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Avoiding Common Pitfalls in Oil and Gas Reserve Valuations

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The key to an oil and gas company's compliance with US tax reporting requirements is performing impartial valuations of the fair market value of its assets, say KPMG Washington National Tax and Valuation Services specialists.

Oil and gas businesses often actively seek acquisitions to expand their oil and gas reserve base, enhance operational efficiencies and grow shareholder value. For these businesses to comply with U.S. tax reporting requirements for Fair Market Value (FMV) of the assets, they require impartial valuations. Companies preparing income-based valuation analyses often wrestle with recurring and challenging issues specific to the oil and gas reserves.

A close examination of these commonly seen issues/pitfalls can help acquirers estimate the FMV of oil and gas reserves for US tax purposes.

Valuations of O&G Reserves for Tax Purposes

For US tax purposes, valuations typically adhere to the standard of FMV as defined in Revenue Ruling 59-60 as:

"the price at which the subject property would change hands between a willing buyer and a willing seller when the former is not under any compulsion to buy and the latter is not under any compulsion to sell, both parties having reasonable knowledge of the relevant facts."

Purchase and sale agreements often require an agreement between a buyer and a seller on the allocation of the purchase price to the individual asset classes acquired to enable tax returns to be filed under I.R.C. §1060 by both parties. In such cases, FMV becomes a critical component for disaggregating the overall purchase consideration transferred and determining the value assigned to each asset class, including O&G reserves and tangible equipment.

In this context, we will cover some common O&G reserves valuation pitfalls for tax purposes.

Pitfall 1: Using PV10 Value as a Proxy for FMV

PV10 is the present value of the projected cash flows discounted at 10% as prescribed in the Securities and Exchange Commission's (SEC) Standardized Measure of Oil and Gas (SMOG) disclosure rule. It is a metric presented in the year-end reserve reports and financial statements of O&G companies for comparability and disclosure purposes only.

Therefore, PV10 is typically not an appropriate measure of FMV. Not only does it rely on a default discount rate and a historical view of commodity prices, but it also excludes considerations of risk adjustments to the reserves and the potential impact of corporate income taxes as illustrated in Figure 1.

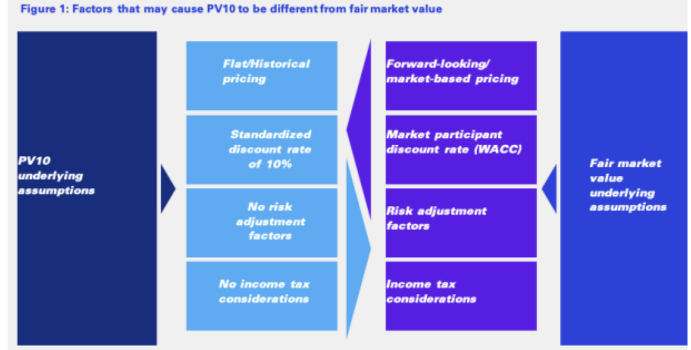


Figure 1: Factors that may cause PV10 to be different from fair market value

Furthermore, the IRS's Oil and Gas Audit Technique Guide clarifies (at VII.C.4.) that estimates of SMOG-compliant reserves for financial reporting disclosures may not be appropriate for tax purpose, where estimated volumes can vary significantly with the non-market-based assumptions such as historical price average and misrepresent the recoverable reserves subject to cost depletion calculations.

And finally, market players active in the upstream sector may have varying degrees of risk and return requirements that could result in a discount rate that is different from the standardized 10% discount rate required by SMOG disclosure rule.

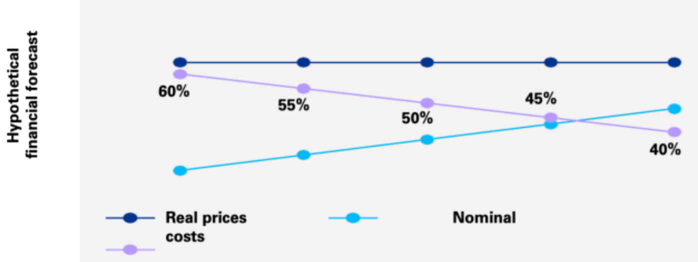
Key takeaway: Reserve reports prepared by third-party reserve engineers often include disclaimers that the PV10 should not be relied upon as indications of FMV. A valuation specialist can help companies ensure compliance with FMV as defined by the IRS.

Pitfall 2: Lack of Consistency in Nominal and Real Inputs

One of the key considerations at the onset of a reserve valuation is whether the inputs used in the expected future net cash flows are prepared in nominal terms (directly accounting for inflation) or in real terms (removing the effect of inflation). The inputs should be prepared on a consistent basis throughout the valuation to avoid a mismatch.

In the hypothetical example presented in Figure 2, if an appraiser holds prices flat in the forecast (assuming real pricing as shown by the dark blue line) while escalating expenses, a mismatch will result between the real basis of the revenue as compared to the nominal basis of the expenses (represented by the light blue line). This potentially understates profitability, as shown by the light purple line.

Figure 2: Mismatch of real prices and nominal costs leads to potentially understated profitability



Performing a valuation on a nominal basis often requires incorporating inflation into both the price and expenditure forecasts to achieve parity and consistency in long-term profitability margins. Additionally, the discount rate needs to be consistent with the cash flows. For example, nominal cash flows should be discounted with a nominal discount rate. Typically, cash flows for oil and gas reserves are prepared on a nominal basis; however, if real cash flows are relied upon, then the discount rate should be adjusted to real terms using a long-term inflation forecast.

Key takeaway: When determining fair market value for O&G reserves, discuss with the reserve engineers whether inflationary assumptions have been considered in the reserve reports.

Pitfall 3: Reliance on SEC-Prescribed Disclosure Methodology for Market Price Estimates

Rev. Rul. 59-60 states: *Prior earnings records usually are the most reliable guide as to the future expectancy, but resort to arbitrary five- or-ten-year averages without regard to current trends or future prospects will not produce a realistic valuation.*

As such, in performing an FMV analysis of O&G reserves, a key input such as commodity prices requires a forward-looking perspective. Examples of benchmarks for estimating future prices may include:

- Commodity futures published by the New York Mercantile Exchange (NYMEX), known as the "strip," is a common source for nominal price forecast
- Forecasts from independent analysts, such as economic research or investment banking firms. When considering these forecasts, one will need to assess whether the pricing data provided by analysts is on a real or nominal basis.

Reliance on third-party sources for commodity prices in a tax valuation context adds to the robustness of an internally developed DCF analysis, while the use of forward-looking forecasts reflects best available information for the highly cyclical oil and gas sector. When relying upon NYMEX futures, we note that robustness of the forecast dissipates with each successive year due to the rapidly declining number of outstanding futures contracts informing the price. This loss of liquidity towards the end of the strip price is typically remedied by transitioning to a long-term price or a weighted basket of long-term analyst prices.

Key takeaway: It is important to consider a forward-looking, market-based price curve when performing an FMV analysis.

Pitfall 4: Lack of Use of Reserve Adjustment Factors or Risk-Adjusted Discount Rate

Rev. Rul. 59-60 states: *The appraiser must exercise his judgment as to the degree of risk attaching to the business of the corporation which issued the stock, but that judgment must be related to all of the other factors affecting value.*

The risk associated with the likelihood of economic production of reserves, commonly referred to in the oil and gas industry as "reserve risk," varies depending on reserve categories. Reserve risk is incremental to the risk associated with the cost of capital, which captures the corporate or non-cash flows specific risk. There are two generally accepted practices for quantifying reserve risk:

1. A *reserve adjustment factor* (RAF) is a downward adjustment to cash flows attributable to reserves to account for reserve risk. RAFs are expressed as a percentage, ranging from 0 to 100% and are incorporated into the build-up of the DCF analysis, effectively reducing the projected production volumes with consideration of appropriate OpEx and CapEx adjustments. RAFs vary

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across reserve categories, with a progressively higher risk adjustment factor applied to increasingly uncertain categories (i.e., higher risk translates to a lower RAF percentage).

2. A *risk-adjusted discount rate* (RADR) is a discount rate applied to cash flows attributable to reserves, which includes a premium for reserve risk. Because the RADR accounts for cost of capital and reserve risk, a firm's RADR will be equal to or larger than its cost of capital.

Key takeaway: A reconciliation of individual risk factors across all reserve categories enables further assessment of the risk profile of the assets and ensures the overall FMV conclusion is reasonable. To support this analysis, organizations can perform additional benchmarking to market multiples and consider readily available industry survey data.

Tax Assumptions Considerations

Tax Structure and Highest and Best Use

In performing a DCF analysis of acquired O&G reserves, one needs to determine the appropriate transaction structure, in order to estimate future income taxes as a critical component of cash flow and thus FMV. The estimate of future cash taxes is subject to forecasting several material corporate income tax deductions available for upstream oil and gas companies under IRS regulations such as tax depletion, intangible drilling costs (i.e., IDC) and tax depreciation for tangible equipment.

If a non-taxable (stock) transaction is assumed in the DCF analysis, the tax basis for calculating these three deductions should be based on carryover or historical tax books of the seller. If a taxable (asset) transaction is relied upon in the DCF analysis, the tax basis for calculating the tax deductions is based on new or stepped-up tax basis, which typically equates to the FMV of the individual assets acquired such as O&G reserves and tangible equipment.

Considering that O&G reserves are a depleting asset, rapidly producing its initial reserve volumes, subsequent valuations of such reserves may result in an FMV above historical tax value or a step-up in tax basis. Since the step-up in FMV of tax basis leads to higher tax benefits, taxable (asset) transactions are viewed favorably when compared to non-taxable (stock) transactions and have become the dominant form of tax structures in tax-based valuations. The fundamental valuation concept outlines that the *highest and best use* of an asset is where the determination of FMV typically reflects the maximum reasonable expected monetary amounts of the future economic benefits from the assets.

Implications on Tax Depletion Deductions

Valuations of O&G reserves for tax purposes often help establish the new tax basis for what are called "depletion pools," which drive the calculations of tax depletion deductions for the purpose of federal corporate income tax returns.

Rules for tax depletion deductions are outlined in I.R.C. §611 and §613, which allow for two methods — cost and percentage depletion — with the method providing the largest deduction prevailing. Further guidance on calculating tax depletion deduction, including units of production, reserves and determination of fair market value for mineral assets subject to depletion, are outlined in the regulations issued under §611 through §613A. One notable consideration in the guidance is that typically only proved (developed and undeveloped) reserves comprise the reserve basis subject to FMV assessment and cost depletion deduction. Oil and Gas Audit Technique Guide published by IRS outline that care should be taken with regard to inclusion of probable and possible reserves in the tax depletion basis calculation.

Under a taxable (asset) transaction, the "reset" of tax basis of O&G reserves may result in a higher depletion deduction under the cost depletion method, which can be more advantageous as compared to percentage depletion. The higher tax shield favorably impacts the FMV of O&G reserves, which further aligns with the highest and best use valuation concept mentioned above. In other words, due to rapid decline in depletion basis for oil and gas reserves, there is often a step-up in basis at the close of the transaction and thus the cost depletion method often results in a higher FMV.

Intangible Drilling Costs and Tax Depreciation

On the other hand, intangible drilling costs (IDCs) represent costs incurred by the O&G operator to prepare a well for production and are not subject to capitalization like lease and well equipment. Typical IDCs examples include drilling, wages, supplies, cementing and fuel. The IDCs are capital expenses eligible for full deduction in the year incurred for purposes of corporate income taxes and should be considered in a tax valuation as a material input into the FMV of O&G reserves.

Within the context of tax valuations using the DCF method, total capital costs incurred on drilling future undeveloped reserves are assumed to be bifurcated between IDCs and tangible lease and well equipment. This split in total capital costs is typically based on historical spending by the company on similar onshore wells or fields. In our experience, we typically see 70 to 95% is attributed to IDCs and remainder to tangible equipment. The allocation for offshore wells would typically be weighted less towards IDCs considering the relatively higher capital spend on tangible equipment as compared to onshore oil and gas development.

With IDCs and tax depletion driving the bulk of tax deductions available to upstream oil and gas companies, tax depreciation on tangible equipment is a lesser but still

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an important deduction to consider in the DCF analysis. Tax depreciation for lease and well equipment is based on the modified accelerated cost recovery system (MACRS) as published by IRS, with a seven-year class life as the typical election by companies and thus incorporated into an FMV analysis.

In Summary

The valuation of oil and gas reserves using the Discounted Cash Flow method relies upon various assumptions to capture specific facts and circumstances that go well beyond the examples discussed here. By understanding how to develop supportable assumptions and where critical calculations tend to go astray, O&G businesses can improve their ability to prepare robust and supportable fair market value analyses. Furthermore, a qualified appraiser with the requisite skills and experience is key to supporting a robust valuation that can withstand scrutiny.

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Kevin Kennison is a Principal, Kellie Adkins a Managing Director, Julie Chapel a Director, Max Raev a Senior Manager, Francis Dorrego a Senior Manager, and Brad Holinbeck a Senior Manager in KPMG's Washington National Tax and Valuation Services. The information contained herein is of a general nature, based on authorities that are subject to change, and not intended to be "written advice concerning one or more Federal tax matters" subject to the requirements of section 10.37(a)(2) of Treasury Department Circular 230. Applicability of the information to specific situations should be determined through consultation with your tax adviser.

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