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MINING ACTIVITY - ENVIRONMENTAL IMPACT IN THE WEST AREA OF ROMANIA^{}**

Abstract

Pollution is a major problem updated in every corner of the world. The sources of pollution are diverse, from the natural pollution to the anthropogenic pollution. Anthropogenic pollution has a significant impact. Industrial activity, with all its fields, represents one of the most important sources of anthropic pollution. Also, the mining activities can be a source of pollution worth considering. Even if the mining activity has been completed, the possibility of pollution exists. Mining activity is the major source of industrial waste. At present, the mining units can fall into three categories: active mining, where the activity continues; in conservation mining, where the closing and greening program has not yet been applied; closed mining, which are in the Closing and Greening Program. The most affected environmental factors can be the sources of water, soil, but also air.

Keywords: environment, West area of Romania, pollution

INTRODUCTION

The West area Mining activity of Romania is bordered by the Danube River and Serbia in the South-East and Hungary in the North-West. The area includes four counties Arad, Caraş-Severin, Hunedoara and Timiş.

The total surface of west area is 32.034 km² which represents 13.44% from surface of Romania. The area has a diversified and harmonious relief distributed in plains, hills and mountains.

The plains are part of the Western Plain and predominate in the Timiş County. In Caraş-Severin and Hunedoara the mountains occupy 65% of the surface and the most important mountain altitudes of the region are: Parang Peak 2519 m (Parang Mountain), Peleaga Peak 2509 m and Retezat Peak 2482 m (Retezat Mountain) [1].

The Banat Hydrographic area is 18,393.15 km², which represents 7.7% of the Romanian territory and extends from the South of Mures to the Cerna river confluence with the Danube. The hydrographic network includes 389 watercourses, with the total length of 6,705 km (excluding the length of the Danube River section that borders the Banat Hydrographic Area and which is 145 km) and the average density of 0.36 km/km², the value very close to the density of the hydrographic network of Romania (0.33 km/km²).

The Banat Hydrographic Area is composed of six hydrographic basins and hydrographic basins of the direct left tributaries of the Danube River between the Nera and Cerna basins [2].

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The climate is moderate-continental, with the Mediterranean influences on the Danube and Cerna Valley (CS) with the multiannual average temperatures ranging from 10-12°C. The multiannual average rainfall is between 560-580 L/m² that is significantly higher in the mountain areas [1].

NATURAL RESOURCES

As a result of the varied relief, the area possesses rich and diverse natural resources: *liquid and gaseous hydrocarbons* in the plains (Pecica, Turnu, Șandra, Calacea, Dudeștii Vechi), *metalliferous ores* (iron, manganese, molybdenum, copper, uranium, precious metals) in the hill and mountain areas. *Gold and silver* are found in Chisnădia, Dud, Cladova, *iron* in Dezna, Moneasa, Ocna de Fier, Dognecea.

In Hunedoara and Caraș-Severin counties the coal deposits are concentrated at Lupac, Doman, Secu, Sinersig, etc. Anina is the oldest coking coal mine in Romania. Construction materials are located along the Mures Valley (sand, granite, granodiorite and diorite) and Crișul Alb (andesite, asbestos) in the Western Plain (refractory clays), in Carpiniș, Biled, Jimbolia marble at Rușchița, crude oil and gas at Biled, Satcinez, sand for glass in Tomești [1].

The thermal and mineral springs are also important natural riches of the region, which are known and captured since ancient times. The spa potentials of thermal water from Băile Herculane (Caraș-Severin county), Geoagiu Băi (Hunedoara county) are exploited.

The mineral waters from Lipova (Arad County), Buziaș (Timiș County) and the flat water from Băile Herculane (Caraș-Severin County) are intensely used.

The important forest resources of the area (31% of the total area) exceeds the national average (28%). In Hunedoara and Caraș-Severin counties, this percentage is much higher (44% - 46%) [1].

Water resources consist of surface and groundwater. They can be a limiting factor of the regional economic development especially if it is comparative with the demands of populations [3].

In Caraș – Severin County, the total technically usable water resources of the Banat Hydrographic area are approximately 1.50x10⁹ m³/year, from which 392.2x10⁶ m³/year are surface water and 1.11x10⁹ m³/year underground water.

In the Banat Hydrographic area of Caraș-Severin County, a number of 247 bodies of water in the natural state were delimited. From 247 bodies of water, 33 are monitored and 214 are not monitored. The total number of monitoring sections is 36.

The results indicate that 165 (66.80%) natural water bodies are in a good ecological condition, 82 (33.20%) bodies of water are in a moderate ecological state. Chemical status was good in 212 (85.83%) bodies of water and poor in 35 (14.17%) bodies of water.

In the Caraș-Severin county, a number of 66 highly modified and artificial bodies of water (65 highly modified bodies of water and 1 artificial body of water) were delimited, of which 23 monitored (22 CAPM and 1 artificial) and 43 unmonitored, with a number of 26 monitoring sections.

The chemical state was determined for cadmium, lead (dissolved fraction) and organic micro pollutants. The results indicate that 24 (36.37%) of strongly modified bodies of water have good ecological potential, and 42 (63.63%) strongly modified bodies of water have moderate ecological potential. The chemical state of the highly modified bodies of water was good in 34 (51.52%) and bad in 32 (48.48%) of them [3].

The total theoretical water resources of the Banat Hydrographic Area in Timiș County are approximately 4.58x10⁹ m³/year, out of which 3.38 x 10⁹ m³/year surface water and 1.20 x 10⁹ m³/year underground water.

In the Banat Hydrographic Area of Timiș County, in the rivers subsystem, a number of 247 bodies of natural water were delimited. Out of these, 33 bodies of water are monitored and 214 are not monitored. The total number of monitoring sections is 36.

The results of classification the bodies of water (monitored and not monitored) in the corresponding ecological and chemical states indicate that 165 (66.80%) bodies of water fall into a good ecological state, 82 (33.20%) bodies of water fall into a moderate ecological status.

In the Bega river basin, 37 surface bodies of water were delimited, out of which 6 bodies of water were monitored and 31 bodies of water were interpreted by similarity. The largest river in this river basin is the 170.132 km Bega River, which gathers its springs from the North-West slope of the Poiana Ruscăi Mountains, receives tributaries from their western slopes and from the southern half of the Lipova hills. From Timisoara, the Bega river continues through the Bega channel which drains a basin area of 2362 km² with an average altitude of almost 240 m.

In the Timiș river basin, 99 bodies of water were delimited, out of which 10 bodies of water were monitored and 89 bodies of water were interpreted by similarity. The Timiș River is the richest water resource in the Banat Hydrographic Area which drains a basin area of over 5677 km².

Its length totals 234,748 km. The river Bârzava with its boundary in the area of the western side of the Semenic mountain captures the streams of the Semenic channel which drains the basin area of 38 km² (25 km² in the upper basin of the Timiș river) and take from the upper Nera basin the water on a receiving surface of approx. 13 km² [3].

The surface freshwater represents the majority of the fresh water reserves. The water surfaces are classified as a standing water (seas and oceans, lakes, ponds,

marshes) and flowing water (spring - stream - river).

The results of classification the water bodies, lakes, in the categories of ecological potential and the corresponding chemical state, in the Caras-Severin County, reveals that the 8 (100.00%) bodies of water have moderate ecological potential. The chemical condition was good.

THE IMPACT OF MINING ACTIVITIES ON THE ENVIRONMENT

The quantities of pollutants discharged by economic activities (tones/year) - 2011 in Bega Timiș, Timiș County are presented in table below [3].

The pollution produced by different industrial activities affects the quality of soils, in different degrees. In the field of soil protection, generally by pollution is understood any disturbance that affects the quality of soils from the qualitative and / or quantitative point of view.

In the Caraș-Severin county, the area occupied with industrial waste and household inventory so far is 459.32 ha, out of which: 5.15 ha covered with ash from CTE Crivina Anina; 29.25 ha covered with the household waste, in the urban environment from which (those from rural area were closed on July 16, 2009, rehabilitated and reproduced in the natural circuit); 245.01 ha are occupied with tailings from the extractive industry; 60.51 ha are covered with slag resulting from the processes of ferrous metallurgical industry [3].

In the Timis County, the soils are affected by different industrial and agricultural activities on an area of 3764 ha, as follows:

- Code. 01. Pollution (degradation) of soils by up-to-date mining, ballast, quarries - areas heavily and excessively affected by ballast and quarries, 3350 ha. These deepen the waterbeds causing the decrease of water level to and consequently reduce the water re-

serves in the surrounding areas, but also disturb the soil by depositing extracted materials.

- Code 02. From recorded data pollution with deposits, dumps, tailings ponds, tailings dumps, floating dumps, etc. affects excessively on 85 ha.
- Code 06. Pollution with the organic waste, resulted from the food industry and light industry affects the soil strong and excessive on an area of 12 ha, much smaller than that caused by the other industrial activities.
- Code 07. Pollution with the agricultural and forestry waste and vegetable residues - from the statistical data results that this type of pollution affects the soil on an area of 15 ha in a strong and excessive mode.
- Code 08. Pollution with animal manure - this type of pollution affects in strong and excessive mode the soil on an area of 282 ha.
- Code 20. Pollution with fuel from the extraction, transport and processing - this type of pollution affected a small areas of soil, especially the soil in the fuel parks of SC Petrom SA[3].

CONCLUSION

Mining activity is the major source of industrial waste. At present, the mining units can fall into three categories: active mining, where the activity continues; in conservation mining, where the closing and

greening program has not been yet applied; closed mining, which are in the Closing and Greening Program [4, 5].

The exploitation of useful resources from mining areas, following the exploitation is imperative necessary in order to reduce the environmental pollution.

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