

Practical Aspects in Estimating the Value of Marcellus Shale Oil & Gas Rights (or Speculation is not the Same as Appraisal)

Purpose of Appraisal

An appraisal is done to estimate the value of a defined property on a particular date for a specific purpose. Appraisals of oil and gas rights in the Marcellus Shale are done to estimate a value for Federal and/or state gift or estate tax, for Pennsylvania transfer tax, or to establish a value for use in family/estate planning. The effective date of the appraisal is chosen by the user of the appraisal. The physical and economic conditions of the appraisal are those that exist on the effective date.

Appraisal is Not Speculation

Appraisal is an ordered process of estimating value using accepted methodologies and appropriate data. Appraisals used for estimating value for tax purposes must conform to the prevailing version of the Uniform Standards of Professional Appraisal Practice (USPAP), definition of Fair Market Value, and other standards. The appraisal report should clearly state that the appraised value was derived in conformance to USPAP and the appraisal report itself must meet USPAP requirements.

Speculation is the creation of a “value” based on physical and/or economic conditions that do not exist for the subject property and which may have not a factual foundation. USPAP does not condone speculation in appraisal work.

Fair Market Value

Appraisals done for Federal and state tax purposes must conform to the prevailing definition of Fair Market Value. To wit:

“The highest price estimated in terms of money that the land would bring if exposed for sale in the open market, with reasonable time allowed in which to find a purchaser, buying with the knowledge of all the uses and purposes to which it was adapted and for which it was capable of being used.” [*Sacramento Southern R. R. Co. V. Heilbron 156 Cal. 408, 104 P. 979 (1909).*] or,

“The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under duress.” [American Institute of Real Estate Appraisers, *The Appraisal of Real Estate*, 9th ed.]

Virtually all definitions are comprised of the same elements. The only real difference is that some definitions refer to the “highest price” whereas other definitions refer to the likely price. The definition that should be used is the one applicable to the purpose of the appraisal and the jurisdiction in which it is applied.

Methods of Appraisal

Cost Approach - Estimation of value based on the cost to reproduce or replace the property.

Comparative Sales Approach - Estimation of value based on observed and adjusted market sales of similar properties.

Income Approach - Estimation of the value of a future stream of income based on the physical and economic conditions related to the subject property as of the effective date.

Appraisal of Producing Properties

The procedure for evaluating producing wells and properties is established and can be applied in the Marcellus Shale with no particular difficulty. However, because Marcellus production is recent and because there is no adequate system for reporting and publishing production data, the appraisal of a particular property is generally limited to the data available for that property. Further, since the appraisal is usually being done for a royalty interest, the only detailed information is from the monthly royalty statement.

The monthly royalty data provides useful information on sales, sales prices, ownership interests, and deductions but is limited in not providing production performance information other than volumes, which may be sales rather than production. Given the observed variability of production in the first few months, at least six months of full production is necessary and 12 months is preferred. After six-months, assuming there are no production constraints, some indication of the performance trend can be identified.

The early production data can be compared to data from other producing wells, to models from other sources, and/or to data from published/academic studies. The comparison data can be monthly production from nearby wells. This requires that a data base of information from other wells be available. Published models from the Barnett and other shale gas sources combined with data from longer term academic studies can be used to extend the initial well data into the future.

The DEP data is no help here except to check the reported volumes. The semi-annual reporting of total production provides no detailed information such as monthly rates and pressures. There have been attempts to construct Marcellus models using average production rates, dividing the six-month cumulative production by the producing days, and plotting these average rates to build decline curves. These models essentially show that the Marcellus performs in a manner similar to other gas producing shale formations, such as the Barnett. The data can be used to analyze the regional distribution of rate-time performance and development activity/trends.

Appraisal of Leased Non-Developed/Non-Producing Properties

Properties that are leased but have no development or production are not commonly appraised. However, the extensive and well publicized leasing of oil and gas rights in Pennsylvania in the 2007-2013 period led to a need to value these rights to establish a tax basis for newly formed corporations and for transfer and gift taxes. While there was no production or income from production it was recognized that the rights had acquired a value due to the leasing of those rights. There was and remains no basis for imposing a value based on speculative future production and income.

The accepted approach is to value the rights according to the terms of the lease. Depending on the date of the lease and the negotiating ability of the rights owner, the lease could provide income in the form of a bonus, delay rentals and, when and where applicable, an extension payment. The negotiation of the terms of the contract (lease) imparts an enhancement to the rights that represents the value to the Lessee (for access to the property) and a value to the Lessor that justifies allowing that access; the Lessor also retains the potential for future income if development occurs.

Example: The oil and gas rights to a property are encumbered by a lease signed in 2008 with a bonus of \$100,000 and annual delay rental of \$2,000. The rights could be valued in 2011 at \$100,000 plus \$6,000 (delay rentals received) plus the present value of the remaining delay rental (\$1,818 at 10%) resulting in a total of about \$108,818. Until production and royalties begin, this is the only source of income from the rights.

Note: The value of the subject rights is not influenced by the bonus and rentals paid for leases on other properties. The lease is a **contract** with the Lessee for a specific purpose and duration. The terms of the lease are not subject to re-negotiation.

This approach has been used to value hundreds of properties in Pennsylvania since 2008. It has been subject to review by attorneys and tax professionals and has not been challenged by IRS or Pennsylvania authorities.

However, some disagree with the “terms-of-lease” approach and insist that information regarding purchase and sale of oil and gas rights and/or the production data reported to DEP should be used instead. The question is, *Does that information exist in usable form and would the use of that data produce a reliable value?*

Mis-Use of So-Called “Sales” Data

This is an attempt to use the Comparable or Comparative Sales Approach to value oil and gas rights. This method is very common in the appraisal of residential and farm properties as well as business and industrial properties. However, the method fails when applied to oil and gas properties due to the lack of the necessary data to conduct a proper comparison between the comparable properties and the property being appraised.

In order to properly use the Comparable Sales approach EACH transaction considered to be useful as a comparable property transaction must meet certain basic criteria:

- The Property must be defined and described as to location, size, etc.
- The Actual Purchase Price for the Property (preferably, the oil and gas rights) must be known.
- The status of the Oil and Gas Rights (leased, un-leased, pooled, etc) must be known.
- If the property is leased, a copy of the complete lease (not the Memorandum of Lease) including all addenda, exhibits and attachments is necessary.
- There must be sufficient information on each comparable transaction to allow the properties to be compared to each other and the subject property.
- No lunch counter data (otherwise known as “hearsay” or “gossip”) is acceptable.
- Adjustments must be made to the “value” of each of the comparable properties as compared to the subject property.

The following is a partial list of the characteristics that must be identified for each Comparable Sale.

- Location - Township, County
- Acreage of Comparable Property
- Original Lessee
- Current Operator if Different
- Date of Original Lease and Remaining Term
- Date of Extension and Remaining Term
- Bonus Amount Paid
- Delay Rental Amount Paid and Remaining Due
- Extension Payment Amount
- Royalty Rate
- Standard Lease Form or Modified by Additions
- Purchase Price for Property
- Did the Purchase Price Include the Surface Estate?
- Value of Surface Encumbered by the Oil and Gas Lease
- Payments for Surface Use and/or Damage
- Subject to Deductions From Royalty for Gathering, etc?
- Is the Property Pooled or Unitized?
- Division Orders Issued?
- Well Drilling Permits Requested? Approved?
- Is the Buyer Knowledgeable?

- Was the Seller Knowledgeable?
- Any Restrictions on Accessibility to the Property?
- Any Nearby Production?

Each of these characteristics must be compared to the same characteristics of the property being valued. Where there are differences, the value of the Comparable property must be adjusted to account for each difference. If there are five Comparable properties the value of each must be adjusted. The five Sales can then be used to derive an indicator of value (such as \$/acre) which can then be applied to the property being appraised to estimate a value.

Example: The Subject Property has a Royalty of 12.5% while a Comparable Property has a 16% Royalty? How much of the Purchase Price of the Comparable is due to the Difference in Royalty Rate? What if the other Comparable Properties all have Different Royalty Rates?

Experience in Pennsylvania and every other oil and gas producing region shows that, except in very rare circumstances, these criteria cannot be met; the method is not valid for valuation of Pennsylvania Marcellus oil and gas rights.

Mis-Use of Reported Production Data

Some authors and others have suggested that the production information reported to the DEP and/or other sources can be used to estimate the production that would be obtained from a leased but non-producing and/or un-developed property. In oil and gas evaluation and appraisal, this is known as using “analogy” data to approximate the performance that might be expected from a well or wells where there is no production or limited production.

The use of data from analogy wells (or leases or fields) is a commonly accepted procedure BUT it requires that certain criteria be met. Some of these criteria are discussed above in relation to evaluating producing wells. The best analogy wells are those in the same lease or Unit or in the same field. Analogy wells are those whose geologic, engineering and production characteristics are identical or at least closely similar to the apparent characteristics of the subject well.

- ◆ **Location** - The analogy well should be in reasonably close proximity to the subject well. For Pennsylvania Marcellus evaluation wells should be within a \pm five mile radius. While somewhat arbitrary, this distance recognizes that the Marcellus is not fully developed and evaluated and that differences in the formation can occur that would effect production potential. The radius will diminish as data become available.
- ◆ **Geology** - While it is often assumed that the Marcellus is a consistent regional geologic unit, no formation created by sedimentary deposition is uniform. As demonstrated in the Barnett and Monterey shales, differences occur in the mineralogical composition of the shale, in the geo-mechanical structure of the shale intervals, and in the susceptibility of the formation to well completion methods.

- ◆ **Completion Method** - While most Marcellus wells have been completed with horizontal wellbores and have been subjected to one or more hydraulic fracturing treatments, those procedures are not identical from well to well, have varied over time, and (depending upon their success) have produced differing production results.

- ◆ **Production Performance** - The primary purpose of using analogy wells is to develop a value is to employ the experience of those wells to estimate the future production performance of the subject well. This requires a knowledge of the certain data from the analogy well.
 - Initial Production Rate
 - Following Monthly Production Rates
 - Initial Wellhead Pressure
 - Following Months Wellhead Pressure
 - Initial Gathering System Pressure

Absent access to the data from a large number of wells from private or company sources, the only data available is the information collected by DEP. The semi-annual reports of total gas volumes and producing days are not adequate for use as analogy data. There is no monthly breakdown of production or producing days; no pressure data; and no mapping of production performance. The DEP data can be used as broad support but does not provide sufficient detail to be applied to a market-value appraisal.

Further, the estimation of the value of a specific property requires data which may or may not be available even if a production projection can be created. When will production start; at what rate; will there be gathering system constraints; what will be the ownership interest in the property? Assuming production starts, what will be the initial price of gas; what will be future prices; what deductions will be made from the royalty?

Until (1) an adequate reporting system is developed and implemented and (2) information regarding the performance characteristics of the Marcellus Shale is published, the imposition of a value based on analogy data is not a valid method of appraisal.