09/10/2012

FAO: The International Valuation Standards Committee
41 Moorgate, LONDON EC2R 6PP, United Kingdom.

Subject: Valuation in the extractive industries
IVSC Discussion Paper- RSA comments

Dear Sirs,

In the attached text, The Russian Society of Appraisers (RSA), as a constituent of the International Valuation Standards Council (IVSC), responds to the IVSC’s invitation to comment on the initiatives raised in the Valuation in Extractive Industries Discussion Paper. While the Discussion Document presents for discussion a wide-ranging number of issues, in our response we particularly focus on those conceptual and methodological matters that are of interest in the national context. Russia possesses a vast mineral resource wealth and accounting for it in quantitative and value terms invariably poses a host of problems of a conceptual nature and those that relate to the methodology. Thus, interest in the natural resource valuation provisions, including those offered by IVSC, has always been high in the country – especially among those associated with state-related natural resource assessments.

The research personnel of the RSA have been exploring some of the conceptual issues raised in the Discussion Paper for a number of years in a joint cooperation with “The Russian Academy of Science Council “On Eurasian economic integration, modernization and sustainable development” (The RAS Council) staff. Therefore, this response also bears the imprint of certain findings relating to the general valuation needs of a cadastral natural resource administration. It is hoped that IVSC will appreciate the needs for competent valuation guidance arising from those quarters and will also consider developing its forthcoming natural resource guidance having regard to the interests and needs of the cadastral sector among the other stakeholders. It is our conviction that in developing the guidance the Working group should have the broad public interest in its mind that goes beyond merely addressing the valuation needs of the corporate governance. Even though the state-related assessment perspective is no longer considered to lie within the remit of the IVSC projects, it is felt that the peripheral exception is begging in the matters pertaining to natural resource valuation, which is often conducted under the supervision of state authorities and with the involvement of state investment funds in the framework of public-private partnership mechanisms.

There is an ample opportunity to incorporate this public approach into the mineral’s valuation perspective. To date, there exist no international guidelines that purport to provide a comprehensive view for natural resource accounting in value terms; this is an acutely felt void in
the international appraisal standard-setting, and it is laudable that IVSC had set out to fill it up in a comprehensive way (the standard + TIPS). A due balance can be struck here, it is believed, if the concept of public values were to make its first-time appearance in the IVSC documents, since public values are acquiring a wide currency in the natural resource valuation sector and will become conventional before long in the same way they had become conventional in the area of assessment for large-scale development projects.

Having this in mind, our comments come divided into two parts: Part 1 follows the structure of the Discussion Paper questions in a Q&A pattern, while Part 2 of our response dwells on the basic issues of mineral valuation methodology and requisite valuation bases, discussing them in a holistic way to which the concept of public values for cadastral purposes is integral.

The attached comments letter has been prepared by the natural resource valuation working group comprised of the RSA staff and members of the RAS Council. Special thanks are due to Prof. Sergey Smolyak who by being in charge of the working group was an inspiring influence and principal contributor to the project. Other contributing members of the group also included: Prof. G. Mikerin, Prof. O. Medvedeva and Mr. A. Artemenkov.

We trust our comments will be found to be of some value by IVSC Valuation in Extractive Industries Working Group.

Respectfully,
Igor Artemenkov, FRICS, CCIM, FIABCI,
Senior Vice President, The Russian Society of Appraisers

Attachment: RSA-RAS Council commentary on the Valuation in the extractive industries IVSC Discussion Paper
RSA-RAS Council Comments on the Valuation in the extractive industries IVSC Discussion Paper

This submission consists of two parts. The first part outlines our replies to a number of questions posed by the IVSC in connection with the development of a standard on the valuation of assets in the extractive industries (in IVS 2007 this set of guidelines was referred to as GN 14). The second part describes RSA experts’ views about the orientation the provisions in the new standard should take -- in view of the specific needs of the Russian natural resource sector and its regulators (for consistency, this text uses "standards", although the final status and name(s) of the resulting document(s) can be other than that). Throughout, the main focus of this commentary is not on suggesting any specific wordings of the provisions of the standard, rather the aim is conveying our perception of the essence of certain concepts and methods, and presenting a justification for considering certain discussed factors. At the same time, we do attempt to address in a substantive way the subject matter we envision to be included in standard -- aiming to point out the features we hope to see reflected in the standard having regard to our country-specific needs.

Throughout this commentary, the reference to “mineral properties” (MP) substitutes the cumbersome expression "assets in the extractive industries". Making this reference we have in mind the different kinds of minerals, including solid (mineral) and hydrocarbon resources (oil and gas).

1. Replies to IVSC questions

Question 1.1:
Should IVSC produce combined standards and guidance for Extractive Industries or produce separate pronouncements for mining and for oil and gas? If you believe the latter please indicate the reasons why you consider separate guidance is appropriate.

The processes involved in the exploration and development of various deposits have their own peculiarities. From this perspective, it would be necessary to issue standards or guidelines for each specific type of mineral, or for field groupings in the aggregate (for example, separate guidance provided for the solid (mineral) resources, separate guidance for oil and gas, not forgetting having the special guidance accorded as well to the groundwater). However, there are deposits from which several different types of minerals are jointly extracted such as oil, gas, helium and sulfur. Additionally, valuation methods for all types of MPs are similar; the manifest difference is in the composition of the primary information necessary for undertaking the valuation, and in the list of factors to be considered in the valuation process. On this basis, we believe it inappropriate to set about developing different standards for each of the mineral types.

Question 1.2:
a) Should the project focus just on the valuation of reserves and resources or should it extend to other assets employed in the industry and to entire businesses in the sector? Please provide reasons for your answer.
b) How often do you assess or use (if it is readily ascertainable) the value of an extractive business as a starting point for the valuation of reserves and resources?

A) The standard should bear on the valuation of the entire group of assets involved in the working of any specific mineral field (license area). As with the organization of mass appraisal of mineral properties in the state of Arizona, the foundational principle should be the treatment of mining assets as a single isolated enterprise complex (the business unit valuation concept). Thus, all the property used for the development of the field should be conceptually considered and evaluated together as a single complex. This is due to the fact that:
1) Certain assets (e.g., wells), considered in isolation, may have zero or a negative value.
2) The assessment takes into account the costs associated with all types of properties involved in the extraction of minerals. Valuation is commonly applicable to the field in general, and only in exceptional cases - to its constituent parts (e.g., a particular section of the deposit or an ore body). For example, in oil extraction this can be due to a fact that sinking a well in a certain place would change the distribution of oil throughout the field and affect the extraction of oil from other wells located in different places. Therefore, hydrodynamic calculations can not be limited by only one particular section of a deposit (for example, containing only the proven reserves) and exclude from the consideration all the rest. And the economic calculations shouldn’t neglect the fact that the extraction of minerals from different parts of the field is serviced by a common infrastructure, which is not merely the sum of "partial infrastructures" serving the individual sites. Considering this, it would be improper to talk about value estimates for individual reserve categories (e.g., proven reserves), though the presence of different categories of mineral resources in a particular field should be taken into account.

B) The experts preparing this commentary have had extensive involvement with the valuation of deposits, participating both in the capacity of preparers of some feasibility studies, and being involved in the state reviews of feasibility studies for oil and gas commissioned in the context of oil and gas reserve accounting. The same applies to solid minerals. It is precisely on the basis of valuations (economic evaluations) that a project development option is selected corresponding to reserves figures for minerals approved by the state (and reflected in the national natural resource inventory).

Question 1.3: Do you agree with the Board’s preliminary view as to the type of pronouncements that IVSC should be making in relation to valuations in the Extractive Industries? If not please explain what alternative or additional material you believe would be useful.

Some general principles of valuation as applied to mineral deposit appraisals should be modified, and the use of comparative and cost approaches should be restricted to special cases only. Because of this it is desirable to have a separate standard. The main points we hope to see addressed in the standard are touched upon and briefly discussed throughout this commentary.

Question 2:
  a) Are you familiar with the former GN14?
  b) Is GN 14 used in the valuations that you provide or receive?
  c) What elements of GN 14 do you find useful in either reporting or interpreting valuations?

a) We are familiar with the GN14 and have participated in preparing its Russian translation
b) The standard is not relied upon in our practice
c) Sections 1.3, pp. 5.1.5-5.1.6, 5.2-5.3.

Question 3
  a) Which classification code or codes are most commonly used in your industry /sector?
  b) Which code do you normally use or rely on?
  c) Are you aware of differences across your / industry sector on the classification codes used? If so please indicate whether these differences cause problems in undertaking or understanding valuations.

a) The Russian classification of mineral resources is utilized. It is currently undergoing improvements converging to the classifications used in other countries.
b) We are familiar with these differences, but they do not interfere with the unambiguous understanding of the value estimates, since only the valuation of a field as a whole is meaningful, and not of its specific differently classified areas.

Question 4:
  a) Please identify the valuation methods that you most commonly use or encounter for valuing:
     • Producing reserves
     • Reserves undergoing development
     • Reserves or resources subject to exploration
  If you are a valuation provider, please indicate why you prefer these methods. If you are a valuation user, please indicate if you are confident in the result obtained by these methods.
We rely on the DCF method only and have confidence in the results obtained under it, as long as the technological information and the pricing data for specific types of works has undergone verification by other experts (the reasonableness of output prices is also being checked by us).

**Question 6.1:**

a) Production forecast – do you use internal production forecasts developed by the entity’s own geological and engineering specialists, external forecasts, or a combination of both?

b) Do you adjust the production forecasts for risk by reserve category?

c) Do you make an explicit cash flow forecast through the term of expected production, even though it might be a very long period of time, or do you use a “remainder period” for long lived reserves? If you use a remainder period, typically over what period is your explicit forecast?

d) Do you use an internal management estimate for future pricing, eg the NYMEX, investment bank analysts’ estimates, industry sources, or a combination thereof to estimate future prices? If using the NYMEX strip pricing, what are the typical assumptions you make for prices beyond the NYMEX strip (e.g., flat, inflationary growth, etc.) Do you consider the impact of any hedging of future prices that might be in place in estimating the future revenue stream?

e) Do you apply differentials to the future price estimates? If so, what is your source for estimated differentials?

f) Do you reflect currency exchange risks to future income and operating cost projections in the cash flow or in the discount rate?

g) Do you include corporate overheads when estimating the value of mining, oil and gas reserves, or just the selling, general and administrative costs associated with operating and producing the reserves?

h) How often do you use the DCF method to value probable or possible reserves?

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a) We use independently reviewed estimates for the production volumes and scope of certain types of works developed during the exploration of a field and prepared by geologists and technology experts involved in the development of the project documents (as a rule, the project design documents are developed by independent organizations, although they can also bear imprimatur of the mineral licensee). In this framework, for example, oil production estimates are supported by hydrodynamic models.

b) We rely on the production volumes and scopes for certain types of works to be undertaken during the development of the field covering the entire period of its development (which may be very long). On this basis, the estimated cash flows are constructed which are then used for valuation and selection of the recommended ways to develop the deposit. It is important to note that these estimated cash flows in general are neither the "expected", nor "the most likely" ones, and they cannot be regarded as forecast cashflows. In terms of their economic substance, they are closest to the certainty equivalents of uncertain cash flows, although their calculation techniques differ (see part 2 of this commentary).

c) The calculations are carried out in constant prices, such that the price forecasts generated by analysts and the banks are used but only to establish a reasonably uniform price of oil continuing for the entire planning period. This is another reason why the estimated cash flows can not be interpreted as a forecast cashflows.

d) and f) no, because the calculations are performed in constant prices.

e) The cash flows should reflect only those costs which are directly associated with the development of a given field. Costs relating to the entity as a whole (overhead, corporate, general administrative costs, etc. – their national classification may vary) are also usually considered in the context. The composition of such costs (and taxes!) is subject to reviews.

h) We always use this method.

**Question 6.2:**

a) What methods do you use or are familiar with for determining the discount rate used for valuations of reserves and resources?

b) Do you separately consider and evaluate market (systemic) risk and asset specific risk?

c) Please indicate the factors that you normally consider and reflect in the discount rate and any source you use to determine the appropriate rate adjustment.

d) Do you use multiple discount rates to reflect the changing risk profile as an extractive process moves through its life cycle?
a) stock market returns data; rates of return on investments required by mineral licensees; expert
estimates; discount rate standards established by the state in its guidelines for the development of
project documents.
b) The objective is to reflect all types of risks and uncertainties in the cash flows. Risks
associated with developing a specific field in a specific technological manner usually bear a
distant relationship to the risks of investing in shares of extracting companies.
c) In view of the foregoing, it would be appropriate to have only the country risk reflected in the
discount rate, making its value a little higher than the risk-free rate. In developing the estimates
of cash flows we try to take into account all factors affecting the volume of recoverable reserves
and expenses, including uncertainty and risk factors.
d) A constant (time-invariant) discount rate is applied, although it would be theoretically
appropriate to consider the longer-term trends for its change over time. Different stages of
project lifecycles give rise to their specific risks that can be directly reflected in the cash flows,
and not in the discount rate.

Question 7:
a) Please indicate what methods you use or are familiar with that fall under the Cost Approach and that are used in
valuing assets in the Extractive Industries.
b) If you use or are familiar with the Cost Approach, please indicate in your experience how the cost of an
equivalent asset is determined.
c) If you use or are familiar with the Cost Approach, please indicate the three most common adjustments that are
made in your experience to reflect physical, functional or economic obsolescence, and what metrics are used to
determine these adjustments.

We are familiar with the cost approach, but consider it to be generally inapplicable to the
valuation of oil and gas fields. In practice, it is used in exceptional cases for the valuation of
individual items, for example, an individual well (where a need arises to adjust carrying figures
in the financial statements or when the items are transferred to another entity).

Question 8:
  a) How should the unit of valuation (unit of account) be determined in the valuation of extractive activities?
The unit of account should be represented by a field as a whole, including all of the assets
involved in its development such as those described in section 8.3 of the Discussion Paper.

Question 9:
a) How do you estimate the cost of future reinstatement or environmental protection obligations?
b) Do you discount the future cost of reinstatement obligations using a risk free rate or another rate? If another
rate please identify and provide rationale for this approach.

a) The cash flows should include either the liquidation costs to retire the constructed facilities at
the end of the project development, or annual contributions to the abandonment fund. This is an
extra reason why the cash flows should be constructed and analyzed for the entire period of field
development.
b) The one and the same risk-free discount rate is applied to discount all types of income and
expenses. Otherwise, in discounting taxes, for example, we would have had to take into account
the risk of non-payment or a partial payment of the tax, or a provision for the risk that the wells
will have to be drilled again in a different place would have had to be incorporated into the
respective discount rate when handling the discounting of the drilling costs.

Question 10:
a) If you provide valuations of mineral assets, what investigations do you undertake to established the
reasonableness or otherwise of estimates of the extent of reserves or resources provided by geologists?
b) If you provide valuations of mineral assets, are you routinely provided with estimates from engineers of the cost
and feasibility of extraction? What enquiries do you make to satisfy yourself as to the reasonableness of these
estimates?

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1 It would be beneficial were the Council to undertake a study of trends investigating the behavior of risk-free
discount rates in different countries over the period of, say, 1950-2010. Such a survey would help elicit and
recognize long-term trends in the variations of this rate.
c) If you are a recipient or other user of valuations of assets in the Extractive Industries, are you satisfied that the valuations properly reflect any uncertainties in the current estimates of either the extent of the reserves or the costs of recovery? What information would you expect to see in a valuation report that would improve your understanding of the sensitivity of the reported value to uncertainties in the identified reserve or the costs of recovery?

a), b) According to the established national practice, the views of independent experts are considered in developing the project and when it undergoes the approval review stage. Geologists and engineers have to provide (in their reports, feasibility studies and other project documents) support for the respective values of assumed characteristics of the deposit and its development. Their studies are then subjected to independent reviews. It is always the case during the project review/state approval process that a conclusion as to the reliability of various estimates is collegiate; it is not the opinion of a particular expert. Depending on how accurate is the information about the mineral body, the cash flows incorporate certain adjustments to take account of the risks involved. For example, if the boundaries of a body are not known with a reasonable certainty, the cash flow estimates may provide for the inclusion of some monetary provisions to enable the drilling of additional wells in the eventuality some of the wells being drilled prove to be “dry”.

c) To provide the users of mineral valuations with a clear understanding of a degree to which the uncertainty of reserves and development costs is being accounted for, all the types of considered uncertainties should be explicitly listed in the project documents (mineral property valuation reports), with the explanatory statements being made as to how each type of the uncertainty finds its reflection in the constitution of cashflows. Sensitivity analysis falls short of this goal, as it is lacking in information about the probabilities attaching to variations in a specific parameters. It is to be noted that plant and machinery items are also valued under conditions of uncertainty, but no sensitivity analyses are usually attempted on them.

**Question 12**

a) Please provide any examples of which you are aware of significant differences between the value of otherwise similar resources arising solely from different Governmental policies.

b) Please indicate how “country risk” factors are reflected in the way in which you price or value extractive assets.

a) The legislation may permit the use of different tax regimes. If, for example, a deposit is developed on a PSA terms or such a development is covered by tax benefits, then the resulting value will be different. The value of deposits is materially contingent on the terms of the license agreement and the size of the negotiated royalty payments and, of course, on the ever-changing export duties.

b) Country risk is accounted for in the discount rate, such that the resulting rate is "not entirely risk-free" (it is an abstraction to contemplate estimating a "pure risk-free rate", not unlike the abstraction of a material point or that of a perfect competition). However, difficulties may arise if the field is being developed jointly by companies from different countries with the participation of the state (this is a situation encountered in the development of fields made under PSAs).
2. Some proposals for the new standard for valuing mineral properties

It is expected that the new standard on valuation of mineral properties will address the distinguishing features associated with the “the object of mineral valuation”, the type of valuation, valuation methods, and the use of valuation results. Additionally, we expect it to contain a discussion bearing on the fact that in some countries mineral properties (MPs) are allowed to circulate freely on the market, while in others MPs are owned by the state, which only transfers specific subsoil use rights enabling the development of MPs. With this in mind, the commentary hereinafter concerns itself with references to “the MP user” (this being a more general term implying that in respective countries the user of mineral resources may also be the full owner of the MPs). Accordingly, in speaking about the market or market circulation, we will be referring to the circulation of either the MPs or the rights associated with their development.

The object of valuation. This commentary takes the view that the object of valuation (an entity being valued) should be conceived as the “mineral deposit” (= "mineral property"). At the same time, this raises a number of problems:
1. A field, for example, an oilfield, may be constituted of several "parts", each of which having the potential to be developed independently of the others. Moreover, different parts of the MP can be related to different resource users.
2. The deposit may include ore bodies which have been explored to a varying degree and therefore are classified in different ways. For example, one segment is classified as the proven reserves, while the other is held as probable reserves. Moreover, different countries may have different classification regimes for mineral deposits, and the classification may even be different within the boundaries of a particular country depending on the purpose for which the classification is maintained.
3. The deposit may consist of ore bodies, each containing a different set of minerals. For example, one subsoil strata contains oil and gas only, while the other additionally allows for the extraction of helium.

An important question arises in this respect: can we regard a "part" or a “section” of the deposit as an object of valuation in its own right, or such an object must be constituted by the entire mineral deposit?

MP can be roughly conceived as a body, every little part of which contains mineral(s) in specific amounts. In general, however, these quantities are not known precisely. And we can’t talk about the probability of specific parts of a deposit containing specific amounts of such and such mineral, because all the deposits are unique and no statistics of this kind is accumulated which could be trusted by the geologists, engineers, financial institutions, and the state. Therefore, the designers are trying to put into each project document the most plausible ideas about the spacing and configuration of ore bodies (deposits, oil reservoirs, etc.) and the concentrations of minerals (conditions of solid minerals, oil saturation, etc.) in its individual parts. These ideas should be clearly described in the project documents and should be subjected to examination by the publicly-appointed reviewing experts. In other words, in this second approximation, the object of valuation is represented not by the entire mineral deposit or its separate, disparately explored parts, but by the most plausible element of the mineral deposit.

Distinguishing features of mineral properties as valuation objects. As objects of valuation, mineral properties are characterized by the following features:
1. MPs being geological objects are thought of as real estate. However, as objects of valuation, MPs include all the available information about them, all the man-made facilities in place intended for exploration of the MP and the extraction of minerals therefrom, and in some cases - any part of goodwill associated with the entity which carries out the exploration and
development of MP. In this sense, MP is closer to such an object of valuation as a business entity than to equipment, buildings, or parcels of land.

2. They are unique, exclusive, and have no comparables. For example, different MPs are located in different places, have different shapes, contain different sets of minerals and are explored in different ways. In this sense, MPs, as valuation objects, are more akin to works of art or historical properties than to equipment or buildings. This circumstance practically eliminates the possibility of applying the comparative sales approach to value MPs.

3. They can’t be replicated. One can’t create an exact or even inexact replica of a MP, especially if the aim is to reproduce it in the same condition as it is found at the valuation date. This virtually eliminates the possibility of using the cost approach to value MPs.

4. The exploitation of MPs creates benefits for the MP user, the state budget, and the public. This feature allows employing the income approach to undertake their valuations. In this sense, the MPs are closer to buildings and businesses.

5. They can be developed in different ways. For example, alternative technological schemes always suggest themselves for a field development. It is essential that different ways of developing a MP result, ultimately, in different amounts of various minerals being extracted and variations in the timing of such an extraction. However, the development of MPs is a type of capital investment and is always pursued in accordance with the approved plans. These project plans are coordinated with the designated state agencies, meaning that the state has the ability to influence which of the methods of development will be implemented. In this sense, MPs are closer to land, for which the state establishes the patterns of permitted use. It is important to bear in mind that the project design decisions taken today often are irrevocable and cannot be fundamentally revised even after some time. So, if some wells turn out to be "dry", neither they, nor any other previously drilled wells, lend themselves to relocation to another, more convenient, area. However, changes can be made to a previously approved project (providing, for example, for a different arrangement of yet undrilled wells).

6. Any method of developing MPs from time to time calls for a deployment of capital investments in various amounts throughout the period of development, with the extraction volumes being constantly in fluctuation and irregular (i.e., there is no single law that would govern the variations in the volume of extraction with time - each method of extraction having its own dynamics as far as the production volumes, capital and operating costs are concerned). This prevents the application of the current income capitalization techniques.

7. As has been rightly pointed out in Section 5.3.4 of GN 14 IVS 2007, the market value of MPs is usually not equal to the sum of market values of their constituent parts or components.

8. An informed choice of MP development methods (or continuations thereof), as well as their valuation, are grounded in project documents. There may be differences in the degree of complexity of these documents and the depth of their investigation, and they may have different names. Usually, the project documents are comprised of Prefeasibility Studies, Feasibility Studies, and proper technical designs for the development of MPs.

**Approaches to valuation and valuation methods**

From the foregoing it follows that only the income approach can be relied upon to value MPs. Moreover, only the Discounted Cash Flow (DCF) method can be considered a valid method within the income approach framework, because of the material fluctuations in the profile of cash flows. In this respect, the MPs, again, are akin to businesses. On this basis, we can support a valuation concept which treats the totality of assets within a MP as a stand-alone operating entity (a business unit valuation concept)—such as the one adopted for the tax assessment of mines in the state of Arizona.

If one knows what cash flows a property would generate in the subsequent periods of its use, this information would allow estimating not only the value it has as at the valuation date, but also its value at the beginning of each subsequent year. Very often it happens that some ways of property use would ensure its value at the date of valuation being positive, which lapses into the negative
territory only after the passage of, say, 20 years. In such situations, the cash flow analysis would allow us to establish the expected optimal period for property use, and this holds a particular significance in the assessment of MPs.

**The use of valuation results**

The users of valuation results are represented by mining companies, market participants, financial institutions, and the state. The role of the state as a user of such reports is three-fold and its guideline requirements are motivated by simultaneous needs to:
- fill up the budget (commonly, an expanded budget of all the levels of government);
- keep track of the inventory of mineral resources;
- better serve the public interest.

There can be no single valuation which would adequately meet the needs of all valuation users. Because of this, the results of valuation are best captured by several substantially different value bases, which will be discussed below.

**Valuation of MPs. Principles and the Bases of value.**

The preparation of MP-related valuations requires the knowledge of cash flows arising from the MP development. These flows depend on the choice of a MP development technique. This way, to each technique there correspond a related dynamics of mineral production volumes and the associated capital and operating costs (including environmental protection costs) varying from year to year. Moreover, each development technique is factored to last for a limited period, and, at the expiry of this period, there should be carried out remediation (abandonment) works, sometimes of a quite substantial and prolonged nature. Therefore, cash flows should be projected for the entire MP development period, including the liquidation stage, and not only for a duration of the license term (after all, the whole MP development business is a subject of valuation, not merely a business conducted by a specific business entity; a MP may continue to have a value upon the expiration of the license which should also be captured under the DCF).

The process of developing a MP gives rise to cashflows that accrue to the MP user and the state budget, while the public as a whole also enjoys a certain stream of benefits that can be evaluated in monetary terms. Accordingly, **three types/bases of value** can be used in valuing a MP:
- The market value of MP which is estimated on the basis of cash flows accruing to the MP user. As volumes of mineral resources, as well as the market value of real estate items, are usually recorded in the respective national cadastres, such value can be referred to as a *cadastral value* and reflected in the national MP cadastre; if necessary, this value can also form the basis for MP taxation (in some countries).
- “Budgetary value” (the aggregate budgetary effect from exploiting a MP), measured on the basis of cash flows accruing to the budget.
- Public value of MPs which is estimated on the basis of social effect from the reserves extraction. As volumes of mineral resources, as well as the value of real estate items, are usually recorded in the respective national cadastres, such value can be referred to as the *cadastral public value* and recorded in the national MP cadastres.

All these values have a scope in the context of the national mining project approval process and cadastral accounting. Therefore, Russian IVSC stakeholders would be interested in having the relevant issues addressed in the related IVSC pronouncements, believing IVSC to be a forum which can make a substantial contribution towards standardization of mineral valuation practices, including those globally associated with securing the state and public interest in the best way.

According to the national mineral evaluation practice, in order to secure an exploration or development approval, a MP user should submit to the State commission on mineral reserves a
set of alternative project design options, each characterized by its own NPV value and reserve volumes. The NPV positivity for the submitted options ensures that all the considered alternatives would be found beneficial by the MP user. Such a set of submitted development options forms a decision set from which the collegiate deliberation of public experts appointed by the State Commission selects the one option it recommends for the state approval (or suggests additional modifications). The choice of the best option can be made at the nexus of three criteria: the maximization of the quantity of minerals to be extracted, the maximization of the budgetary effect (value), and the maximization of the public value. Even though the optimality indications provided by each of these criteria may clash, a preference for maximization of the public value of the project is seen as an increasingly important decision factor.

In estimating the public value of extractive projects, the cash flows are established according to the general conventions adopted globally for assessing the public (social) effects from investment projects (the respective methodology is explained, for example, in project evaluation Guidelines developed by the World Bank and the Asian Development Bank). It is natural that any taxes, duties and other transfer payments are excluded from the analysis in constructing these flows. Remediation expenses at the termination of the project are accounted in the cashflows for those years in which they fall due. Annual contributions to the abandonment fund, even if scheduled, are not considered in the process.

Subsequent to the approval process, the volume of mineral reserves corresponding to the selected development option is recorded in the State Mineral Inventory and MP cadastre. The cadastral market value of the MP corresponding to the MP user’s NPV under the selected development option is contemplated for inclusion into the MP cadastre, and there are continuing discussions to base the taxation regime for MPs on this value, as is done in a number of western jurisdictions. The same value can also be incorporated into financial statements of the MP user. As has previously been noticed, the MP user’s project design submissions and the option review process address not only the cadastral market values (NPVs) placed on the mineral property as at the assessment date, but also consider the values it would have at the beginning of each subsequent year (i.e. cut-off NPVs). A difference (reduction) in the MP market value thus established in the projections over the course of each given forecast year can be treated as the MP asset depreciation and later reflected in the financial statements, unless its projections are supplanted by a subsequently commissioned repeat valuation.

Going forward, it is envisaged that MP cadastral accounting will also start incorporating indications of public values for all nationally significant MPs, including their “depreciation” based on cut-off NPV year-on-year differences, similar to as described for cadastral market values. Apart from statistical and planning purposes, this indicator is of an undoubtedly practical utility: a reduction in MP public value due to the MP user’s departure from the approved development plan can be treated as damage caused to the public and underlie the assessment of monetary sanctions.

As can be seen, the national mineral resource assessment practice is evolving a number of valuation bases the interplay between which may determine the outcome of mining project approval decisions. Even though the approval regimes in other jurisdictions may be less technically elaborate in valuation terms, it is a sure thing that IVSC constituents would be interested to hear the Council pronouncements on the use of public values methodology in MP assessments, and the scope it may enjoy. It is also submitted that future IVSC pronouncements on MPs should not skirt the issues of their cadastral evaluations, since this area of practice is not yet regulated by any international valuation or assessment bodies and awaits the best guidance.

In all cases, cash flows for valuation purposes are projected for the period from the date of assessment until the completion of abandonment operations and are expressed in constant prices as at the valuation date. This is roughly equivalent to NPV calculations in real (i.e. not nominal)
prices.

In assessing the cadastral market value of MPs, a use is made of *market prices* for individual goods, works, services and property rights, the acquisition of which is provided for in the respective MP development designs (specific data about the cost of such goods, services and rights to the MP user may also be taken into consideration). At the same time, the cash flows in question are constituted on the *after-tax* basis, rather than being pre-tax. In terms of the investment analysis, the resulting estimating process yields NPV calculations in real (i.e. not nominal) prices, with capital investments over the lifetime of the project traditionally reflected as outgoings in the construction of cash flows.

Public values of mineral projects are ascertained on the basis of cash flows occasionally involving the use of shadow prices and externality considerations, the associated techniques may be quite complex, but they are gaining in use.

In discounting cash flows to assess the cadastral market, budgetary or public values of MPs, the following rates are employed, respectively:
- real after-tax market discount rate established by the professional valuers.
- budgetary real discount rate set by the state on the basis of actual yields on long-term government securities.
- real public (social) discount rate suggested by the government.

Due to the fact that the selected MP development method may represent a middle-ground compromise between various interests (especially in case of the originally submitted development plans being modified during the approval process), it may happen to be neither the most effective (highest and best) use option for the MP user, nor the optimal use from the standpoint of the state or society, that is why here we can’t talk about full compliance with the HABU principle. However, we can say that:
- The cadastral market value of MPs corresponds to the most efficient way of developing the deposit for the MP user, *given the restrictions set by the state*.
- The public value of MPs corresponds to the most efficient way of developing MP from the standpoint of society, *given the restrictions imposed by the state and the system of market relations*.

Finally, we turn to the issues of incorporating *uncertainty and risks* into the valuation of MPs. Generally considered, these factors contribute to the probabilistic nature of cash flows and it is possible to account for them under either of the two methods:
1) Using the expected values (mathematical expectation, mean) of the cash flows and employing the risk-adjusted discount rate;
2) Using the certainty equivalents of cash flows and the risk-free discount rate.

The first method is commonly used for valuing businesses in other sectors of the economy. However, in our opinion, this method would be inadequate if used for MP valuation purposes. The fact is that information about the underlying probability distribution of many characteristics of MPs and/ or their development processes is hard to come by, as a rule. For example, there can be several competing alternative geological models of a MP, but it is not clear what probabilities to assign them; it is commonly known that the development of any project will involve unforeseen implementation costs, but we do not know a probability distribution for the amounts of these costs. Even if we were to regard the cash flows associated with the development of MPs as stochastic, the quantitative characteristics of their randomness could never be obtained by

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analyzing the data on the development of other MPs, because all such properties are unique and
the related cash flows are materially non-stationary. Information on the risk of investment into
the shares of MP users is not suitable for these purposes either, because the development of
subject MP is seen as a separate business, and its risk usually has little to do with fluctuations in
the stock price of the company.
Theoretical analysis of the issues involved in the assessment of investment projects under
different types of uncertainty\(^3\) indicates that in such situations one should rely on the second of
these methods. In other words, it is appropriate to have all kinds of risks directly accounted for in
the cash flows and apply the risk-free discount rate to the latter. In practice this can be achieved
by using moderately pessimistic assessments for individual characteristics of MPs and/ or their
development processes. For example:
• The risk that a certain segment of MP contains reduced volumes of a mineral or is completely
lacking in it is taken into account by using moderately pessimistic estimates for the
  corresponding MP content or development characteristics (e.g., the gold content in the ore, the
dilution loss factor, the saturation factor, the amount of contingency provisioning for capital
  expenditures). Plausible, but "more pessimistic" values of the characteristics should be
  considered for the under-explored sites.
• Risks associated with the need for the implementation of unforeseen works and the incurrence
  of related expenses (including the cost of remediating the consequences of accidents) are
  accounted for by the use of moderately pessimistic projections for the relevant activities, costs
  and deadlines.
• Risks associated with the fall of real (inflation-adjusted) prices for the mined output are also
  incorporated through the use of moderately pessimistic estimates for these prices, not the actual
  prices prevailing as at the valuation date.
• Risks associated with the possible failure of some of the measures to improve the efficiency of
  mineral extraction (for example, measures taken to increase the oil production output) are also
  taken into account by using a moderately pessimistic assessment of their impact on the volumes
  of production, loss recovery and the current cost of mining, extraction and processing of mined
  raw materials.

Those types of risks that do not lend themselves to being directly incorporated into the cash flow
projections should be clearly identified and reflected by means of appropriate adjustments to the
discount rate.
Variable "degrees of pessimism" can be imputed when dealing with the estimation of each of the
three value bases.

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\(^3\) E.g. see http://ssrn.com/abstract=2097349