Taxation of Mineral Products in Russian Federation

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Abstract

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The results of information transfer from one system to another will depend on the nature of deposit and complexness of its geological construction of mineral extraction tax base.

The basis for placing the resources on the State Balance Sheet in Russian Federation are the opinion letters of the state expert appraisal bodies, according to which, the licenses are granted to the users of subsurface resources.

For the purpose of taxation, the chapter 26 of the Tax Code of Russian Federation accepted the “multicomponent complex ores”. However, this term is interpreted in different ways, which complicates the definition of the taxation objects.

The author of this article proposed to state the whole list of minerals, in the production license.

It is proposed to exclude the “multicomponent complex ores” term from the chapter 26 of the Tax Code of Russian Federation, for the purpose of non-admission of interpretation of this term in different ways.

While processing mineral raw material we have basic product and by-products and wastes products.

The sale proceeds are 3% from the accounting basic production. If the sale proceeds from realization of the by-product is more than 3%, this product is basic. This criterion is developed for taxation.

The use of recycled resources is aimed at reducing of environmental risks. It is important for economic and environmental stability of country. Methods for determination of tax rates on mining (exampled at the estimation of raw materials’ cost and indirect estimation method for determining the amount of minerals and the price factor) are considered in this article.

Keywords: waste of mining production, technogenic field (TF), secondary mineral resources, tax rate on mining with the involvement of secondary resources into the reproduction, by-product, basic product

1. Introduction

Through the years, geologists, mining engineers, and others operating in the minerals field have used various terms to describe and classify mineral resources, which as defined herein include energy materials. Some of these terms have gained wide use and acceptance, although they are not always used with precisely the same meaning.

Long-term public and commercial planning must be based on the probability of discovering new deposits, on developing economic extraction processes for currently unworkable deposits, and on knowing which resources are immediately available. Thus, resources must be continuously reassessed in the light of new geologic knowledge, of progress in science and technology, and of shifts in economic and political conditions.

During the planned economy period coproduces were used as finished gods without finalization mainly for losses reducing and rational complex row materials usage. Recently the by -product become an independent marketing object. The latest technologies allow to use such products as an initial raw in different inductries.

Capacity’s realizing for economic growth is determined by the policy of the Government of Russian Federation. Acceleration of its growth should be based on maintaining a balanced budget by reducing the tax burden on the economy. Improvement of tax legislation at the present stage of tax reformation is one of the main tasks aimed at increasing the income of the budget thanks to the main taxes such as: value added tax (VAT), tax on mining (MET) and income tax. Analysis of the development of mineral resources' complex of Russia shows that the situation is unstable, because the current model of mineral reserves' reproduction does not stimulate the investment in the subsoil.

Huge wastes from mining and mineral production are accumulated over a long history of mining industry' development in Russia. The applied enrichment technologies over 50-100 years ago do not allow extracting useful components from the original rock mass on background of today's opportunities. Therefore, nowadays wastes (waste rock dumps and substandard raw materials, tailings, etc.) have an economic interest for the mining-production industry (Fersman, 1932) (see table 1).

Moreover, sometimes the content of useful components in the waste exceeds their natural presence in emerging mining fields.

Table 1. Number of different useful components in each technogenic field (TF) in Russia

Wastes	Number of different useful components in each technogenic field in Russia, %							
	Cu	Pb	Zn	Ni	Sn	W	Mo	Al_2O_3
Final shale	0.25-0.3	0.12-0.82	0.17-0.35	0.15-0.45	0.03-0.1	0.1-1.1	0.03-0.08	22
Milltailings	0.09-0.29	0.09-0.67	0.14-1.39	0.14-0.25	0.06-0.18	0.4-0.93	0.01	—
Final slag	0.39-1.49	0.08-1.04	0.5-1.52	0.02-0.16	—	0.01-0.9	—	
Slag	0.9-2.3	0.37-1.52	0.91-1.52	—	—	—	—	
Slurry cake	1.69-3.63	1.38-40	10.9-19.1					
Sludge	—	—	—	—	—	—	—	3.5-14.5
Ore concentrate	0.79	—	—	1.88	—	—	—	

From the standpoint of subsoil, accumulation of mining wastes is referred to the technogenic mineral objects and their commercial valued part is referred to the technogenic fields (TF).

2. Literature Review

The U.S. Geological Survey (USGS) collects information about the quantity and quality of all mineral resources. In 1976, the USGS and the U.S. Bureau of Mines developed a common classification and nomenclature, which was published as USGS Bulletin 1450-A—"Principles of the Mineral Resource Classification System of the U.S. Bureau of Mines and U.S. Geological Survey." Experience with this resource classification system showed that some changes were necessary in order to make it more workable in practice and more useful in long-term planning. Therefore, representatives of the USGS and the U.S. Bureau of Mines collaborated to revise Bulletin 1450-A. Their work was published in 1980 as USGS Circular 831—"Principles of a Resource/Reserve Classification for Minerals" (USGS Bulletin, 1976).

Article has definitions of stocks of ore and minerals according to JORC Code (Mineral Resources and Ore Reserves). IAS 2 Inventories, 2013.

Notwithstanding the equivalence in static framework between an ad-valorem and a specific sale tax, this paper shows in the dynamic Hotelling model for an ex-haustible resource that the ad valorem tax is definitely welfare-superior to the specific tax (Hotelling, 1931; Hung & Quyen, 2009).

D. Lund consider that at the same time, this tax is neutral in relation to companies that are well diversified. Although the information needed to implement an exactly optimal tax rate may be difficult to obtain, this is at least an example that all is not dark (Lund, 2009).

Pittel K. and Bretschger L. (2010) analyze an economy in which sectors are heterogeneous with respect to the intensity of natural resource use. Long-term dynamics are driven by resource prices, sectoral composition, and directed technical change. We study the bal- anced growth path and determine stability conditions. Technical change is found to be biased towards the resource-intensive sector. Resource taxes have no impact on dynamics except when the tax rate varies over time. Constant research subsi- dies raise the growth rate while increasing subsidies have the opposite effect. We also find that supporting sectors by providing them with productivity enhancing public goods can raise the growth rate of the economy and additionally provide an effective tool for structural policy.

T. Bloshenko consider that during the planned economy period coproduces were used as a finished gods without finalization mainly for losses reducing and rational complex row materials usage. Recently the by -product become an independent marketing object. The latest technologies allow to use such products as an initial raw in different inductries. At the same time are no economic criteria of production assignment as by product in the Russian legislation, which raise serious problem related to the corresponding taxation. To solve the problem pf the reasonable by-product tax assessements a definition of a coproduct and a formula of calculation of the tax base for profit taxation and calculation of expenditures for the basic product manufacturing are proposed (Larichkin et al., 2012; Bloshenko, 2011; Pavlova, 2009).

Domestic science gives several definitions of technogenic fields (TF).

For example, K. Troubetzkoy and V. Umanets consider TF as the technogenic formations containing minerals, which are suitable for effective use in material production at the moment in quantity and quality (Troubetzkoy & Umanets, 1998).

It should be noted that the research of K. Trubeckoy, V. Umanets and A. Tolumbaeva are very significant in science for the theoretical development of TF. According to their opinion, the comparative characteristics of technogenic objects should be done by the criterion of the benefit maximization. From the standpoint of V. Chainikov and E. Goldman, TF is the accumulation of waste tonnage of mineral raw materials, which provides the economic effect by using (Chainikov & Goldman, 2000).

As a result, we conclude that "technogenic fields" are mining mineral wastes. Technical difficulties to reproduce them are usually absent. But the problem is the cost-effectiveness of their development. Tax optimization products produced from waste is becoming the main part of this problem. As the owner of the subsoil resources, the government is interested in recycling mining wastes. Positive results are obvious:

1) new raw productions;

2) creation of new vacancies;

3) improvement environmental conditions;

4) cleaning waste areas, etc.

Therefore, it is logical that governmental regulation of the economy through tax component should stimulate actions of subsoilers recycling mining waste.

3. Resource/Reserve Definitions

A dictionary definition of resource, "something in reserve or ready if needed," has been adapted for mineral and energy resources to comprise all materials, 1Based on U.S. Geological Survey Circular 831, 1980, including those only surmised to exist, that have present or anticipated future value.

Nevertheless, a knowledge of what has been produced is important to an understanding of current resources, in terms of both the amount of past production and the amount of residual or remaining in-place resource. Specialists of "Micon" give generalized view of the most often used classifications of the USA (1980), Australia (1989), Great Britain (1991) and Canada (1996) in "Survey of mineral resources and ore reserves" (look table 2 "Categories definitions of mineral resources and reserves in different countries").

All reserves are divided into four categories: A, B, C_1, C_2.

Besides balance and off-balance reserves in deposits and ore regions epy the forecasted recourses of categories P_1, P_2 and P_3 are estimated. Reserves of categories A and B are geologically the most detail investigated deposits of operating mines where the current or prior operational prospecting by underground drilling has been fulfilled.

Reserves of category C_1 are the basic category created by detail prospecting which are used together with A and B for compilation of mine projects, estimation of profitability of ores refinement. Reserves of category C_2 are amassed on the flanks of deposits of rich cupriferous ores and deep mines (Bloshenko, 2013).

Table 2. Categories definitions of mineral resources and reserves in different countries

USA (1980)	AUSTRALIA (1989)	GREAT BRITAIN (1991)	CANADA (1996)	RUSSIA (1997)
Resources	Mineral Resources	Mineral Resources	Mineral Resources	Reserves of hard minerals
Measured Resources	Measured Mineral Resources	Measured Mineral Resources	Measured Resources	A or B
Calculated resources	Calculated mineral resources	Calculated mineral resources	Calculated resources	C_1
Supposed resources	Supposed mineral resources	Supposed mineral resources	Supposed resources	C_2
Reserves	Ore reserves	Mineral reserves	Reserves	Reserves of hard minerals
Measured Resources	Proved ore reserves	Proved mineral reserves	Proved reserves	A or B
Mentioned reserves	Probable ore reserves	Probable mineral reserves	Mentioned reserves	C_1
Suggested reserves	-	-	Possible reserves	C_2

4. Results

The Code of Joint Ore Resources Committee (the JORC Code) is widely adopted be mining industry for the compiling of mineral resources and reserves reporting.

The results of information transfer from one system to another will depend on the nature of deposit and complexness of its geological construction of mineral extraction tax base.

The basis for placing the resources (A, B, C_1, C_2 categories) on the State Balance Sheet in Russian Federation are the opinion letters of the state expert appraisal bodies, according to which, the licenses are granted to the users of subsurface resources.

For the purpose of taxation, the chapter 26 of the Tax Code of Russian Federation accepted the “multicomponent complex ores”. However, this term is interpreted in different ways, which complicates the definition of the taxation objects.

The composition of mineral resources has a direct influence on the formation of mineral extraction tax base. Taking into account thus fact, in practice, the following types of minerals can often not be mentioned in license. Thereby, they don’t form the tax base.

It is proposed to exclude the “multicomponent complex ores” term from the chapter 26 of the Tax Code of Russian Federation, for the purpose of non-admission of interpretation of this term in different ways (Smolyaninov, 1955).

The sale proceeds are 3% from the accounting basic production. If the sale proceeds from realization of the by-product is more than 3%, this product is basic. This criterion is developed for taxation.

Meanwhile, it should be noted that the development of technogenic mineral objects is expensive and risky. Accumulations of waste were sent to the storage from the point of minimum calculated costs for storage/disposal.

At the same time the possibility of waste recycling in the future was not considered. Therefore today waste repositories are “mineral dumps”. An important factor contributing to the uncertainty of occurrence and local content of useful components in the storage is physical and chemical processes that have passed during the waste storage under the influence of rainfall and accompanied by a redistribution of mineral elements in the anthropogenic array. To decide the issue of profitability recycling the technogenic it is necessary its geological discovering with certain costs. But it does not guarantee a positive result. In case of positive decision waste recycling, mining subsoiler puts storage into the state balance, receives a license and legalizes it in the Russian Technical Supervision.

That is a mandatory procedure, which priors to the commencement of useful components’ extraction from the waste.

5. Materials and Methods

What is position for the tax authorities? First of all, the legal status of the subsoiler is significant. If the subsoiler is the one who developed the natural mining field from the outset, paid taxes on mining and now recycles mining wastes, he can count on preferential taxation up to zero rates in accordance with the Article 336, Chapter 26 of Tax Codex of Russian Federation (Tax Code of Russian Federation, 2013).

Other situation is, when the recycling subject is perennial wastes of liquidated enterprise, which recycled by third enterprise. In this case, valuable components from wastes must be taxed usually (by tax rate provided by Chapter 26 of the above-mentioned Tax Codex).

Such situation is deterrent to large-scale development of technogenic objects because of set accumulated wastes in the country.

To engage the secondary mineral raw for recycling it is supposed to realize the investment project. For this the data on TF in Russia are necessary: their composition, volume, recycling, etc. Selection criterion to choose tax rates on mining is the maximum flow of MET in the budget for all TF (Bloshenko, 2013).

That is why our article presents:

1) the method of determining the optimal MET rates when secondary mineral raw materials is recycled at the example calculated cost for the estimation of mineral resources and the indirect method of determining the amount of minerals;

2) the method of determining the optimal MET rates when secondary mineral raw materials is recycled on the basis of the price-factor.

Methods for determination of the optimal mining tax rates when secondary mineral resources are involved.

5.1 Method 1

We introduce the following notation: M- number of technogenic fields; rm—minimum rate, which makes possible to realize a project to develop the field m; K—number of different useful components in each TF in Russia; tm—term of m-investment project; cmt—cost of the m-investment project in t-year including amortization; q_{mtk}—extraction of k-component in the m-TF in t-year in percentage; c_{mtk} - part of the costs for the k-component, which could be calculated by means the formula (1):

$$c_{mtk} = c_{mt} \frac{q_{mtk}}{\sum_{k=1}^{K} q_{mtk}} \tag{1}$$

there are p_{tk}—prognosticated price of k-component in t-year; ηk—MET tax rate for the useful k-component; dt - discount rate of tax payments in t-year can be defined as a zero- coupon government bond yield rate (Note 1)

The project for the development of m-field will be realized if IRR is higher rm or NPV

will be more or equal to zero, which could be calculated by means the formula (2):

$$F(x) = \begin{cases} 0, x < 0 \\ 1, x \geq 0 \end{cases} \tag{2}$$

$$NPV_m(r_m) = \sum_{t=1}^{t_m} \frac{\sum_{k=1}^{K} \left(q_{mtk} p_{tk} - (1+\eta_k) c_{mtk} \right)}{(1+r_m)^t} \geq 0$$

NPV of tax revenues from the TF-development for the state will be calculated by

means the formula (3):

(3)

$$NPV_{TM}\left(\eta_k, k=1,\dots K\right)=\sum_{t=1}^{\max(t_m, m=1,\dots M)}\frac{\sum_{m=1}^{M}F\left(NPV_m\left(r_m\right)\right)\sum_{k=1}^{K}\eta_k c_{mtk}}{\left(1+d_t\right)^t}$$

ARGMAX gives the optimal MET rate in terms of tax collection.

5.2 Method 2

The project for the development of m-field will be realized if IRR is higher rm or NPV will be more or equal to zero, which could be calculated by means the formula (4):

(4)

$$NPV_m\left(r_m\right)=\sum_{t=1}^{t_m}\frac{\sum_{k=1}^{K}\left(\left(1-\eta_k\right)q_{mtk}p_{tk}\right)-c_{mt}}{\left(1+r_m\right)^t}\geq 0$$

NPV of tax revenues from the TF-development for the state will be calculated by means the formula (5):

(5)

$$NPV_{TM}\left(\eta_k, k=1,\dots K\right)=\sum_{t=1}^{\max(t_m, m=1,\dots M)}\frac{\sum F\left(NPV_m\left(r_m\right)\right)\sum_{k=1}^{K}\left(\left(1-\eta_k\right)q_{mtk}p_{tk}\right)}{\left(1+d_t\right)^t}$$

Finding the maximum of formulas (3) and (5) is a complex non-convex optimization task. To begin, we can recommend the search algorithm to select the best values of η_k, *k = 1, ... K.*

To clarify the task and to confirm its relevance, development of special optimization algorithms will be appropriate. To apply the method of determining optimal MET-rates for each component being in technogenic raw materials it is necessary to generate cadastre of technogenic fields (Bloshenko, 2014).

Cadastre should be supplemented by the information:

1) capital and operating project costs on the development of each technogenic field;

2) annual extraction of each useful component in the case of realization the investment project when NPV is more than zero;

3) price forecast for all components in the raw materials for the term of investment project.

The suggested principles act simultaneously and in common and define the strategy and tactics of mining of secondary mineral resources.

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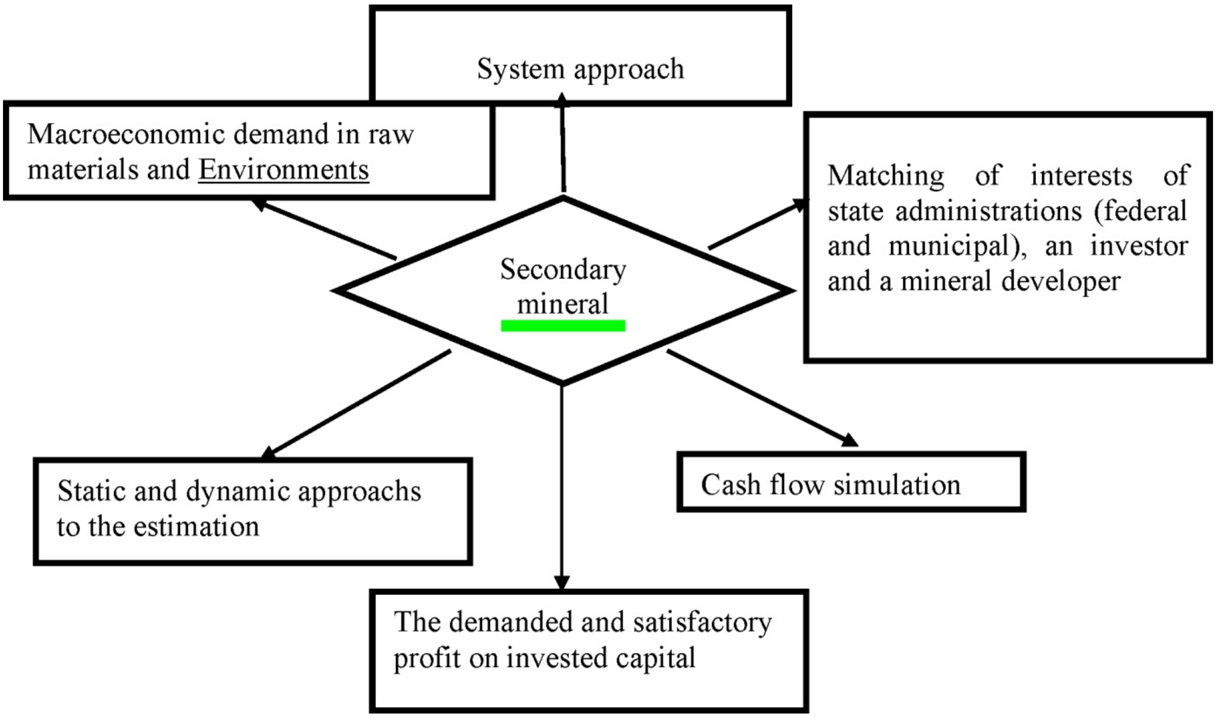

Figure1. The suggested principles act simultaneously and in common and define the strategy and tactics of mining of secondary mineral resources

6. Conclusions

The Code of Joint Ore Resources Committee (the JORC Code) is widely adopted be mining industry for the compiling of mineral resources and reserves reporting.

The results of information transfer from one system to another will depend on the nature of deposit and complexness of its geological construction of mineral extraction tax base.

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IAS 2 Inventories contains the requirements on how to account for most types of inventory. The standard requires inventories to be measured at the lower of cost and net realisable value (NRV) and outlines acceptable methods of determining cost, including specific identification (in some cases), first-in first-out (FIFO) and weighted average cost. A revised version of IAS 2 was issued in December 2003 and applies to annual periods beginning on or after 1 January 2005.

"A production process may result in more than one product being produced simultaneously. This is the case, for example, when joint products are produced or when there is a main product and a by-product. When the costs of conversion of each product are not separately identifiable, they are allocated between the products on a rational and consistent basis. The allocation may be based, for example, on the relative sales value of each product either at the stage in the production process when the products become separately identifiable, or at the completion of production.

Most by-products, by their nature, are immaterial. When this is the case, they are often measured at net realisable value and this value is deducted from the cost of the main product. As a result, the carrying amount of the main product is not materially different from its cost".

This Standard does not apply to the measurement of inventories held by:

(a) Producers of agricultural and forest products, agricultural produce after harvest, and minerals and mineral products, to the extent that they are measured at net realisable value in accordance with well-established practices in those industries. When such inventories are measured at net realisable value, changes in that value are recognised in profit or loss in the period of the change.

While processing mineral raw material we have basic product and by-products and wastes products.

By-product hasn't the cost of conversion, because it is produced simultaneously with the basic product. The by-product is realized at the market price. How many are the sale proceeds after the realization of the ancillary product at the market? The sale proceeds are 3% from the accounting basic production. If the sale proceeds from realization of the by-product is more than 3%, this product is basic. This criterion is developed for taxation.

Methods for determination of optimal MET-rates calculate income to the budget with secondary mineral resources recycling in TF. Involvement of secondary resources in recycling is directed to the full withdrawal of all useful components from the mining wastes. Rational use of resources is aimed at reducing the negative influence the environment.

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Note.

Note 1. http://www.cbr.ru/GCurve/gko_yieldcurve_rcb_3_2006.pdf, http://data.cbonds.info/files/curves/Gpdf