

Ecological and legal regulation of geological survey, exploration and extraction of minerals during construction

Elena V. Voskresenskaya^{1,*}, *Lybov G. Vorona-Slivinskaya*², *Vitaly Snetkov*¹ and *Alexander Tebryaev*¹

¹Peter the Great St.Petersburg Polytechnic University, 195251, St. Petersburg, Polytechnicheskaya str., 29, Russia

²Saint Petersburg State University of Architecture and Civil Engineering, 190005, St. Petersburg, 2nd Krasnoarmeyskaya str., 4, Russia

Abstract. Within the study, the authors of the present article analyzed the acts of both Russian and foreign legislation in the field of legal regulation of geological survey, exploration and mining in terms of construction. Specific legal regulation regarding mineral resources is standing apart due to growing demand of the world economy in such strategic types of mineral raw materials as rare and rare-earth metals or hydrocarbon reserves that are difficult to recover. The article describes the characteristics of certain provisions of the legislation of foreign countries that regulate relations in geological study, exploration and mining, including those within the construction process. The authors classified the forms of conferring rights for geological survey, exploration and mining of minerals, as well as the types of project documentation in the field of mining for the extraction of minerals during construction. Two models of legal regulation of geological survey and exploration (that are defined as eastern and western models) are studied. The authors revealed that minerals appear as the main object of legal relations or as belonging to a certain land plot (subsoil plot) in mining and urban planning legislation of different countries.

1 Introduction

Modern legal science in Russia is developing in accordance with international experience in the field of jurisprudence and is constantly being improved under the changing political and economic environment. The study of foreign law is one of the important areas of jurisprudence. Comparative jurisprudence develops and enhances the general legal and professional culture of a lawyer expanding his or her legal consciousness, but practical application of this knowledge is also important, particularly in terms of the continuously growing demand for comparing domestic and foreign law.

Currently, there are more than 200 states in the world. Therefore, it is impossible to consider all the features of legal regulation of geological survey, exploration and mining of

* Corresponding author: elenvoskr@mail.ru

minerals in each of these countries. However, there is no need of it since mining legislation is usually more developed in those countries where mining represents a significant part of the state budget income.

The legal regulation of geological survey, exploration and mining has been studied in numerous works of legal scholars since the end of the 19th century. The following works covering dozens of mining law institutions are worth mentioning: I. Karlovich, V. Neskromnykh, V. Avdonin, Yu. Mikhailov, A. Tsuranova. [1-5]. The authors of the present article have analyzed the system of granting rights to geological survey, exploration and mining in certain foreign countries many times, studied the peculiarities of legal regulation of geological survey and exploration of minerals during construction. The results of their studies are reflected in the following works: E. Voskresenskaya [6-14], V. Snetkov [6, 7], A. Tebryaev [6, 7, 9], L. Vorona-Slivinskaya [8, 11, 13,14].

2 Materials and Methods

Based on the comparative and historical legal research, the thesis revealed that there is a effective self-sufficient model of legal regulation of subsurface use relations in Russia and other post-Soviet countries, which is based on declaring that the subsoil as an underground space owned by the government is the main object of legal regulation.

During determining the objectives and methods of legal regulation the authors identified state-legal and environmental-legal approaches to the legal regulation of relations in geological survey, exploration and mining in foreign countries. The state-legal approach, unlike the environmental-legal one, is characterized by a greater centralization of legal regulation. However, both approaches mostly involve imperative methods of legal regulation, since both approaches are aimed at protecting public interest in the legal regulation of public relations.

3 Results

The analysis of the legal regulation of granting rights for geological survey, exploration and mining in Russia and in foreign countries revealed that today contractual legal forms for granting rights to geological survey, exploration and mining during construction, which are common in some countries at initiatory stages of development of legislation, are transformed into licensing-permitting forms. Such a transformation proceeds through the mutual penetration of licensing-permitting and contractual-legal forms of granting rights to geological survey, exploration and mining. As a result, intermediate forms of subsoil leasing appear, such as a modernized concession.

There are the following forms of granting rights to the geological survey, exploration and mining for types based on the emergence of subjective rights:

1) licensing-and-permitting forms for granting rights for geological survey, exploration and mining of mineral resources, which include administrative acts of authorized state bodies on the granting of exclusive rights to explore, assess and develop mineral deposits. These forms include licenses and permits of the relevant state authorities for geological survey, exploration and mining;

2) contractual-and-legal forms of granting rights for geological survey, exploration and extraction of mineral resources during construction, which include:

- agreements with public legal entities (including the government itself or authorized state bodies or companies), which include concession agreements and production sharing agreements;

- agreements on granting rights for geological survey, exploration and mining of mineral resources with land owners (typical for countries with an accessory system for distinction of rights for mineral resources and land), which include mining lease agreements (for countries of the Anglo-American legal system) and other contractual forms provided for by national civil and land laws, including rent;

3) intermediate (combined) forms of granting rights for geological survey, exploration and mining of mineral resources that cannot be fully attributed to any of the above forms. These forms may include modernized concessions existing in Latin America, as well as government contracts and government assignments for geological exploration of mineral resources enshrined in Russian legislation.

4 Discussion

There are two models of legal regulation of geological survey and exploration that can be referred to eastern and western. The Eastern model that was historically formed in the former Soviet Union is based primarily on government funding of geological exploration of the subsoil and to a small extent on the share of private capital of the exploration industry. The eastern model is characterized by the following features:

1) when designing geological exploration works, special attention is paid to the management of financing of geological exploration due to state financing of these works;

2) the staged sequence of works on a subsoil parcel is strictly controlled at the regulatory level;

3) when determining the classification of mineral reserves, the main attention is paid to geological exploration. The classification of mineral reserves itself is normatively regulated. There is also the institute of state examination of mineral reserves.

The Western model that formed in foreign countries including the countries of Western Europe, North America and Australia develops according to the market principles, involving minimal state participation in the geo-exploration industry. Western model has the following features:

1) the legal regulation of the design of exploration works focuses on ensuring environmental protection and safety during the works;

2) stages of works on the geological exploration of subsoil are not regulatory controlled and are carried out remaining to the discretion of a subsoil user;

3) the classification of mineral reserves is based on economic indicators of the profitability of mining, not on geological knowledge. The classification of reserves is performed at the level of standardization documents and best practices. The state examination of mineral reserves is not carried out. Today in Russia, the two models mentioned above are interpenetrating and become closer to each other. Tables 1, 2, 3, 4 provide statistical information on the extraction of minerals by types in different regions of the world [15].

Table 1. Coal mining, million tons.

Region	2010	2011	2012	2013	2014
Totally in the world	7170,0	7627,0	7764,0	8075,0	8023,0
Russia	322,0	336,0	357,0	353,0	357,0
Europe	635,6	672,0	680,9	638,0	594,1
Asia	4296,3	4679,6	4847,7	5194,3	5135,6
Africa	255,0	253,0	259,1	256,1	253,1
America	1157,2	1181,0	1110,1	1085,4	1100,1
Australia and Oceania	429,3	406,9	435,9	463,6	495,0

Table 2. Oil extraction, million tons.

Region	2010	2011	2012	2013	2014
Totally in the world	3983,0	4030,0	4098,0	4117,0	4200,0
Russia	506,0	512,0	519,0	522,0	526,0
Europe	237,4	168,0	159,4	159,4	114,7
Asia	1840,4	2003,4	1995,4	1976,0	2054,2
Africa	436,7	364,3	389,1	358,8	327,9
America	937,2	958,1	1011,2	1079,9	1157,6
Australia and Oceania	25,3	24,2	23,9	20,9	19,6

Table 3. Natural gas production, billion m³.

Region	2010	2011	2012	2013	2014
Totally in the world	3288,0	3371,0	3424,0	3512,0	3524,0
Russia	651,0	671,0	655,0	668,0	642,0
Europe	336,0	307,3	311,5	305,8	285,8
Asia	1178,0	1219,6	1253,1	1323,5	1331,8
Africa	177,8	178,8	182,7	175,7	177,2
America	887,7	933,5	963,1	972,5	1021,2
Australia and Oceania	57,5	60,8	58,6	66,5	66,0

Table 4. Iron ore mining, million tons.

Region	2010	2011	2012	2013	2014
Totally in the world	2557,2	2885,9	2884,1	3190,7	3273,9
Russia	95,9	103,6	104,0	102,0	102,0
Europe	108,9	109,4	114,4	116,4	116,7
Asia	1364,0	1612,5	1565,7	1767,1	1726,3
Africa	69,1	67,4	75,2	77,6	85,1
America	483,9	513,6	500,4	515,4	517,7
Australia and Oceania	435,4	479,4	522,4	612,2	726,1

Based on the criteria of a type of mining and according to the comparative analysis of domestic and foreign legislation, the authors propose the following classification of types of project documentation in this area:

1) project documentation on the rational use of minerals, ensuring their complete extraction with minimal losses in terms of economic efficiency and profitability of their production;

2) project documentation for the construction of a mining enterprise, including various buildings and structures included in the complex of a mining enterprise in terms of industrial safety;

3) project documentation for the protection of the environment and its restoration, including the reclamation of disturbed lands.

Legal regulation of elaborating project documentation belonging to the above types is carried out within the framework of various branches of legislation. While for mining operations in foreign countries the development of project documentation is regulated by mining legislation, then design documentation for the construction of mining enterprises

and environmental protection can be included in the scope of legal regulation as well as environmental or town planning legislation.

Regarding geological survey, exploration and extraction of rare and rare-earth metals, as well as non-traditional (non-conventional) hydrocarbons, the legislation of some foreign countries has established special legal regime for the development of these minerals against the general legal regime. This special regime includes:

1) state-legal regulation, including the establishment of a state monopoly on the development of strategic mineral deposits, protectionist policies in order to protect the interests of local producers, encouraging the development of technologies for efficient and cost-effective mining of these minerals;

2) private-law incentives, manifested by attracting private investments, including foreign ones, financially stimulating subsoil users, and encouraging junior exploration business.

5 Conclusions

Based on the analysis of foreign concepts of the mineral use (dominal concept, mining regalia, accessory concept and mining freedom) and according to legal regulation formed in Russia and the countries of the former Soviet Union, the study revealed interrelated elements of the concept of subsurface minerals as objects of legal relations and subjective rights:

- minerals are the main object of legal relations, while they are objects of state or private property, regardless of land or subsoil ownership. At the same time, according to the concept of mining freedom in foreign law, unbound minerals can be recognized as no one's property (*res nullius*). Russian legislation does not recognize this point of the concept;

- minerals are not the main object of legal relations (but are the property of the main objects, following the fate of the main object), while the main object is the land plot or subsoil plot (or the subsoil as a whole). This approach to consideration of minerals is reflected in the Russian legislation on subsoil.

The authors concluded that in the post-Soviet countries (the Russian Federation and the CIS member states), relations both in geological survey, exploration and mining during construction and in the use of underground space (inclusive of non-mining purposes) are the subjects of legal regulation of subsoil use relations. Mining legislation of foreign countries, by contrast, applies only to relations in the search and assessment of mineral deposits and their mining, as well as safety and environmental protection when performing this type of activity, excluding the use of underground space for other purposes.

These conceptual differences explain the fact that mining legislation of foreign countries is characterized by the formation of basic legislative acts based only on the stages of works on mineral resources, while the Russian legislation on subsoil resources is based on legal institutions (types of subsoil use, property, public administration, subsoil provision, subsoil use, etc).

References

1. I. Karlovich, *Geological structure and minerals of Northern Eurasia* (2006)
2. V. Neskromnykh, *Design of wells for solid minerals* (2016)
3. V. Avdonin, *Metallic mineral deposits* (2005)
4. Yu. Mikhailov, *Underground mining of mineral deposits* (2008)
5. A. Tsuranova, *Legal mechanism for ensuring the rational use of subsoil in the geological study, exploration and mining of mineral resources* (2017)

6. E. Voskresenskaya, V. Snetkov, A. Tebryaev, Z. Askarov, V 2017 MATEC Web of Conferences **106**, 08055 (2018)
7. E. Voskresenskaya, V. Snetkov, A. Tebryaev, V E3S Web of Conferences **33**, 03051 (2018) doi.org/10.1051/e3sconf/20183303051
8. E. Voskresenskaya, L. Vorona-Slivinskaya, V E3S Web of Conferences **33**, 03052 (2018) <https://doi.org/10.1051/e3sconf/20183303052>
9. E. Voskresenskaya, D. Mokhorov, A. Tebryaev, Matec web of conferences **170**, 01058 (2018) DOI <https://doi.org/10.1051/matecconf/201817001058>
10. E. Voskresenskaya, N. Zhilskiy, E. Shariapova, Matec web of conferences **170**, 01057 (2018) DOI <https://doi.org/10.1051/matecconf/201817001057>
11. P. K.e Sun, L. Vorona-Slivinskaya, E. Voskresenskaya, IOP Conference Series: Earth and Environmental Science **90** (2017) <https://doi.org/10.1088/1755-1315/90/1/012073>
12. E. Voskresenskaya, L. Vorona-Slivinskaya, S. Panov, MATEC Web of Conferences **193**, 02025 (2018) doi.org/10.1051/matecconf/201819302025
13. E. Voskresenskaya, L. Vorona-Slivinskaya, A. Loiko, Constitutional-legal issues of ensuring environmental safety in modern Russia **8(19)**, 57-59 (2018)
14. E. Voskresenskaya, L. Vorona-Slivinskaya, A. Loiko, Economic and legal problems devastated territories in the Russian Federation **7(18)**, 62-65 (2018)
15. *Russian Statistical Yearbook* (2017)