Methodological approaches to raw material resources evaluation
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Методические подходы к оценке сырьевых ресурсов
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Abstract: *the presented article offers examination of methodological approaches to evaluation of raw material resources with taking into accounting the peculiarities of formation of expenses and prices of products obtained. The emphasis is placed on conducting distributive phases between the output products and consumed valuable elements pro rata to the growth of the elements' prime cost. The methodological approaches shown below confirm necessity of analysis for various distributive production phases, first of all where there is no the prime cost growth or where obtained products cannot be regarded as a carrier thereof.*
Keywords: *resource saving, expenses of raw material resources, resource saving criteria.*

Аннотация: *в представленной статье рассматриваются методические подходы к оценке сырьевых ресурсов с позиций учета особенностей формирования издержек и стоимости получаемых продуктов. Акцент сделан на проведении распределительных стадий между вырабатываемой продукцией и потребляемыми ценными элементами пропорционально росту себестоимости элементов. Представленные методические подходы подтверждают необходимость анализа для различных распределительных производственных стадий, в первую очередь в таких, где роста себестоимости не наблюдается, либо получаемая продукция не является её носителем.*
Ключевые слова: *ресурсосбережение, затраты сырьевых ресурсов, критерии ресурсосбережений.*

When examining and characterizing rational consuming of a raw material resource, evaluation of the level and efficiency of this line should be singled out.

Hereby we propose methods of calculation of the complexity index using the set of the following three factors:

- the gross index of a resource rational application calculated as relation of the cost value of a portion of elements withdrawn into the final products to the gross value of all elements contained in the natural resource by the same prices;
- the normative factor of complex use of the resource: relation of the value of elements which can be efficiently withdrawn with taking into account of involving modern technologies and the best results of domestic and foreign experience, to the aggregate value of the most of elements contained in the resource;
- the attained complexity factor: relation of the value of elements actually withdrawn into the final product to the portion of the value of elements in the resource which can be efficiently extracted with taking into account of involving the best possible technology, i.e. to the maximally allowed value [1].

The degree of extraction of components and the complexity factor in result of scientific and technological development, improvement of industrial plants' activity will grow up; but in practice, the high level of complexity index will be a result of improvement of elements extraction with rising above the economically required value.

Generalization of various criteria for analysis of efficiency of withdrawing some useful elements at rational use of a resource allows bringing them to methodic substantiations of the evaluation basing on payback periods:

- sum of basic and extra expenses;
- with taking into account basic extra expenses emerging at organization of output and bringing to the stage of commercial production of each evaluated element, without accounting for some extra expenses necessary for obtaining of certain or all extracted elements [2].

Evaluation of efficiency of a raw material resource complex use will include:

a) economic boundaries of substantiation of applying any of valuable elements of the resource as an independent one in case of its complex use shall be defined basing on payback periods emerging in connection with production of the element under consideration, without accounting for a part of indirect expenses;

b) efficiency of complex use of a raw material source in general will be established from payback periods of aggregate direct and indirect extra expenses for extraction from the depths and complex processing of the resource, with taking into account only those elements withdrawal whereof is rational in accordance with the approach examined in item «a»;

c) realization of complex use of a natural resource shall be regarded economically rational, provided both «a» and «b» conditions are fulfilled [3].

The main peculiarity of methods of additional division boils down to the fact that the rated indicator value within borders of their stable value does not impact neither proportions of expenses division nor the value of the division indicator.

In market conditions, the parameter of net discounted income (NDI) can be used as a leading indicator of the raw material base evaluation:

$$NDI = \sum_{t=0}^{T} \frac{(V_t - C_t)}{(1+E)^t} - \sum_{t=0}^{T} \frac{K_t}{(1+E)^t} = \sum_{t=0}^{T} (V_t - C_t - K_t) \cdot (1+E)^{-t} \geq 0 \quad (1),$$

Where V_t – the value of commercial products in the t^{th} year, roubles;

C_t – current expenses made in the t^{th} year, roubles;

T – time of completing the use, years;

K_t – lump-sum expenses in the t^{th} year, roubles;

$t = 0$ - time of realization of the project, years;

E – discounting indicator.

The efficiency of accounting and use of each of valuable components of a natural raw material resource can be defined from the following expression:

$$\sum_{t=0}^{T} (V_{it} - C_{nit} - K_{nit}) \cdot (1+E)^{-t} \geq 0 \quad (2)$$

Where V_{it} – price of the i^{th} element within the commercial products in the t^{th} year;

C_{nit}, K_{nit} – direct and, consequently, operational costs and capital investments for processing of the i^{th} element within the commercial products in the t^{th} year.

Formulae 1 and 2 contemplate the environmental factor and reflect the impact of rational use of resources on parameters of the processing ecological state.

To take into account the environmental component (*En*) in market conditions, the following interrelation complex is offered:

$$\begin{cases} \sum_{t=0}^{T} (V_{it} - C_{nit} - K_{nit} \pm En_{it})(1+E)^{-t} \geq 0 \\ NDI = \sum_{t=0}^{T} (V_t - C_t - K_t \pm En_t)(1+E)^{-t} \geq 0 \end{cases} \quad (3)$$

Thus, the scope of works has been singled out which must define the process of resource saving:

- defining of the resource array, i.e. what resources, in what amount, and of what quality will be involved into the production activity;
- what is the complex used technologies, its optimal amount and characteristics;
- what is the amount of maximally efficient involvement of resources and the existing complex of technologies for the best fulfilling production tasks in terms of resource consuming.

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