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REPRODUCTION OF THE MINERAL – RAW MATERIAL BASE PROBLEMS IN THE REPUBLIC SRPSKA

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ABSTRACT

The Strategy for the management and utilization of mineral resources of the Republic Srpska includes inevitably the mineral resource base as an essential element of material and social development, and it is one of the significant reliance forms on its own sources in achieving economic development. In this sense, geological exploration, like an important activity in providing mineral resources for the development of the economy of the Republic Srpska, has not been given adequate attention since the 1990 and has not been systematically conducted at all.

The practice of the surrounding countries, and also in the earlier period, in these regions was such that geological exploration were treated adequately with the importance of mineral resources and, accordingly, funds were provided for their financing by the state and also by users of mineral resources. Today, there are no systematic geological surveys in the Republic Srpska and no systematic sources for their financing. The geological research activity in Bosnia and Herzegovina and the former Yugoslavia, throughout the earlier period, was characterized by relatively good organization and coherence of the research program. Due to this, many remarkable results have been achieved, which justify the realized investments in many ways.

The paper presents the basic characteristics of the mineral raw material base of the Republic Srpska, as then an analysis of inefficiency and stagnation in the research was done, and finally suggestions are given the necessary activities to improve the present situation.

Key words: *basic, regional and detailed geological explorations, mineral raw material base, mineral raw material complex.*

INTRODUCTION

In the current conditions in the Republic Srpska, the mineral economy and geoindustry, which were relatively developed by the beginning of the last war, have greatly moved the transition process in this segment of economy. This process is rather slow and there are still dilemmas as to whether mineral resources represent a comparative advantage or a burdensome legacy that brings only problems and losses and can hardly fit into the international division of work. These dilemmas are well overcome, but they can definitely be broken, if state authorities most urgently establish a strategy for the development of a mineral resource complex, a mineral resource base and a mineral policy as part of economic policy, with the revision or creation of completely new legislation and management system.

The mineral economy of a country is part of its economy, and mineral policy is undoubtedly part of economic policy as a whole [1,2]. Accordingly, the laws of the market economy must be respected in the mineral resource complex as a whole and in the mineral economy. The mineral resource base is developing, faster or slower, depending on the general positions in the country and within its highest management level. However, experience from countries with a highly developed mineral economy clearly shows that there are always some interests that will not, and cannot, of course, in the specific situations, fully respect the principle of profitability. However, experience from countries with a highly developed mineral economy clearly shows that there are always some interests that will not, and cannot, of course, in the specific situations, fully respect the principle of profitability. In this regard, for decades, world theory and practice have insisted on considering (especially when making investment decisions) two types of return on investment: commercial and national payback. This is also accepted in the mineral economy of the Republic Srpska and expressed through the separation of production systems of strategic importance.

In the relevant professional literature, mineral policy implies a series of conscious and organized planning activities undertaken by the state and its authorities in order to achieve specific, set goals in the mineral resource complex. These goals are, first of all, to provide the necessary types and quantities of mineral resources from domestic and foreign sources, but also to increase the degree of exploration (knowledge) of the territory of the country in the broadest geological sense, increase in foreign currency inflow through the export of certain mineral resources, increase the number of employees in the branches of geological exploration, exploitation and, in particular, processing and processing of mineral resources, more harmonious regional development, especially underdeveloped areas with identified explored or potential mineral resources, attraction foreign and domestic private capital, a reduction in imports of mineral resources, the protection and improvement of the environment and etc.

BASIC CHARACTERISTICS OF THE MINERAL – RAW MATERIAL BASE OF THE REPUBLIC SRPSKA

Mineral - raw material base is a complex economic system that is divided in subsystems (systems of second order), and by them to the corresponding elements. In modern economics of mineral resources in the context of the functioning of the mineral and raw material base is pulled four relatively large subsystems: geological sciences, geological research, industrial (economic) utilization of ore deposits and exploitation of ore deposits [3,4].

The mineral resources of the Republic Srpska are not distributed in a chaotic manner, they already have a geological position that is strictly dependent on the natural geohistorical conditions of their origin [2]. This regularity in their arrangement is reflected, first of all, in the organic connection of each of the raw materials with some of the bearing ore formations. Hence, a general, but also a thorough knowledge the ore bearing formations of the Republic Srpska is one of the essential preconditions for their exploration, evaluation and exploitation [5,6,7,8]. Precarbon and Carboniferous geological formations are ore-bearing in content of very important deposits of iron and natural pigments (Ljubija), barite (Novi Grad, Ljubija) and architectural building stone (Sana Paleozoic).

Ore bearing formations with gypsum and anhydrite (Volari, Petkovac), barite (Vidrenjak), lead - zinc ores (Ljubija) with architectural - construction stone (in several places) and dolomite were formed in the Perm and Triassic. The Jurassic system is characterized by the fact that asbestos deposits (Petrovo) and magnesite (Snjegotina, Borje) are attached to the serpentine ore formation, then there are smaller manganese deposits in the Diabase - chert formation (eastern Kozara and the vicinity of Prnjavor), and the limestone formations is represented architectural - building stone.

During the Cretaceous, a large bauxite formation of eastern Bosnia (Vlasenica), various limestones and architectural building stone were formed. Formations bearing petroleum (Majeвица), limestones (Kozara, Hercegovina), architectural - building stone, and small bauxite deposits (eastern Hercegovina) are known from the Paleogene.

Neogene is rich in ore formations in which various mineral deposits are known: brown coals (Ugljevik, Miljevina, Lješljani, Teslić, Kotor Varoš, Banja Luka) and lignites (Stanari, Gacko, Ramići), lead - zinc ores (Sase-Srebrenica), redeposited bauxite (Baraći), bentonites (Šipovo, Japra, Stanari), kaolin clays (Kobaš, Bratunac), fireproof and ceramic clays (Prijedor, Zvornik), zeolites (Celinac), coal-bearing raw materials (Lješljani, Gacko, etc.), quartz sands (Brezičani, Omarska, Ivanjska, Stanari, Milići), oil (Posavina), etc.

The Quaternary contains formations with pebbles and sands (along the Sava, Una, Sana, Drina, Bosnia, Ukrina, etc.) and brick clays (Prijedor, Banja Luka, Gradiška). Geothermal energy sources can be added to this. There are other mineral resources in the Republic Srpska associated with various bearing ore formations but according to the present state of their research, they have no first-class significance. Because, no particular attention was devoted to them in this review.

INSTITUTIONAL AND LEGAL FRAMEWORK OF PLANNING AND REGULATION IN THE MINERAL – RAW MATERIAL COMPLEX

According to today's legislation, there are numerous institutions that regulate issues related to the mineral resource complex. This primarily refers to the state administration bodies within whose scope it is to manage and supervise activities in the mineral resource complex. These are: Ministry of Energy and Mining which performs administrative tasks related to exploration and exploitation of all mineral resources [9,10], The Republic Srpska Concessions Commission, which gives its consent to all concessions in the field of mineral resources [11,12], Government of Republika Srpska which, at the proposal of the Ministry of Energy and Mining and the approval of the Concession Commission, makes decisions on the assignment of these public goods for use, Inspectorate of the Republic Srpska which performs inspection tasks under special laws [9,10], The Ministry of Finance, which controls the allocation and use of usage fees. Geological Survey of Republic Srpska in Zvornik in the field of strategic planning for the development of the mineral resource complex.

Several institutions are responsible for supervising the activities of the mineral resource complex: Mining Inspectorate is responsible for supervision of the mining activity, Geological Inspection is responsible for supervision of geological activity, An environmental inspection is responsible for protecting the environment, Sanitary inspection carries out supervision over noise protection, etc., The Water Management Inspectorate monitors surface and groundwater pollution.

In order to better monitor mining activities, institutions are important: Statistical Office of the Republic Srpska and the Republic Srpska Chamber of Commerce. From the scientific and professional point of view, the Faculty of Mining in Prijedor, University of Banja Luka also deals with mineral resources.

There are 29 licensed companies in the Republic Srpska for conducting applied and general geological surveys in the field of mineral resources. These institutions are mostly privately owned except for the "Institute for Geological Surveys of the Republic Srpska" in Zvornik, which is 100 % state property and the "Mining Institute" in Prijedor, which is mixed- property and majority state-property. Personnel capacity of private institutions is at a minimum level. Also, the personnel capacity of state - property institutions is unsatisfying.

Companies perform detailed geological explorations. The Republic Institute for Geological Research is part of the Ministry of Energy and Mining and performs professional and other tasks related to: geological research - making geological maps of different specialties and purposes of interest to the Republic, establishing a central archive (fund, libraries) geological research, digitization of the fund material in the form of projects, programs, reports, studies, studies on exploration of various mineral resources in the Republic, respectively the establishment of a geological information system in the Republic, making medium and long term forecast of geological exploration, making normative acts in the field of geological research, preparation of projects and studies of economic justification for concessions on geological exploration and exploitation of mineral resources by public invitation and performs other tasks in accordance with the law and by order of the Ministry.

In the Republic Srpska, according to some records, about 70 personnel of the geological profession are present (data from the Ministry of Energy and Mining, Association of Geologists of Republika Srpska). Apparently, the personnel situation is quite bad. A major lack of institutional arrangement is the inability to fully monitor the situation in the mineral and raw material complex of the Republika Srpska due to the lack of a single database and a large dispersion of data sources.

Laws and regulations for the mineral - raw material sector at the level of Republic Srpska and established a legislative and institutional framework for restructuring the sector, opening markets, regulating activities, concessions, etc. A legal framework for concessions has been established, which includes, inter alia, concessions for existing and new facilities. The area of public-private partnership, which can be applied to this sector, is also regulated. The area of public-private partnership, which can be applied to this sector, is also regulated.

In the Document on Concessions Policy [11,12], there is a provision that the objects of the future concession can be: the mineral raw materials which have been investigated in detail and prepared for exploitation or are in in exploitation, established, but insufficiently explored mineral resources with a clear potentiality, then uncertain perspective mineral resources identified at the prospecting level, and at the end of the bearing ore formation as a surface promising for the discovery of known and other mineral resources, analyzed by blocks, with supporting documentation for each block.

The long-term program for the development of basic geological explorations of the Republic Srpska has been completed for a fifteen-year period (2014 – 2029). In it, all aspects and goals of the future development of basic geological exploration have been systematically, based on the results of the previous research and with respect to the contemporary flows of geological research in our country and in the world. This primarily refers to the creation of transparent and basic geological maps of the Republika Srpska, various types and purposes, and that all countries in the region possess.

The long-term program is planned to be implemented through 12 macro projects, which include the making basic geological maps and the continuation basic geological explorations of all mineral resources in the ore fields where the presence of ore deposits has been determined and where there are realistic assumptions for finding new ore concentrations. There are regions in the Republic Srpska that have been identified as potential or some mineral resources recorded in previous studies, and it is necessary to continue activities to identify perspective areas and deposits of mineral resources that are of interest for conducting detailed geological surveys, conducting concession activities, etc.

In these laws and other acts more or less successfully are given basic solutions in terms of planning, organization and implementation of geological research. There has been some progress in legal regulation, but there are also some weaknesses, both evident and significant. In the law of geological surveys and regulations are expressed to geological exploration are divided into are divided into basic ones performed by the Geological Survey of Republic Srpska – Zvornik and detailed ones performed by companies [10]. All other forms of research (regional, pre-detailed, etc.) have been eliminated. Also in the in the Regulations on Classification and categorization of mineral reserves there are no categories of reserves D1 and D2, which in previous practice were used for planning basic regional geological researches where are the parameters for evaluation (provision and capacity, size, type, medium content etc.) assume and determine indirectly. This Regulation refers to the United Nations Framework Classification, which is broader and more detailed than in this Regulation and provides for the makingt of feasibility studies after each stage of prospecting, preliminary and detailed research. The aim of this study is to identify mineralization, to determine the continuity, quantity and quality of mineral resources in the deposit and to determine the value of the investment. Also in the Regulations on the Procedure for approval of detailed geological reserches and the Regulations on the Level of concession fee and Bank guarantees in the field of electricity, energy, mining and geology, the fees for geological surveys are determined in proportion to the amount of investment in exploration works, regardless of the results obtained, which is a unique practice.

At the Republic Srpska level, long-term plans for mineral exploration should exist, because the existing Long-Term Program for the Development of Basic Geological Explorations of the Republic Srpska from 2014-2029 is not sufficient, respectively there is no strategy for the reproduction of the

mineral resource base, with precisely specified types of raw materials and metallogenetic units according to which the research will be implemented out with budget funds.

GEOLOGICAL RESEARCH OPERATION IN THE REPUBLIC SRPSKA

The development of basic geological research in Republic Srpska can be monitored on the basis of the realization of the Long-term program of development of basic geological surveys of the Republic Srpska from 2014 to 2029, and detailed according to the Law on Concessions, respectively based on the concessions granted by the Ministry of Energy and Mining registered in the cadastre of approved exploration fields.

After the acceptance of the Long-Term Program by the National Assembly of the Republic Srpska, it is planned to produce geological maps of different sizes and purposes and to perform geological explorations in order to increase the degree of exploration of different mineral resources of certain regions. The production of geological maps does not made according to the dynamic plan. To perform geological exploration of mineral resources, in order to increase the level of research areas of the Republic of Srpska, according to long-term programs, provided financing from the budget. In 2018, the budget did not approve funds for this type of basic geological exploration, so the realization of the annual plan of work of the geological exploration, in this part, is unrealized. Some of the macroprojects involved experts from other countries, mainly from the Geological Survey of Serbia and the Faculty of Mining and Geology from Belgrade, considering the shortage of employed geologists at the Institute and the lack of skilled workforce. According to the Long – Term Program, for its realization, the admission of new young experts in the geological profession of different specialties is necessary.

The greatest degree of organization and continuous investment was achieved in the period from 1962 to 1990, when a unique concept of fundamental and regional research was established in the former Yugoslavia, which, with certain modifications, existed in Bosnia and Herzegovina. During this period many significant results were achieved, on which the development of coal, iron ore, lead and zinc ore, bauxite, manganese, asbestos, rock salt, gypsum, barite, quartz sand and a number of other mineral resources was based. During this period, the Basic Geological Map of the scale 1: 100,000 and the accompanying fundamental bases were completed, on which all the studies and practical interventions in the crust on the territory of Bosnia and Herzegovina are based.

In its activity, the Geological Survey of Republic Srpska – Zvornik mainly innovated earlier geological explorations, with very little or no new basic geological exploration. The concept of future development of geological research should be based on current domestic and foreign results and experiences. Next, regional geological researches of mineral resources (not regulated by law) should follow. The Republic of Srpska is primarily interested in these results because they enable it to inventory national resources in mineral resources and stimulate activities in the development of the mineral economy, some business companies and, in rare cases, by the local community, because these studies allow them to extend the life of the mine by expanding existing ones, and often by building new mining facilities.

The situation in the field of detailed geological researches can be illustrated through the concessions granted and the cadastre of approved spaces for geological research. The number of valid concession agreement until 2018 was 120. Agreements have been concluded with 100 legal entities, some of which were completed two or more agreements, Figure 1.

In the research, the concessionaires perform a minimal amount of exploration work, only to provide the minimum conditions for the design of exploitation works in order to obtain a concession for exploitation. It is possible to speak here of the translation of reserves from the lower into the higher category, and not in any way about the expansion of the raw material base. The review of the granted concessions and the selected exploration areas shows that there are five concessions for the exploration of rare elements (B, Li, Na, Sr and K), which is a novelty in these areas, Figure 2.

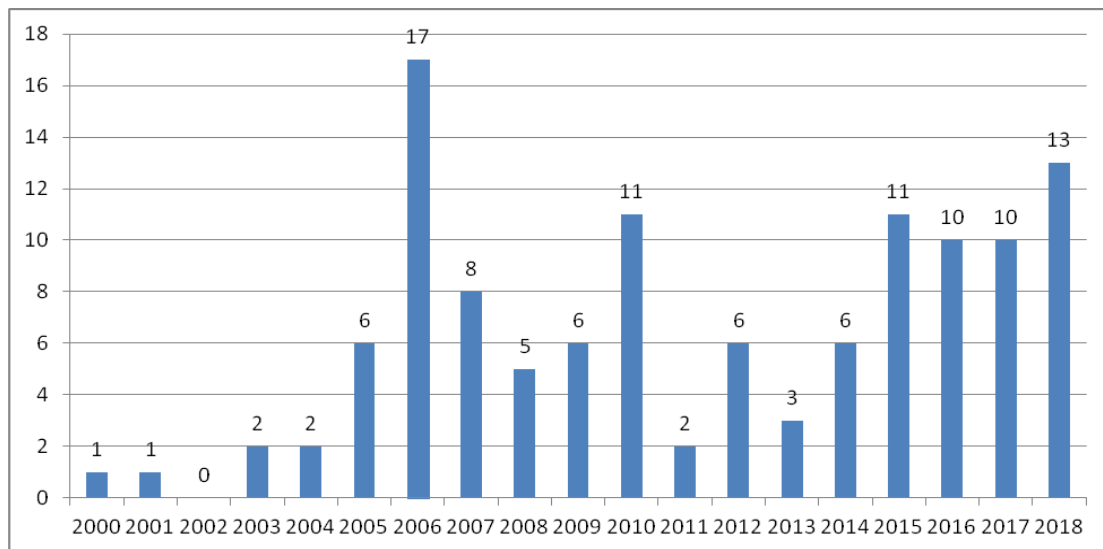


Figure 1. Number of concluded concession agreements by years

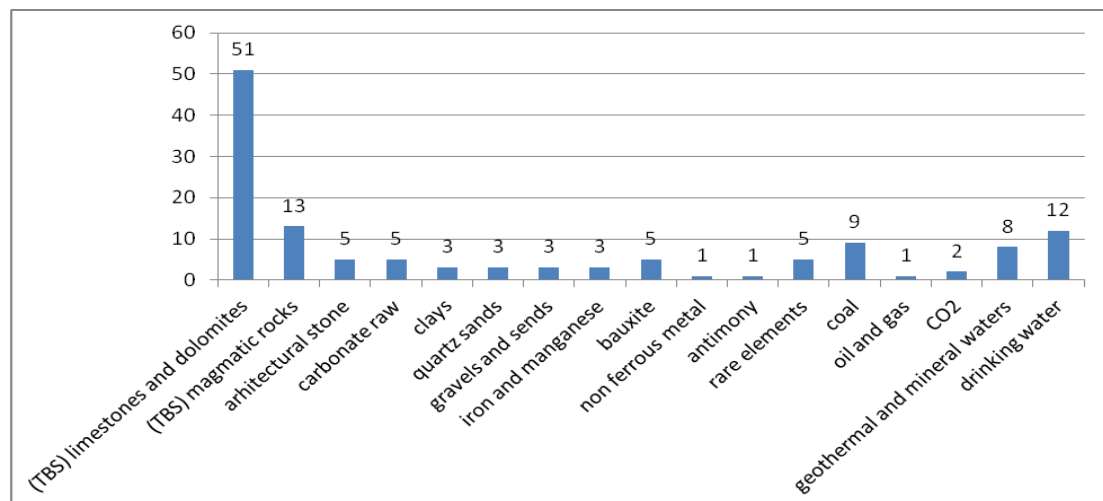


Figure 2. Number of concluded concession agreements by mineral resources

Mineral resources are of a non-renewable and exhaustive nature and require that three standards of sustainable development be applied consistently in their exploration and exploitation: economic, environmental and social. This can be achieved through optimal planning and management where, with the concession as a new approach in new conditions, geological exploration is planned, organized and performed in order to reproduce the mineral base. Geological explorations do not monitor the level of exploitation, so we have no new reserves, and slowly mineral resources are depleted, and there is no increase in new reserves.

ANALYSIS OF ACTIVITIES AND MEASURES FOR IMPROVEMENT OF THE MINERAL - RAW MATERIAL COMPLEX OF THE REPUBLIC OF SRPSKA

Starting from the importance of the role and potential of mineral resources of the Republic of Srpska (coal, iron ores, lead and zinc and nickel ores, industrial minerals, construction technical and decorative stone, mineral, thermal and other waters, etc.), to further intensify sustainable economic, environmental and social development without endangering the environment, or without limited depletion reserves at the expense of future generations, then noting the need for available and potential resources to be explored, and to use in accordance with the modern achievements of science, and

technology with optimal management on the basis of advanced management the mineral sector must be reorganized. The statement is given full significance given the limited funds in the Republic Srpska to develop the mineral complex on its own, and starting from fundamental definitions throughout the community for further ownership transformation through privatization and market-based development. then through concession and the need to create an attractive legal and other environment to attract foreign and domestic investors to invest in the mineral resource complex (mineral sector) [13].

Relevant factors, with optimal respect for economic, environmental and social interests, natural capital, benefits from mineral extraction are being reinvested in other activities and fields, such as construction of economic facilities and infrastructure, health, education, science, public administration, security, etc. Mineral resource development should be fully integrated into local and regional development [14].

It is necessary for the functioning of the Geological Survey of Republic Srpska to reach the optimum state. Geological surveys should be conducted continuously with the long-term secured inflow of the necessary financial resources, and with the adequate assistance of the completed geological information system, the provision of adequate personnel, etc. The level of geological exploration has reached a certain level, thanks to intensive geological research prior to the 1990 s, but new geological explorations and studies need to be steadily increasing.

The concept of geological explorations in the coming period should be based on reaffirmed fundamental geological exploration, regional and detailed mineral exploration.

These situations should determine the creation of a strong center for fundamental and applied research. Such a center, parts of ministries, administrative bodies and scientific institutes are obliged to take care of the continuity of geological research, inventory, protection and utilization of mineral resources and regulations in this field. As a rule, these are state bodies whose activities are financed from the budget. Activity organization for applied research in countries with market economies adapted to the law of supply and demand, but the plan is managed at the state level.

To mineral-raw material complex survived and evolved in a particular environment, it must have a clearly defined purpose of existence. This purpose of existence is primarily reduced to the multiphase process of providing and using mineral resources, in accordance with realistic natural, economic and ecological opportunities, in relation to which there are expressed needs in a wider or narrower environment [15].

The problem of qualified human resources in the reproduction of the mineral base has been expressed. Highly skilled and most qualified human resources for all subsystems of the mineral resource complex must be continuously provided not only through the planned and systematic training of existing staff at different levels of the workforce, but also through scholarships for new young staff and referrals to specializations, masters and doctoral studies of perspective personnel.

CONCLUSION

Geological research activity in the former Yugoslavia was characterized by relatively good organization and compatibility of the research program. Thanks to that, remarkable results have been achieved in finding numerous mineral deposits using modern formation and metallogenetic analyzes.

Over the last two decades, there has been a marked stagnation in the Republic Srpska mineral resource complex and even a crisis which is especially manifested in geological research regarding the reproduction of mineral resources. The organization, planning and realization of geological exploration have been impaired, so the absence of any research work on all aspects of this industry is generally evident.

The conception of geological exploration in the coming period, in order to move from a state of total stagnation to the stage of active relationship to this activity of specific material production, should be

based on reaffirmed fundamental geological researches, which belonging to a larger social and national interest. Next, regional geological researches of mineral resources should follow. Detailed geological researches should be programmed, funded and performed by business companies, depending on their own needs and development opportunities.

Geological exploration in the forthcoming period should be programmed on the basis of an analysis of the development to date and the results achieved, the contemporary flows of geological exploration in the world with aspects and the goals of future development on a unique global concept.

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