

MINING SECTOR AND ITS IMPACT ON AIR QUALITY AND SOIL IN MITROVICA

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ABSTRACT

Air pollution in mines is mainly due to the fugitive emissions of particulate matter and gases including methane, sulphur dioxide, oxides of nitrogen and carbon monoxide. The major operations producing dust are drilling, blasting, hauling, loading, transporting and crushing. Basically, dust sources in mines can be categorized as primary sources that generate the dust and secondary sources, which disperse the dust and carry it from place to place called as fugitive dust.

Opencast mining has more potential impact on land than underground mining. With improved technology, opencast coal mining is being used extensively because of its cost effectiveness and productivity though it results in large-scale land disturbance.

The purpose of our work was the study of mining sector and its impact on air quality and soil in Mitrovica region.

Contamination of water, soil, and air in many parts of the world, but also in Kosovo, is a serious environmental problem, and a permanent risk to public health. Kosovo has had great industrial potential with different destinations. As a result, today a large number of inherited environmental problems is actual, which were accumulated during decades of uncontrolled exploitation of natural resources, mining activities and industrial production, associated with high pollution level.

After 1999, most of manufacturing industries were out of function. Most of these industries resulted with hazardous waste, old unused technology, demolished buildings, and unmanaged storages.

Key words: mining sector, environment, Mitrovica, pollution, soil

INTRODUCTION

Kosovo has had great industrial potential with different destinations. As a result, today a large number of inherited environmental problems is actual, which were accumulated during decades of uncontrolled exploitation of natural resources, mining activities and industrial production, associated with high pollution level.

Contamination of water, soil, and air in many parts of the world, but also in Kosovo, is a serious environmental problem, and a permanent risk to public health. Industrial development that does not comply with environmental standards is the main source of pollution.

Because of abundant natural resources, part of Kosovo's economy has been oriented on development of the mining sector. Greater exploitation of these resources has been occurred especially during the 70s and 80s. Consequently, there are inherent problems in the field of environment. Here, above all, we must emphasize the impact on the environment from industrial waste, industrial plants, tailings (mine dumps), storage of chemicals from agriculture etc.

After 1999, most of manufacturing industries were out of function. Most of these industries resulted with hazardous waste, old unused technology, demolished buildings, and unmanaged storages. All these contributed to increased environmental impact. Such locations of potential pollution from industry can be considered as hot spots, and with environmental impacts. These sites are a source of pollution of soil, water and air. Vast areas of land are contaminated by acidic water, and heavy metals, especially Lead, Zinc, Cadmium, Arsenic, Mercury etc.

Scientific mining operations accompanied by ecological restoration and regeneration of mined wastelands and judicious use of geological resources, with search for eco-friendly substitutes and alternatives must provide sensational revelation to the impact of mining on human ecosystem (Surender Singh Chauhan, 2010).

The main air quality issue with mining is dust particles (Ghose and Majee, 2000). Large amounts in concentrations of dust can be a health hazard, exacerbating respiratory disorders such as asthma and irritating the lungs and bronchial passages.

The relative contribution of different combustion sources is a function of economic, social and technological factors, but all mixtures contain certain primary gaseous pollutants, such as sulfur dioxide (SO₂), nitrogen oxides (NO_x) and carbon monoxide (CO), that are emitted directly from combustion sources, as well as secondary pollutants, such as ozone (O₃) that are formed in the atmosphere from directly-emitted pollutants.

Environmental degradation through air pollution, noise, chemicals, water quality, and loss of natural areas, combined with changes in lifestyle, may greatly affect the quality of

human health. Exposure to chemicals is associated with decreased function of genital organs, genital mal-formations, mental development problems, obesity, and cancer diseases.

MATERIAL AND METHOD

Municipality of Mitrovica its region has one of the highest levels of pollution in Kosova, caused by industrial activities of Trepça mining complex.

This pollution has started from the prehistoric times, but more intensively from 1927 in the mining of Stan Terg started, operated by the British company” Mine Limited”, in 1939 lead foundry and 1967 the production of zinc.

In this study are presented separately groups: industry and mining sector and its impact on air quality and soil in Mitrovica region. Only these areas which are considered, to have a significant impact on the environment and public health.

Data for preparation of the study were collected from site visits, meetings, and contacts with various governmental and non-governmental institutions, during the year, 2010-2011.



Figure 1. Industrial park of Mitrovica

Mitrovica is situated in the north of Kosova between two rivers, Ibrë and Sitnica, and is 40 km from Prishtina. It covers 350 km per square, meanwhile represents 3.25 % of Kosova's total territory. It extends in elevation 508-510 meters above sea level. The municipality of Mitrovica borders with Zubi Potok in the West, Skenderaj in the Southeast, Zveçan in the northwest, Leposaviq in north, Podujeva in northeast, and Vushtrria in the South. The town of Mitrovica is in the center of Municipality, and also in the center of the region.

RESULTS AND DISSCUSION

Impact on the environment of Industrial park in Mitrovica

Industrial park in Mitrovica is consisted of former Battery Industry, Zinc Metallurgy, and Chemical Industry. Within the chemical metallurgical processing of these industries, in addition to finalizing the products, they have created hazardous waste for the environment. These wastes are dumped in the vicinity of the park, thus created the industrial waste landfill, which is in a common space.

The industrial waste landfill has an area of 34.62 hectares. Total mass of these industrial waste is estimated to be about 1 520 000 tonnes. The landfill consists of four types of industrial wastes, pyrites and pyrotine, phosphogypsum, jarosite and the so-called residue of neutral process of lye-ing the fried zinc, also known as the EMKO residue. Location of the landfill is inadequate, and with increased concern for its impact on the environment, in particular because the surrounding area is the area with settlements, and near the river.

Environmental problem from Mine of Stan Terg

The mine of Stan Terg is located about 8 km northeast of Mitrovica. It is considered one of the richest mines of Lead, Zinc and Silver in Europe. Since 2000, efforts are made to rehabilitate and to put into operation, with the help and support of the Kosovo institutions and some donors. The biggest environmental problem from the mine is the contaminated mine water, which contaminates the surface and ground waters of surroundings. Another problem is the dust that comes from uncovered dumps of this mine.

In this area, the sites considered as environmental hotspots are: industrial waste landfill in Leposaviq-Bostanishte, industrial waste landfill in Zvecan-Zhitkovc, industrial waste landfill in Zvecan/Mitrovica/Gornje Pole, industrial waste landfill at “Tuneli i pare”, industrial waste landfill inBadovc-Potok, industrial waste dump (ash deposit) in Zvecan, industrial waste landfill in Mitrovica, and the waste remained from minerals melting plant in Zvecan.

State of mining sector in Kosovo

Within the mining sector the following tailings (mine dumps) have been identified as potential hotspots: Hajvali, Badovc, Kishnice, Artane, Kelmend (for Stan Terg mine), materials of Trepca Industrial Park in Mitrovica, Zvecan tailings, Leposaviq tailings, and asbestos dump in Hani i Elezit (Table 1).

Table 1. State of mining sector in Kosovo

<i>Site</i>	<i>Activity</i>	<i>Surface</i>
Industrial park in Mitrovica	Miines of Lead, Zinc and Silver	36.62
Mining Artana	Pb, Zn, S	4 ha

Tailings near Badovc Kishnice, Gracanice	Content of Pb, Zn, Au	2.85 ha
Mareci 1 and 2	Tailings of lead and zinc	2.38 ha
Industrial landfill in Zvecan	Dispose off of heavy metals	62.28 ha
Industrial landfill Leposaviq	Dispose of heavy metals	20.31 ha

Water pollution by heavy metals

The KHMI have started to monitor the heavy metals in surface waters since 2008. Some of them are toxic elements such as: Pb^{2+} , Cd^{2+} , Cu^{2+} , Cr^{6+} , Ni^{2+} etc. But, among them are included as well the essential elements such as: Fe^{2+} , Zn^{2+} , Mn^{2+} , and Cr^{3+} . The heavy metals such as cadmium and lead are found in water as the result of dumping the remnants from industrial processes.

The Ibrí River basin – in this river basin is evidenced the presence of heavy metals such as chromium (Cr^{3+}), in both water quality monitoring stations of Shtime River, and in the Sitnica River at Plemetin station. It is indicated as well the influence of cadmium (Cd^{2+}). The graphic shows that in Graçanka River (at its monitoring station in Vragoli) has a difference compared to other monitoring stations. The Zinc (Zn^{2+}) that comes from the pumped waters of Kishnica mine, is within the allowed limit values with respect to the EU directive EU 152/1999.

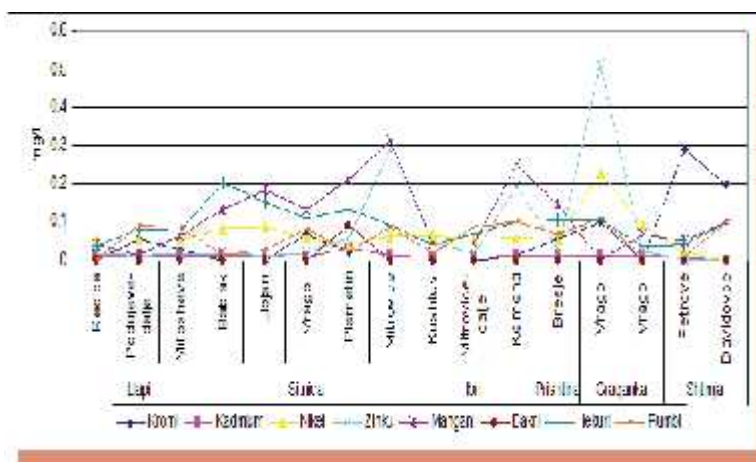


Figure 2: Heavy metals in Ibrí River Basin

Contamination of lands with heavy metals

This category of pollution is produced by industrial processes. Heavy metals and highly toxic which contribute to pollution are: methyl mercury and organic-metric compounds as dimetil-mercury of Hg (CH₃), arsenic, lead, cadmium, beryllium, etc. Their effects are very negative for organism causing damage to the nervous system, cardiovascular system, and urinary system; also they cause pneumonia and severe skin wounds.

The continuing impact of human activities brings to degradation of land surfaces by causing harmful environmental and socio-economic effects. The challenge is to prevent land degradation through specific policies and measures for land protection. In Table 2 are presented data on land use classes in hectares (ha).

Table 2. Total surface of lands according to using class

<i>Used surface</i>	<i>Surface (ha)</i>
Forest	464800
Forest land	28200
Agriculture land	342400
Pasture and meadow	153200
Westland	23400
Urban areas, buildings	4000
Unclassified	460
Water surfaces	41600
Total	1098200

CONCLUSIONS

Contamination of water, soil, and air in many parts of the world, but also in Kosovo, is a serious environmental problem, and a permanent risk to public health. Kosovo has had great industrial potential with different destinations. Industrial park in Mitrovica is consisted of former Battery Industry, Zinc Metallurgy, and Chemical Industry. Within the chemical metallurgical processing of these industries, in addition to finalizing the products, they have created hazardous waste for the environment.

After 1999, most of manufacturing industries were out of function. Most of these industries resulted with hazardous waste, old unused technology, demolished buildings, and unmanaged storages. All these contributed to increased environmental impact. Such locations of potential pollution from industry can be considered as hot spots, and with environmental impacts. These sites are a source of pollution of soil, water and air.

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