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V.V. Zhydkova, PhD student
I.R. Polishchuk, PhD in Economics, Assoc. Prof.
Zhytomyr Polytechnic State University

Costs for exploration works in extraction of mineral resources in granite quarries: essence, classification and accounting assessment

It has been established that the costs of overburden are the costs of open mining operations associated with improving access to the mineral and the ability to separate it from the rock. They include the preparation of rock for extraction by means of blasting, the extraction and loading of rock, their movement and the formation of dumps.

The classification of costs for excavation works during the extraction of minerals in granite quarries for accounting purposes has been developed: by economic elements; by the period of recognition as part of expenses; depending on the stage of the life cycle of the technological process of mineral extraction; depending on the subject of performance; according to the degree of completeness of the distribution between reserves and the asset of excavation work; according to the results obtained as a result of their implementation; by capitalization level; based on the results of a comparison of costs for excavation works and the benefits received and the possibility of including costs in the value of assets.

An algorithm has been developed for the recognition of costs for overburden work at the mining stage as an asset in accordance with the Interpretation of IFRIC 20 «Expenses for overburden work at the mining stage in a quarry».

The content and characteristics of cost items for excavation work in preparatory works for granite extraction in deposits are disclosed in accordance with Appendix No. 1 to the Standard Regulation on planning, accounting and costing of products (works, services in industry) «Nomenclature of cost items for preparatory work in mining industries». It has been established that the main normative documents governing the exploration and estimation of mineral reserves are IFRS 6 «Exploration and estimation of mineral reserves» and National Accounting Regulation (standard) 33 «Expenses for the exploration of mineral reserves». The recognition of costs for excavation works as part of reserves and non-current tangible and intangible assets is characterized, regulated by the Interpretation of IFRIC 20 «Expenses for excavation works at the mining stage in a quarry».

Keywords: *overburden; classification; costs; accounting; overburden asset; granite quarry.*

Topicality. Extraction of minerals in granite deposits is carried out by an open method. Accounting for overburden costs is an important stage both in the preparatory stage for the technological process and in the direct extraction of minerals in granite deposits. At each stage of overburden operations, fixed assets are used, qualified personnel are involved, fuel and lubricants necessary for the operation and performance of the functional purpose of fixed assets are consumed. Thus, as a result of overburden operations, material costs, labor costs and a single social contribution, depreciation of excavators and dump trucks used, and other expenses will be recorded in the accounting. Managing the costs of overburden operations in the extraction of minerals in granite quarries is aimed at minimizing their overall size, choosing the optimal method of their implementation (economic or contract), preventing the occurrence of unproductive costs in the context of elements. Accounting for overburden costs has a number of features due to various benefits that may result from their implementation, as set out in international and national accounting standards. In particular, the procedure for reflecting the efficiency of mineral separation from rock as part of current or capitalized costs, reserves or overburden assets is regulated. Therefore, the practical application of the current regulatory documents on accounting for the costs of overburden operations in the extraction of minerals in existing granite quarries requires research.

Analysis of recent research and publications. The following national scientists have devoted their works to the issues of technological features of implementation and accounting for the costs of overburden operations in the extraction of minerals in granite quarries: Ya.D. Krupka, Ya.A. Porokhnavevets [2], K.I. Kuzminska [3], L.V. Chyzhevska, O.M. Shendrychenko [7].

Economic processes in the extraction of natural resources in an open way, according to Ya.D. Krupka, Ya.A. Porokhnavevets, include the process of preparation and development of deposits, which involves the performance of work on the opening of deposits (drilling and blasting; removal and movement of the fertile soil layer; removal and transportation of unproductive rock; arrangement of entrances, roads, fences, checkpoint systems; supply of communications (electricity, water, etc.); other preparatory work) [2, p. 84].

Chyzhevska L.V., Shendrychenko O.M. revealed the technological map of accounting at the stage of exploration and evaluation of minerals [7, p. 47]. The authors summarize the options for output due to overburden

operations and the benefits that mining enterprises can receive as a result of their implementation: ore for creating reserves and better access to additional volumes of ore. These well-founded developments of the authors are the basis for forming an accounting policy for overburden costs and overburden assets.

On the peculiarities of accounting for the costs of overburden notes K.I. Kuzminska, alluding that when accounting for actual costs, you should pay attention to the fact that the repeated movement of rocks within the quarry and in the dumps is considered the movement of rock mass, and the costs incurred in this case are attributed to the cost of mining operations, and the volume of rock moved is not included in the volume of overburden operations. The cost of related ore extracted during mining operations is reduced by the amount of costs for such works [3, p. 748]. Despite the significant contribution of the above-mentioned scientists, the following issues remain insufficiently studied: classification of overburden costs for accounting purposes; accounting policy regarding overburden costs at the preparatory and mining stages, and the procedure for forming the cost of an overburden asset.

The purpose of the study is an improvement in the classification of overburden costs for accounting purposes and the establishment of possible results of implementing accounting policies for their assessment at different stages of the granite quarry life cycle.

Presentation of the main material. Overburden costs are the costs of open-pit mining related to improving access to a mineral and being able to separate it from the rock. These include preparing rocks for removal by blasting, removing and loading rocks, moving them, and forming dumps.

The terms of reference for overburden operations by the contractor, approved by the management of the mining enterprise, the chief engineer and the surveyor, must contain the following information:

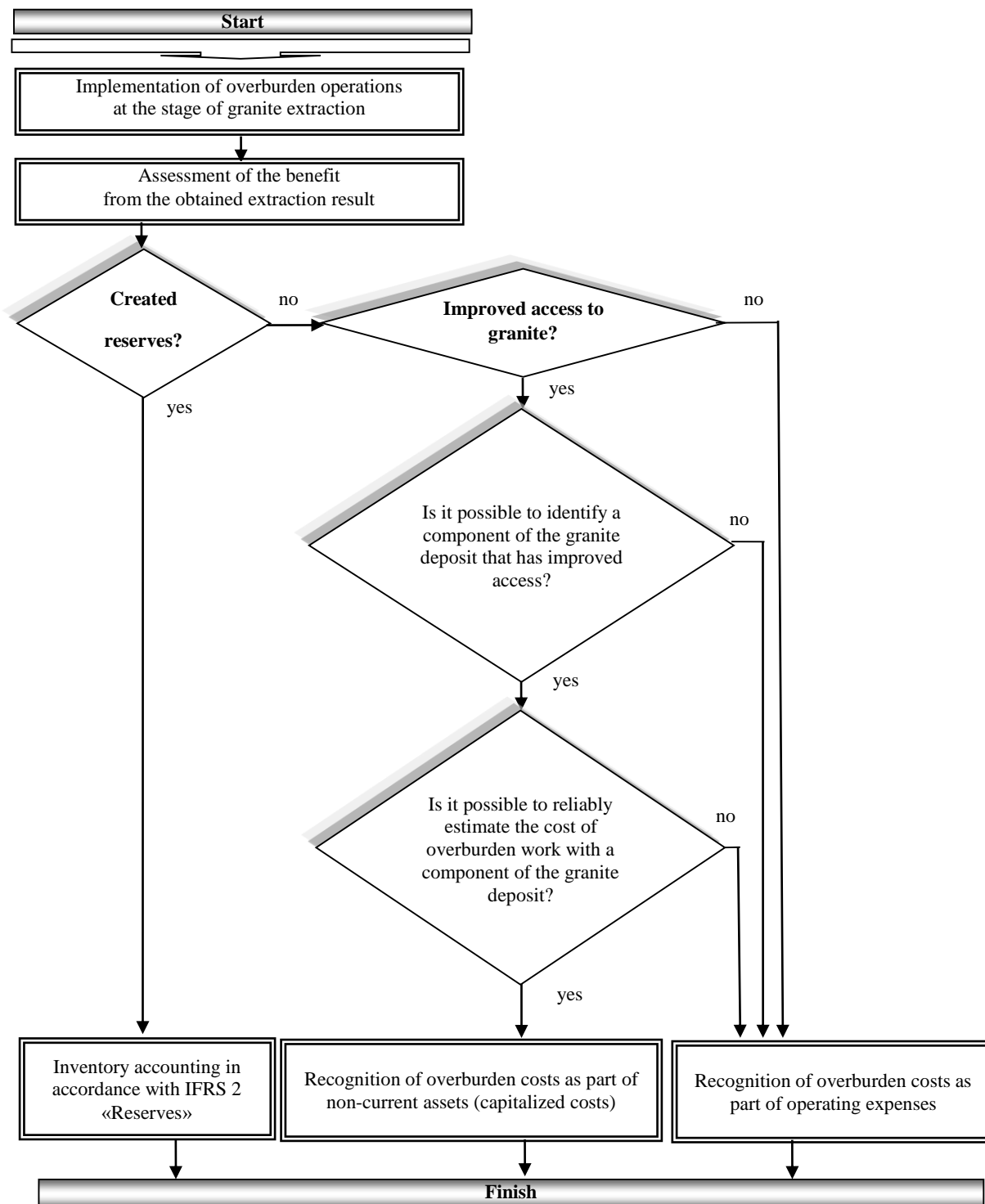
- 1) name of the object (field and enterprise) and its location;
- 2) list of minerals;
- 3) the structure of overburden rocks indicating the length of the soil and vegetation layer and soft layer, etc.;
- 4) total area of overburden operations;
- 5) volumes of overburden operations in the context of the soil and vegetation layer and soft layer, etc.;
- 6) maximum transportation distance of soil-vegetation layer and soft layer, etc.;
- 7) terms of work completion with indication of volumes;
- 8) fuel and lubricants are provided by the customer or at the expense of the contractor;
- 9) payment procedure for overburden operations performed;
- 10) the procedure for acceptance and transfer of completed overburden works by the customer (the scope of work performed is accepted by the surveyor).

The main regulatory documents regulating the issues of exploration and assessment of mineral reserves are IFRS 6 «Exploration and evaluation of mineral reserves», national accounting regulation (standard) 33 «Expenses for exploration of mineral reserves». The recognition and structure of costs for overburden operations regulate the interpretation of IFRIC 20 «Costs for overburden operations at the stage of mining in a quarry», as well as Appendix No. 1 to the Standard provision on planning, accounting and calculating the cost of production (works, services in industry) «Nomenclature of cost items for preparatory work in the extractive industries».

The expenses for preparatory work in the extractive industries in accordance with the Nomenclature of items of expenditure for preparatory work in the extractive industries include: 1) expenses for additional exploration of deposits, 2) expenses for cleaning the territory of the open mining zone, sites for storing fertile soil layers used for subsequent land reclamation; 3) expenses for equipment of temporary access roads for the export of extracted raw materials; 4) expenses for passing preparatory mine workings; 5) expenses for overburden and other types of work; 6) expenses for compensation of losses of agricultural production during land withdrawal to expand the production of mineral raw materials [1].

Expenses for overburden and other types of work include labor costs for workers engaged in breaking, cargo and other works; deductions for state social insurance and mandatory insurance contributions to the pension fund; expenses for materials, purchased components; fuel and energy costs; depreciation deductions from the cost of fixed assets; payment for services of other enterprises; other expenses [1].

The constructed algorithm is based on (Fig. 1) the procedure for recognizing expenses for overburden operations at the mining stage as an asset (non-current and current) is laid in accordance with the interpretation of IFRIC 20 «Expenses for overburden operations at the mining stage in a quarry».



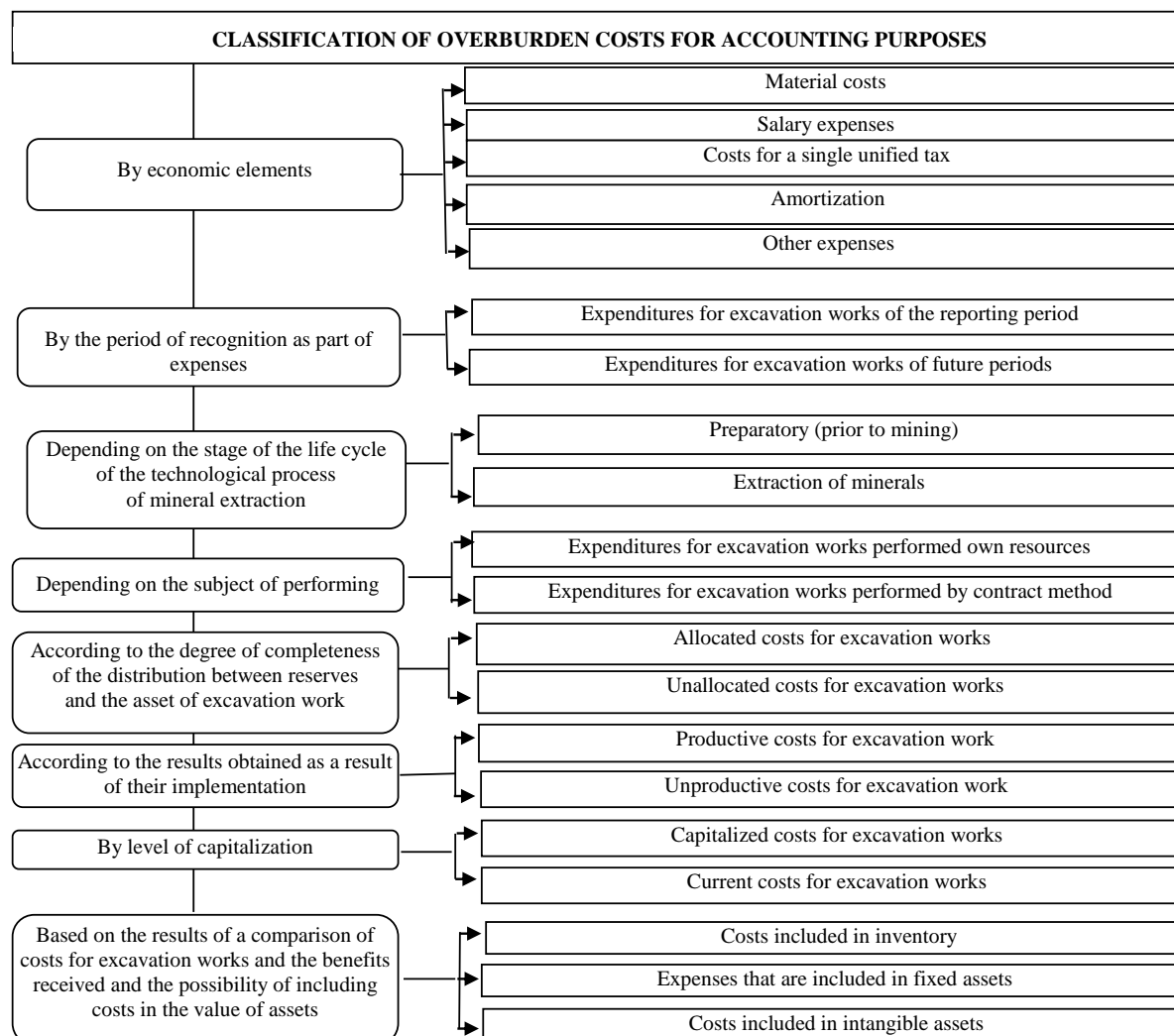
Source: own development

Fig. 1. Algorithm for recognizing overburden costs at the extraction stage as non-current and current assets

If it is not possible to determine the value of the received inventory and overburden asset, overburden costs should be distributed based on the distribution base.

Examples of such indicators are: a) the cost of created reserves compared to the expected cost; b) the volume of extracted waste rock compared to the expected volume, for a given volume of ore extraction; and c) the mineral content in the extracted ore compared to the expected content of the mineral to be extracted, for a given volume of extracted ore [6]. As a distribution base, you can select the volume of waste rock extracted in comparison with the expected volume.

To fully reflect the costs of overburden operations in accounting, a classification should be considered, which will allow distinguishing them at different stages of the technological process and managing their structure (Fig. 2).



Source: own development

Fig. 2. Classification of overburden costs for accounting purposes

The proposed classification takes into account the requirements of Appendix No. 1 to the standard regulation on planning, accounting and calculating the cost of production (works, services in industry) «Nomenclature of cost items for preparatory work in extractive industries» regarding the structure of costs by elements, the norms of interpretation of IFRIC 20 «Costs for overburden at the stage of mining in a quarry» regarding the recognition of reserves and assets of overburden. The classification reveals the reflection in the accounting of benefits as the efficiency of overburden operations in the form of formed mineral reserves or recognition in the composition of fixed assets and intangible assets in the event of improved access to the identified type of mineral and the ability to reliably determine the amount of overburden costs incurred for this identification.

The main activities of JSC Korostensky quarry are 08.11 «Extraction of decorative and building stone, limestone, gypsum, chalk and clay shale» and 08.12 Extraction of sand, gravel, clays and kaolin. The company regulates the following procedure for capitalization of overburden costs.

Overburden and other mining waste materials must be removed before the development is operated in order to gain access to granite deposits. This activity is called pre-operation overburden costs, and it is capitalized as part of the cost of construction in progress. Determining whether costs relate to overburden operations before or after the start of operation is based on an approved quarry development plan. In case of any significant further changes to this plan, the accounting is re-checked and capitalized expenses are adjusted accordingly. The cost of overburden operations after the start of operation is capitalized when overburden activities during the development operation phase lead to improved access to minerals [5]. That is, the condition for capitalizing the costs of

overburden operations in JSC Korostensky quarry is the improvement of access to minerals, which corresponds to the norms of paragraph 9 of the interpretation of IFRIC 20 «Costs of overburden operations at the stage of mining in the quarry» [6].

At ALC «Berezivsky quarry» the main activity is 08.12 Extraction of sand, gravel, clays and kaolin. When performing open-pit mining operations, it is necessary to remove empty rocks («cover / overburden rocks») in order to gain access to granite deposits. At the stage of preparation of the quarry (before the start of production on a separate ledge or horizon), the cost of overburden is capitalized as part of the cost of development and construction of the quarry, which is amortized after the start of production. Overburden costs at the extraction stage are capitalized as an overburden asset. The asset is amortized by the straight-line method over the useful life, which is set within the period of validity of the permit for the use of mineral resources, i.e. 20 years [7, p. 45]. That is, the regulation on accounting policy provides for depreciation on this overburden asset using a straight-line method.

At the studied enterprises of ALC Berezivsky quarry and JSC Korostensky quarry, overburden costs are recognized as capitalized in accordance with IFRS.

Conclusions and prospects for further research. In the course of studying the essence, classification and accounting assessment of overburden costs in the extraction of minerals in granite quarries, the following was found out:

1. Overburden costs are the costs of open-pit mining related to improving access to a mineral and being able to separate it from the rock. These include preparing rocks for removal by blasting, removing and loading rocks, moving them, and forming dumps;

2. The main regulatory documents regulating the issues of exploration and assessment of mineral reserves are IFRS 6 «Exploration and evaluation of mineral reserves», National accounting regulation (standard) 33 «Expenses for exploration of mineral reserves». Recognition of overburden costs as part of inventories and non-current tangible and intangible assets regulates the interpretation of IFRIC 20 «Overburden costs at the quarry mining stage». Appendix No. 1 to the Standard regulation on planning, accounting and calculating the cost of production (works, services in industry) «Nomenclature of cost items for preparatory work in extractive industries» regulates the content and characteristics of cost items for overburden work in preparatory work for the extraction of granite in deposits;

3. The classification of expenses for overburden operations in the extraction of minerals in granite quarries for accounting purposes has been developed according to the following characteristics: 1) by economic elements; 2) by the period of recognition as part of expenses; 3) depending on the stage of the life cycle of the technological process of mining; 4) depending on the subject of execution; 5) by the degree of completion of the distribution between the reserves and the asset of overburden; 6) by the results obtained as a result of their implementation; 7) by the level of capitalization; 8) by the results of comparing the costs of overburden and the benefits received and the possibility of including costs in the value of assets;

4. The developed algorithm for recognizing the costs of overburden as non-current tangible and intangible assets and reserves at the stage of granite extraction allows us to identify the benefits from the obtained extraction result. If it is not possible to determine the value of the received inventory and overburden asset, overburden costs should be distributed based on the distribution base.

Prospects for further research are to improve the reflection of information on overburden costs in financial statements.

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Zhydkova Viktoriia Viktorivna – post-graduate student of the Department of Information Systems in Management and Accounting of the Zhytomyr Polytechnic State University.

<https://orcid.org/0000-0001-8178-9581>.

Research interests:

- accounting for overburden costs in granite quarries;
- accounting of operating expenses of a mining enterprise.

Polishchuk Iryna Romanivna – PhD in Economic Sciences, Associate Professor, Associate Professor of the Department of Information Systems in Management and Accounting of the Zhytomyr Polytechnic State University.

<https://orcid.org/0000-0002-6074-6627>.

Research interests:

- methodology of strategic analysis;
- accounting and analytical support for the preparation of integrated reports;
- accounting for overburden costs in the extraction of minerals.

Жидкова В.В., Поліщук І.Р.

Витрати на розкривні роботи при добуванні корисних копалин у гранітних кар'єрах: сутність, класифікація та бухгалтерська оцінка

Встановлено, що витрати на розкривні роботи – це витрати на відкриті гірничі роботи, пов'язані з покращенням доступу до корисної копалини і можливістю її відокремити від гірської породи. Вони містять підготовку гірських порід до виймання за допомогою вибухових робіт, виймання та навантаження гірських порід, їх переміщення та утворення відвалів. Розроблено класифікацію витрат на розкривні роботи при видобутку корисних копалин у гранітних кар'єрах для цілей бухгалтерського обліку: за економічними елементами; за періодом визнання в складі витрат; залежно від стадії життєвого циклу технологічного процесу видобутку корисних копалин; залежно від суб'єкта виконання; за ступенем завершеності розподілу між запасами та активом розкривних робіт; за одержаними результатами внаслідок їх здійснення; за рівнем капіталізації; за результатами порівняння витрат на розкривні роботи і одержаних вигід та можливістю включення витрат до вартості активів. Встановлено, що основними нормативними документами, що регулюють питання розвідки, оцінки запасів корисних копалин, є МСФЗ 6 «Розвідка та оцінка запасів корисних копалин» та Національне положення (стандарт) бухгалтерського обліку 33 «Витрати на розвідку запасів корисних копалин». Охарактеризовано визнання витрат на розкривні роботи в складі запасів та необоротних матеріальних і нематеріальних активів, регламентоване Тлумаченням КТМФЗ 20 «Витрати на розкривні роботи на етапі добування в кар'єрі». Розроблено алгоритм порядку визнання витрат на розкривні роботи на етапі добування як активу відповідно до Тлумачення КТМФЗ 20 «Витрати на розкривні роботи на етапі добування в кар'єрі». Розкрито зміст і характеристику статей витрат на розкривні роботи на підготовчих роботах при добуванні граніту в родовищах відповідно до Додатка № 1 до Типового положення з планування, обліку і калькулювання собівартості продукції (робіт, послуг у промисловості) «Номенклатура статей витрат на підготовчі роботи у видобувних галузях».

Ключові слова: розкривні роботи; класифікація; витрати; облік; актив розкривних робіт; гранітний кар'єр.

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