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Institutional Environment of the Mining Waste Management of the EU Countries and Russia.

Marina Anatolyevna NEVSKAYA*, and **Oksana Anatolyevna MARININA**.

Saint Petersburg Mining University 199106, 21 line, 2, Saint-Petersburg, Russia.

SUMMARY

This article represents the research results of the problem of formation of institutional environment of mining waste management in the Russian Federation. This problem is so important today because it is connected to the growth of accumulation of significant volumes of mining waste in the natural resources sector of Russia. It is grounded that the growth of accumulation of mining waste was caused, on the one hand, by the deterioration of the mining works conditions and the mineral resources quality, and on the other hand, by the absence of institutional environment allowing to develop the forms of economical interaction of the waste processing. The article compares the mining waste management systems in the countries of the European Union and Russia on the base of the offered criteria characterizing the quality of the institutional environment. We made a conclusion that it is necessary to consider the mining waste management as an independent area of institutional regulation.

Keywords: institutional environment, institutional interest, institutional, regulation, mine wastes.

**Corresponding author*

INTRODUCTION

The natural resources sector of the Russian Federation produces every year about 5 bln tons of production and consumer waste, 90% of which is mining waste. Only half of the total amount is recycled, the rest is accumulated till better days. According to the data of the Ministry of Natural Resources of the Russian Federation, during 2005-2013 above 16 bln tons of waste was accumulated in dump sites and tailing dumps, taking into account the mining in the past it is about 100 bln tons.

Average annual rates of formation and accumulation of the waste during the said period were 8.2 and 9.4% correspondingly (in comparison, the mining growth rate in the industry is 1.8%). About 60% of the produced waste is the waste of fuel and power resources, and this exceeds the growth of the oil and gas reserves (Orlov, 2015).

Such situation can be considered as a result of the impact of interrelated factors groups (Nevskaya and Marinina, 2015):

Mining and technological (deterioration of the geological conditions of mining and qualitative content of mineral resources, accepted technologies of mining allowing the formation of large volumes of waste, quality of waste as potential raw sources, etc.). For instance, more than 75% of the developed ground raw hydrocarbon deposits are already half developed now (Kryukov *et al.*, 2011).

As a result of decreasing of the important component content the mining companies have to extract more of mined rock to provide the set volume of mining. Consequently, the volume of waste is also increasing.

- Economic (growth of mining volumes during last 15 years, which influenced the reserves of mineral and raw resources and determined the necessity to develop the deposits with the worse qualitative and quantitative characteristics. The important factors are: liquidation of the state system of stimulation of intelligent use of mineral resources of the deposits, underdevelopment of market stimuli and motivation of complex processing of mineral resources, extraction of useful components, waste recycling, low quality of geological and economical estimation of the mineral resources, etc.).
- Organizational and management (insufficiently high level of requirements to the projects of deposits development, acting procedures and rules of the subsurface resources provided for use, absence of concordance in the accounting systems of various wastes, etc.).
- Regulatory (ways to establish the rights for the waste and its limitations, underdevelopment of conceptual framework, and non-concordance of the regulatory documents make the legal communications between the participants of the process of subsurface management, etc. more complicated).
- Social (uneven distribution of human resources around the country, heavy natural and climatic and production labor conditions, weak social motivation for the population to settle down in the mining regions, big part of which is located in northern latitudes, etc.).

Taking into account the prognosis of the decrease of quality of mineral reserve base (MRB) and also the deterioration of the mining and geological conditions, the further growth of mining waste accumulation is probable.

The extent of the problem and the character of the revealed factors stipulating it allow to determine the problem of formation, use, and accumulation of mining waste as a separate management field.

The importance of the institutional aspect of the mining waste management is stipulated by several reasons, including:

- Maintaining of the tendency to produce and accumulate the mining waste in such volumes that it is rather difficult to solve this problem in the frame and at the level of mineral resources sector.
- Development of new institutional theory including the theory of proprietary rights.
- Necessity of clear procedures, rules and requirements allowing to develop the forms of economic cooperation in the waste processing field and also to manage this process efficiently.

- Necessity of legal regulation of business relations in regard to the mining waste handling, consequently the increase of requirements to the capability of the legal system to provide the regulation of these relations.

REVIEW OF LITERATURE

The most widespread definition of the institutional environment is the definition of it as a set of political, social and legal norms and rules forming the basis of the production, exchange and distribution (Davis and North, 1971).

In neo-institutional economy the institutional environment is determined in the context of the influence of various institutions on the economic activity (Williamson, 1985).

Russian publications of the last years provide extensive coverage of the theoretical questions of the terminology development of new institutional economy that is based upon the stated basic notions. In political and economic aspect, the institutional environment is considered as a system of relations to form and realize the institutions (Kondratov and Garipov, 2013) and as a “set of institutions and system forming game rules formed by them” (Kolyushin, 2010).

In economic aspect, the institutional environment is determined as a factor influencing the development of economy (Bozo *et al.*, 2007), as characteristics of external environment significant for economic activity, set of values, formal and informal norms influencing the correlation of stimuli in the activity (Oleinik, 2011).

Institutional environment is determined as institutional factors, i.e. “particular conditions, elements and ways of forming and functioning of economic institutions” (Zotov *et al.*, 1999). Laws and regulations regulating the particular economic activity are one of these elements.

Important role of forming of institutional relations and institutional environment belongs to the state, establishing the “strict forms” of these relations or creating the conditions for its participants to form the institutional relations by themselves (Mikhailov, 2006).

The main instrument of the establishing of forms of institutional relations in subsurface resources sector is its “resource” or legal and regulatory mode” (Kryukov, 2006).

METHODS OF THE STUDY

Research methodology includes:

- Determination of the main categories content of institutional theory applicable to the mining waste management problem.
- Revealing of conditions, forming the institutional environment of mining waste management in EU countries and the Russian Federation.
- Determination of complex comparison of institutional conditions of waste management in the European countries and Russia.

In our research, we based upon the Russian and European legislation in the waste management field and also upon the information and materials obtained during the internships in the leading companies in Finland, Sweden, Poland in the directions: “rational use of natural resources”, “environmental safety and production energy saving”.

Mining waste management can be considered as a realization of main management functions (calculation, control, analysis, planning, and organization) and as organizational production process, i.e. the activity to collect, store, process, use, dispose (dump) of waste.

The aim of mining waste management is to decrease a life cycle of waste that can be reached due to the involving of waste into the economic turnover (use as a resource of raw, materials, energy), i.e.

“transformation” of waste into resources, or the disposal of waste (to prevent or decrease the negative impact of waste on the environment).

The specific character of mining waste (mining and processing) is that because of the material constitution the most of them are suitable for the further use (recycling). At the same time, the recycling of this waste using the existing technologies is practically impossible without stopping the production connected to it and breaching of technological cycle.

Therefore, the solution of this problem is possible in two ways:

- Reorganization of the whole production process that is connected to the significant volumes of investments into extension, reconstruction, modernization of production;
- Involving of new participants into the organization and production process of waste management who will perform particular functions or the whole package of works.

In any case, the independent activity of the participants of the process of mining waste management shall be provided by the conditions that in their turn are formed by the institutional environment.

Using the most widespread definitions of the main categories of institutional theory, we determined the institutional environment of mining waste management as a system of institutions (rules and norms), forming the conditions for involving of mining waste into the economy turnover.

- Towards to institutional environment of mining waste management, the system of basic political and economic institutions such as private property institution, state, legislative system perform as external environment determining the limits of functioning of mining waste management environment (see Figure 1).
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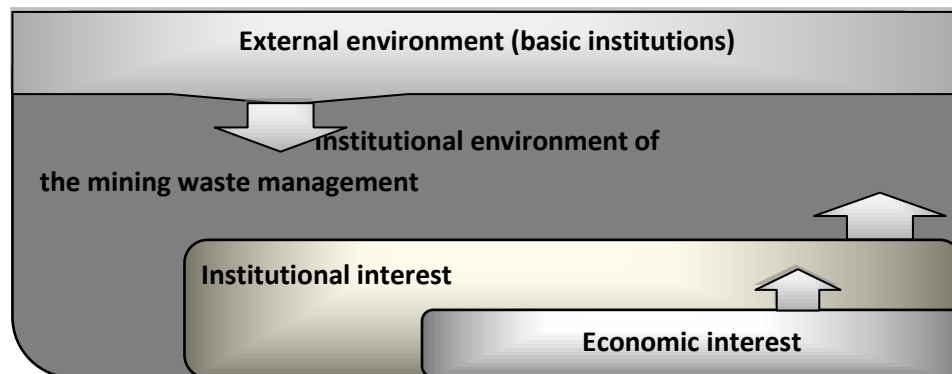


Figure 1. Formation of institutional environment of mining waste management

Institutional interest is actions of economic entities directed to the formation of institutions to create the economic environment and conditions for realization of economic interests of these entities (Mikhailov, 2006).

Institutional interest forms the institutional environment and taking into account of the external factors balance of institutional interests provides its stability (Klein, 1998).

RESULT

The conducted research revealed that institutional environment of mining waste management and natural resources recycling of the European countries form:

- Eco-culture, environmental conscience and education, transformed into the element of state policy;
- Legislation, ideological core of which is eco-efficiency principle;

- Institute of small and medium business of the mining waste handling and recycling;
- Research and development centers, one of the task of which is organization of interaction of mining companies with small and medium business;
- Municipal and regional supervisory and coordinating authorities that are a part of waste management system.

It can be concluded that in the European Union countries the mining waste management field is the most demonstrative example of the balanced institutional interests, to which first of all the environmental safety and social stability refer.

The base of such balanced interest is common economic interests, specified by the deficit of own natural resources, limitation of territorial resources, issues of energy and resource dependence from external sources (mainly from Russia).

For example, in some Baltic Sea countries the following interaction schemes of participants of mining waste management are singled out (Report on the State of Mining Waste Management in the Baltic Sea Region, n.d.):

1. Creation of a subsidiary by the mining company (in the form of small or medium business), specializing in the recycling and dumping of waste. Scientific and technical assistance of interaction of the parent company and the subsidiary to prevent the formation, re-use or recycling of waste can be made by the regional research and development centers (Poland, Germany).
2. Cooperation of mining company and independent small and medium business accepting the responsibility to recycle waste, sale of the recycling products, recultivation of lands according to agreement. Such form also provides the support from the research and development centers (Poland, Germany, Estonia).
3. Acquisition of waste by small and medium businesses for production and free sale of waste (mainly for the construction materials production) (Sweden, Germany).
4. Sale of waste by communes to the small and medium businesses for the further recycling. In the countries where the accumulated waste in the dumps belongs to the communes according to the law on the lands where they are located (Poland, Sweden).
5. Support of innovative activity of small and medium businesses by the Ministry of Environment according to the agreement (Estonia).

Efficiency of the institutional environment of EU countries is provided by the private property law, determining the level of responsibility for its formation and use, active policy of resource saving and energy-efficiency, availability of independent regulatory acts regulating the handling of mining and recycling waste, close interconnection of central and regional authorities.

In comparison with European countries, in the Russian Federation the mining waste management is not singled out in a particular area of institutional regulation, and the activity of independent economic entities in this sphere is performed in the conditions of:

- uncertain legal status of mining and recycling waste;
- uncoordinated mining and environmental legislations, referring to the different law branches and having different potential of instruments to regulate the waste handling;
- administrative and economic barriers to attract the small and medium businesses into the sphere of mining waste management, complexity of the access procedures to the man-made objects;
- monopolized market of mineral resources;
- imperfection of the institute of estimation of primary deposits, licensing procedures;
- absence of unified state policy in the sphere of mineral resources mining and recycling waste management, and consequently the low attention to the formation of condition promoting its attraction to the economic turnover (Nevskaya and Kabak, 2015).

Institutional development factors of the mining waste management system are insufficiently efficient due to the weak state interest to the small and medium mining business, intradepartmental conflicts, conflicts of resources owners and also large, medium and small businesses.

The high level of monopolization of business in mineral resources sector becomes a serious institutional problem in Russia, because it creates the barriers to the attraction of small and medium businesses into the waste recycling sphere. According to the official statistics, the share of small and medium businesses in the mining of natural resources was 1% in 2014, and a share of workers employed in this sphere was 2.1%; these are the lowest values in the total structure of all types of activity (Yaremenko, 2015).

Economic interests are stipulated by the availability of natural sources of fuel and power resources, significant territorial resources, orientation to external markets, low internal demand for the mining waste recycling products.

In our opinion, the quality of institutional environment is determined by the conditions that allow to perform one or another economic activity in the most efficient way.

The comparisons allowed to single out some features characterizing the conditions of mining waste management in the EU countries and in the Russian Federation (see Table 1):

- Independence of mining waste management sphere.
- Provision of regulatory resources in the sphere of mining waste management.
- Conformity of the management mechanism to the market conditions of management.
- Main form of interaction between the subjects of waste management.
- Balance of institutional interests.

Table 1. Comparison of the mining waste management conditions in the EU countries and Russia

| Mining waste management conditions | European Union countries | Russian Federation |
|---|---|---|
| Independence of mining waste management sphere | It is singled out in an independent area of institutional regulation | It is not singled out in an independent area of institutional regulation |
| Provision of regulatory resources | Availability of independent regulatory acts in the mining waste management sphere | Absence of independent regulatory acts in the mining waste management sphere |
| Conformity of the management mechanism to the market conditions of management | Flexible management mechanism based on the diversity of forms of interaction between the subjects of waste management | Rigid management mechanism built in into the subsurface resources management system |
| Main form of interaction between the subjects of waste management | Contract | Permissible |
| Institutional interests | Balances | Balanced only in the frame of programs |

DISCUSSION

Nowadays, the mining waste management of the EU countries is regulated by the mining code and environmental standards that provide the process of waste formation on the stages of deposits estimation and designing of it in the form of environmental load.

The legislation of economically developed countries (in the first place, EU countries) (Directive 2006/21/EC of the European Parliament and of the Council on the Management of Waste from Extractive Industries and Amending Directive 2004/35/EC, 2006) was made according to the principles of environmental efficiency owing to which the possible contradictions are minimized between the participants of the mining waste management process. For example, in 2011 in Finland, which is the leader in the sphere of the rational use of mineral resources, environment protection and ecology, the program “Green Mining” (“Green Mining Industry”) started that is realized by the fund Tekes; the goal of this program is to make Finland a pioneer in the environmentally efficient mining industry by 2020.

Framework directives of wastes and landfills (EU – Waste Framework Directive, 1991) are the main acting legal documents in the sphere of mining waste management; in addition to them the following directives are used: IPPC (96/61/EC); Seveso II (96/82/EC, revised by 2003/105/EC); Hazardous waste (91/689/EEC); Water Framework Directive (2000/60/EC); EIA (85/337/EEC, 97/11/EC); Nature (Habitats/birds dir. 92/43/EC, 79/409/EEC) (INTOSAI Working Group on Environmental Auditing, 2010). These directives reflect the principles of the payment for environment pollution, prevention, use and disposal of wastes.

At the same time, every EU country has the right to establish its rules and requirements in the sphere of mining waste management.

In the Russian Federation, the main method to solve the waste problem allowing to coordinate partially the interests of economic entities is state target programs.

In this sphere, our country has a significant experience, despite the fact that all state target programs are of post-Soviet period: FTP “Wastes (1996-2000)”, “Recycling of Man-Made Formations of Sverdlovsk Region” (1996-2004) were closed early due to the lack of finance, or their status was decreased to the regional level (Recycling of Man-Made Formations of Sverdlovsk Region, 1996) (Pinaev, 2004). For the realization of the last federal program “Liquidation of Accumulated Environmental Damage” for the period 2014-2025, in 2015 the finance has not been issued yet.

It should be mentioned that not only in Russia but, for example, in Canada and the USA the main mining waste management and waste recycling is development and realization of various environmental and nature-oriented programs.

However, in the European Union countries, where the production volume of mineral resources is significantly lower than the volumes of its recycling, the mechanisms allowing to perform the activity of waste disposal are marked more thoroughly with a smaller environmental damage, and ecological element is the main feature of efficiency of waste recycling.

Therefore, the European experience can be a good example of the institutional conditions formation of efficient management of mining waste.

In the present research, we showed the possibility of application of institutional theory to a particular problem of mining waste management.

The logic of the research provides the further development of the issue in the direction of the improvement of the mining waste management mechanisms and mineral resources recycling.

CONCLUSIONS

- Mining waste management in the Russian Federation shall be singled out as an independent area of institutional regulation.
- The function of institutional environment is a creation of conditions for the selection of the most efficient variant of the life cycle decreasing of mining waste by the economic entities by means of transformation of waste into an actual production factor.
- A market management system provides more possibilities for the development of the various forms of interaction of economic entities, but it also makes more requirements to its legislative provision.
- One of the subjects of institutional environment in the field of mining waste management shall be small and medium business.
- The obligation of the state is not only to create the conditions for the development of the institutional environment (elimination of administrative and economical barriers for the small and medium businesses to enter the industry), but also to form the economical (by means of internal consumer market development) and institutional interests. This, in its turn, can become an impulse for the introduction of new technologies and creation of new working places, and also to provide the environmental safety of the country.

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