserves also should have operational facilities to process and transport those reserves to market at the time of the estimate or a reasonable expectation of installing such facilities in the near term. Proved reserves are either proved developed or proved undeveloped.

- **Proved developed:** E&P companies expect to recover developed reserves from existing wells including reserves behind the 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. There are two subcategories of developed reserves: producing reserves and nonproducing reserves.
 - **Proved developed producing (PDP):** E&P companies expect to recover reserves subcategorized as producing from completion intervals, which are open and producing at the time of the estimate. Improved recovery reserves are considered producing only after the improved recovery project is in operation. Loan underwriting should be predicated primarily on PDP reserves.
 - **Proved developed nonproducing (PDNP):** Reserves subcategorized as nonproducing include proved developed shut-in (PDSI) and proved developed behind the pipe (PDBP) reserves. E&P companies expect to recover PDSI reserves from (1) completion intervals that are open at the time of the estimate but have not started producing, (2) wells that were shut-in for market conditions or pipeline connections, or (3) wells not capable of production for mechanical reasons. E&P companies expect to recover PDBP reserves from zones in existing wells that require additional completion work or future recompletion before the start of production.
- **Proved undeveloped reserves (PUD):** E&P companies expect to recover undeveloped reserves (1) from new wells on undrilled acreage; (2) from deepening existing wells to a different reservoir; or (3) where a relatively large expenditure is required to (a) recomplete an existing well or (b) install production or transportation facilities for primary or improved recovery projects. Up-front capex, mainly drilling and completion costs, are required to develop the reserves to a producing state. The advent of horizontal drilling techniques has increased the success of drilling undeveloped reserves, reducing “dry hole” risk, though often at higher development costs.

Proved reserves may be considered undeveloped if

- the locations are directly offset to wells that have indicated commercial production in the objective formation.
- it is reasonably certain that such locations are within the known proved productive limits of the objective formation.
- the locations conform to existing well spacing regulations when applicable.
- it is reasonably certain that the locations will be developed.

Reserves from other locations are categorized as PUD only where interpretations of geological and engineering data from wells indicate with reasonable certainty that the formation is laterally continuous and contains commercially recoverable petroleum at locations beyond direct offsets.

Unproved Reserves

Unproved reserves are based on geologic or engineering data similar to that used in estimates of proved reserves, but technical, contractual, economic, or regulatory uncertainties preclude categorizing such reserves as proved. There are two subcategories for unproved reserves: probable reserves and possible reserves.

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

Probable Reserves

Probable reserves are unproved reserves that are expected to be produced based on geological or seismic data from planned wells in areas anticipated to be economically viable (for example, with a 50 percent certainty of recovery). In general, probable reserves may include

- reserves anticipated to be proved by normal step-out drilling where subsurface control is inadequate to classify these reserves as proved.
- reserves in formations that appear to be productive based on well log characteristics but lack core data or definitive tests and are not analogous to producing or proved reservoirs in the area.
- incremental reserves attributable to infill drilling that could have been classified as proved if closer statutory spacing had been approved at the time of the estimate.
- reserves attributable to improved recovery methods that have been established by repeated commercially successful applications when (1) a project or pilot is planned but not in operation, and (2) rock, fluid, and reservoir characteristics appear favorable for commercial application.
- reserves in an area of the formation that appears to be separated from the proved area by faulting and the geological interpretation indicates the subject area is structurally higher than the proved area.
- reserves attributable to a future workover, treatment, re-treatment, change of equipment, or other mechanical procedures, when such procedure has not been proved successful in wells that exhibit similar behavior in analogous reservoirs.
- incremental reserves in proved reservoirs where an alternative interpretation of performance or volumetric data indicates more reserves than can be classified as proved.

Possible Reserves

Possible reserves are unproved reserves inferred from geological and seismic information that have a chance of being developed under favorable circumstances but are less likely to be recoverable than probable reserves (for example, possible reserves that have a 10 percent certainty of recovery). In general, possible reserves may include

- reserves that, based on geological interpretations, could possibly exist beyond areas classified as probable.
- reserves in formations that appear to be petroleum bearing based on log and core analysis but may not be productive at commercial rates.
- incremental reserves attributed to infill drilling that are subject to technical uncertainty.
- reserves attributed to improved recovery methods when (1) a project or pilot is planned but not in operation and (2) rock, fluid, and reservoir characteristics are such that a reasonable doubt exists that the project will be commercial.
- reserves in an area of the formation that appears to be separated from the proved area by faulting, and geological interpretation indicates the subject area is structurally lower than the proved area.

Types of Interest in O&G Reserves

E&P lending involves understanding the allocation of the borrower's property interests, reserves, and cash flow within the capital and ownership structure. Each interest is subject to encumbrance, and the borrower may have numerous entities that hold different interests and have different encumbrances. Conversely, the borrower may subject all interests to a single encumbrance. Properties may be located in various jurisdictions, including different states and countries, but mortgaged under a single loan transaction. The following is a partial list of types of ownership interests:

- **Mineral interest:** A property interest created by an instrument that transfers—by a grant, assignment, reservation, or otherwise—an interest of any kind in coal, O&G, or other minerals.
- **Royalty interest:** A property interest in O&G minerals entitling the owner to a share of production when there is production. A royalty interest is free of the costs of production.
- **Working interest:** A percentage of ownership in an O&G lease that grants its owner the right to explore and produce O&G from a tract of property.
- **Net revenue interest:** A property interest that the assignee of a lease has in the profits of the mineral-production operations, free of production costs and after paying out all overriding royalties.
- **Overriding royalty interest:** A working interest in the production of O&G rather than a property interest in the minerals in the ground.

Financial Accounting and Reporting

Accounting approaches differ significantly among E&P companies. A company may use two methods of accounting for drilling costs: full cost and successful efforts. The choice greatly

affects a company's income statement. A full-cost company capitalizes all of its acquisition, exploration, and development costs and does not differentiate between successful and unsuccessful projects. A successful-efforts company only capitalizes costs pertaining to successful projects and acquisitions, amortized over the production life of the projects. If the efforts are unsuccessful, the company expenses the costs. The result is that the full-cost companies typically report higher earnings and equity initially, with higher depreciation, depletion, and amortization charges in future periods. Comparatively, successful-efforts companies tend to have lower earnings and equity in the early stages, with lower depreciation, depletion, and amortization charges in future periods.

The reliability of reserve disclosures sometimes varies among companies. Lenders prefer reserve reports prepared by an independent, third-party engineer. Lenders may use company-prepared reports, however, if reviewed by third-party engineers. E&P companies' annual reserve disclosures can have a material impact on stated earnings. Companies that book reserves liberally may be required to make substantial revisions to their financial statements.

E&P companies that hold derivatives that do not qualify for hedge accounting report their gains and losses on each income statement. Unrealized gains and losses that relate to future production can distort current cash flow analysis and make O&G performance comparisons difficult.

O&G reserve disclosures usually adhere to the definitions set by the Society of Petroleum Engineers (SPE), World Petroleum Council (WPC), American Association of Petroleum Geologists (AAPG), or Society of Petroleum Evaluation Engineers (SPEE) in the SPE/WPC/AAPG/SPEE Petroleum Resources Management System for classifying and reporting reserves. Additionally, the U.S. Securities and Exchange Commission has established a reporting and disclosure rule⁴ for O&G public companies.

E&P Funding Sources

A traditional role of bank credit in the O&G industry has been to finance E&P capex. The repayment of E&P loans depends primarily on revenues and cash flows generated by the successful acquisition, development, completion, and production of O&G reserves, and secondarily on the liquidation of O&G reserves securing the debt.

There are several loan structures used by E&P companies to finance their businesses. Most independent, non-integrated E&P companies obtain financing through a reserve-based loan (RBL). The RBL typically is a revolving facility secured by lower-risk proved reserves and governed by a borrowing base determined by a valuation of those reserves.

Most RBLs have a term of three to five years. The RBL's purpose is primarily to fund acquisition and development costs for new reserves, which, if successful, increase the reserve valuations and provide increasing cash flow for debt service and profits for the company's shareholders and investors. Other senior notes, bonds, or other forms of debt are normally

⁴ Refer to the U.S. Securities and Exchange Commission's final rule, "Modernization of Oil and Gas Reporting."

subordinate to the RBL in collateral position, but in certain cases, second-lien loans are pari passu with the RBL in right of contractual payment streams.

RBLs are subject to periodic evaluation of the borrower's O&G reserves to redetermine the borrowing base commitment. Redeterminations typically occur semiannually, but lenders and borrowers normally have the right to additional redeterminations once or twice during a year, as defined by the credit agreement.

Typical financial covenants included in the RBL credit agreement include cash flow leverage, interest coverage, and current ratio covenants:

- The cash flow leverage ratio is typically defined as senior funded debt or total debt over trailing 12 months (TTM) EBITDAX.⁵ This covenant is the most critical of the three main RBL covenants because it may provide the least amount of headroom while also controlling the amount of additional borrower debt. The total debt to EBITDAX covenant is frequently set at 3.5x and normally does not exceed 4.0x, unless the covenant is increased to account for an acquisition with step-downs to more reasonable leverage.
- A standard definition for interest coverage is TTM EBITDAX divided by TTM interest expense. Interest coverage covenants for RBLs are typically 2.5x to 3.0x EBITDAX coverage of TTM interest expense. (Updated October 15, 2018)
- A standard definition of the current ratio is current assets divided by current liabilities less current maturities, typically set to at least 1.0x to 1.25x coverage. Some transactions, however, may define the current ratio covenant as current assets plus unfunded RBL availability divided by current liabilities less current RBL maturities. (Updated October 15, 2018)

Declining commodity prices and a corresponding drop in revenues can stress these measures and limit production growth, which can lead to reduced RBL borrowing bases during redeterminations. Lenders work with borrowers to formulate plans and implement short-term solutions. Without a significant rebound in prices, however, borrowers may need to negotiate covenant waivers or longer-term loan amendments, with lenders allowing borrowers to develop a combination of short-term liquidity and long-term capital structure solutions. These solutions can include obtaining a term loan secured by a junior lien on the O&G reserves or sale of reserve assets.

Although less common in the United States, another credit structure that E&P companies use is a reducing revolver, which is a combination of a revolving loan and a term loan. The revolver can increase to a maximum commitment level and then step down at regular principal payment dates.

⁵ EBITDAX is earnings before interest, taxes, depreciation, and amortization (EBITDA) with depletion, exploration, and abandonment expense added back. These expenses are add backs because they are often considered discretionary, while also providing consistent application of the covenant regardless of whether the company uses the full cost accrual or successful efforts accounting method. EBITDAX, rather than EBITDA, appears almost universally in O&G financings.

Lenders may also make term loans for project financing, acquisition of O&G properties, or acquisition of other fixed assets secured by a first lien on the company's reserves. For term loans, banks determine the lendable amount based on engineering reports and make a one-time advance for the acquisition. This type of financing amortizes over the loan term or the principal balance is paid at maturity. The term of loans typically varies from five to 10 years, but the term of these loans should always be tied to the economic life of the underlying asset.

Although banks have historically been the primary financial provider of RBLs, other market participants are active in providing additional sources of capital to the industry. Examples of other forms of capital extended to the sector include the following:

- **Second-lien debt:** In E&P lending, second-lien senior term loans may rank *pari passu* in right of payment with first-lien debt, including RBLs. Second-lien loans carry higher interest rates than the senior RBLs because of the additional risk to repayment but remain in a secured position ahead of unsecured debtors, such as bondholders. Second-lien loans often are structured with five-year maturities with interest-only payment requirements.
- **Mezzanine debt:** Mezzanine loans are subordinated to senior loans and are used to leverage acquisition or development activities, particularly when companies do not have sufficient producing reserves to support borrowing under an RBL. These loans may have tight covenants and extensive controls on funding and are generally unsecured and not subject to a borrowing base; rather, these loans are based on collateral coverage or cash flow ratios.
- **Bonds:** High-yield bond offerings and securitizations have played an important role in E&P financing by providing affordable access to capital markets. Longer-term bond offerings with 10-year maturities and interest-only payments have been common sources of funding for E&P companies.
- **Equity:** The role of equity investors in the E&P industry has increased significantly as new E&P ownership and financing structures have evolved. The increasingly complex corporate structure of E&P companies generally necessitates E&P lenders to have more specialized expertise and monitoring systems. For example, the equity structure can be a traditional (operating) equity investment in the operating company or a nonoperating investment in an affiliate when the operating company has limited liability exchanged for the capital investment. An example of the latter is a volumetric production payment (VPP) arrangement, an increasingly popular financing structure. (Updated October 15, 2018)

Volumetric Production Payment Financing Transactions

Under a VPP financing transaction structure, the bank provides financing to an O&G producer and receives a limited overriding royalty interest in the producer's lease of specifically identified reserves. A VPP arrangement is a method to monetize future O&G production. Instead of cash payments, the VPP interest entitles the bank to receive a dedicated share of the hydrocarbons produced over a stated term. Additionally, the bank enters into a forward sale agreement to presell the hydrocarbons at a set price (spot price) based on the forward prices for the commodity at the time of the transaction. On the day of settlement, the producer, through the bank, transfers the title to the hydrocarbons to the

purchaser of the forward contract. As either an alternative or supplement to selling the forward contract, the bank may mitigate the hydrocarbon price risk using other derivative transactions to hedge the risks, such as commodity swaps. Banks should contact their supervisory offices before engaging in such transactions to assess whether the activities can be conducted in a safe and sound manner and in accordance with applicable law. With respect to national banks, refer to 12 USC 29, “Power to Hold Real Property,” and OCC Interpretive Letter 1117 for details on the permissibility of VPP financing transactions. From the bank’s risk perspective, the VPP interest is free and clear of all operating costs, capex, and taxes. The O&G producer (borrower) retains all of the operational and environmental risks. Commodity price risk is negligible if appropriate hedging techniques are used. The VPP, however, has recourse only to the production from the specified reserve and not the producer’s other assets. Although the bank has first right to the production up to the specified amount, there is no right to additional production unless the reserves under-produced in a previous period. Therefore, excess production cannot be captured unless there has already been a shortfall. As a result, the bank has production risk if the underproduction is permanent or otherwise not replaced by overproduction later.

Authority and Limits

Statute generally permits national banks and FSAs to engage in E&P lending. The authority for national banks comes from their general lending authority in 12 USC 24(Seventh), “Corporate Powers of Associations,” while the authority for FSAs is in 12 USC 1464, “Federal Savings Associations.”

A national bank’s E&P lending exposure is not specifically limited other than limitations provided by 12 USC 84, provided the volume and nature of the lending do not pose unwarranted risk to the bank’s financial condition. Certain types of E&P lending may require consideration of the requirements of 12 USC 29. (Refer to OCC Interpretive Letter 1117.)

Certain exposure limitations in addition to 12 USC 84 apply to FSAs as set forth in 12 USC 1464(c), “Loans and Investments,” and 12 CFR 160.30, “General Lending and Investment Powers of Federal Savings Associations.” E&P loans typically are classified as commercial loans, which cannot exceed 20 percent of total assets provided that commercial loans in excess of 10 percent of assets must be small business loans.⁶ An FSA, however, may make E&P loans under other authority, depending on the circumstances.⁷ For example, to the extent an E&P loan is secured by nonresidential real property, an FSA may make the loan under its nonresidential real property loan authority.⁸

⁶ Refer to 12 USC 1464(c)(2)(A). Small business loans include any loan to a small business (defined in 13 CFR 121) and any loan that does not exceed \$2 million and is for commercial, corporate, business, or agricultural purposes. Refer to the definitions of “small business loans and loans to small businesses” and “small business” in 12 CFR 160.3.

⁷ 12 CFR 160.31(a) states that if a loan is authorized under more than one section of the Home Owners’ Loan Act, an FSA may designate under which section the loan has been made. Such a loan may be apportioned among appropriate categories.

⁸ 12 USC 1464(c)(2)(B) generally limits nonresidential real property loans to 400 percent of the FSA’s capital.

Risks Associated With O&G E&P Lending

From a supervisory perspective, risk is the potential that events will have an adverse effect on a bank's current or projected financial condition⁹ and resilience.¹⁰ The OCC has defined eight categories of risk for bank supervision purposes: credit, interest rate, liquidity, price, operational, compliance, strategic, and reputation. These categories are not mutually exclusive. Any product or service may expose a bank to multiple risks. Risks also may be interdependent and may be positively or negatively correlated. Examiners should be aware of this interdependence and assess the effect in a consistent and inclusive manner. Examiners also should be alert to concentrations that can significantly elevate risk. Concentrations can accumulate within and across products, business lines, geographic areas, countries, and legal entities. Refer to the "Bank Supervision Process" booklet of the *Comptroller's Handbook* for an expanded discussion of banking risks and their definitions.

The risks associated with O&G E&P lending are credit, interest rate, liquidity, operational, compliance, strategic, and reputation.

Credit Risk

Credit risk to banks that finance E&P companies arises from the ability or inability of the E&P borrower to repay debt with operating cash flow generated from the production and sale of oil and natural gas. The repayment capacity of an E&P borrower highly depends on the company's ability to economically and successfully acquire, develop, and produce O&G reserves on an ongoing basis. Additionally, an E&P company's repayment capacity is vulnerable to market volatility, government policies, and legal risk, which may not be under the borrower's control. Borrowers can mitigate many of these risks by using geographic and product diversification strategies, obtaining insurance coverage, integrating operations, employing hedging and structured finance strategies, and taking ownership of service companies or equipment.

Market Volatility

Volatile market prices for O&G present the primary repayment risk for the E&P borrower. Large price fluctuations can occur because of weather, changes in supply and demand, and geopolitical events. Because crude oil usually trades in U.S. dollars, changes in the value of the dollar also may affect oil prices. Producers have the ability to hedge their production to alleviate large price variations; hedges, however, tend to be short term with three-year maturities or less, and may prove costly if the commodity price already is depressed. Commodity swaps, call options, put options, futures contracts, and forward contracts are the most common derivatives used. Call options (ceilings) and put options (floors) can be arranged to form collars. Some collars, known as participating collars, have provisions that

⁹ Financial condition includes impacts from diminished capital and liquidity. Capital in this context includes potential impacts from losses, reduced earnings, and market value of equity.

¹⁰ Resilience recognizes the bank's ability to withstand periods of stress.

allow the producer to participate in a portion of the upside (that is, when the market price moves above the ceiling). Others may have disappearing ceilings, known as knockouts.

Most frequently, E&P companies use simple commodity swaps, in which the borrower swaps a floating market price (usually New York Mercantile Exchange, or NYMEX) for a fixed price (the strike price) on a given volume of the commodity (the notional amount). E&P companies also use future and forward contracts to lock in O&G at a future sell price. The bank's written E&P lending policy should address the use of commodity derivatives. The policy should include a discussion of counterparty risk, operational risk, the maximum O&G production volume that can be hedged, and the tenor of hedges.

Government Policies and Legal Risks

O&G E&P is highly regulated in the United States, and changes in government policies can affect the industry. Regulations may differ among states or even counties. Private landowners often own mineral rights in the United States, but public entities often own mineral rights abroad, causing ownership, environmental liability, and business risks to vary depending on where the operation is located.

E&P companies need large areas of land to develop and operate wells. O&G E&P carries environmental risks, and there is extensive state and federal regulation of access and environmental remediation. Additionally, government restrictions can affect the type of drilling technology used to extract O&G. New technologies, such as fracking, are particularly susceptible to regulatory restrictions. In such cases, the industry may rapidly adopt new technology, but final health, safety, and environmental regulations may follow a significant time lag. If the regulations involve production restraints or even cessation, banks that have made loans based on the technology and communities that have built up around the technology may experience significant harm.

Regulation-induced production restraints include restriction by certain states on fracking and restrictions on drilling in Alaska and the Gulf of Mexico. Government regulation might also unexpectedly increase production costs through mandates to remove equipment when pumping is finished, mandates on the use of alternative fuel, and foreign government policies in O&G-producing countries. E&P companies also face compliance (legal liability) and reputation risks due to accidents, such as explosions or oil spills that can cause casualties, damage property, or cause environmental contamination. Such events can result in significant strain on an E&P borrower's repayment capacity if insurance coverage is inadequate.

Limited Purpose Collateral

O&G drilling-related equipment collateral may have few or no alternative uses to support value under depressed market conditions. Mineral interests can be bought and sold, however, through a secondary market. In the case of O&G equipment, auction companies can dispose of bank collateral on an as-needed basis. Demand for specialized O&G equipment, however, closely correlates with O&G commodity prices. When O&G prices fall, equipment values

usually fall as well. Additionally, during periods of severe price declines, banks may have difficulty liquidating equipment at a reasonable price.

Interest Rate Risk

The level of interest rate risk attributed to the bank's E&P lending activities depends on the composition of the bank's loan portfolio and the degree to which the underwriting terms of its loans, such as tenor and pricing, expose the bank's revenue to changes in interest rates. Most E&P financing provided by banks is on a floating rate basis, which makes the interest rate sensitivity for the lending bank relatively low. Banks that provide fixed-rate financing for extended terms expose themselves to interest rate risk to the extent that shorter-term liabilities or structured wholesale borrowings fund these loans.

Liquidity Risk

The nature of E&P lending can result in higher liquidity risk at some banks, especially smaller banks in areas where changes in O&G supply and demand strongly affect the local economy. High levels of correlated credit concentrations may be evident under those circumstances, and a bank's liquidity can become strained if unfavorable market conditions result in borrowers having difficulty making loan payments or in reduced public and private deposits. Longer-term liquidity pressure may arise at some banks because of capped or abandoned wells, reduced exploration, and population migration due to high local unemployment. A bank's inability to liquidate or sell E&P loans at a reasonable price during sustained downturns in the O&G market also may cause liquidity risk.

Operational Risk

E&P lending carries an elevated level of operational risk because of the complexity of the industry and E&P borrowers as well as the corresponding need to maintain effective monitoring and control systems. A lack of understanding of operational risks, or failure to monitor and control them, may lead to serious credit weaknesses, including ultimate collection problems. E&P operational risks are affected by the following:

- Complex financing structures used in the E&P industry.
- Volatile commodity markets, which banks should routinely monitor.
- Reliance on complex engineering reports and inspections to monitor the borrowing base, reserve value, production levels, and depletion.
- Different legal requirements across jurisdictions.
- Complex corporate and capital structures that may change over time.
- Routine use of hedging techniques and financial derivatives, which banks should document and understand.
- Environmental and safety hazards that should be monitored and evaluated. (Updated October 15, 2018)

Compliance Risk

E&P lending is subject to the same regulatory and compliance issues as other types of commercial lending. Given the numerous restrictions governing O&G E&P activities, E&P lending can be vulnerable to specific types of compliance risk, such as potential environmental liability, should the bank repossess contaminated collateral. Some banking regulations discussed in this booklet govern an institution's risk management.

Strategic Risk

A sound E&P lending program should include management and staff that have the knowledge and experience to recognize, assess, mitigate, and monitor the risks that are unique to E&P. Prudent E&P lending requires specialized expertise. Failure to invest in sufficient staff and infrastructure, or to provide effective oversight of E&P lending, can significantly increase the bank's strategic risk profile while also affecting other interrelated risks such as credit and reputation. (Updated October 15, 2018)

Reputation Risk

Over the years, the O&G industry has achieved high technical and safety standards. When accidents occur, however, the loss of life, property, and damage to the environment attracts wide media coverage and results in significant reputation risks.

Lending to companies found or perceived by the public to be negligent in preventing environmental damage, hazardous accidents, or weak fiduciary management can damage a bank's reputation. A bank also puts its reputation at risk if it reduces the availability of credit to small businesses dependent on the O&G industry, even when these decisions are prudent.

Some E&P transactions are syndicated throughout the institutional market because of their size and risk characteristics. A bank's failure to meet its legal or fiduciary responsibilities in sourcing and syndicating E&P loans can damage its reputation and impair its ability to compete successfully in this line of business.

As previously discussed, some E&P loans are only a part of complex structured finance arrangements. These arrangements involve the structuring of cash flows and the allocation of risk among borrowers and investors to meet specific customer objectives more efficiently. The transactions involve professionals with specialized expertise and may involve creation of special purpose entities. Although the majority of transactions serve legitimate business purposes, banks may expose themselves to significant reputation and legal (compliance) risks if they enter into transactions without appropriate due diligence, oversight, and internal controls. Further guidance pertaining to structured finance is contained in OCC Bulletin 2007-1, "Complex Structured Finance Transactions: Notice of Final Interagency Statement."

Risk Management

Each bank should identify, measure, monitor, and control risk by implementing an effective risk management system appropriate for the size and complexity of its operations. When examiners assess the effectiveness of a bank's risk management system, they consider the bank's policies, processes, personnel, and control systems. Refer to the "Corporate and Risk Governance" and "Loan Portfolio Management" booklets of the *Comptroller's Handbook* and section 201 of the *Office of Thrift Supervision Examination Handbook* for expanded discussions of risk management. (Updated October 15, 2018)

As discussed in the "Overview" section, this booklet addresses only the more specialized E&P segment of the O&G industry. Because a variety of companies engage in E&P, the booklet includes some discussion of equipment lending and other considerations that may be applicable to midstream or upstream companies.

Loan Policy and Governance

The board of directors should review and approve the bank's E&P lending policy annually. An effective policy should include the following:

- E&P lending objectives and risk appetite, including acceptable types of E&P loans, portfolio distribution (concentrations of credit), lending market or territory, risk limits measured as a percentage of capital, and correlation risk to other industries in the bank's loan portfolio.
- Comprehensive, written O&G engineering policy that provides specific guidelines for engineers and is reviewed and approved at least annually by an appropriate governing body. The policy should provide for the following:
 - O&G engineering function is independent of line of business, credit approval, credit administration, and financial functions.
 - Someone who does not have credit approval authority performs the annual performance evaluations of engineers.
 - Compensation program for engineers does not include incentives for loan volume generated by the O&G lending department.
 - Depth of experience among the engineering staff enables succession and continuation of quality work during times of change or adversity.
 - Sufficient resources allocated to talent development and continuing education of staff is a high priority.
 - Reasonable price decks are used and adjusted semiannually or on an as-needed basis.
- Requirements for the structure, reporting lines, and oversight of the E&P lending department and independent engineering department.
- Underwriting standards and approval requirements that are specific to lending to the E&P industry and provide appropriate lender controls, including measurement of O&G reserve and production history; financial analysis expectations; realistic repayment terms consistent with the use of proceeds; advance rates and risk adjustments on various reserve types; pricing parameters; stress or sensitivity analysis of cash flow; covenant and structure expectations; approval authority; and policy exception authority.

- Standards for hedging activities.
- Credit administration and loan documentation standards, including
 - reserve production, depletion and replacement.
 - new project development.
 - borrowing base redetermination requirements and processes.
 - stress testing.
 - collateral re-valuation.
 - collateral documentation and title verification.

Risk management systems should be sufficient to monitor compliance with established E&P lending policies. Bank management should provide the board of directors with an analysis of the risk posed by E&P lending activities as well as risks correlated to the E&P industry and their potential effect on the bank's asset quality, earnings, capital, and liquidity. Management should consider the potential impact on earnings and capital and on the bank's operating strategy of E&P lending under stressed market conditions and economic downturns, as well as normal market conditions. (Updated October 15, 2018)

The board of directors should consider whether the bank maintains adequate capital relative to concentration risks, including concentrations pertaining to E&P lending. Examiners should refer to the "Concentrations of Credit" booklet of the *Comptroller's Handbook* for more details pertaining to concentration risk. There may be cases in which the potential risk to capital is so significant that reduction of the concentration or suspension of E&P loan originations may be the most effective risk mitigation action.

Staffing

E&P lending involves unique, and sometimes complex, risks that require specialized knowledge and controls. The E&P lending staff should possess sufficient technical expertise for the volume and complexity of E&P lending performed and monitored. Given that E&P lending decisions rely on quality engineering reports, the technical expertise of the engineering staff is critical. The board should assess whether the size of the engineering staff is sufficient to enable timely completion of work so all borrowing base redeterminations can be promptly completed. The depth within the engineering staff should enable succession and continuation of quality work during times of change or adversity. Additionally, sufficient resources should be allocated to staff development and continuing education.

The O&G engineering function should be independent of the E&P loan production and credit approval functions. Although engineers may have communication with and input from loan production personnel to facilitate credit analysis, the reporting line for the engineering function should be separate from the production line. Someone independent of the credit approval process should perform performance reviews and approve the list of acceptable third-party engineers. The bank's engineering department may have input into credit decisions, for example, veto power, but should not have loan approval authority. The engineer's compensation program should not include incentives for E&P loan production volume. (Updated October 15, 2018)

Underwriting Standards and Practices

E&P loan underwriting standards share many of the same characteristics as those for lending to commercial enterprises in other industries. The bank's E&P underwriting criteria should consider the borrower's experience and record of managing similar operations or projects. The underwriting process begins with current, accurate, and complete credit data. The bank should obtain both fiscal year and quarterly financial statements, including periodically obtaining and reviewing the borrower's lease operating statements (LOS), which provide detailed production and cost information. The bank's loan policy should detail specific requirements for credit information.

Credit underwriting standards should include the following:

- Receipt and analysis of the borrower's business plan, including well-supported financial projections and a detailed capex program.
- Assessment of the borrower's RBL and total debt repayment capacity based on base case cash flow projections.¹¹ Projections should include one or more realistic downside scenarios or sensitivity analysis that estimate the impact that sustained changes in market conditions would have on the borrower's repayment capacity.
- Loan structures appropriate for the type of borrowing and primary source of repayment, including maximum loan terms.
- Loan agreement covenants.
- Assessment of the borrower's history of meeting projections and managing debt repayment.
- Ongoing monitoring of the borrower's O&G exploration, development, and production activities, including in-depth financial analysis of the borrower and any guarantors, and comparison with the borrower's financial plan.
- Repayment criteria, if the borrowing base declines below the outstanding balance.
- Fully supported risk adjustment factors applied to proved nonproducing O&G reserves.
- Fully supported cash flow discount rates used in reserve valuation that reflect an appropriate risk premium over the risk-free rate of return.
- Timely preparation of in-house engineering reports or reviews of external reports to support timely semiannual borrowing base redeterminations.
- Assessment of the impact of hedging and hedge expiration.
- Independent collateral evaluations, including bank-reviewed semiannual engineering reports, borrowing base redeterminations, and updated bank O&G price deck.
- Limits on concentration of production (by well or field), inclusion of nonproducing reserves in the borrowing base.
- Minimum number of producing wells, and minimum levels of property and liability insurance.
- Acceptable status with state-specific governing authority.

¹¹ In general, the base case cash flow projection is the borrower or deal sponsor's expected estimate of financial performance using the assumptions that are deemed most likely to occur. The financial results for the base case should be better than those for the conservative case but worse than those for the aggressive or upside case. The bank may adjust the base case financial projections, if necessary.

Hedging

Nonintegrated O&G E&P companies frequently employ hedging strategies to manage commodity price volatility.

Hedge instruments include forwards, futures, swaps, options, or combinations, such as collars. Banks may act as a direct party to the hedge or as a collateral agent only (that is, not as a party to the hedge). Hedge counterparties governed by a multiparty, inter-creditor agreement often are secured *pari passu* with the bank group lenders. Borrower hedge positions are incorporated in cash flow forecasts and reserve valuations, which may provide increased borrowing base capacity.

Commodity hedging, as a risk management tool, is used to help ensure stable and predictable cash flow, maintain liquidity, and manage credit risk. If used incorrectly, derivative strategies can multiply losses, particularly in the case of underperforming reservoir-related production. The use of derivative strategies should involve clear understanding of the interaction between the derivative product and the production, timing, and fiscal risks of the underlying reserves. Factors contributing to derivatives hedging risk include the nature of underlying reserves; the size, scale, maturity, and sophistication of the company's operations; the petroleum economics of the underlying asset(s); and the fiscal context of the country of operations.

Additionally, monetizing hedges or selling hedges that are “in the money” may have the effect of improving liquidity, but to the detriment of future cash flow. Examiners should review financial statements, financial projections, and engineering and bank approval memos to determine the borrower's cash flow reliance on hedge revenue.

Other considerations when evaluating hedges include

- the bank's right to approve the creditworthiness of any hedge counterparties.
- whether the engineered loan value reflects the impact of hedges with strike prices below the bank's price deck.
- limits in the credit agreement for commodity hedging to reasonably anticipate projected production from PDP or total proved reserves.
- limits or prohibition in the credit agreement for the cancellation and prepayment of any hedges to which value was attributed in the engineered loan value.
- prohibition in the credit agreement for hedging subject to margin, or the bank may enter into standard inter-creditor agreements that eliminate the requirement to maintain a margin account with the counterparty.

Engineering Function

An important process in underwriting and administering E&P loans is the engineering function analysis. Cash flow generated from the future sale of encumbered O&G reserves is the intended and, in most cases, the primary source of repayment. Reserve interests are the most significant, if not the only, asset pledged as collateral. Therefore, the integrity of

engineering data that depict the value of the future cash flow stream is critical to the initial lending decision and equally important to an examiner assessing credit quality.

Estimating O&G reserves is difficult and not always precise. The reliability of reserve estimates can be inconsistent depending on the assumptions used by engineers. Because O&G prices and production are subject to significant risks that are volatile and difficult to predict or control, reserve development and extraction operations are sometimes delayed, suspended, or even stopped.

Engineering reports used in the underwriting process should be independent, detailed analyses of the O&G reserves prepared by a competent engineer. Credit agreements usually require two engineering evaluations per year, including an annual independent engineering evaluation performed by an approved and qualified engineering evaluation firm hired by the borrower. The borrower typically prepares a semiannual interim evaluation as an update to the annual independent evaluation. In both cases, these reports should be thoroughly reviewed by the bank's internal engineering department or an external independent engineer hired by the bank to assess whether reserves are valued properly.¹² (Updated October 15, 2018)

The bank's engineer reviews the reserve report for estimates of operating costs and expected ultimate recovery of reserves, production rates, and capex needed to convert reserves into the PDP category. The bank's engineer makes technical adjustments based on his or her professional judgment. Examiners should assess whether adjustments are well supported and documented. The bank engineer provides adjusted engineering valuations based on the bank's price deck and that conform to the bank's energy lending policy with respect to risking, concentration and reserve limitations, and discount rates.

The engineering report should address four critical concerns:

Pricing: O&G prices should be realistic and fully supported. Banks and independent engineers use a price deck to determine the assumed future price of O&G production. The price deck is used in calculations, modeling, predictions, underwriting, and ongoing monitoring. Price decks should be updated at least semiannually (or more frequently during periods of high commodity price volatility). The bank's price deck should indicate consideration for potential price deflation and cost inflation over time.

Banks commonly construct their commodity price deck at a discount to the current NYMEX futures curve and consider industry price deck surveys. Individual borrower pricing used in the engineering analysis is adjusted up or down from the base price deck by oil and natural gas price differentials, which represent the borrower's historical sales price in comparison with the market benchmark crude prices (WTI for U.S. oil and Henry Hub for natural gas). The price a borrower receives in the market can be more or less than the spot prices for these indices, as determined by the quality of the commodity and transportation costs specific to

¹² For guidance pertaining to use of third parties, refer to OCC Bulletin 2013-29, "Third-Party Relationships: Risk Management Guidance," and OCC Bulletin 2017-21, "Third-Party Relationships: Frequently Asked Questions to Supplement OCC Bulletin 2013-29."

the borrower's reserves. Price differentials should be documented and supported by review of the borrower's historical LOS.

Costs: Cost assumptions also should be realistic and fully supported. Costs affect the economic life of reserves primarily in two ways: development costs and production costs. Production costs are a key focus in underwriting because the borrowing base is based primarily on PDP reserves. Production costs include lifting costs or lease operating expenses, which include operating and maintenance expenditures for materials, supplies, fuel, insurance, maintenance, and repairs. Additional production costs include property and severance taxes. If there are plans for further development, engineering reports may include development costs, or capex, for PDNP and PUD properties as well. Capex may include roads, utilities, drilling pads, site facilities, development wells, wellheads, well casing, and pipe and well equipment. To a lesser extent, capex may include workover costs for PDP wells.

Discount rate: The discount rate depends on current market factors that consider the required market rate of return on future cash flows given the relative risks involved. Assumptions used to determine the discount rate should be fully supported.

Timing: The annual and interim engineering reports should be based on data that are no more than six months old. Recent significant price fluctuations or changes in interest rates may require bank management to adjust the evaluation of the reserves to reflect current conditions. The "as of" date of the evaluation is typically dated forward to the next redetermination date, often six months, so that the amount outstanding does not breach the borrowing base evaluation at the next redetermination date because of reserve depletion. This is referred to as a "roll forward" evaluation. (Updated October 15, 2018)

When engineering reports do not address one or more of these four critical concerns, the examiner should challenge management to provide support for the evaluation assumptions, and may need to evaluate other bank methodologies, for example, recent cash flow histories, to determine the current collateral value. In addition, appropriate comments should be included in the report of examination and recommendations or matters requiring attention made to bank management for improving its engineering reporting and requirements.

Establishing the Borrowing Base

The borrowing base for E&P loans represents the lending commitment established from the engineering valuation of the borrower's proved O&G reserves, subject to limitations and adjustments. The borrowing base is determined by analyzing previous production reports and independent engineering evaluations.

The borrowing base, as established in the loan agreement, governs the maximum amount of availability under the RBL at any one time. The commodity prices, risk adjustment factors, and cash flow discount rate used to determine reserve values and the borrowing base should be fully supported in the lender's underwriting documentation. The RBL is normally secured by a first lien on the borrower's O&G reserves, the cash flow from which is the loan's

primary source of repayment. Banks typically perfect liens on reserve interests that produce 75 percent to 90 percent of the economic value of the borrowing base.

The value of the reserves helps determine the loan amount and dictates the availability of funds. Normally, the borrower has unrestricted draws on the RBL up to the available borrowing base or commitment amount. The outstanding balance of the loan fluctuates with the operating needs of the borrower, subject to the availability constraints of the borrowing base. Credit availability increases when principal is repaid or collateral value increases through acquisition or development of new reserve assets.

Lenders usually require that collateral reserves have diversification in the geographic location of fields or reservoirs where the reserves are situated. At a minimum, limits should be set on the lowest number of producing wells needed to establish an acceptable borrowing base and concentration limits on the maximum value contribution from any single well or field.

Lenders typically attempt to limit well concentration in the construction of the borrowing base so that the loss of one well or a number of wells will not excessively jeopardize the repayment source. The borrowing base may also require the inclusion of wells from more than one field. A single well is usually limited to no more than 15 percent to 20 percent of the borrowing base.

Lenders generally use risk adjustment factors to lower the value of unseasoned (less than six months of production) producing and nonproducing reserves before applying advance rates. Frequently used risk adjustment factors are 100 percent of seasoned PDP, 90 percent to 95 percent of unseasoned PDP, 65 percent to 75 percent of PDNP, and 25 percent to 50 percent of PUD reserves. The risk adjustment factors are applied to the net present value (NPV) of the reserve estimate. Some lenders may use a more conservative approach by applying the risk adjustment factors to the projected O&G production volume (volumetric adjustments) rather than the NPV.

Banks using risk adjustment factors typically apply a single advance rate to the total risk-adjusted proved reserves to determine the borrowing base commitment. The maximum advance rates against the total risk-adjusted NPV of the proved reserves typically range between 50 percent and 65 percent. Other lenders may not apply risk adjustment factors directly but instead use separate advance rates for each reserve category based on the relative reserve risk. For instance, the net advance rate may range from 50 percent to 65 percent of the NPV of PDP, up to 50 percent of unrisks NPV of PDNP, and up to 35 percent of unrisks NPV of PUD reserves.

Regardless of the method used, there should be a limit established for the contribution of nonproducing reserves (for example, PDNP and PUD) to the borrowing base. This is commonly set at no more than 25 percent to 35 percent of the valuation. Unproved (probable and possible) reserves are typically not included in the collateral pool or used in determining the borrowing base of a RBL, given the level of uncertainty involved in the development of these assets.

Borrowing Base Redeterminations

The borrowing base is normally reset every six months. The bank reviews the most recent engineering reserve report and determines the revised borrowing base commitment by applying the bank's borrowing base methodology to the reserve report valuation. Engineering and approval memos should address the reasons for any changes in borrowing base amounts (for example, new production, acquisitions, reserve depletion, commodity price volatility, shut-in wells, weather, or environmental issues). Per the credit agreement, borrowers should be required to cure any over-advance within 30 days with either cash payment or pledge of additional collateral. If the over-advance is not cured within 30 days, the bank may require the borrower to repay the over-advance evenly over six months. At the next redetermination date, the loan should comply with no over-advance, subject to revaluation of the reserves. An over-advance does not automatically result in an adverse risk rating. Examiners must assess the borrower's ability to repay the total debt, including over-advances.

Borrowing Base Stretch

A "stretch" occurs when the bank agrees to provide the borrower with an RBL commitment that materially exceeds the lendable amount as determined by the bank's underwriting criteria and loan policy. In a syndication, each participant calculates the RBL lendable amount separately. The calculated lendable amount may vary by bank, and some banks may agree to "stretch" to meet the higher borrowing base amount agreed upon by the syndication group. Bank approval of the stretch should be supported by documented risk mitigants. The approval of a stretched borrowing base should not be used to avoid borrower repayment requirements caused by an over-advance. If the stretch is not well supported, the advance should be considered in the risk rating assessment. Examples of lender actions to stretch the borrowing base include the following:

- Providing higher advance rates (for example, over 65 percent), allowing less conservative risk factors, and increasing the value attributable to PDNP and PUDs. These actions may be supported by a variety of reasons, including borrowers backed by substantial private equity sponsors.
- Allowing "leasehold" value when the borrower's acreage position is located in a particularly competitive area.
- Lending beyond 100 percent of PDPs on a temporary basis, with interest rates and fees that reflect the increased risk.
- Giving value for the next six months' production, which is usually omitted from the borrowing base (with a monthly reduction feature).
- Lowering the discount rate for determining the NPV of reserves, thereby increasing the total present value.
- Restructuring borrowing base loans into conforming and nonconforming stretch tranches with higher fees and rates on the stretch loans.

Repayment Analysis Processes

The primary repayment source for most RBLs and other types of debt issued by an E&P company is cash flow from operations. Therefore, a borrower's future cash flow should demonstrate the ability to cover projected expenses and repay total debt within a reasonable time.

Prudent E&P loan underwriting requires that lenders have a thorough understanding of the borrower's operating environment and future cash flow capability. E&P company cash flow is vulnerable to a wide range of risks, and lenders should have a comprehensive understanding of the company's financial operations, funding needs, and cash flow volatility. O&G reserves are the most significant asset on an E&P company's balance sheet and are subject to both price volatility and depletion. An E&P borrower's operating leverage, liquidity, and access to capital are important factors to understand when determining the borrower's ability to withstand adverse conditions.

Royalties and ground lease costs for E&P companies also are significant. Royalty and ground lease rates vary extensively depending on location, timing, tax rates, and contract structure. A major risk facing E&P companies is overpayment for royalty and ground leases. This risk is especially relevant if the company is a latecomer to a recently discovered field, where high demand and a "boom" mentality pushes up lease rates. Lease overpayment can quickly erode returns, especially if the field does not produce as expected. Additionally, leases may expire at the end of the term unless the company has started drilling or producing O&G, which can adversely influence the timing of drilling plans and capex in a company's effort to retain leases.

As part of the underwriting process, lenders normally prepare base case and sensitivity case repayment analyses. Banks use repayment tests to determine whether future cash flow—using revenue and expense projections from the engineering report less estimated general and administrative (G&A) expense, production, and ad valorem taxes, capex, required principal and interest payments, and required distributions—is sufficient to repay the existing borrowing base commitment within a reasonable time.¹³ A reasonable repayment period for an RBL is normally within 60 percent of the economic life of the proved reserves (alternatively, 120 percent of the economic half-life), and within 75 percent of the economic life for total secured debt, in the base scenario. Refer to table 1 in this booklet for a sample repayment test.

A base case analysis should use prevailing market prices, such as NYMEX futures prices, as opposed to the bank's commodity price deck used for borrowing base determination. The repayment test should be based on repayment capacity from unrisks and undiscounted revenues from the borrower's total proved reserves. Proved reserve life is the estimated productive life of a proved reservoir based on the economic limit of producing the reserves assuming certain price and cost parameters. The economic half-life of the proved reserves

¹³ Repayment tests should use a fully funded borrowing base commitment, rather than the current outstanding balance; it is reasonable, however, to assume excess availability under the RBL incrementally funds projected capex.

represents the point in time when the borrower will have generated half of the estimated future net revenue (FNR).¹⁴ The reserve life and economic half-life of the reserves can be stated in months or years or as a percentage of the total FNR.

The amount of the aggregate FNR remaining at the time of projected repayment, expressed as a percentage of the total FNR, is called the “reserve tail.” A reasonable reserve tail provides the lender with sufficient cushion against risks such as declining O&G prices, rising borrower operating costs, or unsuccessful development. Sensitivity and total debt repayment tests allow for longer repayment, that is, smaller reserve tails.

In addition, a sensitivity case analysis subjects the O&G reserves to adverse external factors, such as stressed market prices or higher operating expenses, to determine the vulnerability of the borrower’s repayment capacity to adverse economic conditions. When determining total debt repayment capacity, banks should use sensitivity analysis in the underwriting process to estimate the impact that sustained changes in commodity prices, E&P costs, and other market conditions would have on a company’s repayment ability.

The analysis and risk assessment also should consider any necessary adjustments pertaining to accounting, nonrecurring gains and losses, acquisitions or company restructure, and hedging, all of which are common in the industry at certain stages of the E&P business cycle. E&P companies capitalize exploration and development costs in different ways whether they select the “successful efforts” method or the “full cost” method under generally accepted accounting principles. Additionally, the E&P business is highly capital-intensive because of the need for ongoing reserve replacement. As a result, liquidity analysis should determine whether cash and RBL availability are sufficient to meet the borrower’s “capital plan,” an industry term for projected acquisition and development capex.

As with other types of lending, when a bank relies on a guaranty to support approval of the loan, a guarantor global financial condition (GFC) analysis should accompany the initial underwriting and approval. The guarantor should be financially responsible, meaning the guarantor has the capacity and willingness to support the loan. Determination of capacity should include a current and comprehensive analysis of the guarantor’s GFC, including legal structure, asset evaluations, liquidity, sources and amounts of recurring cash flow, actual and contingent liabilities, and any other relevant factors necessary to demonstrate capacity to support the loan. This analysis should consider the total number and amount of guarantees currently extended by a guarantor and the effect such guarantees have on the guarantor’s cash flow. Cash flow analysis should always be part of the GFC analysis. Subsequent to loan approval and funding, a periodic financial analysis of a guarantor is appropriate and prudent for most lending relationships. If the guarantor’s financial condition is complex or indicates significant risk, a periodic guarantor GFC analysis should be performed to monitor other projects and the guarantor’s financial capacity.

¹⁴ The FNR attributable to a company’s reserves typically does not include estimated interest costs or general and corporate administrative costs, but is net of estimated royalties, production costs, development costs, production and ad valorem taxes, and other income, as well as future capex and well abandonment costs related to existing developed and undeveloped reserves.

E&P borrowers may have equity sponsors that fund a portion of ongoing exploratory capex through equity injections, provided the company successfully meets projections. While the presence of an equity sponsor alone does not enhance the credit risk rating of a borrower with well-defined weaknesses, examiners should consider the strength of the sponsor and the record of equity support when assessing the borrower's liquidity and ability to meet its projected capital plan. The greatest degree of consideration should go to borrowers with formal equity commitment letters that include specific terms of equity support and a history of sponsor injections.

Equipment

Many O&G equipment loans approved for acquisition or development are made separately from E&P loans because some or all of the equipment does not remain at the drilling site. In some cases, the equipment and working capital loans are combined. Banks also sometimes cross-collateralize and cross-default loans to one borrower across multiple loans. Given the limited use of some O&G equipment, banks may attempt to sell the company as a whole rather than repossess limited-use collateral when an O&G company is under financial duress.

Depending on the type of equipment, especially if it is specialized or costly to relocate, the bank should obtain independent appraisals by firms with specialized expertise. If the equipment is working under a high utilization rate, repair costs and accelerated depreciation may be appropriate for the evaluation. Developing or new technologies can cause some O&G equipment to become obsolete or require substantial investment to retrofit. Government regulations also can affect the choice of O&G technology. Banks should understand the impact of new O&G technologies and consider the effects on their equipment valuation when it is appropriate.

Credit Administration

Ongoing Monitoring

Ongoing monitoring is critical to prudent E&P lending. Ongoing monitoring entails not only remaining well informed of the borrower's operations but also independently keeping up with market events that may affect the borrower. Banks should update their price decks at least semiannually or more frequently as market conditions warrant. Banks should regularly monitor O&G production output and compare it with assumptions provided in the engineering report by obtaining periodic LOS from the borrower. When there is significant deviation, a new or updated engineering analysis should be considered. Banks should assess current market prices and the cash flow discount rate in comparison with previous assumptions. The updated lender analysis should be documented and should consider whether the borrower's ability to repay committed debt remains within the bank's underwriting standards.

The quality of financial information and subsequent analysis is an integral part of any O&G credit. This analysis should include an assessment of the following:

- The borrower's operating cash flow and repayment capacity.
- Compliance with any financial covenants, including borrowing base limitations, contained in the loan agreement.
- Reasonableness of budget assumptions and projections and comparison with actual results.
- Liquidity and working capital adequacy.
- Capital and leverage ratios changes.
- Impact of capex modifications or asset acquisitions.

Subsequent updates to the base case and sensitivity case analyses should occur at least annually or more frequently as changes warrant. Loan repayment sensitivity analysis should fall within the standards set by the bank's policy.

Collateral Documentation

E&P lending involves unique documentation and perfection of security interests in collateral. The ownership of O&G is real property while it is still in the ground, but it changes to personal property when it is extracted from the well. Following is a short synopsis of the documentation that banks should use for E&P lending:

- **Deed of trust or real estate mortgage:** The deed of trust or real estate mortgage (depending on the state in which the property is located) should provide for the assignment of O&G proceeds, which allows the bank to request that payments from the reserve purchaser be distributed directly to the bank. A bank may or may not perfect its assignment of the lease proceeds, but this clause in the document is necessary if the bank ever desires to do so.
- **Title opinions:** The bank should obtain a title opinion on loans secured primarily by O&G reserves. A competent O&G attorney should prepare this opinion, and bank counsel or the board of directors should approve it. This opinion is especially important when there is a collateral concentration, a new borrower, or properties that are new to the borrower.
- **UCC-1:** The bank should properly file a Uniform Commercial Code (UCC) UCC-1 form to perfect the bank's security interest in all equipment on the lease as well as the proceeds from the lease. A UCC filing also should be made when the operator of the lease is a significant working-interest owner. In most states, a UCC filing must be recorded with the Secretary of State and, in some circumstances, in the county (or parish if in Louisiana) where the O&G lease is located.
- **Chattel liens:** The model UCC, which provides the process for securing chattel collateral, has been adopted with minor variations in all states except Louisiana. Examiners should become familiar with the relevant state's securitization and perfection requirements for the type of collateral reviewed. In general, such requirements include obtaining a signed security agreement and filing appropriate documentation with either the county or state, depending on the type of collateral perfected. With some types of collateral, multiple filings may be necessary to perfect the lien. (Updated October 15, 2018)

- **Lien search:** The bank should perform a lien search to determine the existence of any previous liens before funding the loan and should document the lien search in the loan file. This search normally is completed in conjunction with the title opinion. In the rare case that a title opinion is not obtained, a lien search should be done as a minimum precaution. It is appropriate for the bank to perform lien searches periodically to verify the bank's position in the collateral. (Updated October 15, 2018)
- **Transfer or division orders:** The bank should obtain copies of transfer or division orders from the reserve purchaser. Transfer or division orders usually are not available until at least 60 days after a loan is made if the loan is for the acquisition of such property. Most title opinions verify the existence of a proper payee on division orders to assist in the determination of ownership (division order title opinion) when title is being transferred from a seller to the buyer. New division orders are issued to the new owner from a certified copy of a filed assignment or deed of trust.
- **Appraisal/evaluation:** Documentation of the value of the O&G-related collateral should be an integral part of the file. Whether the loan is for equipment or O&G production, an evaluation of that collateral is necessary.
- **Leases and operating agreements:** If applicable, the file should contain copies of all agreements that the debtor has entered into with others that involve the O&G property pledged as collateral.
- **Equipment lists and valuation:** If possible, a complete listing of all equipment found on an O&G lease, including models and serial numbers, should be in the file. Since many leases contain hundreds of wells, it may not be practical to obtain such information. At a minimum, collateral supporting term debt should be inspected and valued on a periodic basis. Collateral condition and marketability assessments should be included in the documentation.
- **Conveyance documents:** The bank should obtain all conveyance documents related to an O&G transaction, particularly when a title opinion is not obtained or the bank is financing the purchase of the producing collateral. Normal conveyance documents would include assignments as well as purchase agreements.
- **Certificate of insurance:** The bank should obtain documentation showing that payment of insurance premiums are up-to-date and that collateral is appropriately covered against potential perils.
- **Phase I environmental report:** This document should be required for acquisition financing.

Policy Exception Monitoring

Similar to other types of lending, management should have a continuous process to identify, approve, document, and monitor loan policy and underwriting exceptions. To gain the maximum benefit from such a process, management information systems (MIS) should provide data not only on individual exceptions but also on the aggregate level of policy exceptions. Such aggregated data can provide a more complete picture of risk in the portfolio and reveal weaknesses in the underwriting process or in the policy itself.

Concentrations

Excessive and poorly managed O&G loan concentrations can lead to significant losses during financial stress periods and adversely affect a bank's earnings and capital position. Banks with geographic concentrations in areas that are heavily dependent on the O&G economy can be affected beyond their direct E&P lending activities. For example, during periods of either slowing demand or oversupply, O&G companies can slow drilling and exploration or even shut down unprofitable wells. Ancillary O&G businesses, such as O&G service companies, water haulers, and O&G construction companies, may lay off employees or move operations to a more profitable area. Banks that finance local hotels, housing projects, restaurants, convenience stores, etc., in the area are likely to be sensitive to the O&G industry. Bank management may face other correlated risks due to funding concentrations, deposit declines during periods of significant local unemployment, or local municipality financial problems (for example, bond defaults and public deposit reductions). Because of correlations among O&G-related risk factors, stress testing loan portfolios closely related to this industry should be an important part of banks' risk management processes. Further guidance is contained in the "Concentrations of Credit" booklet of the *Comptroller's Handbook*.

Environmental Issues

Significant environmental risks can affect O&G borrowers. Some environmental issues, such as large oil spills and the safety of fracking techniques, have been widely publicized in recent years. Environmental problems can cause project delays, terminate drilling, increase costs, impair cash flow, and reduce collateral values. In some instances, environmental problems can cause significant losses. If banks become responsible for repossessed property, they may be held financially accountable for environmental remediation under the Comprehensive Environmental Response, Compensation, and Liability Act.

Significant environmental disasters can severely increase reputation risks for responsible parties. Potential liabilities can greatly exceed the amount of the original loan. Banks should perform appropriate due diligence, including obtaining independent environmental engineering reports when appropriate, to understand any existing environmental issues and potential environmental risks. Banks should consider both the borrower's operations and the collateral in this analysis.

Allowance for Loan and Lease Losses

Banks should segment O&G loans in their allowance for loan and lease losses (ALLL) analyses when the exposure represents a meaningful level of risk (for example, a concentration) because of the unique risks that affect borrower performance. Banks also should consider the extent of exposure to oil production versus natural gas production, risk within particular geographies, and other risk factors to determine if further segmentation is necessary. When changes or other significant events pose additional risks, banks should consider adjusting their historical loss rates so that the rates appropriately support the ALLL estimate. (Updated October 15, 2018)

An E&P loan should be considered impaired when, based on current information and events, it is probable the bank will be unable to collect all amounts due (including interest and principal) according to the contractual terms of the loan agreement. For regulatory reporting purposes, an impaired collateral-dependent loan should be measured for impairment based on the fair value of the collateral (less estimated costs to sell, if appropriate) regardless of whether foreclosure is probable.

Generally, the fair value of O&G reserves should be based on the risk-adjusted NPV of total proved reserves, unless more appropriate and supportable comparable sales information is available. The evaluation of the discounted and risk-adjusted NPV should be based on historical production and cost data (decline curve analysis engineering), using current market pricing, market-supported cash flow discount rates, and supportable adjustments that account for the inherent production, operating, development, and market risk of the reserve categories, particularly for unseasoned proved producing, proved nonproducing, and PUD reserves. Adjustments should be well supported and reflect current market conditions.

The “Allowance for Loan and Lease Losses” booklet of the *Comptroller’s Handbook* contains further guidance.

Risk Rating E&P Borrowers

Cash flow from operations is the primary source of repayment for most debt obligations incurred by an E&P company, with secondary sources of repayment including collateral liquidation, other asset sales, or funds from the issuance of other debt or capital instruments. E&P companies, therefore, should be evaluated through a comprehensive assessment of (1) current and projected financial condition and operating performance, (2) cash flow generation and debt repayment capacity, (3) liquidity position, (4) capital strength, (5) credit facility structure and controls, (6) collateral protection, and (7) guarantor or sponsor support, if applicable.

Relationship to Asset-Based Lending

Although RBLs have some similarities to traditional working capital asset-based lending (ABL) facilities, there are notable differences that warrant different risk rating considerations. Traditional ABLs are committed lines of credit subject to a borrowing base that can be drawn and repaid as needed, secured by a first-priority lien against a borrower’s relatively liquid assets (that is, assets that can be converted to cash quickly at a relatively stable value). In most ABL transactions, this collateral consists of short-term working capital assets, such as accounts receivable and inventory. The borrowing base of an ABL facility fluctuates depending on the amount of underlying assets available to secure the facility and is re-determined monthly, if not more frequently.

Similar to RBLs, borrowing base methodologies for ABLs incorporate a series of adjustments to the collateral value to provide a cushion for lenders between the amount available for borrowing and the value of the collateral. ABL lending, however, has the added controls of cash dominion and lock box arrangements, which, when effectively monitored

and controlled, can be the primary source of repayment for the debt. RBLs are not typically structured with cash dominion or lock box arrangements. In an RBL, the borrower's operating cash flow is usually unrestricted, meaning the primary source of repayment is normally available to pay senior and junior creditors. Moreover, in many cases, senior and junior secured creditors share *pari passu* in the right of contractual payment.

RBL collateral is significantly more volatile given historical changes in the commodity prices, has a longer cash conversion cycle (RBL cash conversion can take several years as opposed to days or months for working capital collateral found in other borrowing base loans), and requires experienced operators to continue extraction and production. Furthermore, unlike traditional ABL facilities, a decline in the borrowing base of an RBL does not necessarily coincide with reduced funding needs of the borrower. The RBL borrowing base tends to decline because of a drop in the underlying commodity prices at a time when the company may be experiencing a decline in operating cash flow and liquidity. Borrowers may find the RBL over-advanced in these scenarios, triggering principal payment or other actions to return the line to a conforming status.

Liquidity Considerations

E&P companies are highly capital intensive because of the need for almost constant reserve replacement. Liquidity analysis is therefore a critical part of the financial analysis. Liquidity should be evaluated when the lender is considering the likelihood of the borrower being able to meet its development plan and production estimates. This evaluation includes assessing the borrower's planned capex and sources of funds to meet the cash demands.

A sudden and significant reduction in operating cash flow and liquidity can force a company to reduce capex that support drilling programs, incur higher borrowing costs, issue equity at unattractive prices, monetize hedges to improve short-term liquidity (at the expense of future revenues), or sell assets. For a company already in a weak financial position, this reduction could lead to payment default and cause the borrower to file for bankruptcy. In addition to a decline in commodity prices, other circumstances can lead to a sudden reduction in the RBL borrowing base. These include a sudden rise in the company's costs associated with drilling and production, delays in the expected production schedule, a reserve write-down or other decline in reserves, and tightened underwriting standards by lenders.

The level of projected capex in the engineering report represents the estimated capex needed to develop the PUD reserves (drilling and completion of the wells) and, to a lesser extent, completion of PDNP wells or workovers of PDP wells. Projected capex in the engineering report may differ from the borrower's budgeted "Capital Plan," which describes the company's forecasted capex, including potential acquisitions. If the borrower is unable to meet projected capex because of limited or no liquidity sources, the borrower may be unable to fully realize the cash flows projected in the engineering report from PDNP and PUD wells, which may affect the reserve valuation. Repayment analysis of borrowers with limited to no liquidity should give more consideration to scenarios that focus on cash flows from PDP reserves (currently producing).

While capex may be discretionary, liquidity analysis is particularly important for borrowers with significant “nonoperated” reserves, as the projected capex associated with these reserves may not be discretionary. Nonoperated lessees are normally required to pay the operating lessee the pro rata share of the incremental capex as incurred in order to maintain the nonoperated lessees’ interest in the reserves.

Leveraged Lending Considerations

The “Interagency Guidance on Leveraged Lending” issued by the OCC, the Board of Governors of the Federal Reserve System, and the Federal Deposit Insurance Corporation on March 22, 2013, applies to E&P borrowers meeting an institution’s definition of leveraged lending. The “Risk Rating Leveraged Loans” section of the leveraged lending guidance states that risk rating for leveraged loans involves the use of realistic repayment assumptions to determine a borrower’s ability to de-lever to a sustainable level within a reasonable period. The leveraged lending guidance also states that supervisors commonly assume that the ability to fully amortize senior secured debt or repay at least 50 percent of total debt over a five- to seven-year period provides evidence of adequate repayment capacity. Regarding loans to E&P borrowers, the borrower’s ability to repay the RBL and total debt are assessed relative to the economic life of the borrower’s O&G reserves, rather than the five- to seven-year period discussed in the leveraged lending guidance.

Repayment Test Example

Table 1 provides a sample repayment test to determine whether the borrower has the capacity to repay total secured debt from excess cash flow within a reasonable time. Cash flow available for debt repayment is equal to projected FNR less G&A and interest expense on total debt (column J). The beginning borrowing base commitment (column K) is reduced by the incremental cash flow available for debt repayment from each period until payout and then applied to junior lien secured debt (column N). At payout, the FNR remaining (column Q) divided by the aggregate FNR represents the reserve tail (column R). Said differently, the inverse represents the percent of economic life used to repay total debt (column U). The example shows the borrower can repay the RBL well within 60 percent of the economic life (actual payout at 40 percent of the economic life) and repay total debt within 75 percent of the economic life (actual payout at 59 percent of the economic life).

Examiners should evaluate the borrower’s ability to repay total secured debt, including a fully funded RBL and interest expense on all debt. When it is unlikely that the borrower will use the full RBL commitment to fund projected capex or deficit cash flow, however, examiners may also run scenarios of the borrower’s repayment capacity reflecting actual or anticipated usage on the RBL. The ability of the borrower to repay or refinance unsecured debt should consider the maturity structure and any contractual repayment obligations of the unsecured debt relative to the repayment capacity of the total secured debt.

Table 1: Example E&P Borrower Cash Flow Repayment Test

	A	B	C = A + B	D	E	F	G = C - D - E - F	H	I	J = G - H - I
Year ending	Oil, gas, and NGL revenues	Hedging revenues (losses)	Total revenues	Total lease operating expense (LOE)	Production/ ad valorem taxes	Capex	FNR	G&A	Total Interest expense (all debt)	Cash flow available for debt repayment
Year 1	48,892	8,699	57,591	6,623	733	6,917	43,318	2,512	8,500	32,306
Year 2	53,401	7,783	61,184	7,036	801	34,601	18,746	2,667	7,369	8,709
Year 3	45,003	3,919	48,922	5,626	675	3,412	39,209	2,131	7,064	30,013
Year 4	42,486		42,486	4,886	637		36,963	1,848	6,014	29,101
Year 5	37,965		37,965	4,366	569		33,030	1,651	4,987	26,391
Year 6	36,455		36,455	4,192	547		31,716	1,586	2,348	27,782
Year 7	28,068		28,068	3,228	421		24,419	1,221		23,198
Year 8	26,094		26,094	3,001	391		22,702	1,135		21,567
Year 9	21,075		21,075	2,424	316		18,335	917		17,418
Year 10	16,860		16,860	1,939	253		14,668	733		13,935
Remainder	67,750		67,750	7,791	1,016		58,943	3,092		55,851
Total	424,049	20,401	444,450	51,112	6,359	44,930	342,049	19,493	36,282	286,274

	K	L = J	M = K - L	N	O = J - L	P = N - O	Q = total FNR - G	R = Q ÷ total FNR
Year ending	Beginning RBL (total committed)	Cash repayment	Ending RBL balance	Beginning junior secured debt	Cash repayment	Ending junior secured debt	Year-end FNR remaining	FNR remaining percent
Year 1	100,000	32,306	67,694	50,000		50,000	298,730	87%
Year 2	67,694	8,709	58,985	50,000		50,000	279,984	82%
Year 3	58,985	30,013	28,971	50,000		50,000	240,775	70%
Year 4	28,971	28,971	0	50,000	129	49,871	203,812	60%
Year 5				49,871	26,391	23,480	170,783	50%
Year 6				23,480	23,480	0	139,067	41%

	T = R at payout	U = 1 - T
	FNR remaining at payout	Economic life at payout
RBL payout	60%	40%
Total debt payout	41%	59%

Source: OCC.

Note: Figures are rounded to the nearest dollar.

Assigning Regulatory Loan Ratings

Examiners should consider the following factors and borrower characteristics when determining the regulatory rating for E&P loans. These factors and characteristics are not all inclusive, nor are they meant to be “bright lines” for rating purposes, because other factors or characteristics may be present that influence the analysis and rating decision. When using these factors or characteristics, a borrower or credit might meet one or any combination of them when assigned to a particular rating. Examiners should use judgment and reasonableness when making final regulatory rating decisions; each borrower is unique. Further guidance on regulatory loan rating processes is in the “Rating Credit Risk” booklet of the *Comptroller’s Handbook*. (Updated October 15, 2018)

Special Mention Factors and Characteristics

- The borrower has potential weaknesses that deserve management’s close attention. If left uncorrected, these potential weaknesses may result in well-defined weaknesses and deterioration of repayment capacity.
- Cash flow from operations is declining, total debt repayment capacity under the “base case” forecast is marginal, or financial performance to plan has not been achieved.
- Bank projections indicate the borrower’s future cash flows repay the borrowing base commitment under the RBL within 60 percent to 75 percent of the total proved reserve’s economic life or repay total secured debt within 75 percent to 90 percent of the total proved reserve’s economic life. When either case is true, the borrower’s repayment capacity may be marginal.
- The loan structure possesses inadequate bank monitoring and lender control (for example, no or not meaningful covenants, excessive headroom, or too few covenants).
- Borrower is approaching covenant limits or has experienced recent covenant waivers or resets.
- Advance rates and the mix of reserve categories used to determine the borrowing base exceed the bank’s limits or industry standards.
- Engineering evaluations may be outdated, be incomplete, or use assumptions that are inconsistent with the current market environment or the borrower’s current financial plans.
- Liquidity and cash flow are diminished and marginally sufficient to fund operations and meet the borrower’s projected operating and capital plan. The borrower has a history of over-advances and demonstrates marginal capacity to cure such over-advances.
- Borrower’s equity capital has declined in response to the company’s deteriorating financial condition. Leverage metrics have increased or exceed industry norms.
 - Total funded debt ÷ EBITDAX is generally greater than 3.5x.
 - Total funded debt ÷ the sum of total funded debt + equity capital is generally greater than 50 percent.
 - Total committed debt is between 65 percent and 75 percent of the total unrisks and undiscounted proved reserves.

Substandard and Worse Factors and Characteristics

- A substandard RBL is inadequately protected by the current sound worth and paying capacity of the borrower. Borrowers have well-defined weaknesses generally characterized by current or expected unprofitable operations, inadequate repayment capacity, inadequate liquidity, or marginal capitalization. There is higher probability of payment default, and repayment may depend on collateral or other secondary sources of repayment.
- Cash flow from operations has significantly deteriorated, and total debt repayment capacity under the “base case” forecast is insufficient.
- Lender financial projections indicate the borrower’s future cash flows either repay the borrowing base commitment under the RBL, or some other RBL amount as determined by the examiner as described in the Repayment Test Example, beyond 75 percent of the reserve’s economic life, or repay total secured debt beyond 90 percent of the reserve’s economic life.
- Borrower breached covenant limits or needs covenant waivers.
- Liquidity and cash flow are insufficient to fund operations and meet projected capex. The company may need to sell assets or operations due to weak or distressed financial condition. The borrower has a history of over-advances and cannot cure existing over-advances within six months.
- Borrower’s equity capital has declined in response to the company’s deteriorating financial condition. Leverage metrics have materially increased or exceed industry norms.
 - Total funded debt ÷ EBITDAX is generally over 4.0x.
 - Total funded debt ÷ the sum of total funded debt + equity capital is generally over 60 percent.
 - Total committed debt is greater than 75 percent of the total unrisks and undiscounted proved reserves.
- In combination with other substandard risk characteristics,
 - loan structure weaknesses provide for inadequate bank monitoring and lender control (for example, no or not meaningful covenants, excessive headroom, or too few covenants).
 - advance rates and the mix of reserve categories used to determine the borrowing base exceed the bank’s limits or industry standards.
 - engineering evaluations are outdated, incomplete, or use assumptions that are not consistent with the current market environment or the borrower’s current financial plans.

When well-defined weaknesses exist, the following criteria should be applied to determine the appropriate regulatory rating classification.

Substandard

The portion of the loan commitment(s) secured by the NPV of total risk-adjusted proved reserves should be classified substandard. The evaluation of the risk-adjusted NPV should be based on historical production and cost data (decline curve analysis engineering), using

current market pricing, market supported cash flow discount rates, and supportable adjustments that account for the inherent production, operating, development, and market risk of the reserve categories, particularly for unseasoned proved producing, proved nonproducing, and PUD reserves.

Adjustments should be well supported and reflect current market conditions. For example, property that is shut in because of a shortage of pipeline or other disruptions in transportation to market presents different risk characteristics than a property that is shut in because of lingering price pressures affecting the commodity. Furthermore, differing market and interest rate environments may influence changes in capitalization rates for discounted cash flows.

While banks appropriately limit the contribution of PDNP and PUD in determining the borrowing base, the collateral evaluation for regulatory classification purposes should include all proved reserves that serve as collateral, subject to market and production risk adjustments. Similarly, while many banks exclude the first six months of production in the borrowing base determination, the collateral evaluation for classification purposes should be as of the same date of the evaluation. The evaluation should include hedge positions, but it should not include probable or possible reserves.

Doubtful

The remaining balance secured by the NPV of unrisks proved reserves should be classified doubtful when the potential for full loss may be mitigated by the outcome of certain pending events, or when loss is expected but the amount of the loss cannot be reasonably determined. The combined substandard and doubtful portions should not exceed 100 percent of the unrisks NPV of proved reserves.

Loss

The portion of the loan balance that exceeds 100 percent of the unrisks NPV of proved reserves and is clearly uncollectible should be classified loss.

Nonaccrual Status

(Updated January 27, 2017)

Banks should follow the Federal Financial Institutions Examination Council's "Instructions for Preparation of Consolidated Reports of Condition and Income" (call report instructions) when determining the accrual status for oil and gas loans. As a general rule, banks shall not accrue interest, amortize deferred net loan fees or costs, or accrete discount on any asset if

- the asset is maintained on a cash basis because of deterioration in the financial condition of the borrower,
- payment in full of principal or interest is not expected, or

- principal or interest has been in default for a period of 90 days or more unless the asset is both well secured and in the process of collection.¹⁵

The call report instructions provide one exception to the general rule for commercial loans:¹⁶

Purchased credit-impaired loans need not be placed in nonaccrual status when the criteria for accrual of income under the interest method are met, regardless of whether the loans had been maintained in nonaccrual status by the seller.¹⁷

As a general rule, a nonaccrual loan may be returned to accrual status when

- none of its principal and interest is due and unpaid and the bank expects repayment of the remaining contractual principal and interest, or
- it otherwise becomes well secured and is in the process of collection.

The OCC's *Bank Accounting Advisory Series* and the "Rating Credit Risk" booklet provide more information for the recognition of nonaccrual loans, including the appropriate treatment of cash payments for loans on nonaccrual.

As a general principle, nonaccrual status for an asset should be determined based on an assessment of the individual asset's collectability and payment ability and performance. Thus, when one loan to a borrower is placed in nonaccrual status, a bank does not automatically have to place all other extensions of credit to that borrower in nonaccrual status. When a bank has multiple loans or other extensions of credit outstanding to a single borrower, and one loan meets the criteria for nonaccrual status, the bank should evaluate its other extensions of credit to that borrower to determine whether one or more of these other assets also should be placed in nonaccrual status. In cases with multiple loans to the same borrower that are structured as *pari passu* to principal and interest payment and supported by the same source of repayment, regardless of collateral lien position, the loans should not be treated differently for nonaccrual or troubled debt restructuring purposes.

¹⁵ An asset is "well secured" if it is secured (1) by collateral in the form of liens on or pledges of real or personal property, including securities, that have a realizable value sufficient to discharge the debt (including accrued interest) in full, or (2) by the guarantee of a financially responsible party. An asset is "in the process of collection" if collection of the asset is proceeding in due course either (1) through legal action, including judgment enforcement procedures, or, (2) in appropriate circumstances, through collection efforts not involving legal action which are reasonably expected to result in repayment of the debt or in its restoration to a current status in the near future.

¹⁶ For more information, refer to the "Nonaccrual Status" entry in the "Glossary" section of the call report instructions. This entry describes the general rule for the accrual of interest, as well as the exception for commercial loans. The entry also describes criteria for returning a nonaccrual loan to accrual status.

¹⁷ For more information, refer to the call report instructions' "Glossary" section, entry "Purchased Credit-Impaired Loans and Debt Securities."

Regulatory Classification Example

Table 2 illustrates an example of the rating methodology for a classified borrower. Actual pricing, discount rates, and risk adjustment factors may vary according to current market conditions and the nature of the reserves. Examiners should closely review the key assumptions made by the bank in arriving at the current collateral valuation.

Table 2: Example of Classification for Substandard or Worse E&P Borrowers

Example Collateral Valuation (in Thousands)					
Discounted NPV at 9% and using NYMEX strip pricing					
Valuation basis	Hedges	PDP	PDNP	PUD	Total proved
Unrisked NPV	\$10,000	\$50,000	\$20,000	\$40,000	\$120,000
Risk adjustment factors	100%	100%	75%	50%	
Risked and adjusted NPV	\$10,000	\$50,000	\$15,000	\$20,000	\$95,000
Total collateral value:					\$95,000

Example 1: OCC Classification (in Thousands)						
Borrowing base commitment amount on RBL is \$125 million						
Risk classification	Commitment	Pass	Special mention	Substandard	Doubtful	Loss
RBL	\$125,000			\$95,000	\$25,000	\$5,000
Total	\$125,000			\$95,000	\$25,000	\$5,000

Example 2: OCC Classification (in Thousands)						
Borrowing base commitment amount on RBL is \$75 million; second-lien term loan is \$50 million						
Risk classification	Commitment	Pass	Special mention	Substandard	Doubtful	Loss
RBL	\$75,000			\$75,000		
Second-lien term loan	\$50,000			\$20,000	\$25,000	\$5,000
Total	\$125,000			\$95,000	\$25,000	\$5,000

Note: The \$25 million of doubtful represents the difference between the unrisked NPV and the risked NPV. If the borrower's prospects for further developing PDNP and PUD reserves to producing status is unlikely or not supported by a pending event, this amount should be reflected as loss.

Examination Procedures

This booklet contains expanded procedures for examining specialized activities or specific products or services that warrant extra attention beyond the core assessment contained in the “Community Bank Supervision,” “Federal Branches and Agencies Supervision,” and “Large Bank Supervision” booklets of the *Comptroller’s Handbook*. Examiners determine which expanded procedures to use, if any, during examination planning or after drawing preliminary conclusions during the core assessment.

Scope

These procedures are designed to help examiners tailor the examination to each bank and determine the scope of the E&P lending examination. This determination should consider work performed by internal and external auditors and other independent risk control functions and by other examiners on related areas. Examiners need to perform only those objectives and steps that are relevant to the scope of the examination as determined by the following objective. Seldom will every objective or step of the expanded procedures be necessary.

Objective: To determine the scope of the examination of E&P lending and identify examination objectives and activities necessary to meet the needs of the supervisory strategy for the bank.

1. Review the following sources of information and note any previously identified problems related to E&P lending that require follow-up: (Updated October 15, 2018)
 - Supervisory strategy
 - Examiner-in-charge’s (EIC) scope memorandum
 - OCC’s supervisory information systems
 - Previous reports of examination and work papers
 - Internal and external audit reports and work papers
 - Bank management’s responses to previous reports of examination and audit reports
 - Bank correspondence pertaining to E&P lending
 - Customer complaints and litigation. Examiners should review customer complaint data from the OCC’s Customer Assistance Group, the bank, and the Bureau of Consumer Financial Protection (when applicable). When possible, examiners should review and leverage complaint analysis already performed during the supervisory cycle to avoid duplication of effort.
2. Obtain and review the Uniform Bank Performance Reports and other applicable OCC reports or analytical tools. Identify any concerns, trends, or changes involving E&P lending since the last examination. Examiners should be alert to growth rates, changes in portfolio composition, loan yields, and other factors that may affect credit risk. (Updated October 15, 2018)

3. Obtain and review policies, procedures, and reports that bank management uses to supervise E&P lending, including internal risk assessments. Consider
 - portfolio strategies, risk limits, and risk management guidelines.
 - loan trial balance, past due accounts, and loans in nonaccrual status.
 - loan commitment and pipeline reports showing commitments and undisbursed funds.
 - internal loan review reports.
 - credit risk rating reports, including a list of “watch” credits.
 - problem loan reports for adversely rated O&G loans.
 - concentration reports and board-approved concentration limits.
 - loan policy exception report.
 - financial statement and collateral exception reports.
 - financial statement tracking reports.
 - board or loan committee reports and minutes related to E&P lending activities.
 - loans for which terms have been modified by a reduction of the interest rate or principal payment, by a deferral of interest or principal, or by other restructuring of payment terms.
 - loans on which interest has been capitalized subsequent to initial underwriting.
 - over-disbursed loans.
 - loan participations purchased and sold since the previous examination.
 - shared national credits, if applicable.
 - organizational chart of the E&P lending and internal engineering departments.
 - résumés of the E&P lending department management and internal engineering staff, to include any additional staff added since the last examination.
 - loans to insiders of the bank or any affiliate of the bank.

4. In discussions with bank management, determine if there have been any significant changes (for example, in policies, processes, personnel, control systems, third-party relationships, products, services, delivery channels, volumes, markets, geographies, etc.) since the previous examination of E&P lending. Discussions should address
 - management’s strategy for the E&P lending function, including
 - growth goals.
 - existing and potential sources of loan demand.
 - new loan types, property types, or geographic regions.
 - new marketing strategies and initiatives.
 - the staff’s experience and ability to implement strategic initiatives and achieve goals.
 - current and projected concentrations of credit, as well as management’s plans to manage concentrations.
 - significant changes in policies, procedures, underwriting, personnel, and control systems.
 - internal or external factors that could affect the portfolio.
 - stress testing practices.
 - observations from examiner review of internal bank reports, as well as OCC and other third-party-generated reports.

- the extent of syndicated distribution and participation activities as a buyer and a seller, if applicable.
5. Based on an analysis of information obtained in the previous steps, as well as input from the EIC, determine the scope and objectives of the E&P lending examination. Consider
- growth and acquisitions.
 - board or management changes.
 - changes in risk limits, including concentrations.
 - changes in external factors, such as
 - national, regional, and local economies.
 - industry outlook.
 - regulatory framework.
 - technological changes.
6. For FSAs, determine if O&G loans are approaching the limits described in 12 USC 1464(c) and 12 CFR 160.30. O&G loans typically are classified as commercial loans, which, under 12 USC 1464(c)(2)(A), cannot exceed 20 percent of total assets, provided that commercial loans in excess of 10 percent of assets must be small business loans. Small business loans include any loan to a small business (defined in 13 CFR 121) and any loan that does not exceed \$2 million and is for commercial, corporate, business, or agricultural purposes. An FSA, however, may make O&G loans under other authority, depending on the circumstances. For example, to the extent an O&G loan is secured by nonresidential real property, an FSA may make the loan under its nonresidential loan authority. Under this authority, an FSA generally may make loans secured by nonresidential real property up to 400 percent of capital.

Quantity of Risk

Conclusion: The quantity of each associated risk is (low, moderate, or high).

Credit Risk

Objective: To determine the quantity of credit risk associated with E&P lending. Consider the product mix, markets, geographies, technologies, volumes, size of the exposures, quality metrics, concentrations, etc.

1. Analyze the composition and changes to the O&G portfolio, including off-balance-sheet exposure, since the previous examination. Determine the implications for the quantity of risk of the following:
 - Any significant growth.
 - Material changes in the portfolio, including
 - changes and trends in problem, classified, past-due, non-accrual, and nonperforming assets; charge-off volumes; and risk rating distribution.
 - any significant concentrations.
 - O&G portfolios acquired from other institutions.
2. Assess the effect of external factors, including economic, industry, competitive, and market conditions.
3. Assess the effect of potential legislative, regulatory, accounting, and technological changes.
4. Select a sample of loans to be reviewed. Selection of the sample should be consistent with the examination objectives, supervisory strategy, and district business plans. For guidance on sampling techniques, refer to the “Sampling Methodologies” booklet of the *Comptroller’s Handbook* or the *Office of Thrift Supervision Examination Handbook’s* section 209, “Appendix A, Sampling Terminology.” Consider
 - new, large loans.
 - new loan types.
 - loans originated in new geographic regions or in new O&G producing areas.
 - loans approaching or above the legal lending limit.
 - loans to insiders of the bank or any affiliates.
 - overdisbursed loans.
 - loans with multiple renewals or extensions.
 - special mention loans and classified loans.
 - loans with significant policy or underwriting exceptions.
 - loans with modified repayment terms.

- concentration reports.
 - portfolio stress testing reports.
5. Obtain and review credit files for all borrowers in the sample and prepare line sheets for the sampled credits. Line sheets should contain sufficient analysis to determine the credit rating; support any criticisms of underwriting, servicing, or credit administration practices; and document any violations of law. In particular, examiners should
- evaluate the quality of underwriting if the loan was originated, renewed, or restructured in the past 12 months. Consider whether the approval document is consistent with the bank's underwriting policy. As appropriate, examiners generally use the National Credit Tool to perform the Credit Underwriting Assessment for each transaction in the sample. (Updated October 15, 2018)
 - determine the primary source of repayment of each loan and evaluate its adequacy.
 - assess the adequacy of cash flow to meet debt service requirements.
 - evaluate the integrity of engineering data.
 - Evaluate support for the assumptions used to determine pricing and the discount rate.
 - Assess the timing of reports to determine if current conditions warrant updates.
 - determine if an independent, competent engineer prepared the engineering report. If prepared by an engineer hired by the borrower, evaluate the review performed by the bank's independent internal or third-party engineer.
 - evaluate the borrowing base.
 - Determine the type of reserves that comprises the borrowing base and the advance rates applied to the collateral.
 - Assess the minimum number of wells required to establish the borrowing base.
 - Evaluate the frequency of borrowing base redeterminations.
 - Evaluate repayment criteria in the event the borrowing base declines below the outstanding balance.
 - Evaluate borrowing base “stretches.”
 - Assess the reliability of past production results used to determine the borrowing base and whether it is sufficient to amortize the debt over a reasonable amount of time, including over-advances, within prudent policy guidelines.
 - determine whether appropriate risk factors are used to discount the NPV when PDNP are used in the borrowing base calculation.
 - comment as necessary regarding historical trends in production levels and income to cover operating expenses.
 - evaluate budgeted expenses, including the level and trend of capex, anticipated working capital needs, and costs for any replacement initiatives.
 - analyze secondary sources of repayment provided by guarantors, financial sponsors, or endorsers. If the financial condition of the borrower warrants concern, determine the guarantor's, sponsor's, or endorser's capacity and willingness to repay the credit. Review the obligations of these guarantors and consider the likelihood that any or all contingent obligations will be called.
 - determine the impact of hedging and when hedging will be required, when applicable.

- evaluate the impact of changes to technology, government regulations, current price levels, or economic markets, when applicable.
 - compare collateral with the description on the collateral register.
 - determine that property assignments, stock powers, hypothecation agreements, statements of purpose, etc., are on file.
 - test the pricing of negotiable collateral, if applicable.
 - determine that each file contains documentation supporting guarantees and subordination agreements, when appropriate.
 - list and investigate all collateral discrepancies.
 - evaluate the due diligence performed to assess environmental risk.
 - evaluate the sufficiency of collateral coverage. Determine that appraisal and inspections of machinery and equipment are present.
 - determine whether the borrower complies with the loan agreement and financial covenants.
 - evaluate sensitivity analysis. Assess the impact of changes to the borrower's primary and secondary repayment ability. Compare updates to both the base case and sensitivity case analyses to the standards set in the bank's policy. Determine at what point the stress would cause repayment to fall below the bank's standards and no longer meet policy requirements. Determine the likelihood of such stress event(s).
 - document all significant loan policy, loan administration, and underwriting exceptions, and whether the exceptions were appropriately identified, approved, and reported.
 - determine any significant structural weaknesses and the impact on the borrower's ability to repay on reasonable terms.
 - assign risk ratings to the sampled credits. Refer to risk rating guidance in this booklet and supervisory guidance regarding risk ratings.
6. Review the completed line sheets and summarize the loan sample results. The examiner responsible for the E&P lending review should
- identify recommended loan risk rating downgrades and assess whether such decisions are appropriately documented.
 - maintain a list of structurally weak loans reviewed.
 - complete the Credit Underwriting Assessment requirements to evaluate underwriting practices since the previous supervisory activity and determine the appropriate assessment rating.
 - complete the Credit Underwriting Assessment requirement to determine the direction of underwriting practices since the previous supervisory activity and draw a conclusion on the appropriate assessment rating.
 - maintain a list of loans for which examiners were unable to determine the risk rating due to a lack of information.
 - maintain a list of loans not supported by current and complete financial information and engineering reports, and loans in which collateral documentation is deficient.
 - summarize whether policy, underwriting, loan administration, or documentation exceptions were appropriately identified and approved.

7. Analyze the level, composition, and trend of policy and underwriting exceptions, and determine the impact on the quantity of risk. Consider the frequency of reporting, the total dollar volume, and the percent of the portfolio that exceptions represent in comparison with established limits. (**Note:** A bank's lack of an internal tracking system indicates a need to test for exceptions to the bank's credit policy.) (Updated October 15, 2018)
8. Evaluate the trend and level of concentrations as a percentage of total capital. Consider exposure compared with policy limits for individual wells, fields, political or regulatory jurisdictions, extraction technologies, etc.
9. Evaluate portfolio stress testing. Determine whether assumptions to develop base case and downside cases are reasonable and whether key vulnerabilities have been considered.
10. Determine whether any previously charged-off O&G loans have been re-booked.
11. Using a list of nonaccruing loans, test loan accrual records to determine that interest income is not being recorded.
12. Evaluate the adequacy of the ALLL for the O&G portfolio.
13. Consider the quantity of credit risk indicators in appendix A of this booklet, as appropriate.
14. Discuss the results of the loan sample with the EIC or loan portfolio management examiner and bank management.

Other Associated Risks

In addition to credit risk, E&P lending can generate interest rate risk, liquidity risk, operational risk, compliance risk, strategic risk, and reputation risk. These risks and how E&P lending can expose the bank to these risks are discussed in the "Introduction" section of this booklet.

Objective: To determine the quantity of other risks associated with E&P lending activities.

1. Assess the effect of E&P lending on the quantity of interest rate risk. Consider
 - the effect of interest rate changes on both the borrowers and the bank.
 - underwriting terms such as tenor and management's pricing structure, for example, fixed vs. variable interest rates and the potential exposure to different pricing indices.
 - off-balance-sheet exposures.
 - the quality and results of sensitivity analysis and portfolio stress testing.
2. Assess the effect of E&P lending on the quantity of liquidity risk. Consider

- E&P portfolio growth rates and the corresponding funding strategies.
 - the composition and trends of the E&P portfolio and the ability to convert the loans to cash. Consider correlated concentrations of E&P loans that may be subject to similar supply and demand volatility.
 - current market conditions, including
 - longer-term liquidity pressure due to capped or abandoned wells, reduced exploration, and population migration.
 - deposit trends in regions dependent on the O&G economy.
3. Assess the effect of E&P lending on the quantity of operational risk. Consider
- any operational losses resulting from the E&P lending function.
 - any control weaknesses identified by audit, loan review, or any other risk management or control group.
 - the quality of board oversight.
 - the quality of the loan approval and underwriting process.
 - the quality of credit administration, for example, segregation of duties, financial analysis, and monitoring and documentation standards.
 - the quality and independence of the engineering function.
 - the quality and independence of the audit and loan review functions.
 - staffing turnover affecting the E&P lending function.
 - the quality of and any changes in significant third-party relationships.
 - responses to the internal control questionnaire (ICQ).
4. Assess the effect of E&P lending on the quantity of compliance risk. Consider
- the bank's history of compliance with lending-related laws and regulations, particularly those regarding appraisals, insider lending activities, legal lending limits, and affiliates, as well as safe and sound banking practices.
 - for FSAs, whether the association is approaching or has exceeded its Home Owners' Loan Act investment limits set forth in 12 USC 1464(c).
 - the quality of the bank's environmental risk management program and losses attributed to liabilities resulting from environmental risk.
 - compliance with internal policies and procedures.
5. Assess the effect of E&P lending on the quantity of strategic risk. Consider
- management's strategy regarding E&P lending and the potential effect on risk including those posed by concentrations.
 - board oversight of strategic initiatives and stated risk appetite.
 - the adequacy of the bank's program for monitoring economic and market conditions. Consider management's assessment of O&G supply and demand, government policies, and socioeconomic and demographic trends.
 - the ability of the staff to implement E&P lending strategies without exposing the bank to unwarranted risk.

6. Assess the effect of E&P lending on the quantity of reputation risk. Consider
 - the bank's effectiveness in meeting the E&P needs of the communities it serves, including credit needs of small businesses that depend on the O&G industry.
 - management's oversight of environmental compliance and social responsibility pertaining to E&P lending.
 - the volume of syndicated E&P loans, and the bank's ability to meet its legal or fiduciary responsibilities in sourcing and syndicating E&P loans.
 - management's oversight of complex structured finance arrangements.

Quality of Risk Management

**Conclusion: The quality of risk management is
(strong, satisfactory, insufficient, or weak).**

The conclusion on risk management considers all risks associated with E&P lending activities. Consider the quality of risk management indicators in appendix B of this booklet, as appropriate.

Policies

Policies are statements of actions adopted by a bank to pursue certain objectives. Policies guide decisions, often set standards (on risk limits, for example), and should be consistent with the bank's underlying mission, risk appetite, and core values. Policies should be reviewed periodically for effectiveness and approved by the board of directors or designated board committee.

Objective: To determine the adequacy of the O&G loan policies and to reach a conclusion on underwriting policies and standards for completing the Credit Underwriting Assessment.

1. Assess E&P lending objectives and risk appetite, including acceptable types of E&P loans, portfolio distribution (concentrations of credit), lending market or territory, risk limits measured as a percentage of capital, and correlation risk to other industries in the bank's loan portfolio.
2. Assess underwriting standards and approval requirements that are specific to lending to the E&P industry and provide appropriate lender controls, including measurement of O&G reserve and production history; financial analysis expectations; realistic repayment terms consistent with the use of proceeds; advance rates and risk adjustments on various reserve types; pricing parameters; stress or sensitivity analysis of cash flow; covenant and structure expectations; approval authority; and policy exception authority.
3. Assess credit administration and loan documentation standards, including reserve production, depletion, and replacement; new project development; borrowing base redetermination requirements and processes; stress testing; collateral re-valuation; collateral documentation; and title verification.
4. Assess the bank's policies regarding the structure, reporting lines, and oversight of the E&P lending department and independent engineering department. (Updated October 15, 2018)
5. Evaluate lender controls, including measurement of O&G reserve and production history, financial analysis expectations, stress or sensitivity analysis of cash flow, and approval authorities.

6. Assess covenant and structure expectations and how borrowing bases are determined.
7. Assess maximum advance rates and risk adjustments for all categories of O&G reserves.
8. Assess frequency of borrowing base redeterminations (industry standard is semiannually).
9. Assess how borrowing base deficiencies are cured and how long the bank gives the borrower to cure them.
10. Determine the minimum percentage of production loan value attributable to PDP reserves.
11. Determine whether risk adjustments are applied to nonproducing reserves to discount values before applying advance rates to the borrowing base.
12. Assess maximum loan term and whether the term reflects the purpose and source of repayment.
13. Determine if there is a periodic review and adjustment, if necessary, of the O&G pricing policy (price deck) assumptions and escalation factors for base case and sensitivity case analyses. Industry standard is to review the O&G pricing policy at least quarterly. Reasoning for changes should be documented in writing. Consider
 - how is the price deck determined?
 - how frequently is the price deck reviewed?
 - what is the process for making changes?
 - is the reasoning for changes documented in writing?
 - does the policy address price and expense escalation?
14. Assess hedging activities and strategies, including maximum percent of PDP reserves hedged and maximum tenor of hedges.
15. Determine if policy covers the bank's documentation and filing requirements. (Updated October 15, 2018)
16. Evaluate collateral documentation and title verification and whether policy specifies percentage of O&G properties to be covered under mortgage.
17. Determine if there is a comprehensive engineering policy that provides guidelines for engineers, including discount rates applied to future net income to arrive at the present worth of future net income. Some banks maintain a separate engineering policy.
18. Determine if policy addresses environmental risk.

19. Determine if policy outlines collateral margins for specific types of O&G equipment lending.
20. Determine if policy addresses how O&G loan policy exceptions are defined, identified, monitored, and controlled, including expectations for the frequency of exception report updates. Has the bank established a limit for the percentage of the portfolio with exceptions and does it monitor its performance against this limit?
21. Determine how credit enhancements (personal guarantees, hedging, etc.) are used to support credit underwriting.
22. Does the board review and approve the E&P lending policy annually?
 - Does it evaluate existing policies to determine if they are compatible with market conditions?
 - Does it assess whether policies are consistent with the bank's strategic direction and risk appetite?
23. Reach and document conclusions and findings from the review of the bank's commercial lending policies. Examiner conclusions and findings of the bank's commercial lending policies can also support the "Commercial Credit—Underwriting Assessment" module and the "Overall Credit—Underwriting Assessment" module in Examiner View. Examiners may also add both these modules to the examination activity, if applicable.

Processes

Processes are the procedures, programs, and practices that impose order on a bank's pursuit of its objectives. Processes define how activities are carried out and help manage risk. Effective processes are consistent with the underlying policies and are governed by appropriate checks and balances (such as internal controls).

Objective: To determine the adequacy of the bank's lending practices, procedures, and internal controls regarding O&G loans.

1. Evaluate how policies, procedures, and plans affecting the O&G portfolio are communicated. Consider whether
 - management has clearly communicated objectives and risk limits as a percentage of total capital for the O&G portfolio to the board of directors and whether the board has approved these goals.
 - communication to key personnel in the O&G department is clear and timely.
2. Assess the process to determine the accuracy and integrity of the O&G loan data.

- Is there a process to back-test data by comparing production and expenses from previous engineering evaluations to actual production and expenses for the same period?
3. Assess and reach a conclusion on underwriting practices for E&P lending and complete the appropriate sections of the Credit Underwriting Assessment. Consider
- the appropriateness of the approval process, including approval limits of officers.
 - the quality of the loan approval documents. Do they contain the following?
 - Industry analysis.
 - Description of the company’s operations, including management depth and experience.
 - Comprehensive financial analysis of the borrower and any guarantors, including financial projections.
 - Identification of loan policy exceptions and any mitigating factors.
 - Identification of key risks and any mitigating factors.
 - Purpose of loan.
 - Primary and secondary sources of repayment.
 - Description of collateral and lien status.
 - Environmental risk factors.
 - Property and liability insurance coverage.
 - Borrower’s status with state-specific governing authority.
 - Engineering report summary, including a reconciliation of reserve values between borrowing base redeterminations and a comparison of production and expenses from the previous engineering evaluation to actual production and expenses for the same period.
 - Calculation of borrowing base and covenant compliance monitoring requirements, including the composition and limitations for the type of proved reserves in the borrowing base. (Updated October 15, 2018)
 - Minimum number of wells and maximum amount of production from a single well that will be considered in the borrowing base calculation.
 - Analysis of borrower’s historical ability to economically replace reserves.
 - Limits or triggers to implement workout or exit strategies.
 - Support for risk grade assigned.
 - Upgrade and downgrade triggers for the lowest pass and problem grades.
 - the quality of the engineering reports and the independence of the engineering function.
 - the appropriateness of credit structure.
4. Assess the process for approving policy exceptions. Consider the following: (Updated October 15, 2018)
- Is there a process in place to identify policy exceptions before loans are approved?
 - Does the process identify exceptions that are to be authorized by the appropriate internal approval authority?

5. Evaluate the accuracy and integrity of the internal risk-rating processes. Consider
 - findings from the loan sample.
 - the role of internal loan review.
6. Determine whether there are processes to monitor strategic and business plans for the O&G portfolio. Consider
 - how the O&G portfolio business plans and strategies affect earnings and capital.
7. Review the processes to assess compliance with applicable laws, rulings, regulations, and environmental guidelines. Consider (Updated October 15, 2018)
 - state and local environmental laws and guidelines, if applicable.
8. Evaluate the effectiveness of processes used to monitor collateral. Consider
 - for E&P loans, if there is a process in place to prepare in-house engineering reports or review external reports in a timely manner so that semiannual borrowing base redeterminations are not delayed. (Updated October 15, 2018)
 - for equipment loans, if values are updated periodically. Are values provided by personnel or third parties with sufficient expertise when updating values for specialized equipment (drilling equipment, fracking equipment, etc.)?
 - whether the bank has adequate processes to monitor O&G prices.
 - whether drilling rigs and other equipment are periodically inspected. Are inspections performed by technically qualified and competent inspection personnel or third parties?
 - whether the bank has processes for proper filing and perfection of liens on O&G properties. Does outside counsel review documentation before loan closing? (Updated October 15, 2018)
 - whether the bank has processes to monitor the adequacy of insurance coverage.
9. The examiner reviewing the E&P lending portfolio should review the loan portfolio manager's examination findings to determine whether additional analysis is required for issues related to E&P lending pertaining to
 - problem credit administration.
 - collections.
 - charge-offs.
10. Review the methodology for evaluating and maintaining ALLL. Consider whether
 - the portfolio is analyzed as a separate pool or further segmented by loan type (oil production, natural gas production, equipment, or service) or geographic area.
 - the methodology is reasonable based on historical experience and current trends.

11. Verify that the bank has an effective process to periodically evaluate internal controls. (Note: The lack of an effective process may require examiners to conduct additional testing. Refer to the “Internal Control Questionnaire” section of this booklet for details on additional testing.)

Personnel

Personnel are the bank staff and managers who execute or oversee processes. Personnel should be qualified and competent, have clearly defined responsibilities, and be held accountable for their actions. They should understand the bank’s mission, risk appetite, core values, policies, and processes. Banks should design compensation programs to attract and retain personnel, align with strategy, and appropriately balance risk-taking and reward.

Objective: To determine whether management, lending, and engineering personnel possess and display acceptable knowledge and technical skills to manage and perform their duties, given the bank’s size and complexity.

1. Evaluate the adequacy of the E&P lending staff in terms of the level of expertise and number of assigned personnel. Consider
 - whether staffing levels support current operations or any planned growth.
 - staff turnover.
 - the staff’s previous E&P lending and workout experience.
 - specialized training provided.
 - the average account load per lending officer. Consider reasonableness in light of the complexity and condition of the officer’s portfolio.
 - how senior management and the board of directors periodically evaluate O&G lenders’ understanding of and conformance with the bank’s stated credit culture and loan policy. If there is no process, determine the impact on the management of credit risk.
2. Assess the performance management and compensation programs for E&P lending personnel. Consider whether these programs measure and reward behaviors that support strategic and risk appetite objectives for the portfolio.
3. Evaluate the adequacy of the internal engineering staff in terms of the level of expertise and number of assigned personnel. Consider
 - whether staffing levels support current operations or any planned growth.
 - staff education and experience.
 - staff turnover.
 - continuing education completed each year.
 - succession planning.

4. Assess the independence of the internal engineering function. Consider
 - who prepares the annual performance evaluations of the engineers.
 - whether that individual also has loan approval authority.
5. whether the engineer's overall compensation program includes incentive bonuses for loan volume generated in the bank or department. For guidance, see OCC Bulletin 2010-24, "Interagency Guidance on Sound Incentive Compensation Policies." (Updated October 15, 2018)
6. If the bank has third-party relationships that involve critical activities, determine whether the process for selection and monitoring third-party relationships is appropriate. For guidance, see OCC Bulletins 2013-29, "Third-Party Relationships: Risk Management Guidance"; OCC Bulletin 2017-7, "Third-Party Relationships: Supplemental Examination Procedures"; and OCC Bulletin 2017-21, "Third-Party Relationships: Frequently Asked Questions to Supplement OCC Bulletin 2013-29." (Updated October 15, 2018)

Control Systems

Control systems are the functions (such as internal and external audits and quality assurance) and information systems that bank managers use to measure performance, make decisions about risk, and assess the effectiveness of processes and personnel. Control functions should have clear reporting lines, sufficient resources, and appropriate access and authority. MIS should provide timely, accurate, and relevant feedback.

Objective: To determine whether the bank has systems in place to provide accurate and timely assessments of the risks associated with E&P lending.

1. Evaluate the effectiveness of monitoring systems to identify, measure, and track compliance with the E&P policy. Consider
 - approval and monitoring of policy limit exceptions, including O&G concentration limits.
 - the volume, type, and terms of exceptions, including any identified in the loan sample.
 - borrower hedging programs.
 - internal loan review, audit, and compliance process findings.
2. Determine whether MIS, including engineering reports, provide timely, useful information to evaluate risk levels and trends in the O&G portfolio. For example, is there a worksheet showing key performance and underwriting metrics? Is this information updated at least quarterly and used to monitor the portfolio?
3. Assess the effectiveness of operational controls. Consider

- segregation of duties.
 - quality control testing and monitoring systems.
 - data reconciliation.
 - system access including logical access and physical access to negotiable items or vaults.
4. Assess the scope, frequency, effectiveness, and independence of the internal and external audits of the E&P lending function. Consider the qualifications of audit personnel and evaluate accessibility to necessary information and board responses to audit findings.
5. Assess the effectiveness of loan review. Evaluate the scope, frequency, effectiveness, and independence of loan review, as well as their ability to identify and report emerging risks. Determine whether loan review reports address the
- quality of the E&P portfolio.
 - trend in portfolio quality.
 - effectiveness of the engineering function.
 - reliability of price deck, price deck assumptions, and updates to the price deck.
 - quality of individual loan and portfolio stress testing.
 - quality of significant relationships.
 - level and trend of policy, underwriting, and pricing exceptions.

Conclusions

Conclusion: The aggregate level of each associated risk is
(low, moderate, or high).

The direction of each associated risk is
(increasing, stable, or decreasing).

Objective: To determine, document, and communicate overall findings and conclusions regarding the examination of E&P lending.

1. Determine preliminary examination findings and conclusions and discuss with the EIC, including
 - quantity of associated risks (as noted in the “Introduction” section).
 - quality of risk management.
 - aggregate level and direction of associated risks.
 - overall risk in E&P lending.
 - the O&G E&P Credit Underwriting Assessment of underwriting policy standards and practices.
 - violations and other concerns.

Summary of Risks Associated With E&P Lending				
Risk category	Quantity of risk	Quality of risk management	Aggregate level of risk	Direction of risk
	(Low, moderate, high)	(Weak, insufficient, satisfactory, strong)	(Low, moderate, high)	(Increasing, stable, decreasing)
Credit				
Interest rate				
Liquidity				
Operational				
Compliance				
Strategic				
Reputation				

2. If substantive safety and soundness concerns remain unresolved that may have a material adverse effect on the bank, further expand the scope of the examination by completing verification procedures.

3. Discuss examination findings with bank management, including violations, matters requiring attention, and conclusions about risks and risk management practices. If necessary, obtain commitments for corrective action. (Updated October 15, 2018)
4. Compose conclusion comments, highlighting any issues that should be included in the report of examination. If necessary, compose matters requiring attention and violation write-ups. (Updated October 15, 2018)
5. Complete the Credit Underwriting Assessment for O&G production lending, if included in the examination scope.
6. Update the OCC's supervisory information systems and any applicable report of examination schedules or tables. (Updated October 15, 2018)
7. Document recommendations for the supervisory strategy (e.g., what the OCC should do in the future to effectively supervise E&P lending in the bank, including time periods, staffing, and workdays required.) (Updated October 15, 2018)
8. Update, organize, and reference work papers in accordance with OCC policy.
9. Appropriately dispose of or secure any paper or electronic media that contain sensitive bank or customer information. (Updated October 15, 2018)

Internal Control Questionnaire

An ICQ helps an examiner assess a bank's internal controls for an area. ICQs typically address standard controls that provide day-to-day protection of bank assets and financial records. The examiner decides the extent to which it is necessary to complete or update ICQs during examination planning or after reviewing the findings and conclusions of the core assessment.

Policies

1. Has the board of directors, consistent with its duties and responsibilities, adopted written O&G loan policies that are consistent with safe and sound banking practices and appropriate to the size of the bank and to the nature and scope of its operations? In particular, do the bank's policies
 - identify the geographic areas where the bank will consider lending?
 - establish a loan portfolio diversification policy and set limits as a percentage of total capital for O&G loans by type and geographic market?
 - establish policies for the identification, monitoring, and management of concentrations?
 - identify appropriate terms and conditions for lending on different types of reserves and equipment based on risk?
 - establish loan origination and approval procedures, both generally and by size and type of loan?
 - establish prudent underwriting standards that are clear and measurable, including
 - the maximum loan amount by purpose and collateral?
 - maximum loan maturities by purpose and collateral?
 - amortization schedules?
 - borrowing base determinations?
 - collateral coverage?

2. Has the bank also established loan administration and documentation expectations for its O&G portfolio that address
 - type and frequency of financial statements, including requirements for verification of information provided by the borrower?
 - type and frequency of engineering reports and updates, including updates to the price deck?
 - type and frequency of collateral evaluations and inspections (appraisals and other estimates of value)?
 - loan closing and disbursement procedures, including the supervised disbursement of proceeds on E&P loans?
 - payment processing?
 - loan payoffs?
 - delinquency and follow-up procedures?

- foreclosure timing?
 - extensions and other forms of forbearance?
 - acceptance of deeds in lieu of foreclosure?
 - claims processing (for example, seeking recovery on a defaulted loan covered by an insurance program)?
 - servicing and participation agreements?
3. Are procedures in effect to monitor compliance with the bank's E&P lending policies?
 - Are exception loans of a significant size reported individually to the board of directors?
 - Are the numbers, types, and trends of exceptions monitored so that the loan policy and lending practices can be periodically evaluated?
 - Are loans that are in excess of the borrowing base identified?
 4. Does the bank effectively monitor conditions in the O&G markets to ensure that the E&P lending policies remain appropriate?
 5. Does the bank have an internal review procedure to determine whether the engineer consistently follows engineering policies and procedures and that documentation supports those conclusions?
 6. Are there policies and procedures to ensure that preparation of in-house engineering reports, or review of external reports, is consistently completed in a timely manner so that semiannual borrowing base redeterminations are not delayed?
 7. Are procedures in place to review engineering reports and assumptions for reasonableness before funds are advanced?
 8. Does the bank take steps to determine whether there are any environmental hazards associated with the real estate proposed to be mortgaged?
 9. When there is reason to believe that there may be serious environmental problems associated with property that it holds as collateral, does the bank
 - take steps to monitor the situation to minimize any potential liability on the part of the bank?
 - seek the advice of experts, particularly in situations in which the bank may be considering foreclosure on the contaminated property?

O&G Underwriting

1. Does the bank require
 - current and historical financial statements?

- current and historical tax returns?
 - credit checks?
2. Do E&P company budgets include all costs to bring the hydrocarbons to market both initially and over the life of the loan (including maintenance expenses over that period)?
 3. Does the bank require an estimated cost breakdown for each expense?
 4. Does the bank require that independent engineers review the reasonableness of cost estimates?

Disbursements

1. Are disbursements
 - advanced on a prearranged disbursement plan?
 - made only after reviewing independent engineering reports?
 - subject to advance, written authorization by the
 - borrower?
 - lending officer?
 - reviewed by a bank employee who had no part in granting the loan?
 - compared with original cost estimates?
 - checked against previous disbursements?
 - made directly to suppliers or vendors?
 - made in accordance with the loan agreement?
2. Are there periodic reviews of undisbursed loan proceeds to determine their adequacy and that they are reconciled to the budget?

Documentation

1. Does the bank require that documentation files include
 - loan applications?
 - financial statements for the
 - borrower?
 - guarantors?
 - credit and trade checks on the
 - borrower?
 - guarantors?
 - a copy of all O&G project budgets?
 - the loan agreement?
 - engineering and appraisal reports?
 - title searches and other lien searches?

- copies of transfer or division orders from the reserve purchaser?
- the mortgage?
- financing statements and security agreements?
- disbursement authorizations?
- insurance policies?
- hedging contracts or commitments?

Conclusions

1. Is the foregoing information an adequate basis for evaluating internal controls in that there are no significant additional internal auditing procedures, accounting controls, administrative controls, or other circumstances that impair any controls or mitigate any weaknesses indicated in this section (explain negative answers briefly and indicate conclusions as to their effect on specific examination or verification procedures)?
2. Based on the answers to the foregoing questions, internal controls for E&P lending are considered (strong, satisfactory, insufficient, weak).

Verification Procedures

Verification procedures are used to verify the existence of assets and liabilities, or test the reliability of financial records. Examiners generally do not perform verification procedures as part of a typical examination. Rather, verification procedures are performed when substantive safety and soundness concerns are identified that are not mitigated by the bank's risk management systems and internal controls.

1. Reconcile the trial balance to the general ledger. Include loan commitments, overdrafts, and other contingent liabilities in the testing.
2. Using an appropriate sampling technique, select loans from the trial balance and
 - prepare and mail confirmation forms to borrowers. (Loans serviced by other institutions, either whole loans or participations, should be confirmed only with the servicing institution. Loans serviced for other institutions, either whole loans or participations, should be confirmed with the other institution and the borrower. Confirmation forms should include the borrower's name, loan number, original amount, interest rate, current loan balance, contingency and escrow account balance, and a brief description of the collateral.)
 - After a reasonable time, mail second requests.
 - Follow up on any no-replies or exceptions and resolve differences.
 - examine notes for completeness and reconcile date, amount, and terms to trial balance.
 - If any notes are not held at the bank, request confirmation with the holder.
 - See that required initials of approving officer are on the note.
 - See that the note is signed, appears to be genuine, and is negotiable.
 - compare collateral held in files with the description on the collateral register. List and investigate all collateral discrepancies.
 - determine if any collateral is held by an outside custodian or has been temporarily removed for any reason. Request confirmation for any collateral held outside the bank.
 - determine that each file contains documentation supporting guarantees and subordination agreements, when appropriate.
 - determine that any required insurance coverage is adequate and that the bank is named as loss payee.
 - review participation agreements, when necessary, for such items as rate of service fee, interest rate, retention of late charges, and remittance requirements, and determine whether the customer has complied. (Updated October 15, 2018)
 - review loan agreement provisions for holdback or retention, and determine if undisbursed loan funds or contingency or escrow accounts are equal to retention or holdback requirements.
 - If separate reserves are maintained, determine if debit entries to those accounts are authorized in accordance with the terms of the loan agreement and if they are supported by inspection reports, individual bills, or other evidence.

- review disbursement ledgers and authorizations, and determine if authorizations are signed in accordance with the terms of the loan agreement.
 - reconcile debits in the undisbursed loan proceeds accounts to inspection reports, individual bills, or other evidence supporting disbursements.
3. Review the accrued interest accounts and
 - review procedures for accounting for accrued interest and handling of adjustments.
 - scan accrued interest and income accounts for any unusual entries and follow up on any unusual items by tracing to initial and supporting records.
 4. Obtain or prepare a schedule showing the amount of monthly interest income and balances at the end of each month since the last examination and
 - calculate or check yield.
 - investigate significant fluctuations or trends.
 5. Using a list of nonaccruing loans, check loan accrual records to determine that interest income is not being accrued and whether cash payments received are applied to principal when collection is in doubt.

Appendixes

Appendix A: Quantity of Credit Risk Indicators

Examiners should consider the following indicators when assessing the quantity of credit risk of E&P lending activities.

Low	Moderate	High
The level of O&G loans outstanding is low relative to capital.	The level of O&G loans outstanding is moderate relative to capital.	The level of O&G loans outstanding is high relative to capital.
O&G growth rates are supported by local, regional, or national economic trends. Growth, including off-balance-sheet activities, has been planned for and is commensurate with management and staff expertise, as well as operational capabilities.	O&G growth rates exceed local, regional, or national economic trends. Growth, including off-balance-sheet activities, has not been planned for or exceeds planned levels and may test the capabilities of management, credit staff, and MIS.	O&G growth rates significantly exceed local, regional, or national economic trends. Growth, including off-balance-sheet activities, has not been planned for or exceeds planned levels and stretches the experience and capability of management, credit staff, and MIS. Growth may also be in new products or outside the bank's traditional lending area.
Interest and fee income from E&P lending activities is not a significant portion of loan income.	Interest and fee income from E&P lending activities is an important component of loan income; the bank's lending activities, however, remain diversified.	The bank is highly dependent on interest and fees from E&P lending activities. Management may seek higher returns through higher-risk product or customer types. Loan yields may be insufficient relative to risk.
The bank's O&G portfolio is well diversified with no single large concentrations or a few moderate concentrations. Concentrations are well within reasonable internal limits. The O&G portfolio mix does not materially affect the risk profile.	The bank has a few material O&G concentrations that may be approaching internal limits. The O&G portfolio mix may increase the bank's credit risk profile.	The bank has large O&G concentrations that may exceed internal limits. The O&G portfolio mix increases the bank's credit risk profile.
O&G underwriting is conservative. Policies and procedures are reasonable. O&G loans with structural weaknesses or underwriting exceptions are occasionally originated; the weaknesses, however, are effectively mitigated.	O&G underwriting is satisfactory. The bank has an average level of O&G loans with structural weaknesses. Exceptions are reasonably mitigated and consistent with competitive pressures and reasonable growth objectives.	O&G underwriting is liberal, and policies are inadequate. The bank has a high level of O&G loans with structural weaknesses or underwriting exceptions, the volume of which exposes the bank to loss in the event of default.
Collateral requirements for O&G loans are conservative. Collateral evaluations are reasonable, timely, and well supported.	Collateral requirements for O&G loans are acceptable. Some collateral exceptions exist, but they are reasonably mitigated and monitored. A moderate volume of collateral evaluations is not well supported. Updated collateral evaluations are not always obtained in a timely manner.	Collateral requirements for O&G loans are liberal, or if policies are conservative, substantial deviations exist. Collateral evaluations are not always obtained, are frequently unsupported, or reflect inadequate protection. Updated collateral values are not obtained in a timely manner.

Low	Moderate	High
The level of O&G loan documentation or collateral exceptions are low and have minimal impact on the bank's risk profile.	The level of O&G loan documentation or collateral exceptions is moderate; exceptions, however, are reasonably mitigated and corrected in a timely manner, if applicable. The risk of loss from these exceptions is not material.	The level of O&G loan documentation or collateral exceptions is high. Exceptions are not mitigated and not corrected in a timely manner. The risk of loss from the exceptions is heightened.
O&G loan distribution across pass category is consistent with a conservative risk appetite. Migration trends within pass category favor the less risky ratings. Lagging indicators, including past dues and nonaccruals, are low and stable.	O&G distribution across pass category is consistent with a moderate risk appetite. Migration trends within pass category may favor riskier ratings. Lagging indicators, including past dues and nonaccruals, are moderate and may be slightly increasing.	O&G distribution across pass category is heavily skewed toward riskier pass ratings. Lagging indicators, including past dues and nonaccruals, are moderate or high, and the trend is increasing.
The volume of classified and special mention O&G loans is low and is not skewed toward more severe risk ratings.	The volume of classified and special mention O&G loans is moderate but is not skewed toward more severe ratings.	The volume of classified and special mention O&G loans is moderate or high, skewed to the more severe ratings, and increasing.
O&G refinancing and renewal practices raise little or no concern regarding the quality of O&G loans and the accuracy of reported problem loan data.	O&G refinancing and renewal practices pose some concern regarding the quality of O&G loans and the accuracy of reported problem loan data.	O&G refinance and renewal practices raise substantial concerns regarding the quality of O&G loans and the accuracy of reported problem loan data.
The volume of O&G loans with environmental issues is not significant. Environmental analyses are timely, appropriate, and well supported.	A moderate volume of O&G loans with environmental concerns exists; the risks, however, are identified and reasonably mitigated. Environmental evaluations are not always performed in a timely manner.	The volume of O&G loans with environmental concerns is material if left uncorrected. Environmental evaluations are not performed in a timely manner, or management's response to identified environmental issues is not appropriate.

Appendix B: Quality of Credit Risk Management Indicators

Examiners should consider the following indicators when assessing the quality of credit risk management of E&P lending activities.

Strong	Satisfactory	Insufficient	Weak
There is a clear, sound O&G credit culture. Board and management's appetite for risk is well communicated and fully understood.	The O&G credit culture is generally sound, but the culture may not be uniform and risk appetite may not be clearly communicated throughout the bank.	The O&G lending credit culture may not be uniform, and risk appetite may not be communicated clearly throughout the bank.	The O&G credit culture is absent or materially flawed. Risk appetite may not be well understood.
O&G initiatives are consistent with a conservative risk appetite and promote an appropriate balance between risk taking and strategic objectives. New O&G loan products are well researched, tested, and approved before implementation.	O&G initiatives are consistent with a moderate risk profile. Generally, there is an appropriate balance between risk taking and strategic objectives; anxiety for income, however, may lead to higher-risk transactions. New O&G products may be launched without sufficient testing, but risks are generally understood.	O&G lending initiatives may not be consistent with a moderate risk appetite. Anxiety for income is resulting in higher-risk transactions, and new products are being launched without sufficient testing. Risk taking is evident and severe enough to warrant supervisory concerns.	O&G initiatives are liberal and encourage risk taking. Anxiety for income dominates planning activities. The bank introduces new O&G products without conducting sufficient due diligence.
Management is effective. The E&P lending and engineering staffs possess sufficient expertise to effectively administer the risk assumed. Responsibilities and accountability are clear, and appropriate remedial or corrective action is taken when risk limits are breached.	O&G risk management is satisfactory, but improvement may be needed in one or more areas. E&P lending and engineering staff generally possess the expertise to administer assumed risks; additional expertise, however, may be needed. Responsibilities and accountability may need some clarification. In general, appropriate remedial or corrective action is taken when risk limits are breached. (Updated October 15, 2018)	O&G lending is insufficiently managed, and improvement in risk management is needed in several areas. Lending staff may not possess the expertise needed to administer the assumed risk effectively, and additional expertise is needed in a few areas. Responsibilities and accountability need clarification or correction. Appropriate remedial or corrective actions are not always taken, and a more proactive stance is needed. (Updated October 15, 2018)	O&G risk management is deficient. E&P lending and engineering staff may not possess sufficient expertise or may demonstrate an unwillingness to effectively administer the risk assumed. Responsibilities and accountability may not be clear. Corrective actions are insufficient to address root causes of problems.
Diversification management is effective. O&G concentration limits are set at reasonable levels. O&G concentration risk management practices are sound, including management's efforts to reduce or mitigate exposures. Management	Diversification management is adequate, but certain aspects may need improvement. O&G concentrations are identified and reported, but limits and other action triggers may be absent or moderately high. Concentration	Diversification management is insufficient to manage concentrations adequately. Concentrations may be identified but not completely or with strategic plans in mind. Limits or triggers may be absent, high, or not	Diversification management is passive or deficient. Management may not identify concentrations or may take little or no action to reduce, limit, or mitigate the associated risk. Limits may be present but represent a significant portion of capital.

Strong	Satisfactory	Insufficient	Weak
effectively identifies and understands correlated risk exposures and their potential impact.	management efforts may be focused at the individual loan level, while portfolio-level efforts may be inadequate. Correlated exposures may not be identified and their risks not fully understood.	understood. Portfolio-level concentration management efforts are inadequate. Correlated exposures are not adequately identified, and their risks are not fully understood.	Management may not understand exposure correlations and their potential impact. Concentration limits may be exceeded or raised frequently.
Loan management and personnel compensation structures provide appropriate balance among loan/revenue production, loan quality, and portfolio administration, including risk identification.	Loan management and personnel compensation structures provide reasonable balance among loan/revenue production, loan quality, and portfolio administration.	Loan management and personnel compensation structures provide an insufficient balance among loan/revenue production, loan quality, and portfolio administration.	Loan management and personnel compensation structures are skewed to loan/revenue production. There is little evidence of substantive incentives or accountability for loan quality and portfolio administration.
O&G staffing levels and expertise are appropriate for the size and complexity of O&G activities. Staff turnover is low, and the transfer of responsibilities is orderly. Training programs facilitate ongoing staff development.	O&G staffing levels and expertise are generally adequate for the size and complexity of the O&G activities. Staff turnover is moderate and may result in some temporary gaps in portfolio management. Training initiatives are adequate.	O&G staffing levels and expertise may not be adequate to support the size and complexity of the O&G activities. Recent turnover and experience levels are affecting portfolio management. Additional staff training may be needed.	O&G staffing levels and expertise are deficient. Turnover is high. Management does not provide sufficient resources for staff training.
E&P lending policies effectively establish and communicate portfolio objectives, risk limits, loan underwriting standards, and risk-selection standards.	E&P lending policies are fundamentally adequate. Enhancement, although generally not critical, can be achieved in one or more areas. Specificity of risk limits or underwriting standards may need improvement to fully communicate policy requirements.	E&P lending policies do not provide clear portfolio objectives, appropriate risk limits, loan underwriting standards, and risk selection standards. In some instances, the policies may be adequate but are not enforced or followed.	E&P lending policies are deficient in one or more ways and require significant improvements. Policies may not be clear or are too general to adequately communicate portfolio objectives, risk limits, and underwriting and risk-selection standards.
Staff effectively identifies, approves, tracks, and reports significant policy, underwriting, and risk-selection exceptions individually and in aggregate, including risk exposures associated with off-balance-sheet activities.	Staff identifies, approves, and reports significant policy, underwriting, and risk-selection exceptions on a loan-by-loan basis, including risk exposures associated with off-balance-sheet activities. Little aggregation or trend analysis, however, is conducted to determine the effect on portfolio quality.	Staff insufficiently identifies, reports, and monitors exceptions to policies, underwriting, and risk selection on a loan-by-loan basis, including risk exposures associated with off-balance-sheet activities. Aggregation and trend analysis is lacking, which could result in flawed reporting of the portfolio quality and uninformed decision making regarding risk selection.	Staff approves significant policy exceptions but does not report them individually or in aggregate, or does not analyze their effect on portfolio quality. Risk exposures associated with off-balance-sheet activities may not be considered. Policy exceptions may not receive appropriate approval.

Strong	Satisfactory	Insufficient	Weak
Credit analysis is thorough and timely both at underwriting and periodically thereafter.	Credit analysis appropriately identifies key risks and is conducted within a reasonable time. Monitoring may need improvement.	Credit analysis is insufficient to identify key risks in a timely manner. Periodic analysis is inadequate or not always timely. Additional training may be needed.	Credit analysis is deficient. Analysis is superficial, and key risks are overlooked. Credit data are not reviewed in a timely manner.
Risk rating and problem loan review and identification systems are accurate and timely. Credit risk is effectively stratified for both problem and pass rated credits. Systems serve as effective early warning tools and support risk-based pricing, ALLL, and capital allocations.	Risk rating and problem loan review and identification systems are adequate. Problem and emerging problem credits are adequately identified, although room for improvement exists. The gradation of pass ratings may need to be expanded to facilitate early warning, risk-based pricing, or capital allocations.	Risk rating and problem loan review and identification systems are insufficient to provide accurate and timely information. The gradation of pass ratings is insufficient and should be expanded to facilitate early warning, risk-based pricing, or capital allocations.	Risk rating and problem loan review and identification systems are deficient. Problem credits may not be identified accurately or in a timely manner, resulting in misstated levels of portfolio risk. The gradation of pass ratings is insufficient to stratify risk in pass credits for early warning or other purposes.
Regulatory loan ratings do not indicate any issues regarding administration of the O&G portfolio.	Regulatory loan ratings generally do not indicate administration issues within the O&G portfolio.	Regulatory loan ratings indicate some administration issues within the O&G portfolio.	Regulatory loan ratings indicate management is not properly administering the O&G portfolio.
MIS provide accurate, timely, and complete O&G portfolio information. Management and the board receive appropriate reports to analyze and understand the impact of O&G activities on the bank's credit risk profile, including off-balance-sheet activities. MIS facilitate timely exception reporting.	The accuracy, timeliness, and scope of MIS are generally satisfactory. Management and the board generally receive appropriate reports to analyze and understand the impact of O&G activities on the bank's credit risk profile; modest improvement, however, may be needed in one or more areas. MIS facilitate generally timely exception reporting.	The accuracy, timeliness, and scope of MIS may not be acceptable. Management and the board do not consistently receive appropriate reports to analyze and understand the impact of O&G lending activities on the bank's credit risk profile, and improvement is needed in several areas. MIS may not facilitate timely exception reporting.	MIS are deficient. The accuracy or timeliness of information may be affected in a material way. Management and the board may not be receiving sufficient information to analyze and understand the impact of O&G activities on the credit risk profile of the bank. Exception reporting requires improvement.

Appendix C: Recoverable Resources Classes

The guidance in this appendix is adapted from the SPEE Petroleum Resources Management System.

Class/ Subclass	Definition	Guidelines
Reserves	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.	<p>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 or characterized by their development and production status.</p> <p>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.</p> <p>A reasonable time for the initiation of development depends on the specific circumstances and varies according to the scope of the project. Although five years is recommended as a benchmark, a longer time frame could be applied when, for example, development of economic projects is 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.</p> <p>To be included in the reserves class, there must be high confidence in the commercial viability of the reservoir as supported by actual production or formation tests. In certain cases, reserves may be assigned on the basis of well logs 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.</p>
On production	The development project is currently producing and selling petroleum to market.	<p>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 percent.</p> <p>The project "decision gate" is the decision to initiate commercial production from the project.</p>
Approved for development	All necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is under way.	<p>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 capex 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 or drilling development wells.</p>

Class/ Subclass	Definition	Guidelines
Justified for development	Implementation of the development project is justified because of reasonable forecast commercial conditions at the time of reporting, and there are reasonable expectations that all necessary approvals and contracts will be obtained.	<p>To move to this level of project maturity, and 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 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 before project implementation will be forthcoming. Other than such approvals and contracts, there should be no known contingencies that could preclude the development from proceeding within a reasonable time (refer to reserves class).</p> <p>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 time.</p>
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 because of one or more contingencies.	Contingent resources may include, for example, projects for which there are currently no viable markets; when commercial recovery is dependent on technology under development; or when 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 or characterized by their economic status.
Development pending	A discovered accumulation where project activities are ongoing to justify commercial development in the foreseeable future.	<p>The project is seen to have reasonable potential for eventual commercial development, to the extent that further data acquisition (e.g., drilling or seismic data) 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. Note that disappointing appraisal and evaluation results could lead to a reclassification of the project to "on hold" or "not viable" status.</p> <p>The project "decision gate" is the decision to undertake further data acquisition 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.</p>

Class/ Subclass	Definition	Guidelines
Development unclarified or on hold	A discovered accumulation where project activities are on hold or where justification as a commercial development may be subject to significant delay.	<p>The project is seen to have potential for eventual commercial development, but further appraisal and evaluation activities are on hold pending the removal of significant contingencies external to the project, or substantial further appraisal and 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 re-classification of the project to “not viable” status.</p> <p>The project “decision gate” is the decision to either proceed with additional evaluation designed to clarify the potential for eventual commercial development or temporarily suspend or delay further activities pending resolution of external contingencies.</p>
Development not viable	A discovered accumulation for which there are no current plans to develop or acquire additional data at the time due to limited production potential.	<p>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.</p> <p>The project “decision gate” is the decision not to undertake any further data acquisition or studies on the project for the foreseeable future.</p>
Prospective resources	Those quantities of petroleum that 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 or evaluation to be classified as a prospect.	Project activities are focused on acquiring additional data or undertaking further evaluation designed to confirm whether 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.

Class/ Subclass	Definition	Guidelines
Play	A project associated with a prospective trend of potential prospects, but which requires more data acquisition or evaluation to define specific leads or prospects.	Project activities are focused on acquiring additional data 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.

Appendix D: Glossary

Abandon: (1) The proper plugging and abandoning of a well in compliance with all applicable regulations, and the cleaning up of the well site to the satisfaction of any governmental body having jurisdiction with respect thereto and to the reasonable satisfaction of the operator. (2) To cease completion of a well and salvage drilling or well material and equipment.

Abatement: (1) The act or process of reducing the intensity of pollution. (2) The use of some method of abating pollution.

American Petroleum Institute: The primary trade association representing the O&G industry in the United States.

Annulus: The space between (1) the casing and the wall of the borehole, (2) two strings of casing, and (3) tubing and casing.

Appraisal well: A well drilled as part of an appraisal drilling program that is carried out to determine the physical extent, reserves, and likely production rate of a field.

Backwardation: Sometimes referred to as normal backwardation. A theory that as a futures contract approaches expiration, the trading price increases.

Barrel (bbl): One barrel of oil (1 barrel = 42 U.S. gallons [approx.] or 35 imperial gallons [approx.] or 159 liters [approx.]; 7.45 barrels = 1 ton [approx.]; 6.29 barrels = 1 cubic meter).

Bcf: Billion cubic feet (1 billion cubic feet of natural gas = 0.026 million metric tons or 0.18 million barrels of oil equivalent).

Bcm: Billion cubic meters (1 cubic meter = 35.31 cubic feet).

Blow-out: When well pressure exceeds the ability of the wellhead valves to control it. O&G “blow wild” at the surface.

BOE: Barrel of oil equivalent. A unit of measure to equate O&G volumes. Each barrel of oil equals 6,000 cubic feet (or 6 mcf) of natural gas. For example, if a company produces 1 million barrels of oil and 6 million mcf of gas, it has produced 2 million BOE.

Borehole: The hole as drilled by the drill bit.

Borrowing base: A collateral base agreed to by the borrower and lender that is used to limit the amount of funds the lender advances the borrower. The borrowing base specifies the maximum amount that can be borrowed in terms of collateral type, eligibility, and advance rates.

Brent Crude: Brent Crude is a major oil trading classification of sweet light crude oil that serves as a major benchmark price for purchases of oil worldwide. It is extracted from the North Sea and is described as light because of its relatively low density and sweet because of its low sulfur content.(Updated October 15, 2018)

Brownfield production: An existing field that is brought back into production because of improved markets, technology, etc.

Capex: Capital expenditures.

Casing: Pipe cemented in the well to seal off formation fluids or keep the hole from caving in. Casing remains in the well as a permanent reinforcement after the drilling is complete.

Completion: The installation of permanent wellhead equipment for the production of O&G.

Condensate: Hydrocarbons that are in the gaseous state under reservoir conditions and become liquid when temperature or pressure is reduced.

Contango: A circumstance in which the futures price of a commodity has risen above the future expected spot price. A contango implies that investors are willing to pay a premium for delivery of a commodity in the future rather than pay the carrying costs of buying the commodity today and holding it.

Core: A cylindrical sample of a formation penetrated in a rotary drilling operation. Samples are examined to obtain geological information.

Crude oil: Liquid petroleum as it comes out of the ground as distinguished from refined oils manufactured out of it.

Day rate: The rate paid to a drilling contractor for each day's work under a day work contract, which stipulates that the contractor be paid based on time worked, not footage drilled.

Derrick: The tower-like structure that houses most of the drilling controls.

Development: O&G well development occurs after exploration has located an economically recoverable field. It involves the construction of one or more wells from the beginning (called spudding) to either abandonment if no hydrocarbons are found or to well completion if hydrocarbons are found in sufficient quantities.

Development well: Any well drilled in an area where oil or natural gas has previously been found.

Drilling: The use of a rig and crew for the drilling, suspension, completion, production testing, capping, plugging, and abandoning of a well or the converting of a well to a

producing well. Also includes any related environmental studies. Associated costs include completion costs but do not include equipping costs.

Drilling rig: A drilling unit that is not permanently fixed to the seabed, for example, a drill ship, a semisubmersible, or a jack-up unit. Also, a derrick and its associated machinery.

Dry hole: A well that contains no oil or natural gas, or too little of either to make production economically viable.

Enhanced oil recovery: A process whereby oil is recovered other than by the natural pressure in a reservoir. Examples include water flooding, use of surfactants, and in situ combustion.

Exploration: Oil and natural gas exploration is the search by petroleum geologists and geophysicists for formations containing deposits of oil and natural gas beneath Earth's surface. O&G exploration is grouped under the science of petroleum geology.

Exploration well: A deep hole drilled into the earth by an O&G company that is used to identify new sources of oil and natural gas.

Farm in: When a company acquires an interest in an acreage by taking over all or part of the financial commitment for drilling an exploration well.

Fishing: Retrieving objects from the borehole, such as a broken drill string or tools.

Frack boat: An offshore vessel used in offshore frack jobs. These vessels include various tanks, storage compartments, engines, pumps, mixing blenders, etc., for such jobs and coiled tubing that are lowered into the wellbore to put the frack fluid mix directly into the wellbore.

Fracturing: A method of breaking down a formation by pumping a mixture of fluid, biocide, and proppant(s) under pressure into the formation to create small fissures in the rock to release oil or gas. The objective is to increase production rates from a reservoir. This method is also referred to as hydraulic fracturing, fluid injection, and fracking.

Future net revenue half-life: The remaining value of cash flow after the depletion of half of the reserves.

Greenfield production: New producing wells operating in a field that has not been in production for a long time.

Ground lease: A lease agreement that allows a tenant to develop the property for the lease period but forfeits rights to the improvements to the property owner when the lease has matured.

Horizontal drilling: A drilling method whereby a vertical drilling hole is redirected so it is parallel to the oil formation, which can then be penetrated from the top.

Hydrocarbon: A compound containing only the elements hydrogen and carbon. May exist as a solid, a liquid, or a natural gas. The term is mainly used in a catchall sense for oil, natural gas, and condensate.

Infill drilling: Drilling new wells between established producing wells within an existing field lease to accelerate recovery or to test recovery methods.

Jack-up rig: A mobile offshore drilling rig with legs lowered to the ocean floor as an anchor. Once the legs hit bottom, the body of the rig is “jacked up” above the surface of the water. These rigs are used in shallower applications for drilling, workover, or completion.

Lifting costs: The cost of producing oil or natural gas from a well or lease.

Liquefied: Light hydrocarbon material, gaseous at atmospheric temperature and pressure, held in the liquid state by pressure to facilitate storage, transport, and handling. Commercial liquefied gas consists essentially of either propane or butane, or a mixture of the two.

LOE: Lease operating expense.

Majors: A term referring to the largest multinational integrated oil companies. Super majors refers to the largest of the majors.

Mcf: One thousand cubic feet. The standard measure of natural gas volume (1 mcf = 1 million BTU [British thermal unit] of energy at 1 atmosphere of pressure; 6 mcf = 1 BOE).

Offset well: A well drilled near other wells to assess the extent and characteristics of the reservoir. In some cases, this type of well is used to drain hydrocarbons from an adjoining lease or tract.

Operator: The company with the legal authority to drill wells and undertake the production of hydrocarbons that are found. The operator is often part of a consortium and acts on behalf of this consortium.

Pari passu: A Latin phrase meaning “by an equal progress” or “without preference.” The term’s use by creditors reflects that lenders share equally in the collateral or other asset pool. (Updated October 15, 2018)

Permeability: The property of a rock formation that quantifies the flow of a fluid through the pore spaces and into the wellbore. A tight rock formation has low permeability and lower capacity to flow O&G. Wells in such formations typically require additional stimulation via fracking or other techniques.

Petroleum gas mud: Sometimes referred to as drilling mud, it is a mixture of base substance and additives used to lubricate the drill bit and counteract the natural pressure of the formation.

Porosity: Refers to the pore space present in the underground formation that enables the rocks composing the formation to hold fluids.

Possible reserves: Unproved reserves that at present cannot be regarded as “probable” because of a low probability of profitable development. The industry standard probability that these reserves are technically and economically producible is 10 percent (or moderately higher).

Price deck: Bank-approved commodity pricing forecast that is used in RBL underwriting and the evaluation of reserve assets for RBL borrowers. Bank pricing is often based on but more conservative than market pricing forecasts, such as NYMEX futures curves.

Primary recovery: Recovery of oil or gas from a reservoir purely by using the natural pressure in the reservoir to force out the oil or gas.

Probable reserves: Unproved reserves that are estimated to have a better than 50 percent chance of being technically and economically producible.

Production: O&G production is the process of extracting the reserves and separating the mixture of liquid hydrocarbons, gas, water, and solids; removing the constituents that are nonsalable; and selling the liquid hydrocarbons and gas. Production sites frequently handle crude oil from more than one well. Oil is nearly always processed at a refinery, while natural gas may be processed to remove impurities either in the field or at a natural gas processing plant.

Proved field: An oil or gas field whose physical extent and estimated reserves have been determined.

Proved reserves: Those reserves that on the available evidence are virtually certain to be technically and economically producible (that is, have a better than 90 percent chance of being produced).

Recoverable reserves: That proportion of the O&G in a reservoir that can be removed using currently available techniques.

Redetermination: Reassessment (repricing) of the borrowing base.

Reserves: Those quantities of petroleum that are anticipated to be commercially recovered from known accumulations from a given date forward.

Reservoir: The underground formation where O&G has accumulated. It consists of a porous rock to hold the oil or gas, and a cap rock that prevents its escape.

Rig count: A survey revealing the number of drilling rigs in use during a particular period of time in a given market. Usually includes onshore and offshore rigs, unless specified otherwise.

Rotary drilling: A drilling system in which a rotating bit connected to a hollow drill pipe penetrates a rock formation. Fluid is pumped through the pipe so the rock cuttings can be brought to the surface.

Roughneck: Drill crew members who work on the derrick floor, screwing together the sections of drill pipe when running or pulling a drill string.

Roustabout: Drill crew members who handle the loading and unloading of equipment and assist in general operations around the rig.

Royalty payment: The cash or kind paid to the landowner or holder of royalty rights for a portion of the property's gross production of O&G. Although lease terms vary, a fairly standard royalty is one-eighth of production.

Secondary recovery: Recovery of oil or gas from a reservoir by artificially maintaining or enhancing the reservoir pressure by injection of gas, water, or other substances into the reservoir rock. Secondary recovery techniques are used once natural pressure in the well no longer produces free flowing oil or pumping no longer is economically viable.

Semisubmersible rig: A mobile offshore drilling rig that floats partially submerged.

Shut-in well: A well that is capable of producing but is not presently operating. Reasons why a well may be shut in include lack of equipment or market.

Stripper well: A well that makes a nominal volume of production each day, typically 10 barrels or less. Smaller independents sometimes acquire stripper wells and rework them to enhance production.

Submersible rig: A mobile offshore drilling rig with compartments that are flooded to cause the structure to submerge and rest on the seafloor; used in shallow water.

Turnkey contract: A drilling contract that calls for the completion of a well for a fixed price. All costs, including those that are unexpected, must be borne by the drilling contractor.

Utilization rate: The proportion of the total available rig fleet that is active at a given time. Computed by dividing the number of active rigs by the number of available rigs. Differences of opinion regarding the classification of "active" and "available" rigs mean that utilization rates reported by different sources may vary widely. In the marine industry, the percentage use rate for oilfield-related vessels.

Volumetric calculations: A method of determining O&G reserves by use of rock volume and rock characteristics.

Well log: A record of geological formation penetrated during drilling, including technical details of the operation.

Well spacing: The maximum area of the resource reservoir that can be efficiently and economically produced by one well. The purposes of well spacing are to prevent waste, avoid the drilling of unnecessary wells, and protect the rights of reserves owners. Statutory spacing is the limit of wells per a defined area of land established by state law or regulation.

Wildcat well: A well drilled in an unproved area. Also called an “exploration well.”

Working interest: The term, also called an operating interest, used to describe the lease owner’s interest in the well. Lease owners pay 100 percent of cost and receive all revenues after taxes and royalties are paid.

Workover: Remedial work to the equipment within a well, to the well pipework, or relating to attempts to increase the rate of flow of a well.

Appendix E: Abbreviations

1P	proved reserves
2P	proved plus probable
3P	proved plus probable plus possible
AAPG	American Association of Petroleum Geologists
ABL	asset-based lending
ALLL	allowance for loan and lease losses
Bbl or bbl	barrel
BTU	British thermal unit
CFR	Code of Federal Regulations
E&P	exploration and production
EBITDA	earnings before interest, taxes, depreciation, and amortization
EBITDAX	EBITDA plus depletion, exploration, and abandonment expenses
EIC	examiner-in-charge
FNR	future net revenue
FSA	federal savings association
G&A	general and administrative
GFC	global financial condition
ICQ	internal control questionnaire
LNG	liquefied natural gas
LOS	lease operating statement
MIS	management information system
NGL	natural gas liquid

NPV	net present value
NYMEX	New York Mercantile Exchange
O&G	oil and gas
OCC	Office of the Comptroller of the Currency
PDBP	proved developed behind the pipe
PDNP	proved developed reserves subcategorized as nonproducing
PDP	proved developed reserves subcategorized as producing
PDSI	proved developed shut-in
PUD	proved undeveloped
PV	present worth of future net income
RBL	reserve-based loan
SPE	Society of Petroleum Engineers
SPEE	Society of Petroleum Evaluation Engineers
TTM	trailing 12 months
UCC	Uniform Commercial Code
USC	U.S. Code
VPP	volumetric production payment
WPC	World Petroleum Council
WTI	West Texas Intermediate

References

(Section updated October 15, 2018)

Listed references apply to national banks and federal savings associations unless otherwise specified.

Laws

- 12 USC 24, “Corporate Powers of Associations” (national banks)
- 12 USC 29, “Real Property” (national banks)
- 12 USC 84, “Lending Limits”
- 12 USC 371, “Real Estate Loans” (national banks)
- 12 USC 1461 et seq., “Home Owners’ Loan Act” (federal savings associations)
- 12 USC 1464, “Federal Savings Associations” (federal savings associations)
- 12 USC 3102(b), “Rules and Regulations; Rights and Privileges; Duties and Liabilities; Exceptions; Coordination of Examinations” (federal branches and agencies)

Regulations

- 12 CFR 160, “Lending and Investment” (federal savings associations)
- 13 CFR 121, “Small Business Size Regulations” (federal savings associations)

Comptroller’s Handbook

Examination Process

- “Bank Supervision Process”
- “Community Bank Supervision”
- “Federal Branches and Agencies Supervision”
- “Foreword”
- “Large Bank Supervision”
- “Sampling Methodologies” (national banks)

Safety and Soundness, Asset Quality

- “Allowance for Loan and Lease Losses”
- “Concentrations of Credit”
- “Loan Portfolio Management”
- “Rating Credit Risk”

Safety and Soundness, Management

- “Corporate and Risk Governance”

Office of Thrift Supervision Examination Handbook

These references apply to federal savings associations.

Section 201, “Overview: Lending Operations and Portfolio Risk Management”

Section 209, “Appendix A: Sampling Terminology”

OCC Issuances

Bank Accounting Advisory Series

Interpretive Letter 1117 (national banks)

OCC Bulletin 2007-1, “Complex Structured Finance Transactions: Notice of Final Interagency Statement”

OCC Bulletin 2010-24, “Interagency Guidance on Sound Incentive Compensation Policies”

OCC Bulletin 2013-29, “Third-Party Relationships: Risk Management Guidance”

OCC Bulletin 2017-7, “Third-Party Relationships: Supplemental Examination Procedures”

OCC Bulletin 2017-21, “Third-Party Relationships: Frequently Asked Questions to Supplement OCC Bulletin 2013-29”

Table of Updates Since Publication

Refer to the “Foreword” booklet of the *Comptroller’s Handbook* for more information regarding the OCC’s process for updating *Comptroller’s Handbook* booklets.

Version 2.0: Published March 16, 2016			
Version number	Date	Reason	Affected pages (listed for newest version only)
2.1	January 27, 2017	Nonaccrual status	
2.2	October 15, 2018	Clarified applicability to federal branches and agencies of foreign banking organizations	1
		Added reference to the “Rating Credit Risk” booklet of the <i>Comptroller’s Handbook</i>	1
		Clarifications regarding supervisory guidance, sound risk management, or legal language	11–12, 16–17, 22–23, 30–31, 47, 50, 53–54, 68
		Updated for consistency with the booklets in the “Examination Process” series of the <i>Comptroller’s Handbook</i>	18, 41, 59
		Clarifications regarding the roles of the bank’s board or management responsibilities	19
		Third-party risk management guidance and examination procedures (OCC Bulletins 2013-29, 2017-7, and 2017-21)	22, 56
		Added bullet regarding chattel liens	29
		Updated for clarity	36, 45, 51, 53–54, 59, 64, 76, 78
		Added reference to incentive compensation guidance (OCC Bulletin 2010-24)	56
		Updated “References” section for consistency with the content of the booklet	84–85