



# ROYALTIES AND VALUATION OF MINERAL RIGHTS

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## Introduction

An appraiser of mineral rights or interests in a property is faced with the same three approaches to valuation as with any other real estate appraisal exercise: 1) cost, 2) comparable sales, and 3) the income method. The cost approach is typically viewed as the least reliable for valuing real estate in general, and the same holds if appraising just the subsurface mineral interests. (4,6) It is extremely difficult to even estimate the amount of money spent in years past on land acquisition, geophysical prospecting, drilling, or other activities, much less distinguish between useful expenditures and those that were unwise or frivolous. As for comparable sales, this often is of little use except from a global viewpoint since the characteristics which define a given mineral deposit are unique in detail; thus attempting to compare various attributes, assign a relative worth to these characteristics (surface v. underground, room-and-pillar mining v. block caving, oxide mineralization v. sulfide, etc.) and then subjectively adjust the comparables accordingly to match the subject property is generally not prone to defensible argument.

This leaves the income method as the preferred mineral valuation approach, provided sufficient understanding of

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the deposit is available, and there is reason to believe that development or continued production from the deposit is expected. Generally the mining enterprise is evaluated as an operating entity complete with requisite capital investment, managerial technique collectively captures the value of the minerals and of the business enterprise as well.

In certain instances, however, there is a need for identifying just the value of the minerals as they repose in the ground, such as allocation of a property's purchase price across the asset classes for tax reasons, or the mineral estate is under different ownership from that of the surface. A preferred method can be effected by capitalization of actual or imputed royalty income, as this income stream is directly tied to a mineral owner's or lessor's expectations of worth.

## Definition of Royalty

Like most industrial minerals, the market is relatively opaque and the word "royalty" originally referred to the rent or tax paid to the sovereign in England for the privilege of mining. In the United States, royalty is a reservation to the owner or lessor of a certain portion of the minerals, or the proceeds from their sale, at no cost to the lessor. When the payment of a mining royalty is based on Gross Proceeds, the term typically refers to the gross sales value received from the product, less expenses for freight, smelting and refining

(FS&R). This concept is often stated, in regard to metallic ores, as a royalty paid on net smelter returns to the operator or lessee (NSR).(2) This is the most common type for metallic minerals, and will be the principal form for discussion in this paper. Other types of royalty arrangements include Gross Smelter Returns, Net Value, and Net Profits Interest royalties, which may or may not be based on a sliding scale depending upon product price levels. In some instances an Overriding Royalty may be in effect, which is another royalty applied in addition to an underlying royalty on the particular property. Note that these methods of determining a production royalty are based on some measure of current economics; i.e., product price, present operating costs, capital investment, etc. Certain older royalties, particularly on non-metallic minerals such as aggregates, were predicated on a cents/ton mined basis, which possibly contained a provision for periodically updating the applied rate depending on some published inflation deflation indicator such as the Producer Price Index.

## History

The valuation of mineral properties dates back many decades. The earliest readily attainable reference work dealing with the subject is Herbert Hoover's 1909 book, *Principles of Mining*, wherein the first six chapters cover the topic of valuing mines and prospects.(8) Some techniques were published earlier (such as H.D. Hoskold's 1877 treatise, *The Engineer's Valuing Assistant*), and of course there have been numerous premises and articles written subsequently, especially since the 1960s.

Prior to the concept of discounted cash flow (DCF) analyses being accepted throughout the mining industry, the rate-

of-return approach dealt with discounted net income. This was generally the case in the mid-1930s as exemplified by an American Institute of Mining and Metallurgical Engineers (AIME) committee that conducted an in-depth analysis of coal valuation.(3) However, just prior to World War II, another AIME paper was published which suggested subtracting the present value of capital investment from the discounted value of the income stream, thereby capitalizing the investment at the hazard rate for the property as a whole; this effectively would utilize discounted cash flow as the metric for valuation rather than discounted net income.(7) Gradually this concept of DCF gained acceptance until by the mid-1960s most of the major mining companies were following these precepts in assessing the worth of mining projects.

Almost all the early treatments, including recent texts by Gentry and Stermole,(5,9) discussed the valuation of mines and mining projects. Only recently has the topic of valuing just the mineral interest, separate from an enterprise as a whole, been addressed in detail (although Leith(7) did mention use of royalty rates as a standard of value for mineral in the ground). In some measure, this severance of mineral interests relates to federal court decisions and reasoning whereby the present value of the royalty income stream is accepted as a preferred, more direct measure of the mineral interests themselves, than does a DCF analysis performed on an operating mine or development-stage project.

In 1984 a federal court case, *Cloverport Sand & Gravel Co., Inc., v. U.S.*, noted that appraisers must take care to consider only the income that the property itself could provide, and not the income produced from the business enterprise conducted on the property (i.e., the business of mining).(6) Quoting from the Uniform Appraisal Standards for Federal Land Acquisition, we see the following:

"In developing an estimate of value by the income capitalization approach for a mineral property, it is generally recognized that the most appropriate method of capitalization is yield capitalization, most notably discounted cash flow (DCF) analysis. The income that may be capitalized is the royalty income, and not the income or profit generated by the business of mining and selling the mineral. For this reason, the income capitalization approach, when applied to mineral properties, is sometimes referred to as the royalty income approach."

The document goes on to state that the essential ingredients in developing the present value of a royalty income stream (yield capitalization) are:

- A start date when production will begin,
- An annual production rate,
- The number of production years,
- The projected selling price of the product,
- A royalty rate, and
- The discount rate to be applied.

The first four of these factors relate to specific conditions inherent to the property itself, whereas the final two are best

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obtained from the market place. The federal courts believe (and therefore mineral appraisers should as well) that royalty and discount rate selection derived from, and supported by, direct market data is the preferred approach in valuing mineral interests by the royalty income method.

## Current Royalty Rates

Comparable royalty rates can be obtained from a number of sources, with the most obvious being the rates currently paid to other owners or lessors for extracting the same commodity in the immediate region as the property at issue. Often, however, the data are not forthcoming either because of the paucity of mining and/or leasing in the area, or because the parties involved believe this information is confidential.

Even if such private-party rates are obtained, care must be given in interpreting the information since there is a possibility for a disparity in the lessor/lessee understanding of reasonable royalty rates; lessees are apt to be more knowledgeable than lessors at the time of royalty rate negotiations simply because the lessee has more experience in this task as a normal course of business, whereas for the lessor it may be a one-time event.

There is a possibility that the negotiated royalty rate may be out of date, particularly if the agreement is several years old, and an escalation clause was not included. Also it may be that the lessor controls only a partial interest in the minerals, and therefore his royalty does not reflect an overall rate normally attributable to the full mineral ownership.

Each of the above conditions, should they exist, will tend to understate the current, unbiased rate considered reasonable in the industry.

Another source of rate information, particularly in the western states, may be provided by federal and state agencies involved with mineral leasing. The agencies are charged with insuring that the public receives just compensation for the production of a wasting asset, and from a broad perspective there is some uniformity among these groups. Table 1 is an example of certain rates for metallic minerals (as shown on pg. 4). Generally speaking, a royalty rate ranging from 3-5% of Net Smelter Returns seems appropriate in this instance.

## Discount Rates

The royalty interest owner generally incurs none of the liabilities of operating expense and capital outlays, nor does he carry the burden of non-profitable prospecting and exploration. His primary risk is that of reduced income (or possibly no income) in case the mine or quarry operations slow down or suspend production. As a result, the discount rate on royalty interests should be lower than the rate used in a total property appraisal. (2)

The topic of discount rates in real estate valuation has received considerable attention over the years, and it is equally important in the appraisal of mineral interests. There have been a number of approaches followed in deriving or justifying the most appropriate discount rate for a particular property. Included in

these have been a simple canvassing of other operations to see what rate they may be employing, or using a build-up method where subjective components of the ultimate rate are added together based on perceived risk; i.e., 2% for normal business risk, 3% for mining risk, 1% for market risk, and so forth.

The Arizona Department of Revenue (ADR) is one state agency that annually researches corporate decisions regarding discount rates for natural resource properties, reviews professional literature from security analysts, and assesses changes in components comprising the capital asset pricing model. As such, ADR's findings are believed to be a good source of data and analysis to serve as a basis in formulating a discount rate for royalty interests.

The 2011 guidelines from the Arizona Department of Revenue indicate representative discount rates for large-scale projects (>\$25 million) at basically 13%, with ranges in after-tax, equity hurdle rates from 8 to 15%. (1) Large-scale projects typically have slightly lower hurdle rates; based on commodity, precious metal projects exhibit the lowest representative rates, and new development projects with higher risk are at the upper end of the scale.

It should be noted that the above figure (+/-13%) represents the discount for an operating property where the operator carries substantial risk that is generally avoided by a royalty recipient (although not stated in the ADR guidelines, it is presumed here that this discount excludes inflation).

Royalty is a prior lien on operating profits and, as such, should not carry a rate as high as the more risky discount rate applied to the lessee's operation. A lower bound for discounting might be the long-term AAA bond rate of roughly 4-5% pre-tax, inclusive of an inflation component. With the upper and lower limits reasonably defined, it is then up to the appraiser to identify the particular risk associated with the property of interest and to ascribe a reasonable discount rate to the annual stream of royalty revenues.

Understandably, some deposits may carry extreme risk as to timing, potential expropriation, the solving of a metallurgical problem, or other condition which would require a substantial increase in the discount rate as a compensatory measure in valuation.

## Summary

Of the three accepted approaches to valuation of mineral deposits, the income method is typically practiced in industry. This most often considers the project as a whole, and in an operating mode. The U.S. court system believes that a valuation of the mineral interests can best be completed if a discounted cash flow analysis is performed on just the royalty stream of income due the owner or lessor, and not on the income or profit generated by the business of mining and selling the mineral.

This royalty income approach requires knowledge of the deposit characteristics as well as expected operating criteria including start date, production rate, mine life, and commodity selling price forecasts. Two factors need confirmation from the

marketplace: 1) a reasonable royalty rate to allow estimation of annual receipts, and 2) a discount rate to be applied to the annual stream of royalty revenues in order to arrive at a present value estimate for the mineral interests.

**Table 1:** Royalties, and Valuation of Mineral Rights Government Royalty Rates for Metals, Western US

Entity	Rate	Comments	Source
CO	10% NR 5% GPR	On precious metals, Colorado employs either a 10% Net Returns, or a 5% Gross Profits Royalty, whichever is greater. Net Returns is close to a Net Profits Interest, except that mining costs are not deductible.	State Board of Land Commissioners, "General Mining Lease No. 3432," February 20, 2004, Timothy Kelly, "Personal communication," March 11, 2010.
UT	4% GSR	Utah leases its non-fissionable metalliferous minerals at 4% royalty, which is assumed herein to represent a Gross Smelter Return basis.	SITLA, "Competitive Lease Offering for Oil, Gas and Associated Hydrocarbons and Other Mineral Commodities," December 31, 2009.
NV	N/A	Nevada rarely issues a lease on hardrock minerals, since most metalliferous acreage is held by mining claims on BLM ground. Taxes on a sliding scale of 2% to 5% are levied on the royalties received by lessors.	Nevada Commission of Mineral Resources, <a href="http://minerals.state.nv.us">http://minerals.state.nv.us</a> Nevada Department of Taxation, "Net Proceeds of Minerals," April 20, 2008.
MT	5% NSR	Montana's royalty rate on metallic minerals varies between 5% and 8% of the fair market value of the minerals recovered at the mine site.	U.S. General Accounting Office, "Mineral Royalties", March 1993
AZ	>2% GSR	Arizona assesses a royalty on leased state lands, with the rate determined so that the state obtains a 'fair value' for its minerals. The rate cannot go below 2% of the gross value extracted, and generally is in the 5%-6% range.	U.S. General Accounting Office, "Mineral Royalties," March 1993, Arizona Dept. of Mines and Mineral Resources, "Circular 30, Sept. 1990.
US	5% NSR	Royalty provisions for lead, zinc, and copper leases on acquired lands state that royalties are calculated as a percentage of the gross value at the point of shipment (generally considered at the mill in the form of concentrates).	U.S. Minerals Management Service, "Solid Minerals Payor Handbook," February 20, 1997

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