# The U.S. Mineral Property Valuation Patchwork of Regulations and Standards

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**Abstract**

The valuation of mineral properties in the U.S. is only partially regulated. The regulations which have jurisdiction or impact appear to have such mainly as a consequence of unintended fallout, since the regulations were designed for other purposes. Court case history can also be important. The combined results are a mixture of bad and good, with important lessons to be learned.

Since 1981, the Securities and Exchange Commission has prohibited U.S. listed companies from reporting quantitative estimates of mineralization and the value of mineralization, other than proven and probable reserves. This results in the minerals appraiser (valuator) working with a shortage of data in his everyday work, both on the subject property and in sales analysis.

Between 1989 and 1995, all 50 states and essentially all Federal agencies adopted the Uniform Standards of Professional Appraisal Practice (USPAP) for real property appraisals (valuations). The major national appraisal societies also require their members to abide by USPAP. A significant portion of minerals appraisals must now follow these standards. This paper will discuss the content of USPAP. It provides a very good framework for the valuation of a minerals property or a mine, both as real property and as a business. However, the credentialing standards for real property appraisers are now prohibitive for minerals appraisers.

**Résumé**

Trevor Ellis has a geology degree from The University of Melbourne, Australia and a Masters degree in Mineral Economics from the Colorado School of Mines. He has worked in the mining industry since 1970, and as an independent consultant since 1983. During the past decade he has specialized in the valuation of mineral properties. He has taken numerous appraisal courses from major U.S. societies. He is very active in the American Institute of Minerals Appraisers, having held the post of Treasurer and now Vice President. He drafted its Code of Ethics and is currently working on development of its standards for mineral appraisals.

## INTRODUCTION

U.S. minerals appraisers (valuators) operate in a difficult environment. Regulations of the U.S. Securities and Exchange Commission (SEC) designed for mining company reporting have had severe, unintended impacts on minerals appraisals (valuations).[1] State and Federal regulations designed to regulate the appraisal of residential real estate and office buildings that grew out of the 1970s and 1980s failure of many lending institutions, commonly impinge on minerals appraisals.

It is near impossible for a minerals appraiser to obtain the necessary credentials under the real estate regulations to operate fully within the terms of the regulations. This has resulted in real estate appraisers, generally with little or no

[1]In the U.S., the term appraisal is used for a valuation assignment and a formal valuation report. The term appraiser is used in place of the international terms valuer and valuator.

minerals industry training, performing a large portion of the mineral property appraisals conducted in the U.S. Although these people may be qualified to perform the minerals appraisals, in my opinion, most are practicing outside their area of competency.

There are no valuation standards in the U.S. specifically directed at minerals appraisals. However, minerals appraisers as a professional group have largely ignored the national appraisal standards, the history of court outcomes involving mineral properties, and other indicators of best appraisal practice. This appears to me to have caused considerable erosion of outside confidence in the profession.

I believe that there are important lessons to be learned from these experiences for those involved in the development of Canadian regulations and standards relating to mineral valuation. Also, the U.S. national appraisal standards have many positive features which should be considered in the development of Canadian mineral valuation standards. In addition to explaining the U.S. regulatory patchwork as it relates to mineral valuations, I will attempt to draw conclusions about lessons which can be learned, and highlight features which may be beneficial.

## THE U.S. SECURITIES & EXCHANGE COMMISSION

The SEC rules which most directly impact minerals appraisers were first issued in March 1981 when the SEC adopted Form S-18 for reporting by mining companies. In 1992, the SEC transferred the definitions and disclosure requirements of Form S-18 to Industry Guide 7, which is still in force (SEC, 1992).

Industry Guide 7 is focused on investor protection, as are SEC rules in general. It defines *proven* and *probable* reserves. It then prohibits the disclosure of quantitative estimates, such as tonnage and grade, for all but those reserve categories, except in rare circumstances. Similarly, it restricts disclosure of value estimates to reserves. The policy is designed to prevent private investors from confusing resources and other mineralization, with reserves that can be mined economically and legally (Abbott, 1997; Ellis, Abbott and Sandri, 1999). It is also intended to reduce the speculation associated with initial, in situ estimates of resources, which are invariably greater than the reserves, if any are delineated (Noble, 1993). In only rare cases have other disclosure pressures allowed these rules to be overridden. The fallout from these Industry Guide 7 rules is quite widespread.

In March 1999, the Society of Mining, Metallurgy and Exploration (SME) released its guidelines for definitions to be used in reporting of mineral resources, reserves and exploration information (SME, 1999). These closely follow the 1997 recommendations of the Council of Mining and Metallurgical Institutions (CMMI). To date the SEC has stuck by its antiquated 1981 reserve definitions and prohibitions. This has effectively barred reporting in the U.S. under the SME and CMMI definitions.[2]

So far my mineral property appraisal work has never been for use in a stock exchange filing. Despite this, I am generally unable to obtain important resource estimate and exploration data held by the mining company. This problem seems to arise most frequently when the client has an ownership interest in the mineral property, but is not the operator, and the report is for use by a third party. After touring the mine and plant, with stops at exploration drill rigs, I am refused the exploration drilling results and resource estimates, because they have not been publicly released. Signing of confidentiality agreements has allowed me to look at some (not all) of this non-disclosed data, but not to take much if any away for my analysis. Since the mineral resources and exploration potential generally comprise a substantial portion of the value of the property, even for operating mines, I find myself having to make my own quantitative estimate from what information and impressions I can glean.

I was even placed in the same situation for the appraisal of a mining property 100% owned and operated by my client. Since the appraisal was destined for use outside of the mining company, the company insisted that I only use

[2]Despite this regulation, in recent years an occasional U.S. listed company, such as Newmont, has begun publishing estimates of tonnage and grade of non-reserve mineralization, using terms such as “measured and indicated mineralization.” As far as we are aware, the SEC has not acted on this. (David Abbott, personal communication).

information already in the public domain, and what I could glean from my inspection of the property. Although the mineral resources of the property had tens of millions of dollars in value, no resource estimate had been released. These unintended consequences of the SEC disclosure restrictions make it impossible to directly apply the Australasian VALMIN Code to U.S. mineral property appraisals (AusIMM, 1998; Ellis, 2000a).[3]

The SEC rules also impair the minerals appraiser's ability to analyze U.S. mineral property sales for use in the sales comparison approach to valuation of his subject mineral property. Due to the general lack of resource information for properties that have been sold, I have sometimes found myself estimating the quantity of resources for a sold property.

Whether one uses a sales comparison approach or an income approach to determination of the property value, the appraiser is in a difficult and uncomfortable situation in attempting to develop a reasonable value for delineated mineralization without being provided the basic information about its quantity and quality. Often our work is used in litigation situations, whether or not that was its intended use. The appraiser could find himself being questioned by a lawyer about his use of speculation, particularly if this speculation involves the assignment of future income potential to a resource for which he does not know the quantity and grade.

Appraisers differ in how they resolve this dilemma. The minerals appraiser who is not provided with exploration data beyond that delineating proven and probable reserves can state this in his report and indicate its resulting impact on the appraisal process and value conclusion. A considerable percentage of U.S. minerals appraisers have internalized the SEC's notion expressed in its Industry Guide 7, that value should only be assigned to reserves. This attitude though does not match with the facts of the market place, which show that the value of resources and exploration potential often reach many tens of millions of dollars (Lawrence, 2000).

These unintended consequences of the SEC's actions provide an important lesson for Canadian rule makers. Rules designed to control reporting for securities purposes will probably impact mineral valuations performed for the wide variety of purposes unrelated to securities reporting, unless great care is taken in their drafting.

## NATIONAL APPRAISAL STANDARDS AND STATE LICENSING

In the late 1970s, the U.S. savings and loan industry and some banks began to collapse under the weight of loans gone bad. It was primarily high interest rate loans made during the prevailing period of high inflation rates that had become delinquent. The crisis reached its peak in the mid-1980s after inflation was wrung out of the U.S. economy. The economy went into recession and real estate values fell throughout much of the U.S. The resulting workouts of the failed and failing financial institutions required more than US$100 billion in federal bailout funds. The Resolution Trust Corporation was formed with a primary function of liquidating enormous quantities of foreclosed real estate.

Some of the blame for this stunning collapse of a large portion of the U.S. lending industry was placed on over-valued real estate and business appraisals. This led to the federal government seeking more control of appraisers and appraisal standards in place of self-regulation by appraisers. Congress authorized The Appraisal Foundation as "The Source of Appraisal Standards and Appraiser Qualifications." In 1986-87, The Appraisal Foundation developed its first edition of the Uniform Standards of Professional Appraisal Practice (USPAP).

The Appraisal Foundation in 1989 formed the Appraisal Standards Board to continue the development and amendment of USPAP. Since then, each year the Board has amended the document. The 1999 edition is 164 pages, containing standards for appraisal of real property, personal property, businesses and intangible assets, and standards for appraisers providing consulting services about real property and real estate (Appraisal Standards Board, 1999). The 2000 edition was not available at the time of writing this paper.

[3]Australasia in an economic and political context, effectively encompasses Australia, New Zealand, Papua New Guinea and nearby islands of the South Pacific Ocean.

The major national appraisal institutes of the U.S. require their members to abide by USPAP. As yet, the American Institute of Minerals Appraisers (AIMA), which Certifies minerals appraisers, has not made USPAP a requirement for its members, although it does recommend its use. All Federally chartered financial institutions and Federal agencies use USPAP as their minimum appraisal standard. In 1989, the Federal *Financial Institutions Reform, Recovery and Enforcement Act* (FIRREA) was signed into law. This required the 50 states to set appraisal standards, and to set standards for licensing and certification. By 1995, all states had complied, and had adopted USPAP for their appraisal standards.

Minerals are an integral part of real estate, and mineral rights are real property under U.S. law. Therefore, the appraisal of mineral deposits falls under Standards 1 and 2 of USPAP, the real property appraisal standards. However, if one is appraising a mine as a business, the standards for appraisal of a business, Standards 9 and 10, may be more appropriate. Business appraisals do not fall under the jurisdiction of State real estate appraisal boards. However, appraisal of the real property value as a component of the business value could fall under their jurisdiction. Also, business appraisals can fall under other State regulations.

The small percentage of minerals appraisers who abide by USPAP generally find that it forms a beneficial framework for their reports. However, many minerals appraisers will argue that they do not need to apply the USPAP standards to their work, and to a large extent they will be correct. Only occasionally are minerals appraisals contracted for use in loan applications to Federally or State chartered lending institutions. However, their appraisals are often for submittal to Federal agencies, such as the National Park Service, Forest Service, Bureau of Land Management, and the Internal Revenue Service, in which case they should abide by USPAP. Appraisals for submittal to State agencies should also abide by USPAP.

FIRREA, in amendments since approximately 1992, has exempted the appraisal of mineral rights in limited circumstances, from its control for Federally Related Transactions. The exemption is where the mineral rights are "....severable from the land when the transaction does not involve the associated parcel or tract of land."[4] As at any time with law, there are issues with definitions which would be best interpreted by a lawyer, such as what the meaning of "land" encompasses. The exemption of the appraisal of mineral rights may not necessarily exempt the appraisal of a mineral deposit, even if the mineral estate is clearly severed from the surface estate. For example, the Supreme Court for my home state of Colorado, has a long history of giving the ownership of minerals a higher priority than the ownership of mineral rights. The Union Pacific Railroad Company in the early part of the twentieth century, often sold land while retaining the mineral rights (the exclusive right to prospect for and to mine the minerals). In the 1959 case, *Radke v. Union Pacific Railroad Company*, the court ruled that reservation of the mineral rights was not equivalent to severance of the ownership of the mineral estate from the surface estate. It nullified the reservation of the mineral rights, giving the ownership of the minerals and the mineral rights to the landowner.[5]

Few minerals appraisers are State licensed. Most find it necessary to work across a large number of states, making State licensing an impractical concept. In Colorado, the appraisal of mineral rights (not minerals) is specifically excluded from the jurisdiction of the State's Board of Real Estate Appraisers. However, such exclusions of jurisdiction are a state by state matter, and to my knowledge most states do not have such exclusions. The American Institute of Professional Geologists deserves a good portion of the credit for lobbying for those exclusions that do exist. Despite this help, it is often necessary to include the value of the surface estate as part of a mineral property appraisal, even if its value is relatively insignificant. Some states mandate State licensing for all real estate appraisals, inherently including mineral property appraisals, while others only mandate it for Federally related transactions (Appraisal Institute, 1996, p. 713).

To become State licensed at a level that would legally allow a minerals appraiser to appraise a mineral property under the jurisdiction of a State real estate appraisal board, would now be an almost impossible task for a minerals appraiser coming from a minerals industry background. It requires being a Certified General Appraiser, the highest level of State

[4] 12CFR225.62 para. (h).

[5] 334 P.2d 1077

licensing. A handful of geologists and mining engineers (probably less than ten), became licensed as Certified General Appraisers when the licensing laws were first introduced, at which time the requirements were less onerous and probably applied more generously. To become a Certified General Appraiser requires 180 hours of approved appraisal courses, 3,000 hours of demonstrated real property appraisal experience gained over at least 2.5 years, and passing the Certified General exam. The 3,000 hours of experience must abide by USPAP, and generally at least 1,500 hours should be on non-residential appraisal. To demonstrate the 3,000 hours of experience, and to show that it was gained legally, the minerals appraiser will probably need to perform much if not all of it, under the supervision of a Certified General Appraiser, who will cosign the appraisal reports. Without moving into another field of appraisal, such as appraisal of commercial buildings or agricultural properties, this will be near impossible for a minerals industry professional to accomplish. I have received some suggestions that in a few states, with luck and a lawyer, it may be possible for a minerals appraiser to have his 3,000 hours of appraisal experience approved without any of it being under a Certified General Appraiser.

Even if one were to achieve the Certified General Appraiser status in one state, the reality is that each minerals appraiser generally conducts his appraisal work in a large number of states. The niche of minerals appraisal is so small that the number of mineral property appraisal projects that a minerals appraiser can obtain in his home state is generally too low to provide a living. Reciprocity between state appraisal boards is generally not occurring. Therefore, the Certified General Appraiser needs to go through the arduous, time consuming exercise of applying for a temporary appraiser permit for each assignment in each state in which he works. To be fully legal in some state, he also needs to register temporarily with the state board of geology or state board of engineering.

It is a moderately rare case in reality that a minerals appraiser is taken to task for violating the state regulations, for being viewed as doing real estate appraisal without the pertinent state real estate appraiser's license. However, it does happen, and penalties can be imposed. Our time line of experience is still short, given that the states only instituted their real estate appraiser licensing laws between 1989 and 1995.

In one case, a prominent minerals appraiser advised me that he was severely reprimanded and fined in an eastern state. Presently a Certified Minerals Appraiser of our American Institute of Minerals Appraisers is attempting to defend himself against a similar accusation in Arizona. In such cases the argument will center on whether conducting an appraisal of the mineral estate or mineral rights is considered to be conducting real estate appraisal. Technically, the settlement of the specific case may depend on whether the mineral estate has been severed from the surface estate, or whether one is appraising mineral rights rather than the physical minerals estate. The cautious strategy for the minerals appraiser would be to always take the costly approach of contracting a real estate appraiser with the appropriate State Certification to sign the minerals appraisal report, as one minerals appraisal firm always does, and to always abide by USPAP, particularly if the surface estate is part of the package being appraised.

Acceptance and expectation of the use of USPAP in minerals property appraisals has been growing rapidly. USPAP's emphasis is on full disclosure, of everything. This includes all information that has been considered, actions that may have influenced, and any ground rules used in the conduct of the appraisal. Ethics and competency provisions are included up front. The real property appraisal standards, 1 and 2, specify that for a "Complete Appraisal" the three categories of appraisal methods, called approaches, be considered. These are the *sales comparison approach*, the *cost approach*, and the *income approach*. USPAP's content is discussed below.

As a professional group, minerals appraisers have largely ignored USPAP, saying that it is not applicable or appropriate for mineral property appraisals. This attitude, together with state licensing, has allowed great inroads by real estate appraisers into the field of mineral property appraisal. If these people have any minerals industry training, it is usually at best a week long course in natural resource appraisal from an appraisal institute. Generally they limit themselves to appraisal of construction material quarries and small industrial mineral properties. However, one such appraiser has captured a major portion of the western U.S. State and Federal condemnation and litigation appraisals involving mineral properties, even to including the recent, high profile appraisal of Crown Butte's infamous New World gold property on the north edge of Yellowstone National Park. I do not accuse him of lack of competency, but only include him as an example of the inroads made. In fairness, he does hire minerals industry specialists to assist him with some of his work. However, from my contact with many real estate appraisers who have conducted minerals

appraisals, my opinion is that most are acting well outside their area of competency in even conducting sand and gravel property appraisals.

This experience provides two important lesson for Canadian regulators. Poorly designed regulation can prevent those who are competent from practicing their profession, replacing them with people who are technically qualified but not necessarily competent. Licensing or certification requirements on a Provincial basis can be a barrier to freedom of trade, preventing minerals industry professionals from working across boarders. The valuator must have the freedom to go to the deposit, since the deposit cannot come to him. Technically, most U.S. minerals appraisers, even with all of their credentials, have more legal right to work in many foreign countries than to work in the adjoining states to their home state.

## FEDERAL LAND ACQUISITIONS

When a U.S. Federal agency is buying or condemning land, yet another document rules. The Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) was first released in 1973, then updated in 1992 to its present 132 pages (Interagency Land Acquisition Conference 1992). The next revision is in progress. UASFLA reads rather like a court's legal decision. Since a substantial number of condemnations are settled by courts, case law forms an important basis for this document. In effect UASFLA is a set of guidelines rather than being a set of rules, directed to appraisers working for Federal agencies. It is built on USPAP.

UASFLA very strongly recommends the use of sales comparison over the income and cost approaches. In eminent domain situations (condemnation and takings) in the U.S., the Federal agencies only compensate for the taking of real property based on constitutional property rights, not the value of any business loss. UASFLA grudgingly permits the use of income approaches if adequate sales comparisons are not available, but provides a lot of cautions about the care needed in their application. It is particularly important to exclude business value, which is often captured in income approaches. UASFLA takes away the ability to use speculative income, which would generally remove the ability to consider the net present value (NPV) of reserves and resources not yet in production. However, speculative royalty income for undeveloped mineral properties is allowed.

The important lesson to be learned here is based on the fact that UASFLA and the courts make the clear distinction between the market value of real property and its business value. Applying the Australasian VALMIN Code to a property which is in operation or under development, forces us to include the business value (AusIMM, 1998). This results in the value conclusion being a *use value* of the real property under its current specific use, rather than market value, or results in a *going concern value* of the mining operation as a business valuation instead of a real property valuation (Ellis, 2000a, Ellis, 2000b; Appraisal Standards Foundation, 1999; International Valuation Standards Committee, 1997, Appraisal Institute, 1993). Such a value conclusion is probably desirable for use in securities filings. It will also be desirable for the proposed sale of a mining operation as a going concern business. For almost all mineral appraisal assignment that I receive though, I must determine the market value of the real property, such as for income tax filings, litigation, and business decision making. Therefore, those responsible for drafting and enforcing the proposed Canadian valuation standards, must assure that their rules do not direct the valuator to an incorrect conclusion of value in relation to the purpose of his valuation assignment.

## STATE AND FEDERAL COURTS

Court history provides an important framework to guide minerals appraisals. The courts are where the work of the minerals appraiser is really put to the test. The expert testimony of a minerals industry practitioner is often opposed by that of a Certified General real estate appraiser. The author has discussed such situations with colleagues who study court cases involving the value of mineral properties. These discussions and my review of the literature indicate that in those situations, the testimony of the real estate appraiser generally prevails. This poor to abysmal track record for minerals industry practitioners appears to be largely due to them not following the ground rules of generally accepted appraisal practice for real property appraisal, and not following the specific appraisal ground rules

for the particular jurisdiction. Many minerals appraisals are essentially thrown out of court in eminent domain hearings, because the minerals appraiser has not applied the appropriate ground rules (Paschall, 1999).

Any expert's mineral property appraisal that relies solely on the income approach will have a high probability of losing to the opposing expert's appraisal when that includes simple sales comparison. The courts have ruled that market value appraisals should be based as much as possible on data derived from the market. Sales are market data. Therefore, when developing a market value appraisal, all methods of value estimation should draw as much as possible from sales. As I explain later in this paper, this does **not** mean that sales need to be *comparable*, such as we are familiar with seeing applied in residential real estate appraisal.

As UASFLA indicates, the courts have a strong preference to rely on the results of the sales comparison approach to the exclusion of the cost and income approaches. J.D. Eaton is the Assistant Chief Appraiser for the U.S. Department of Justice. He co-authored the 1992 UASFLA revisions. In his more recent book, *Real Estate Valuation in Litigation*, he states:

> *Most courts do not seem to understand that each of the three approaches to value is an integral part of the valuation process. Many court rulings appear to be based on the assumption that the three approaches to value are totally independent of one another and that only the most applicable approach is used in the appraisal of a specific property.* (Eaton, 1995, p. 158).

In the context of the cost approach, Eaton goes on to explain that "the appraiser has an ethical and professional obligation" to develop each of the three approaches to value "whenever the results of the approach will assist in estimating the value of the property." He encourages the appraiser to then educate the court as to the role of each approach in developing his value conclusion.

The dismal track record of minerals industry professionals testifying as appraisal experts in the courts provides us with an important lesson. We should not expect to learn how to develop a strongly defensible appraisal through only on the job experience. There is a lot we can learn from how other real property appraisers, such as appraisers of agricultural lands, timber tracts and unique office buildings, develop their valuations. They are confronted with the same issues as us in a lack of directly comparable sales data. There are good reasons why a Certified General real estate appraiser has to take 180 hours of appraisal courses, and has to maintain a regimen of continuing education. Few if any minerals appraisers give serious consideration to the three approaches to value that Eaton emphasizes as being "an integral part of the valuation process." We need to recognize that minerals appraisal is a tiny niche speciality within the universe of real property appraisal and business appraisal, and learn from how things are done elsewhere in that universe.

## UNIFORM STANDARDS OF PROFESSIONAL APPRAISAL PRACTICE

USPAP is designed to provide standards for appraisals of all feasible kinds. These include appraisals of real property such as residential and commercial real estate, personal property such as moveable equipment, jewelry and antiques, businesses such as corporations, and intangible assets such as securities, contracts and patents. All of these can be relevant to the minerals appraiser. Standards 1 and 2 for real property appraisal cover the mineral property and the ownership and partial interests in it, and the buildings on the property. Standards 7 and 8 for personal property appraisal cover mining equipment such as trucks and shovels. Standards 9 and 10 for business appraisal and intangible asset appraisal cover the valuation of the mining corporation and the mining operation as a business, valuation of a long term product sales contract and valuation of shares of the mining company. For each of these it covers what must be considered in conducting the appraisal, and what must be included in the appraisal report. USPAP also includes ethics, competency and record keeping rules, and standards for consulting assignments by real property appraisers. State licenced appraisers and appraisers who are members of the major national appraisal institutes are bound by these standards and rules.

USPAP focuses on conducting the appraisal independently, impartially, ethically, objectively and competently. It also focuses on reporting the appraisal clearly, accurately, meaningfully, understandably and with full disclosure.

Real Property Appraisal Standards 1 and 2

In the following I limit my brief discussion to the major features of Standards 1 and 2 for real property appraisal as they apply to mineral property appraisal, and in particular to market value appraisals. There are many important features that are additional to those contained in the Australasian VALMIN Code which the developers of Canadian standards should consider.

Purpose, Intended Use, Scope and Type

The interest in the property that is being appraised must be specified. The purpose of the appraisal must be provided, including specifying and defining the type of value to be estimated, such as market value, use value, insurance value or taxation value. The intended use of the appraisal report must be included.

The scope of work performed must be reported, including the level of inspection and identification of the property, the degree of research of physical and economic characteristics, the extent of data research, and the type and extent of analysis applied. A reasonable level of verification of information relied upon is required. Disclosure of assumptions and limiting conditions is required.

USPAP provides for a variety of levels and types of real property appraisals. A *Complete Appraisal* requires abiding by all the rules and considerations in the two standards. Departure from some rules is allowed, which if invoked, results in a *Limited Appraisal*. For both of these types of appraisals, the levels of reporting must be identified. A *Self-Contained Appraisal Report* will contain everything that is relevant to the appraisal in comprehensive detail. A *Summary Appraisal Report* will cover everything relevant to the appraisal, but at a written, summary level. A *Restricted Use Appraisal Report* is designed for use only by the client, is written at a level appropriate for the client's use, and may make extensive reference to materials retained in the appraiser's workfile. From my experience, minerals appraisers are almost always requested to conduct a Complete Appraisal, and provide a Self-Contained or Summary Appraisal Report.

Effective Date and Exposure Time

Market value is determined as of a specific *Effective Date* of the appraisal. USPAP requires that the Effective Date and the Date of the Report be reported together to avoid confusing the reader. The value determination is generally based on the assumption that the property will have had adequate exposure to the market prior to the specified effective date, for market value to be attained. An opinion of reasonable exposure time must be expressed.

Highest and Best Use

The market value of a property is determined on its *highest and best use*. In doing an appraisal of market value, the first, and also possibly the last consideration, should be highest and best use. Lack of adequate highest and best use analysis is the source of the greatest number of complaints against the work of real property appraisers in the U.S. For real property appraisal, USPAP provides the following definition of highest and best use:

> *The reasonably probable and legal use of property, that is physically possible, appropriately supported, and financially feasible, and that results in the highest value.* (Appraisal Standards Board, 1999, p. 138).

For a very simplified example, assume the subject property has a mineral deposit under an orchard. The appraiser needs to determine whether the value of the property as an orchard exceeds its value as a mineral property. There may also be other uses to consider, such as subdivision into housing lots, if the property adjoins an expanding urban area. For one mining property under development, we analyzed leasing or selling excess water rights, and leasing or selling surface which would not be impacted by the underground mining.

If the subject property is held as U.S. Federal unpatented mining claims or a Federal mineral lease, then an alternative use to mineral development is not legally possible. However, even in these situations, the use which provides the maximum value should be selected. That may be through sublease with an advanced royalty followed by annual payments.

## The Three Approaches to Estimation of Market Value

The methods for determining the market value of a property fall into three categories, called approaches. The *sales comparison approach* is based primarily on the principle of substitution. The *cost approach* is based mainly on the principle of contribution to value. The *income approach* is based on the principle of anticipation of benefits. The three approaches should not be viewed as being independent of each other. Generally they draw mainly from the same sources of data, but the data are analyzed using different methods. The underlying philosophy is that the three approaches should substantiate the findings of each other.

USPAP requires that all three approaches be considered in conducting a Complete Appraisal. If an approach is then excluded, the reasoning for its exclusion should be explained.

I promote that the minerals appraiser should attempt to base his conclusion of value on as many indicators of market value as can reasonably be obtained. This is especially true if the appraisal is to be used in litigation. All the methods of value estimation that the minerals appraiser has available are subject to a high level of uncertainty and are open to criticism. The more methods that can be applied, the more support that we develop for our conclusion of value.

In some cases, even to obtain a modest amount of sales data may require casting ones net more broadly than is generally considered. It may require including sales from a number of different mineral commodities to that of the subject, but with similar economic characteristics. For example, for a crushed stone quarry, one may need to consider analysis of other construction material property sales, such as sand and gravel. For a particular industrial mineral, one may need to consider other industrial minerals with somewhat similar market characteristics. In doing so, though, the appraiser must assure as always that only appropriate methods of value estimation are used with the resultant data. For exploration stage properties, the advanced royalty payment terms on a lease, or the farm-in terms on a joint venture, may also be analyzed to develop indications of value which can help support ones conclusions, since these are generally arms-length transactions (Appleyard, 1994). However, in some cases finding, gathering and verifying even two or three somewhat useful sales can be very time consuming and expensive.

## Sales Comparison Approach

I take the view that one should always attempt to use sales comparison in an appraisal. It generally provides the best indication of the market value of the property. Of the three approaches it draws the most directly on sales data. At the least, sales comparison should be used as a validity or "sanity check" against an estimate derived by the NPV method (Grant, 1994).

The sales comparison approach has to some extent received unjustified bad press within the community of minerals appraisers, due to the extensive use of the term "comparable sales" as used in the appraisal of residential real estate. The approach can use analysis methods which do not require "comparable sales" in any strict sense of the term. Appraisers of difficult to value real property, such as farms, timber and water rights, face somewhat similar problems to minerals appraisers, with scarce and non-comparable sales. They have long ago pushed the sales comparison approach down to working with common units of measure. That is, the adjustment grid to bring the sales data to the subject property can be worked through at the level of $/unit, such as $/ha, $/m$^3$, or $/kg (ASFMRA, 1995, ch. 6). Ratio analysis is used extensively in this process.

## Cost Approach

For a Complete Appraisal, USPAP requires that the cost approach be considered. However, the cost approach to determining market value is generally rejected outright by minerals appraisers as not being applicable to mineral deposits. Some, such as Paschall, use it only for valuing the plant and equipment on the property (Paschall, 1998, p. 4). The concept of estimating the "replacement cost less accrued depreciation" for a unique mineral deposit, or for improvements, such as a mill built at the site of such a deposit, is generally ridiculed. Evans of the Bureau of Land Management states, "A final, and almost always inappropriate approach, is the cost approach to value." (Evans, 1998, p. 16). The writings of minerals appraisers and others about the valuation of mineral properties show that they believe that the cost approach can only be based on depreciated replacement cost analysis and/or historic cost analysis for improvements (Gentry and O'Neil, 1984, pp. 12-13; Loucks,1991, ch 11, pp. 8, 17-18).[6]

My opinion is that the cost approach is receiving unjustified, bad press within the minerals industry. The cost approach is based on the principle of contribution to value. For difficult to appraise real estate properties, a broad interpretation of the cost approach is now being applied, based on the estimation of the contributory value of each component of the property being appraised. Appraisers of rural real estate in the U.S. face similar issues to minerals appraisers when appraising farm and other land, water, and timber. Since about 1990, the American Society of Farm Managers and Rural Appraisers (ASFMRA) has been teaching in its real property appraisal courses, a method for deriving from sales analysis the contributory value to the subject property of various land classes and the improvements (ASFMRA, 1995, ch. 12). The method is based on sales analysis, but does not require the use of so-called comparable sales. The contribution of each component of the land mix of the property is determined using ratio analysis of land classes within sales.

Application of a similar contribution method to the analysis of mineral property sales data should provide similar contributory values for categories of mineralization or other property attributes. In the U.S., the SEC's restriction limiting the reporting of quantitative data to only reserves makes it difficult to obtain adequate data on the categories of mineralization at the subject property, let alone at other properties that have been sold (SEC, 1992). However, diligent research could provide a very useful additional approach for determining the value of a mineral property, particularly if the appraisal is to be used in a litigation situation.

If enough sales data are available to do a sales comparison approach, there should be enough to do a cost approach, since the same sales can be used in both analyses. What may be the most important difference between the sales comparison approach and the cost approach is the presentation of the results of the analyses. Presentation of the sales comparison approach results focuses on the adjustments necessary to get the average dollar per unit bases of the selected sales to that of the subject property. That is, a grid showing the adjustments for each sale is presented, with the resultant value for the subject property. The presentation of the results of the cost approach focuses on the contributory value of each component of the subject property. No sales are shown in this table. The contributory values are summed to provide the property value. Example components will be, reserves, resources, other mineralization and exploration potential, land surface, roads, buildings, and water rights.

## The Income Approach

The income approach includes all methods of value estimation that are based the income generation potential of the property. Methods of estimating property value based on its income generation capability are commonly called income capitalization methods.

Minerals industry professionals tend to rely very heavily on the net present value (NPV) method, also commonly called the discounted cash flow (DCF) method, for estimating market value. This is particularly true for properties

[6]As a variant of the historic cost method, the *multiples of exploration expenditure* (MEE) method, also falls under the cost approach. This method, as described by Peter Onley (1994), ".... is applicable to exploration properties from the earliest stage of exploration to a moderately advanced stage, but, for which no resources have been delineated." For this method, a Prospective Enhancement Multiplier is applied, typically to the relevant and effective exploration expenditures on the property.

under development and in production. In such situations, their reliance on the NPV method is generally to the exclusion of all other methods of estimating value. Often the result of their appraisal is an *investment value* or *use value* rather than the desired estimate of *market value* (Ellis, 2000b).

Many users of minerals appraisal reports outside of the minerals industry have difficulty understanding NPV based appraisals, and look on them with great suspicion. They feel much more comfortable with an appraisal which includes some sales analysis. This is particularly true of many courts within the U.S., with a considerable percentage apparently rejecting NPV based minerals appraisals (Paschall, 1999). Many others are only allowing the NPV method into testimony with reluctance. These problems have contributed to the inroads made by real estate appraisers into the field of minerals appraisal. Eaton writes that the NPV method is so complex compared to other methods of analysis, that neither the attorneys nor the courts understand it (Eaton, 1995, p.192). He goes on to state, "The courts have historically favored the sales comparison approach to value, often to the exclusion of the cost and income capitalization approaches, and preferred valuation opinions that can be supported by solid market data" (p. 193). The UASFLA provides the following extract from a 1982 court decision involving a sand and gravel deposit. The comment pertains to NPV based valuation.

> *Great care must be taken, or such valuations can reach wonderland proportions. It is necessary to take into consideration manifold and varied factors like future supply and demand, economic conditions, estimates of mineral recoverability, the value of currency, changes in the marketplace, and technological advances. Many of these factors are impossible to predict with reasonable accuracy.*[7] (Interagency Land Acquisition Conference 1992, p.24)

Within the income approach, variants of NPV analysis can be applied, including that discussed below. There are also a few other income based valuation methods available which are commonly used by real property appraisers. These include ratio analysis of selling price to gross income and net operating incomes. All methods within the income approach have their individual pros and cons, and all are subject to a high level of criticism. Despite their well recognized individual problems, this author recommends that when possible, a number of methods should applied. Doing so will aid the appraiser in developing an understanding of the subject property within the context of the market.

The NPV method is in the category of value estimation methods called *yield capitalization*. In applying the NPV method to estimate mineral property value, most minerals industry practitioners use projected annual after tax cash flows as the basis of their analysis. On the other hand, U.S. real estate appraisers generally use annual net operating income as the amount to be discounted to present value. Some minerals appraisers, such as Paschall (1998, p. 6) do the same, especially those who have done work for government agencies, or are state licensed. Net operating income (NOI) for this purpose is generally applied as: net sales - operating costs - capital costs. NOI is used because of the need to analyze sales on the same basis as the subject property. Less information needs to be obtained (or assumed) to calculate an NOI than to calculate after tax cash flows. It is also argued that assumptions about the financing and income tax arrangements that the buyer brings to the subject property, should not be made. Some argue that income taxes are levied against the owner and/or operator of the property, not against the property itself.

Most buyers of mineral properties, however, do their analyses of potential acquisitions on an after tax cash flow basis. In evaluating the market for the subject property, it is important to attempt to analyze the subject property and sales from the buyer's perspective. Therefore, I often use both the NOI and after tax cash flows as the basis for discounting, in order to get a better understanding of the property.

Appraisal theory holds that the discount rate applied must reflect the market, and if at all possible, be determined from the market. There is considerable controversy over how this should best be done. This controversy occurs among real property appraisers in general, and appraisers of mineral properties in particular. A strong sector of real property appraisers holds that the discount rate should be abstracted by analysis of sales. The rate selected should reflect the market for the property on the effective date of the appraisal, rather than be an *investment* rate. The rate

[7] U.S. v. 47.14 Acres of Land, 8th Cir. 1982, p. 726.

should also be appropriate for the NOI or cash flow being discounted, such as being a before or after tax discount rate, with or without inflation incorporated.

Reconciliation

In drawing his conclusion of value, USPAP requires the appraiser to reconcile the results of the approaches used, discussing the quality and quantity of data available, and the applicability or suitability of the approaches.

Certification

The report must contain a certification signed by the appraiser. The certification addresses nine items, primarily verifying the independence and impartiality of the appraiser.

Lessons to be Learned from USPAP

USPAP provides separate standards for conducting real property appraisal, personal property appraisal, and business and intangible asset appraisal. The VALMIN Code does not separate these out. Separating these aids the appraiser in developing a conclusion of value which correctly matches with the purpose of the valuation assignment.

USPAP has been developed based on internationally accepted principles of appraisal developed by the appraisal community as a whole. When objectively and fully carried out, the appraisal process follows the scientific method, resulting in an objective conclusion of value:

| **Scientific Method** | **Appraisal Process** |
|---|---|
| Hypothesis | Define the problem |
| Gather information | Plan the appraisal |
| Record the data | Collect the data |
| Analyze the data | Apply value approaches |
| State a conclusion | Arrive at a value conclusion |

(American Society of Appraisers, 1997, Module V).

For a Complete Appraisal of real property, USPAP requires consideration of all three appraisal approaches – sales comparison, cost and income. If an approach is not applied, the reasoning as to why must be reported. Within each approach, a number of valuation methods are available. For market valuation of mineral properties, all three approaches suffer from limitations in their application and are subject to severe criticism. A fundamental principle of the appraisal process is that a number of methods of valuation should be applied if possible, so that the conclusion of value is supported by more than one estimate.

A market value appraisal should be based on the highest and best use of the mineral property or asset being appraised. This may not necessarily match with its use, or the use of some of its components, at the time of the appraisal. The highest and best use is often not even a mineral use.

Developers of standards should be extremely cautious of barring any specific method of value estimation. The minerals appraiser needs all the methods available that he can muster to develop indications of value, given the inherent difficulty of his task in an environment suffering from a severe shortage of good data. For example, some minerals industry professionals promote that the NPV method should never be applied to the valuation of a metallic

mineral prospect at the exploration stage. However, it is quite appropriate in my mind to calculate the NPV of the income stream which might be generated from leasing the prospect, or from grazing cattle on the surface, or from considering a non-mineral highest and best use of the property.

Rule makers should assure that the standards are not so high or inflexible that it is prohibitive for the minerals appraiser to carry out appraisals of low value properties and assets. My experience is that the application of USPAP or VALMIN to small mineral appraisal assignments can be onerous. For example, consider the common request to appraise a farmer's interest in a small sand and gravel quarrying operation on his property. I have not yet been able to develop a low enough budget for such assignments for it to make sense in the context of my potential client's perception of the value of the asset. However, I am learning that USPAP does provide more flexibility than I previously understood in allowing the development of a scope of work that is appropriate relative to the scale of the assignment. This flexibility is largely based on assuring that one conducts a level of research and analysis which at least matches what our competitors and peers would do for the same or a similar assignment. USPAP's allowance of the exercise of Departure Provisions with the client's approval could also prove beneficial under certain circumstances, dependent on the intended use of the appraisal.

I provide detailed discussions of USPAP and the VALMIN Code in my recent papers, *Lessons Learned about Standards from Applying both VALMIN and USPAP on a Complex Appraisal Project*, and *The Difference Between a Value Estimate and an Appraisal* (Ellis, 2000a; Ellis, 2000b).

**CONCLUSIONS**

The unintended consequences of the SEC's Industry Guide 7 in severely inhibiting most minerals appraisals in the U.S., indicates that unless great care is taken, rules designed to control reporting for securities purposes will probably impact mineral valuations performed for the wide variety of purposes unrelated to securities reporting.

The experience of U.S. minerals appraisers under State and Federal real estate appraisal laws, shows that poorly designed regulations can prevent those who are competent from practicing their profession, replacing them with people who are technically qualified but not necessarily competent.

The U.S. experience also shows that licensing or certification requirements enforced at a Provincial level will probably form a barrier to freedom of trade, preventing minerals industry professionals from freely working across borders. The valuator must have the freedom to go to the deposit, since the deposit cannot come to him.

USPAP, the U.S. national appraisal standards document, has been developed based on internationally accepted principles of appraisal developed by the appraisal community as a whole. When objectively and fully carried out, the appraisal process follows the scientific method, resulting in an objective conclusion of value.

USPAP provides separate standards for conducting real property appraisal, personal property appraisal, and business and intangible asset appraisal. Separating these aids the appraiser in developing a conclusion of value that correctly matches the purpose of the appraisal.

USPAP requires that market value appraisal be based on the highest and best use of the property or asset. For real property, it requires that a Complete Appraisal include application of the three approaches, unless the reasoning for exclusion of any of the approaches is explained. The three appraisal approaches are sales comparison, cost and income. The approaches can include a variety of methods of valuation. The results of the approaches must be reconciled in developing the conclusion of value.

Some of the bad press that the sales comparison approach and cost approach have received from minerals industry professionals is due to misunderstanding of their meaning and application.

Developers of standards should be extremely cautious of barring any specific method of value estimation. The minerals appraiser needs all the methods available that he can muster to develop indications of value, given the inherent difficulty of his task in an environment suffering from a severe shortage of good data.

We should not expect to learn how to develop a strongly defensible valuation through only on the job experience. There is a lot we can learn from how other real property appraisers, such as appraisers of agricultural lands, timber tracts and unique office buildings, develop their valuations. They are confronted with the same issues as us in a lack of directly comparable sales data. We need to recognize that minerals appraisal is a tiny niche speciality within the universe of real property appraisal and business appraisal, and learn from how things are done elsewhere in that universe.

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