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Chapter I. Introduction.

A. Purpose of the Handbook.

The purpose of this Handbook is to provide guidelines and a checklist for mineral material appraisers (see BLM Manual 3630 Glossary of Terms) who have received formal training in the preparation of a mineral material appraisal and the writing of an appraisal report for disposals of mineral material under 43 CFR 3600. This Handbook does not take the place of training, but rather provides the mineral material appraiser with the format for the report and the information necessary to conduct an appraisal according to current Bureau standards and policy.

B. Duties of the Mineral Material Appraiser.

A mineral material appraiser's role requires a thorough knowledge of accepted appraisal methods and techniques as used by the Bureau. A working knowledge of the mineral material industry is essential.

The mineral material appraiser's professional reputation as well as that of the agency is "on the line" on every appraisal performed. It is incumbent upon the mineral material appraiser to prepare a thorough professional appraisal to ensure that fair market value is being received by the Government for all mineral material sold.

The mineral material appraiser's function is to apply the technical standards outlined in this Handbook to render an opinion as to the fair market value of the mineral material appraised. In the case of mineral material trespass, a mineral material appraiser may be required to testify as an expert witness for the Government as to the value of the mineral material appraised.

C. Appraisal Type Determination.

The first thing a mineral material appraiser must do is to determine which type of appraisal is necessary. There are two types of appraisals, the narrative appraisal and the short form appraisal.

The narrative appraisal is done for trespass cases and complicated or controversial mineral material sales. An areawide appraisal or preparation of a rate schedule would require a narrative appraisal. An areawide appraisal is prepared in the same manner as a single sale appraisal except that the market area analyzed is larger. Preparation of a rate schedule is less reliable than an individual appraisal, but may be necessary because of personnel or budgetary constraints. The preparation, field examination data, analysis, and format for narrative appraisals are given in Chapters II-V, respectively.

A short form appraisal can be prepared for uncomplicated, noncontroversial appraisals. A short form appraisal uses very basic information and does not go into the detail of a narrative appraisal. The format for the short form appraisal is given in Chapter VI. Since the information needed for a short form appraisal is also contained in a narrative appraisal, the minimum requirements are referenced to where the material is covered in the narrative report chapters.

Chapter II. Preparation for the Appraisal.

A. Office Preparation.

The disposal case file should be carefully examined, making certain that it contains all available pertinent case history. If not in the case file, the Master Title Plat should be reviewed to ascertain the land status or any classification actions which could affect the value of the material. The mining claim recordation index should be checked for any mining claims which would prevent the disposal of mineral materials.

If the land is private surface with minerals reserved to the Government, it will be necessary to ascertain the name and address of the landowner. This can be done by going to the county courthouse and checking the land records. A topographic map, preferably a 7.5 minute series (scale 1 inch to 2000 feet), should be used to plot the necessary data for the field examination. All access routes to and from the mineral material site and the land status of the lands they cross should be noted prior to the field examination. If access to the mineral material site crosses private land, the name and address of the landowner must be ascertained and permission to cross his property obtained. Bureau records should be checked to determine if any rights-of-way or easements were reserved to the United States.

The current land use plan (RMP or MFP) must be checked to see if any conflicts would affect the value (i.e., zoning, resource conflicts, stipulations, etc.).

Photographs of all significant features of the appraisal site should be taken. Best results can be obtained by using a 35mm camera. Prints should be taken as opposed to slides. These pictures will become a part of the appraisal report.

B. Market Data.

All available literature concerning the geology and economics of the mineral commodities being appraised should be reviewed. The best available sources of information are State Highway Departments, the U.S. Geological Survey, State Geological Surveys, private testing laboratories, local colleges and universities, and the Bureau of Mines.

Determine whether the market for the mineral material being appraised is a local market or a regional market. Dependent upon availability, sand and gravel would probably have a local market; whereas building stone may be shipped throughout a wide area, therefore having a regional market.

C. Comparable Sales Data.

Review Bureau records for sales of the same or similar material in the general area of the proposed mineral material site. Sales from the same location such as competitive sales are preferred. All sales used as comparables should be reasonably recent. Generally, reasonably recent would be sales not over two years old.

Private operators and State and local governments should be checked for sales of similar material in the appraisal area. Caution must be exercised when using comparable sales of government agencies and State or county highway departments to ensure that these are "arms length transactions" of unrelated, knowledgeable individuals. BLM negotiated sales should not be used, but the basis for the value of these sales could be. Good sources of information on the market price for mineral material can be found in the following manner:

- Call or visit the State Highway Department.
- Call or visit the County Highway Department.
- Call or visit companies listed in the phone book under such headings as construction, sand and gravel, stone, building supply, landscaping, etc.

D. Checklist for Appraisal Data Acquisition.

Notes taken in the field should be recorded in sequence as the appraisal progresses. The use of a checklist before and during the field examination helps to minimize the possibility of overlooking pertinent data that should be recorded while in the field. See Appendix 1 for the checklist. Not all of the information listed will be needed for each appraisal. Use of the data from this checklist should be commensurate with the complexity of mineral material appraisal.

Chapter III. Field Examination of the Proposed Mineral Material Site.

A. Access Routes.

1. Road Type. Describe the type of road (i.e., paved, gravel, dirt, etc.) and the ownership (public or private).

2. Restrictions. Discuss any legal or physical barriers such as current litigation, mining claims, hostile land owners, feuds, etc.

3. Comparability. Compare the access to areas with similar types of material.

B. Mineral Material Site.

Verify the physical boundaries of the mineral material site. Describe the following aspects of the mineral material site:

1. Location. Give the general location of the site in reference to the nearest town or community.

2. Topography and Geology. Describe physical characteristics such as size and shape of the mineral material, soil type, topography and drainage, vegetative cover, and geology of the site.

3. Climate. Describe the climate and how weather conditions affect the market for and the mining of the mineral material.

4. Present Land Use. Describe the past and present uses of the mineral material site and identify any conflicts which may occur due to the proposed use.

5. Material Data. Describe the material being appraised and the effects of the following factors on its marketability:

a. Describe the quality of the material being appraised and what uses it can be suitable for.

b. Give the quantity of material being appraised and the range of units anticipated if different sizes will be sold from the same location.

c. Describe the thickness and composition of all overburden to be stripped and the placement of the stripped material. Give the stripping ratio.

d. Describe the process by which the material will be removed and the equipment necessary to carry out the operation.

e. Describe how the material will be processed and/or stockpiled. Cite any special problems which may exist.

f. Give distances to market for the materials being appraised and the type of transportation used.

g. Give details of what kind of reclamation measures will be required and who will require them (i.e., State, Federal Government, private landowner, etc.).

6. Photographs, Maps, and Sketches. Take photographs of the mineral material being appraised, the site, and any buildings or equipment being used to mine or process the material. Make appropriate maps and sketches to assist in the evaluation of the material.

7. Sampling. Sampling, drilling, or testing of the mineral material, if required, should be done by the BLM mineral specialist or by a qualified testing facility.

Chapter IV. Analysis of Appraisal Data.

A. Limitations on Analysis.

Describe any factors which may set limitations on the appraisal such as current land use plan restrictions or stipulations, zoning (if applicable), and the amount of market data available or amount of market data used.

B. Critical Assumptions.

Critical assumptions are made prior to the analysis of the market data. These assumptions put the reader on notice of the parameters which constrain the analysis.

1. Examples. Examples of critical assumptions are as follows:

a. Data, opinions, estimates, statistics, etc., obtained from outside sources during the course of gathering information are assumed to be reliable and accurate.

b. The appraiser renders no opinions of a legal nature, such as ownership of the property or conditions of title.

c. The appraisal report should not be used for purposes other than that for which it is written.

d. The estimated value given in the appraisal report is for the date indicated and is subject to change and modification.

e. The mineral material will be disposed of under current BLM procedures.

C. Comparable Sales Method.

The comparable sales method is an appraisal method that relies on direct comparison of transactions between knowledgeable buyers and sellers in the open market. It is the simplest and ordinarily the most direct and reliable approach. Consequently, its use alone may be adequate where sufficient transaction data exists upon which to draw firm conclusions of value. It is particularly applicable to small volume sales. The comparable sales method is the preferred method and should be used unless no comparable sales are available.

1. Data Selection. Describe comparable sales data selection for analysis. Include an explanatory statement concerning the objectivity of comparable sales data which are selected for further analysis and ultimately used involving family members, Government or administrative agencies, and interrelated corporations.

2. Data Verification. Verification of data used for direct comparison is mandatory.

a. Outline the steps followed and any unusual circumstances encountered in verifying data.

b. Personally contact persons knowledgeable about the transaction. Telephone verification is acceptable if the party contacted provides detailed information.

c. Ensure that the individual providing transaction data has been directly involved or is personally familiar with the parties, their motivation, and the intensity of negotiations. He might be the buyer or seller or their agent. Identify the individual on the data sheet by name and title such as buyer, seller, or agent. Also, include the date and name of the person who obtained the information.

d. Thoroughly inspect by field examination the data of each comparable sale so that an accurate comparison may be made with the mineral material being appraised.

e. Complete all items shown on the Comparable Sales Data Sheet during verification so that information concerning the comparable is fully descriptive and accurate, facilitating subsequent analysis (see Illustration 1).

f. Specifically identify the actual transaction date. This is the date the consideration and terms were agreed upon, and may differ from the document date.

g. Specifically explain the details concerning any data involving a government agency. If used, this data must be thoroughly verified with the private party. It must be shown that he was a willing, but not obligated, buyer or seller and consideration was not influenced by the fact that the other party was a government agency.

3. Data Presentation. Present the data documentation so that the reader will know exactly where to search the records and which person to contact who has direct knowledge of the data. Documentation of the data used for direct comparison must be included in the narrative comparison and the comparison summary chart.

a. Identify the data and essential facts of the comparable sales that document quantitative or qualitative differences between it and the mineral material being appraised in the narrative comparison and the comparison summary chart. Take the data directly from the complete documentation of the data contained on the Comparable Sales Data Sheet (see Illustration 1). These may include:

(1) Date of sale.

(2) Distance to market.

(3) Type of deposit.

(4) Type of products sold or that can be sold.

(5) Production rates.

(6) Sale price.

(7) Operating costs (mining, processing fees, and other costs).

(8) Contingencies/conditions of sale, i.e., mining, reclamation, and bonding requirements.

(9) Ownership (private sector, governmental agency, split estate).

4. Data Analysis. Analyze the data in sufficient detail to provide an overall picture and to support specific comparison factors used in the market data approach. In general, more complex valuation tasks require more detailed analysis. If differences or adjustments between the sale and the mineral material being appraised are supportable, the appraiser must present data in sufficient detail, with an appropriate analysis, to reasonably demonstrate the extent of the particular differences or adjustments. If adjustments cannot be fully supported by sales/market data, the appraiser must demonstrate and explain the reasonableness of any adjustments based on this judgment.

a. Describe the overall analysis, proceeding from general to specific comments concerning the data and provide:

(1) An indication of the price level trends affecting the material.

(2) The number of sales selected.

(3) A statement that the data concerning these transactions are included in the addenda and are given on a map showing each comparable sale.

b. Identify, discuss, and analyze significant comparison factors to develop support for adjustments. Some of the factors that may be significant are:

(1) Time as it relates to changes in price as a response to changes in the economy of the market.

(2) The physical properties of the material in relation to its marketability and suitability for various uses (i.e., color, uniformity, density, etc.). Give uses for which the material is marketable.

(3) The cost of access and the stability of the access contract.

(4) The amount of mineral material generally removed by the operator annually.

(5) The ease of removing the vegetation, soil material, and weathered rock.

(6) The physical properties of the deposit and its material in relation to the ease of extraction.

(7) Differences of the material or site (i.e., utilities) that may decrease or increase the cost expended to process the material.

(8) Average cost to haul the material to the consumer.

(9) Relative availability of railroad access.

(10) The cost for the operator to meet reclamation standards as required by the landowner or regulatory authority.

(11) The portion of the price paid which relates to compensation for surface damages. Caution must be exercised to ascertain the real value from any disguise in royalty and damages which seek to give the seller a tax advantage.

5. Data Comparison. The comparison process follows the data analysis. By directly comparing similiar sales, using the factors above, adjustment factors can be calculated.

a. Take into account the following general considerations when comparing similar sales and making adjustments:

(1) Only reasonably comparable sales are included.

(2) Sales must be identified clearly and consistently to permit cross-referencing in the report and to permit detailed documentation in the addenda.

(3) Adjustments should proceed from the known to the unknown. Each sale is compared to the subject disposed material. Where the subject material is superior to the sale in a particular factor, a plus is used on the summary chart with the corresponding narrative explaining the reasons. Therefore, a minus is assigned if the subject material is inferior to the sale for a particular factor and a zero is used where the two are considered to be equal or similar.

(4) Comparisons are made on a sale basis rather than a factor basis. Discuss each sale fully and consider all differences before proceeding to the next sale. Do not use an adjustment factor as the heading. Complete the discussion of each sale by considering each factor or difference and conclude with an overall comparison with the mineral material being appraised, as if there were only this one sale to indicate the mineral material value.

b. Use the comparison summary chart and narrative comparison methods which are dependent and complimentary to each other, in each report.

(1) The comparison summary chart includes essential identifying facts such as the sale number, date, size, and price per cubic yard or ton (see Illustration 2). Headings for each of the significant value factors for which adjustments were made in the narrative comparison are shown. The adjustment described in the narrative is displayed for each factor for each sale.

Inclusion of an appropriate summary chart is required, where one of the data comparison methods (dollar, percentage, bracketing, or a combination) is used (see Illustrations 2 and 3). Preparation of the chart should normally precede writing the narrative. Review the narrative to assure consistency with the chart.

(2) The narrative comparison explains the factual differences between the comparable sale and the appraised mineral material and must be included in all reports. Comparison for these differences may be made using the following techniques:

(a) The percentage or dollar adjustment methods are preferred, however, they must be fully supported by factual evidence. Percentage or dollar adjustments based on judgment without quantitative factual justification are unacceptable.

(i) Make direct adjustments in dollars (or cents) per unit for each comparison factor. For example, "The appraised mineral material is worth $ .05 per cubic yard more (less) because of the shorter (longer) haul." These adjustments are always added to or subtracted from the sale price of the comparable sale.

(ii) Adjust the price of the comparable sale by assigning a percentage factor to compensate for the difference between the mineral material being appraised and the comparable sale. For example, "Compared to Sale No. 1 the appraised mineral material is rated .80." The values assigned in this method are multiplied by one another to achieve the final composite factor.

(b) When the desired factual support for specific percentage or dollar adjustments is unobtainable, use the bracketing (see Illustration 3) method.

(i) List market data in descending order of the price. If adjustments have been made for time and/or other factors, list the data in the order of the adjusted price.

(ii) Consider only factors of significance in the market.

(iii) Compare each sale with the mineral material being appraised, factor by factor. If the material being appraised is superior in a particular factor, a plus is assigned on the summary chart and the reason for it is given in the narrative. Conversely, a minus is assigned if the appraised material is inferior, and where the two are equal a zero is used.

(iv) Assign an overall plus, minus, or zero rating for each factor. Individual factor weights differ; one plus may not offset one minus in the overall rating.

(v) If none of the comparable sales are directly comparable to the subject, then select the value of the mineral material between that sale which is most comparable and superior and the sale most comparable and inferior. These sale values should be averaged with greater weight given to the more comparable sale if fully justified.

6. Correlation and Final Estimate of Value. After the data has been presented and analyzed, correlate the appraised material and the sales data to develop a final estimate of value.

D. Purchase Price as a Percentage of Sales Price Method.

This method is a variation of the market approach used in situations where there is insufficient local market data. Lack of local market data may require substantial and difficult to support adjustments of data from different areas. This method requires collection and analysis of transactions in similar areas (similar in value, overburden, rehabilitation costs, etc.). This data is then used to derive a typical ratio of the purchase price to the selling price of the finished product f.o.b. at the desired location (i.e., the production site, retail yard, delivery point, etc.). This ratio is applied to the typical selling price of the finished product to arrive at an indication of the value of the in-place material. An example is given in Illustration 4.

E. Discounted Cash Flow Method.

Any of the methods of appraisal that convert income into an estimate of value are income approaches. Cash flow or discounted cash flow (DCF) methods are used under the income approach. The DCF method is more complex and requires detailed technical and economic inputs. It is most applicable to large volume sales. Only the most experienced appraisers who have taken advanced professional appraisal courses and have received training in finance and geology should use the DCF method. An example of a simple discounted cash flow analysis is given in Appendix 2. For further information or examples, see texts such as Economics of the Minerals Industry (edited by William A. Vogely 1976 and Engineering Economy by Gerald W. Smith (1977). Maximum time used in calculating DCF's shall not exceed the life of the contract. Do not use DCF for appraisal for contracts of 2 years or less.

F. Reconciliation and Conclusion.

After the data has been collected and analyzed, select the most appropriate appraisal method(s), depending on the scope of the appraisal and the amount of data available. Then, begin writing the appraisal report.

Chapter V. Narrative Appraisal Report.

With the exception of noncontroversial, uncomplicated disposals, all appraisal reports should be done in the narrative type format. Narrative appraisal reports will follow the general format and contain the information presented in this chapter.

A. Part I. Introduction.

1. Title Page. Unless impractical, use Form 9300-9a, Appraisal Report and/or 3060-1, Mineral Report (see Illustrations 5 and 6). Include:

   a. Legal description.

   b. Type of case.

   c. Effective date of appraisal.

   d. Signature of appraiser.

   e. Date of signature.

   f. Reviewing appraiser's signature

2. Table of Contents.

3. Limiting Conditions and Assumptions. This section is comprised of assumptions, expectations, and beliefs considered in applying factual data and judgments which are believed appropriate and plausible. This section puts the reader on notice concerning the appraiser's assumptions.

B. Part II. Factual Data.

1. Purpose. State the type of material being appraised, the reason for the appraisal, and define the value being appraised (i.e., in place, processed, etc.).

2. Mineral Material Site Description and Inspection.

   a. Include a complete and precise legal description.

   b. Describe the mineral rights involved such as the right to extract, process, stockpile, and transport material from the subject tract.

   c. Indicate how the site was identified. Include pertinent explanatory information such as the identification method used (surveys, maps, etc.), and/or the names of persons who confirmed the site boundaries and the date inspected.

3. Area Data. Discuss the physical and economic aspects of the area in which the mineral material site is located. Begin with an analysis of general scope, funneling down to the mineral material site being appraised. Conclude the discussion by identifying any significant economic or land use trends which would have an influence on the value of the mineral material being appraised.

4. Site Data. Describe the aspects of the mineral material site being appraised. The aspects to be described are covered in Chapter III. B of this Handbook.

C. Part III. Analysis and Conclusion.

1. Highest and Best Use. Specifically define, describe, and support the opinion of the highest and best use. This opinion is the basis for subsequent analysis, comparisons, and conclusions. This analysis is based on factual data presented and governs selection of appraisal approaches and comparable data. In mineral material appraisals, the highest and best use analysis pertains to the mineral being appraised, not the land on which the material is situated. The intended use by an identified prospective purchaser may or may not be the highest and best use. As an example, if the analysis shows that similar materials are being bought and sold as aggregates while the prospective purchaser intends to use such material as common fill, the appraisal should consider its value as aggregates and not as common fill. Use sales of aggregates as comparables rather than sales of common fill materials.

a. Ensure all information and data included in Part II of the report provides the basis for the appraiser's opinion of highest and best use and leads logically to it. Describe pertinent aspects of use trends, physical suitability, and potential economic returns before developing an opinion of highest and best use. Base the opinion on an objective and fully described market analysis of the subject material's suitability and the probable use which would be contemplated by typical buyers and sellers rather than an abstract remote possibility.

b. Base comparable data selection on the supported opinion of highest and best use. The highest and best use of the comparable material will be described in subsequent analyses and must conform to your opinion of highest and best use of the material being appraised. Explain fully any variance. The opinion of, and support for, the highest and best use is a major part of the report which establishes the analytical framework for the appraised value.

2. General Valuation Analysis. This provides an introductory overview of the appraiser's data investigation and analysis.

a. Include a brief discussion of the means used to obtain data for the most pertinent appraisal approach(es) and the selected methods. The particular appraisal problem, and the type of data applicable to it, determines which of the recognized approaches to value would best support the value estimate. Discuss the reason for selecting the approach(es) to be used.

b. Arrange valuation data observations so that they proceed from comments on general data to information on specific data selected for direct use in the valuation. These might include:

(1) Type of data which is the most pertinent to the approach selected.

(2) Quality and sources of the data.

(3) Quantity of data obtained.

(4) Value trends which will aid in analyzing specific data.

3. Market Data Approach.

a. Describe the various sources from which data was obtained.

b. Describe the steps taken and present the data of the market data approach in the manner described in Chapter IV, Section 3 of this Handbook.

4. Income Approach. Present the data used in the income approach in the manner described in Chapter IV, Section 4 of this Handbook.

5. Reconciliation and Conclusion. Although each of the approaches requires some reconciliation, this is the "wrap-up" of Part III of the report. It must resolve remaining questions and lead logically to the final value estimate. The value estimate should be clearly and carefully written. Normally, it is compiled as follows:

a. Review and summarize the approach(es) used and the final value estimate(s) for each. This includes a concise narrative statement describing the main features of the approaches employed. Conclude with a summary of the value estimates from each of the applicable approaches.

(2) Explain and reconcile differences in the various approaches. Be clear, concise, and positive in tone. Deal with any questions concerning the relative strength and liability of the data in each approach and with the applicability of the approach to the valuation of the mineral material being appraised.

(3) Logically derive the final conclusion and statement of value from the considerations previously described. Place the greatest emphasis on the most reliable indication of value. The final conclusion is the result of assembling all the facts, analyses, reasoning, experience, and judgment that may be concentrated within the framework of the fair market value definition. End with a clear, definite statement of the estimated value.

D. Part IV. Exhibits or Addenda.

Illustrate pertinent points by including maps, plats, photographs, and other exhibits which are needed in the valuation process in addition to those used in the body of the report. Place in this section any detailed data and information pertaining to the mineral material or other important factors in the valuation which are too long for the body of the report, or which may distract from a smooth presentation. The need to document specific facts or to illustrate particular features of the mineral material or comparable data determines what is placed here. The minimum information required is given below.

1. General Location Map. This map may be included on a facing page opposite the beginning of the Area Data (see paragraph B.3), or in the addenda. It must be an original or very clear copy, capable of good quality reproduction, with the general location of the site noted. The map must cover a sufficiently broad geographic area so that a reader, unfamiliar with the location, can relate it to well-known landmarks. If necessary, use two maps, one a large scale map and the other a small scale map.

2. Comparable Data and Material Site Map. This map covers only a portion of the general location map and may be included on a facing or fold-out page in the Market Data Approach (Chapter V.C.3.), or in the addenda. It must be an original or very clear copy, capable of good quality reproduction, with the location of the mineral material site being appraised and comparable data locations distinctly identified. Include a title, legend, and approximate scale. The scale should permit location of all comparable sales sites on a report-sized sheet which may be folded out for easy reference. This map serves two general purposes:

a. Identification of the subject mineral material site illustrating the narrative description noted in paragraph B.2.

b. Relative location of the material site and the comparables. Number the comparables to coincide with the reference numbers in the narrative so their relative locations can be readily identified.

3. Subject Photographs. Include sufficient photographs to show the mineral material being appraised, the site at which it's located, and the mineral material and locations of the comparable sales. Photographs should show pertinent data outlined in Chapter III.B.6. Describe the purpose of the photo in a caption along with view direction and date taken. Mark the subject boundaries on the photos in a manner that reproduces clearly for duplicate copies.

4. Geological Map. Include a map showing the general geology of the mineral site as it pertains to the mineral material being appraised. A legend or stratigraphic column showing the age and composition of each rock unit may be included.

5. Comparable Data. Include documentation of the details of each transaction which was selected for direct comparison to the mineral material being appraised in a format that includes all of the data shown in Illustration 1. Include in the narrative only facts necessary to the reasoning and logic followed in arriving at the conclusion.

Data used for general purposes such as for developing adjustment factors, illustrating trends, etc., may be included in tabular form. The transaction detail must be retained in the appraiser's working file, and the table must sufficiently identify the data to permit retrieval. Appraisers must maintain data files upon which their approaches are based. This serves two purposes:

a. It provides the information necessary in case the appraisal is disputed.

b. It forms a data bank which can be drawn upon for future appraisals.

6. Other Pertinent Data or Exhibits. These should be restricted to information which is directly pertinent to the valuation and must be specifically referred to in the body of the appraisal report. This might be backup data to the document or illustrate a fact about which a critical reader would require more information, and include:

a. Statistical data upon which the appraiser has relied in developing major points such as highest and best use or comparative adjustment factors. The date, source, and collection method must be shown for such data.

b. Detailed physical data concerning important surface or subsurface features of the mineral material site, or comparables, may be included here. Such information might include: soil analyses, core sample logs, water table data, assay records, American Society for Testing and Materials (ASTM) tests, American Association of State Highway and Transportation Officials (AASHTO) tests, etc.

E. Appraisal Report Distribution.

When an appraisal of mineral material has been completed, a copy of the report will be kept by the State Office and a copy will be sent to the District to be included in the mineral material disposal case file.

Chapter VI. Short Form Appraisal Report

A. Short Form Appraisal Use.

The short form appraisal report is used for uncomplicated, noncontroversial appraisals. All data and analyses used to justify the value must be kept on file in sufficient detail to enable an appraiser to prepare a complete narrative report, if necessary.

B. Short Form Appraisal Format.

The minimum requirements for a short form appraisal report are given below. Further detailed discussion of these components can be found in Chapter V. No format is given because of the small number of components required and to allow for flexibility. An example of a short-form appraisal is shown in Illustration 7.

1. Minimum Requirements. The minimum requirements for a short-form appraisal are as follows:

   a. Purpose of appraisal. (See Chapter V.B.1.).

   b. Legal description. (See Chapter V.B.a.).

   c. Date of appraisal. (Chapter V.A.1.c.).

   d. Rights appraised. (Chapter V.B.2.b.).

   e. Highest and best use of the mineral material. (See Chapter V.C.1.).

   f. Valuation (Comparable sales data). (See Chapter IV.C.3.).

   g. Adjustment or comparison chart. (See Illustrations 2 and 3, Chapter IV.C.5.).

   h. Value conclusion and reconciliation. (See Chapter IV.F.)

   i. Location map showing subject and comparable sale areas. (See Chapter V.D.1,2.).

   j. Appraisers and reviewing appraisers signature. (See Chapter V.A.1.d).

Chapter VII. References (reserved)

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Example of a Comparable Sales Data Sheet

MINERAL MATERIAL APPRAISAL

Comparable Sales Data

Legal Description: Land in Sec. 28, T. 9 N., R. 2 E., NMPM Sale No. A1

Seller: Ralph Neel (Bomur Ind.) Location: NM (State), Bernalillo (County)

Buyer: Ray Gutierrez (Ray's Sand and Gravel or Duke City Gravel Prod.) 11.5 road miles from downtown Albq.

Date of Sale: Janaury 1980 Type of Material: sand and gravel

Tenure: 5 years Source Type: river terrace gravels

Quantity: 50 acres all available (produce 15,000 year) Description of Materials: Rio Grande braided stream deposits, interbedded gravels and sand, one profile: 0 to 4' colluvial silty fine sand, 4' to 6' buried soil A & B horizon, 6' to 14' cobble to gravel layer.

Royalty: 41¢ ton in place

Unit Price at Source (processed)

Type of Processing: Removes as pit run, crushes and screens at plant 3.5 miles N.

Access: Maplewood road.

Market Areas: Albuquerque Metro Area, SW especially.

Transportation Data: Excellent location for serving SW Albuquerque.

Utilities Available: Power: No Water: No

Reclamation Requirements: None

Overburden:

Remarks: (Conditions of sale, etc.)

Verified with: Ralph Neel/Ray Gutierrez Verified by: Bill Jonas

Title: Seller/Buyer-Operator Title: Mineral Appraiser/Geologist

Phone: 766-7365 Date: June 19, 1981

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Example of a Comparison Summary Chart

Adjustment Chart (Dollar Adjustment Method)

SALES DATA — COMPARISON OF SUBJECT TO COMPARABLES

SALE NO.	DATE	TONS	SALE PRICE PER TON	ADJ. FOR TIME	HAUL	QUALITY	PROCESSING	VOLUME	STIPUATIONS	INDICATED VALUE
1	7/76	7.5M	$.32	+.05	-.05	0	0	-.05	0	.27
2	4/78	10M	$.29	+.01	0	0	-.01	-.03	0	.26
3	3/76	20M	$.21	+.04	-.04	0	+.04	0	0	.25
4	4/77	20M	$.23	+.03	-.05	0	+.05	0	0	.26
5	9/76	75M	$.16	+.02	+.05	0	—.5	+.03	+.03	.24
6	4/77	100M	$.15	+.02	0	+.02	+.02	+.02	0	.23

Comparison Chart (Percentage Method)

SALES DATA — COMPARISON OF SUBJECT TO COMPARABLE SALES

SALE NO.	DATE	TONS	SALE PRICE PER TON	ADJ. FOR TIME	HAUL	QUALITY	PROCESSING	VOLUME	STIP.	COMPOSITE FACTOR	INDICATED VALUE
1	7/76	7.5M	.32	.37	.85	1.00	1.00	.85	0	.72	.27
2	4/78	10M	.29	.30	1.00	1.00	.95	.90	1.00	.86	.26
3	3/76	20M	.21	.25	.85	1.00	1.20	1.00	1.00	1.02	.26
4	4/77	20M	.23	.26	.85	1.00	1.15	1.00	1.00	.98	.25
5	9/76	75M	.16	.18	1.25	1.00	.80	1.15	1.15	1.32	.24
6	4/77	100M	.15	.17	1.00	1.10	1.10	1.10	1.00	1.33	.23

Comparison Chart (Bracketing Method)

SALES DATA — COMPARISON OF SUBJECT TO COMPARABLES

SALE NO.	DATE	TONS	SALE PRICE PER TON	ADJ. FOR TIME	HAUL	QUALITY	PROCESSING	VOLUME	STIPULATIONS	OVERALL COMPARISON
1	7/76	7.5M	.32	.37	-	0	0	-	0	-
2	4/78	10M	.29	.30	0	0	-	-	0	-
3	3/76	20M	.21	.25	-	0	+	0	0	0
4	4/77	20M	.23	.25	-	0	+	0	0	0
5	9/76	75M	.16	.18	+	0	-	+	+	+
6	4/77	100M	.15	.16	0	+	+	+	0	+

Comparable Factors Chart

Applicant: Bureau Motion
Date: 5/18/84
Appraiser: Roger Underwood

Sale No	Time Adj.	Transportation	Access	Processing Factors	Volume	Quality	Overall
1	0	0	0	0	0	0	0
2	0	-	-	-	0	+	0
3	0	-	-	-	0	+	-
4	0	-	-	-	+	+	+

(+) Subject Superior to Sale
(-) Subject Inferior to Sale
(0) Subject Equal to Sale

H-3630-1 - MINERAL MATERIAL APPRAISAL HANDBOOK
Derivation of Purchase Price as a Percentage of the Sales Price Method

Derivation of Royalty-Retail Sales Ratio

Operation No.	Royalty Per Ton	Retail Sales Price/Ton 1/	Ratio 2/
1	$.12	$3.00	.040
2	.17	3.25	.053
3	.25	4.39	.057
4	.31	5.25	.059
5	.22	3.75	.058

Average - .055

Median - .057

Operations 2 and 4 are most comparable in haul, overburden, and quality. Select .056 as proper ratio to use.

Example:

Investigation indicates that the subject material should sell at $4/ton fob pit. Applying the .056 factor (.056 x $4 = $.22) indicates a royalty value of $.22 per ton in place. The selection is not based on a mathematical process. It is based on judgement and comparability on the various transactions.

1/ fob pit

2/ Royalty ÷ Retail Sale Price

H-3630-1 - MINERAL MATERIAL APPRAISAL HANDBOOK

Example of a Appraisal Report Title Page

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPRAISAL REPORT

Salt Lake District Utah

Applicant: Bureau Motion Serial Number:

Type of Case: Mineral Material Sale

Purpose of Appraisal:

To estimate the Fair Market Value of clay material, in place, located west of Utah Lake in Tooele and Utah Counties, Utah.

Legal description:

TOWNSHIP	RANGE	MERIDIAN	SECTION	SUBDIVISION
7 S.	3 W.	SLM	4	E½NW¼
7 S	1 W	SLM	12	SE¼SE¼

120 acres

State Utah County Tooele and Utah

Appraised valuation as of (date). . . . March 13, 1985

Fair Rental . . . . . $

Fair Market Value . . . . . $0.25 per ton

I CERTIFY that I have carefully examined the above-described property and the amount indicated represents my best unbiased judgment as to the present fair market value of the fee simple title, except as otherwise indicated. I FURTHER CERTIFY that I have no present or intended future interest in the property appraised

May 29, 1985 (Date) James R. Sinclair (Appraiser's Signature)

RECOMMENDED June 6, 1985 (Date) APPROVED June 10, 1985 (Date)

(Signature) (Signature)

Real Appraiser U.S.G. (Title) GEOLOGIST (Title)

GPO 643-661 Form 9300-9a (J...

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Example of a Mineral Report Title Page

Form 3060-1
(July 1984)
(formerly 3980-1)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial Number
MM-1234

MINERAL REPORT

Mineral Material Appraisal
of
Sand & Gravel
for
John Roxs Material Sale

(Title)

LANDS INVOLVED

T.12S.,R.13E. B.M.
Section 22; NE¼SW¼

Prepared By:

Frank Stone
(Signature)

District Geologist
(Title)

February 29,1984
(Date)

Technical Approval:

John Hammill
(Signature)

Chief,Mining Law & Salable Minerals
(Title)

March 5,1984
(Date)

Management Acknowledgement:

Edward A. Smith
(Signature)

Assistant District Manager for Minerals
(Title)

March 6,1984
(Date)

* U.S. Government Printing Office: 1984-776-009/4879 R8

H-3630-1 - MINERAL MATERIAL APPRAISAL HANDBOOK

Example of a Short Form Mineral Material Appraisal

Report

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SHORT FORM MINERAL APPRAISAL

District Elko Serial Number MMS-NV-010-10-83 Planning Unit Buckhorn

County Elko State Nevada Zoning Open

Location: Township 26 N. Range 51 E. Section 14 Subdivision SW¼ within

Acreage 40 Date of Appraisal 9/30/83 Inspection Date 9/29/83

Purpose of Appraisal: To estimate the fair market royalty of pit run sand and gravel.

Rights Appraised: The right to remove sand and gravel.

Area & Neighborhood Data: This is a remote area, with mining being the major development.

Property Data: This is an old pit. Material consists of an irregular bed (0-4' thick) of well graded sand and gravel with a high silt content overlying lake bed silts.

Highest and Best Use: The highest and best use is as a gravel pit.

Valuation:

Sale No. 1 - This is the only active pit near the subject sale. Material has a lower silt content than that of the subject area and is the only good material in the immediate vicinity of the oil field where it is used. See comparison chart.

Sale No. 2 - Common use area on public land near Carlin, Nevada. Material consists of good quality sand and gravel in a wash.

Sale No. 3 - Sale by USFS to Nevada Dept. of Transportation. See comparison chart.

Sale No. 4 -

Sale No. 5 -

Reference Appraisals:

Conclusion & Estimate of Value: In my opinion the fair market value of this material is $.20/yd.³

Appraiser 10/3/83 Date Reviewed 10/6/83 Date

(+) Superior to subject sale
(0) Equal to subject sale.
(-) Inferior to subject sale.

Sales				Comparison of Subject to Sales							
				Percentage Adjustments							
#	Date		Sales Price $/ton or $/yd^3	Time	Quality	Haul	Volume	Process-ing	Stip.	All Factors	Indicated Value
1	8/83	Pine Valley Pit	3000 yd^3 @ .25/yd^3	0	+	-	+[1]	0	0	+	
2	4/83	Carlin Pit	500 yd^3 @ .25/yd^3	0	+	0	+	+	+	+	
3	7/83	Mountain City	60,000 yd^3 @ .18/yd^3	0	+	-	-	0	-	-	
4											
Subject	9/83		20,000 yds								$.20 yd.^{3}

Comments - In my opinion the inferior quality and greater volume of the subject sale make it of lesser value than sales 1 and 2. The greater haul distance, volume, and stipulations make sale 3 of lesser value than the subject sale.

1) Volume is inverse

Checklist for Appraisal Data Acquisition

Checklist for Appraisal Data Acquisition. The following information provides a checklist for data used in preparing a mineral material appraisal. Information listed under sections D, E, and F are sensitive data which may not be readily or willingly submitted. Items with an asterisk are most commonly used for income approach (DCF method) appraisals.

A. General.

1. Identify each individual agency, or firm from which comparable sales data will be solicited.

2. Ensure that there is sufficient film to adequately photograph each mineral material site to be examined.

3. Obtain topographic maps and aerial photographs for the mineral material sites to be examined.

4. Obtain Master Title Plat and Historical Index for the mineral material site.

B. Physical Features.

1. Note the direction and distance from nearest town.

2. Describe the accessibility of the mineral material site, how it is reached, the road surface, any transportation facilities, etc.

3. Describe the topography by giving a general description and the elevations.

4. Describe the vegetation and general climate and any effects upon the working season.

5. Describe the water and power facilities, as appropriate.

6. Identify the boundaries of the proposed mineral material site by locating section corners and other identifying land features.

7. Describe the current usage of the subject land.

C. Geology and Mineral Deposits.

1. Describe the general geology of the land on which the proposed mineral material site is located.

2. Describe such geologic and material characteristics as the types of bedding, weathering or alteration, thickness of deposit, porosity, permeability, specific gravity, etc., and collect samples for testing, if necessary.

3. Describe the texture as to grading and sorting.

4. Describe the composition.

5. Identify the suitability and usage of the mineral material for various purposes.

6. Describe the type, compaction, and stripping ratio of the overburden.

7. Estimate the tonnage/yardage of reserves.

D. Mineral Development.

*1. Describe surface and subsurface workings and drill holes (relate to surface and subsurface geology and structure), verify data on existing maps, and discuss past and present production.

*2. Describe the type and present use of any buildings, improvements, and equipment.

*3. Estimate the value and utility of plant and equipment.

*4. Calculate the distance to market (first point of sale).

*5. Describe types of transportation used, costs per ton-mile for haulage, and miscellaneous costs such as loading and unloading, etc.

*6. Describe the methods and equipment used for extraction and processing of the mineral material.

E. Sample Data.

1. Obtain any available testing results if possible, to determine quality and/or quantity of the mineral material. Sources are highway departments and private contractors.

2. If no mineral material information is available for the mineral material site being appraised, have sampling and testing done, if necessary, to determine the extent and composition of the mineral material. (Note: Testing of comparables cannot be done on private property.)

F. Economic Data.

*1. Ascertain the number of employees and wages paid.

*2. Obtain mining and processing costs.

*3. Identify sale price or onsite (f.o.b.) prices for each mineral material sold.

*4. Obtain the supervision and administration costs.

*5. Determine the total annual payroll.

*6. Determine the taxes paid (local taxes, County, City, State, and Federal severance tax).

*7. Estimate the current assessed value of buildings, facilities, and auxiliary equipment. If it is a new operation, estimate the capital costs of the equipment and facilities.

*8. Obtain data on royalty paid, if operator is other than the owner.

G. Other Pertinent Data to be Identified.

1. Identify Federal, State and local regulations that could affect mining and reclamation and their possible effects.

2. Take photographs of the mineral material being appraised, the site in which it is located, and any significant appurtenances.

3. Make maps and sketches of the mineral material site, as necessary.

4. Interview mineral material producers to obtain comparable sales data. Give names, addresses, telephone numbers, and dates interviewed.

5. Give a description of the methods used and costs for reclamation.

Discounted Cash Flow Analysis and Simple Discounted Cash Flow Model

A. Discounted Cash Flow Analysis

As previously stated, the discounted cash flow analysis is a form of the income approach. It is a method which calculates the present value (or worth) of an anticipated series of future incomes. In order to estimate present value, future incomes must be discounted to account for the time value of money.

Due to the competitive uses and limited supply of money, investors seek a rate of return on their investments. Thus, one dollar in the present is worth more than one dollar in the future, because the present dollar may be invested and gain a return. From this observation it is evident that the reverse is also true. A dollar in the future is only worth a fraction of a present dollar. To calculate present worths of anticipated future incomes the following formula is used.

$$PW_{Factor} = \frac{1}{(1 + d)^n}$$

n = year
d = discount rate

PW_{factor} = Present worth factor at the $_n$th year. This factor times a future value at year n will yield the respective present worth at discount rate d.

The relationship between the discounted rate and interest rate can be illustrated by comparing present worth formulas with future worth formulas. The present worth factor is a reciprocal of the future worth factor. The future worth factor, which is of more common usage, is used to calculate the future worth of a present sum accruing annual compound interest. The future worth factor based on annual compound interest is calculated as follows:

$$FW\ factor = (1 + i)^n$$

i = interest
n = year

The present worth of an anticipated income (I) may be calculated by multiplying the future income by the appropriate present worth factor.

$$PW = I\ (PW_{factor}) = \frac{I}{(1 + d)^n}$$

I = Income or annual cash flow after all costs, receipts, taxes and allowances have been calculated.

The present worth of an anticipated series of future annual incomes may be calculated using the following equation:

$$PW = \frac{I^1}{(1+d)^1} + \frac{I^2}{(1+d)^2} + \frac{I^3}{(1+d)^3} + \ldots + \frac{I^n}{(1+d)^n}$$

I_1= Income in the 1st year
I_2= Income in the 2nd year
.
.
.
I_n = Income in the final year

To calculate the present worth of a uniform finite series of anticipated future incomes, the above series formula simplifies to:

$$PW = (I)\ \frac{(1+d)^n - 1}{d(1+d)^n}$$

If the income stream continues at a constant annual rate into perpetuity, (assume n goes to infinity) the present worth approaches a maximum value (or limit). The formula is simply expressed as:

$$PW = \frac{I_a}{d}$$

I_a = Income received each year

The perpetuity formula is useful for estimating maximum or permanent damages to agricultural or grazing lands under sustained yield.

For most BLM applications the discount rate is fixed at a reasonable rate of return for the operation in question. The rate of return should be no less than a "safe" rate available from reasonably secure investment alternatives of a similar magnitude. Generally, in mining, the rate of return is increased above a "safe" rate to account for risk. The recommended discount rate for BLM mineral material DCF evaluations is a 10% real rate after tax. DCF's using such a real rate should not include future inflation in the revenue and cost inputs. This rate is derived from the estimated cost of capital to the mineral industries.

B. Simple Discounted Cash Flow. The following inputs and criteria are used to develop the discounted cash flow analysis:

Production Rate (PR in cu. yd. or ton/yr.): The total cubic yards or tons to be sold over the life of the contract divided by the number of years of the contract.

Product Selling Price (PSP in $/cu. yd. or ton): The price at which the material will be sold by the purchaser.

Gross Income (GI in $/yr): Figured as the product of PR (cu. yd. or ton/yr.) and PSP ($/cu. yd. or ton), yielding a value in ($/yr.).

Royalty Payment (RP in $/yr): The amount in $, the purchaser would pay for the material.

Gross Revenue (GR in $/yr): Gross revenue is the dollar value obtained after subtracting RP ($/yr) from GI ($/yr).

Operating Costs (OCo in $/yr.): Total annual operating costs for production and the processing of the mineral material being sold including reclamation, sales and severance taxes.

Net Operating Income (NOI in $/yr.): Income after OCo ($/yr.) is subtracted from GR ($).

Salvage Value (SV in $): SV($) represents the dollar value of equipment after it has been used during the DCF period. If prorated annual capital costs are used, no salvage value is applied.

Capital Investment (CI in $): The largest investment that is required to bring the operation into initial production, but some investments will be required periodically throughout the life of the operation such as replacement of equipment with a short life. Alternatively prorated annual capital investment may be used.

Operating Capital (OCa in $): OCa($) is the additional money required to meet operating costs to maintain the operation. It is added back at the end of the DCF period.

Exploration Costs (EC in $): EC($) is for drilling, sampling, and testing of the mineral material, prior to actual operation.

Cash Flow (CF in ($): CF is obtained by subtracting the SV + CI + OCA + EC from the NOI($) in each DCF year.

Taxes (TX in $): All applicable State and Federal income taxes and county taxes in States without State income tax (i.e., Nevada, Wyoming, South Dakota, Washington, and Alaska). Use a 46% percentage estimate of TI. This percentage represents the combined tax assessed on the net proceeds (CI in $).

Now this annual after tax cash flow (ATCF) needs to be discounted to net present value. Taxes on negative cash flow years are considered credits because the losses protect other income.

Present Worth of $1.00 at discount rate (DR) in percent (PW/1 at %): Figured for a future value (FV) of a present value (PV) of $1.00, its discount rate in percent for the life of the contract by use of the following formula:

$$PV = \frac{FV}{(1 + DR)^N}$$

PV = Present Value of $1.00

FV = Future Value of $1.00

DR = Discount Rate of 10% without inflation

N = Number of years of contract

Discounted Cash Flow (DCF in $/yr.): DCF ($) is the amount obtained by multiplying the CF ($) and the PW/$1 at the Discount Rate (%).

Cumulative Discounted Cash Flow (CDCF in $): Is the cumulative sum of the DCF ($) amounts for the time period of analysis.

Net Present Value (NPV in $): Is the sum of all the discounted cash flows of all the future years.

C. DCF Computation. These factors are then applied in the following manner to obtain the fair market value of the mineral material:

Production Rate (PR) in cubic yards or tons/year

x Product Selling Price (PSP) in $/cubic yard or ton

= Gross Income (GI) in $

- Royalty Payment (RP) in $

= Gross Revenue (GR) in $

- Operating Costs (OCo) in $

= Net Operating Income in $

+ Salvage Value (SV) in $

- Capital Investment (CI) in $, generally in the year the capital was spent or annualized

- Operating Capital (OCa) in $

- Exploration Costs (EC) in $

= Cash Flow (CF) in $

- Income Taxes

= After Tax Cash Flow (ATCF) in $

x Present worth of $1 at 10% discount rate for each year

= Discount Cash Flow (DCF) in $

+ Sum of each years discounted cash flow ($)

= Cumulative Discounted Cash Flow (CDCF) in $

= Net Present Value (NPV)

D. Interpretation of Results. Several iterations of the DCF are run varying the royalty rate for each iteration. A tighter bracketing with a royalty rate differential of $.05 to $.10 is suggested for those with access to a computer or programmable calculator. If doing DCF's without computer assistance a broader spread of royalty rates such as $.25 is recommended. The royalty rate is chosen at the rate at which the discounted cash flow (DCF) is zero or sightly above. Adjust the royalty rate to a reasonable figure in the appraisers judgment and calculate the NPV. This will be the fair market value of the mineral material. If broad (greater than $.10) royalty rates are used in the DCF iterations, additional iterations will be necessary using $.05 to $.10 rate changes to narrow the royalty rate to the most reasonable rate.