



**BOARD OF GOVERNORS**  
OF THE  
**FEDERAL RESERVE SYSTEM**

WASHINGTON, D.C. 20551

DIVISION OF BANKING  
SUPERVISION AND REGULATION

**SR 16-17**

**December 1, 2016**

**TO THE OFFICER IN CHARGE OF SUPERVISION  
AT EACH FEDERAL RESERVE BANK**

**SUBJECT: Supervisory Expectations for Risk Management of Reserve-Based Energy  
Lending Risk**

**Applicability:** This guidance applies to state member banks, U.S. branches and agencies of foreign banking organizations, and depository institution holding companies and nonbank subsidiaries of such holding companies involved in energy lending, regardless of the asset size of the supervised institution.

The purpose of this letter is to enhance existing energy lending guidance<sup>1</sup> and to update financial institutions and supervisory staff about key risks and risk management factors for reserve-based lending activities.

Reserve-based lending is a type of financing where a loan is secured by the reserves of oil and gas of a borrower and repaid primarily using the proceeds from the future sale of encumbered oil or gas reserves. The amount of a reserve-based loan is determined based on the borrower's "proved reserves" borrowing base, adjusted for certain risk factors. Categories of proved reserves include proved-developed-producing,<sup>2</sup> proved-developed-nonproducing,<sup>3</sup> and proved-undeveloped reserves.<sup>4</sup> While this guidance is being issued largely in response to recent

<sup>1</sup> See Energy Lending—Production Loans, *Commercial Bank Examination Manual*, Section 2150.1.

<sup>2</sup> **Proved-developed-producing** reserves are those quantities of petroleum which, by analysis of geological and engineering data, can be estimated with reasonable certainty (90%) to be commercially recoverable, from a given date forward, from known reservoirs and under current economic conditions, operating methods, and government regulations. Reserves subcategorized as **producing** are expected to be recovered from completion intervals which are open and producing at the time of the estimate. "Petroleum Reserves Definitions," Society of Petroleum Engineers, last modified March 1997, [www.spe.org/industry/petroleum-reserves-definitions.php](http://www.spe.org/industry/petroleum-reserves-definitions.php).

<sup>3</sup> **Proved-developed-nonproducing** reserves include shut-in (open but not producing, waiting on market/pipeline connections, or mechanical problems) and behind pipe (requires additional completion or future recompletion) reserves. *Ibid.*

<sup>4</sup> **Proved-undeveloped** reserves are reserves to be recovered from additional drilling, deepening existing wells to a different reservoir, or where a relatively large expenditure is required to complete an existing well or install production or transportation facilities. *Ibid.*

oil and gas industry developments, the risk-management principles are broadly applicable irrespective of market conditions.

### **Market Issues and Risk Ramifications**

A financial institution engaging in reserve-based lending should maintain a robust risk management program to manage and control the level of risk in and concentration of its reserve-based lending portfolio. The program should include timely market condition analysis that supports sound credit risk management and underwriting practices. The range and extent of market analysis may vary depending on the composition of the institution's energy-related loan portfolio and overall risk exposure to the energy industry. The analysis should provide an institution's management and its board of directors with sufficient information on market conditions to make informed decisions regarding both loan and portfolio risk changes.

Prolonged declines in crude oil prices often result in substantial declines in crude oil and natural gas reserve collateral values and associated cash flows, challenging the loan repayment ability of oil and gas exploration and production borrowers. Highly leveraged borrowers and those that are in weakened financial condition are most vulnerable to these market conditions. Financial institutions should monitor market factors to better manage and control the risk of their reserve-based lending portfolios and to determine the repayment ability of their borrowers. These factors include:

- ***Oil and gas commodity prices.*** Commodities are particularly susceptible to price volatility. Global supply and demand imbalances can affect commodity prices and the cost of production. For example, weather events, economic conditions, and numerous other factors can alter global supply as well as demand and place downward pressure on exploration and production company performance. Financial institutions should take market developments and price volatility into consideration when critically reviewing collateral valuation assumptions and managing their reserve-based lending exposure.
- ***Production costs and capital expenditure.*** Production costs are also known as "lifting costs." These costs are incurred in the operation and maintenance of wells, related equipment, and facilities, and can affect sustained production. Financial institutions should critically review production costs and capital expenditures when determining borrower repayment capacity, financial viability, and liquidity. Additionally, production costs can vary significantly between wells and fields. Financial institutions should use location-specific production cost and capital expenditure estimates instead of general assumptions, particularly for those reserve-based lending portfolios containing wells in different oil fields.

New technological drilling and completion improvements, such as horizontal wells with multistage hydraulic fracturing completions, have significantly increased the up-front capital needs for exploration and production borrowers. Financial institutions engaging in exploration and production lending should understand the capital needs of these borrowers, including the use of new technologies, when determining borrower repayment ability. As reserves are depleted, additional capital spending is required to bring additional reserves into production and maintain productivity levels.

- ***Lease provision and maintenance.*** Oil and gas leases generally include a “continuous drilling” or “continuous operations” clause to prevent the lease from expiring at the end of the primary term while drilling operations are in progress. It gives the lessee the right to continue drilling any well that was begun before the lease expired and to begin drilling more wells. Maintaining production in order to exercise these lease maintenance clauses can potentially cause financial challenges to a borrower, particularly during weak market condition. Financial institutions should understand the scope of lease maintenance clauses in place and assess the borrower’s ability to remain in compliance during stressed time periods.

### **Supervisory Expectations for Credit Risk Management and Underwriting Practices**

Financial institutions should have in place appropriate risk management programs and prudent underwriting standards for reserve-based lending. A risk management program should cover concentration limits and market condition analysis, as well as expectations to identify, measure, monitor and control concentration risks associated with reserve-based lending. Moreover, an institution’s risk management program for reserve-based lending should be effectively integrated into its capital planning practices. A financial institution should regularly review its policies and practices for reserve-based lending, including any relevant contingency plans in the event of market changes, and should maintain capital levels commensurate with the level and nature of its reserve-based lending exposure.

At a minimum, an institution with significant reserve-based lending exposure should have established risk management practices that address the following:

#### ***Individual Reserve-Based Lending Credit Monitoring***

- ***Assessment of a Borrower’s Creditworthiness.*** An institution should conduct a thorough analysis of a borrower’s past and prospective creditworthiness, including:
  - projected income and expenses compared to actual results, as well as the results of peer oil and gas producers in the region,
  - working capital adequacy,
  - capital expense analysis,
  - cash flow analysis, and
  - price sensitivity analysis.

Current borrower financial information is essential to the institution’s ability to evaluate the borrower’s creditworthiness, leverage, and liquidity. A creditworthy exploration and production business should exhibit strong repayment ability, risk analysis, liquidity, solvency, reserve valuation, credit management, profitability, and management performance.

- ***Assessment of a Borrower’s Cash Flow.*** In volatile markets, a highly leveraged borrower may not have the necessary cash flow to properly service its debt according to the loan terms. By reviewing borrower-prepared cash flow statements, an institution should be able to identify potential repayment ability problems, calculate key cash flow ratios, and assess the ability of the business to handle risk and uncertainty.

Risk and uncertainty due to market factors, commodity prices, and production levels are prevalent characteristics of most exploration and production operations and should be reflected in the cash flow projections. A sensitivity analysis that determines an exploration and production operator's ability to withstand fluctuations in commodity prices and uncertainty in production levels is critical in analyzing cash flow projections. Some key elements of sound financial analysis that an institution should conduct include:

- Reviewing the reasonableness of underlying assumptions and projections for production, pricing, and price differentials;
  - Comparing these projections with historical production and performance results;
  - Analyzing hedges in place as of collateral valuation date;
  - Assessing the impact of changes in capital expenditures on production levels; and
  - Evaluating a borrower's ability to timely service total debt and significant changes in its balance sheet structure.
- *Reliable Collateral Evaluations.* Valuation of oil and gas reserves demands expertise and industry experience. The interconnected nature of the energy industry is complex and demands breadth and depth of understanding across all business sectors which include upstream, midstream, and downstream segments. Specialized contracts with energy services providers, such as transportation to market or delivery point, should be carefully reviewed as part of risk management practices for reliable collateral valuation.

A typical reserve-based lending credit facility requires a borrower to deliver an updated reserve engineering report twice a year to the lender. A financial institution should identify additional costs and value adjustments not included in the engineering report, such as information on land mortgage restrictions and lease assignments, and use this information to understand the scope and limitation of the collateral securing the reserve-based lending. An institution should assess the assumptions contained in the reserve report, as this information forms the basis for its analysis of the reserve valuation.

A financial institution should have a well-defined and consistently applied process, including minimum frequency, for obtaining independent reserve engineering reports. These reports require significant industry expertise and should include a complete analysis of the wells and production requirements from current production and over the life of a well.

A financial institution should periodically conduct independent assessments of reserve valuation. Depending on the level and complexity of reserve-based lending in its portfolio, an institution should utilize its own independent staff engineers (if available) or retain independent petroleum engineers to conduct a comprehensive assessment of reserve valuation. This assessment should consider such factors as the relevant production volumes, expected ultimate recovery of reserves, and capital expenditures needed to convert reserves into production. An institution should also have processes in place to monitor periodically (at minimum, twice a year) the value of collateral pledged in order to manage repayment risk over the life of the loan. An institution's processes, risk adjustment factors, and discount rates for reserve analyses should be well defined

in policy and consistently applied. Additionally, evidence of collateral lien perfection and collateral inspections should be documented in loan files.

- *Loan structure.* The structure of a reserve-based loan should depend on the nature of a borrower's business. To properly structure a borrowing relationship, a financial institution should be able to:
  - Project how the borrower will perform in the future, including likely primary and secondary repayment sources from producing and developing assets. There should be limits to the portion of repayment capacity derived from developing assets.
  - Anticipate challenges and problems that the borrower may encounter, such as commodity price volatility, operational risks, and lease maintenance requirements.
  - Match the type and terms of the loan to both the loan purpose and the likely repayment sources. This includes ensuring the loan is supported by sufficient cash flow from the expected repayment source, particularly when a reserve-based loan's collateral includes undeveloped fields (that is, proved-developed-nonproducing reserves and proved-undeveloped reserves) or fields that do not have a continuous production history as collateral. The primary source of repayment is typically proved producing reserves.
  - Develop loan agreement covenants that protect the financial institution, including provisions for monitoring the borrower's expenditures for the term of the loan. For example, a forward-looking liquidity test should provide an institution with visibility to the future consolidated liquidity position of the borrower and all guarantors to the loan. In addition, covenants should require the borrower to obtain the financial institution's approval prior to lifting any hedges upon which the institution is relying to mitigate collateral market value fluctuation.
  - Secure the credit facility with collateral and consider requiring the borrower to provide loan support such as guarantees and hedges for commodity price volatility. Any guarantor should be included in the loan agreement. A financial institution should have processes and procedures in place to limit a borrower's commodity price hedging to its total production and thereby avoid over-hedging.
- *Risk rating credit facilities.* A financial institution should have in place a robust process to risk rate reserve-based loans. Risk rating for reserve-based loans should be based on realistic repayment assumptions for a borrower's ability to de-lever and repay the reserve-based loan and its total debt relative to the economic life of the borrower's oil and gas reserves. Financial support or credit enhancement from a sponsor (such as the borrower's parent company) should be demonstrated and documented for rating conclusions.
- *Timing of collateral impairment testing and impairment indicators.* Generally, reserve-based loan terms require a borrower to prepare a reserve impairment assessment at least annually, and more frequently depending on events or changes in circumstances. A financial institution should review the reserve impairment assessment report and associated recoverability test of pledged assets' value whenever events or changes in circumstances indicate that a pledged asset's carrying amount may not be recoverable.

### ***Reserve-Based Lending Portfolio Monitoring***

- *Underwriting standards.* An institution should periodically review its underwriting standards to ensure its reserve-based lending policies do not become outdated, ineffective, or unaligned with its stated risk appetite. The frequency and depth of the review will depend on circumstances specific to the institution, such as growth expectations, competitive factors, economic conditions, and overall financial condition. An institution's management should review and modify, as appropriate, reserve-based lending policies based on any planned changes to its reserve-based lending function or business plan. An institution should also address significant criticisms and recommendations about its underwriting standards that have been identified in recent audits and examinations.
- *Concentration limits.* In general, a financial institution should monitor and manage its aggregate energy lending portfolio to avoid concentration risk. The institution should set risk limits for reserve-based energy lending that are consistent with the risk appetite approved by the board of directors. In addition, an institution should monitor and manage its production and regional concentration risk for exploration and production borrowers to avoid any single well or field accounting for a high percentage of its energy-related loan portfolio.<sup>5</sup>
- *Credit administration and controls.* An institution should have appropriate policies and controls to monitor and separately manage troubled reserve-based loans for which a borrower is unable to generate sufficient cash flow from oil and/or gas production to repay the loan (sometimes called "stretched" reserve-based loans). A stretched reserve-based loan reflects a borrower with credit or liquidity weaknesses, and an institution should understand the fundamental causes of those weaknesses. An institution may still work with a troubled borrower to continue to service existing loans. An institution should confirm the reasons for the borrower's cash flow problems (for example, weaknesses in a borrower's financial condition or operations, or poor market conditions). An institution's credit administration process should appropriately monitor exposure to the borrower and adjust the credit facility rating to reflect the borrower's credit condition, as well as the viability of the borrower's operation, so that the institution can make an informed decision as to whether advancing additional funds is appropriate. Any additional funds advanced should be for the purpose of improving the borrower's financial condition.

Expectations for the level of sophistication of risk management systems will vary based on the specific risk characteristics, complexity, and size of an institution's reserve-based lending exposure. In general, there are higher expectations around risk management for financial institutions with significant reserve-based lending exposures in concentrated geographic locations and market segments. An institution should assess the effect, if any, of its reserve-based lending activities on the institution's overall financial condition, including capital, the allowance for loan and lease losses, and liquidity.

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<sup>5</sup> For more information, see 17 CFR 210.4-10, "Financial accounting and reporting for oil and gas producing activities pursuant to the Federal securities laws and the Energy Policy and Conservation Act of 1975."

## **Contacts**

Reserve Banks are asked to distribute this letter to supervised organizations in their districts and to appropriate supervisory staff. Questions regarding this letter should be directed to Peter Clifford, Manager, Risk Policy, at (202) 785-6057; or Lesley Chao, Senior Supervisory Financial Analyst, Risk Policy, at (202) 974-7063. In addition, questions may be sent via the Board's public website.<sup>6</sup>

Michael S. Gibson  
Director

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<sup>6</sup> See: <http://www.federalreserve.gov/apps/contactus/feedback.aspx>.