

CONSEQUENCES UPON THE ENVIRONMENT DETERMINATED BY THE HUMAN ACTIVITY IN BISTRA COULOIR AREA

CONSECINTE ASUPRA MEDIULUI INCONJURATOR DETERMINATE DE ACTIVITATEA ANTROPICA IN ZONA CULOARULUI BISTRA

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Abstract: *In this paper we studied the consequences of human activities in Bistra Couloir area in the environmental protection context. We are considering that the major impacts of human activities upon the environment are represented by the activity of the steel work from Oțelu Roșu and the marble quarries from Ruschița area. The permanent excavation trapped heavy metals from these rocks in soils and waters. This paper set the alarm considering the human intervention in nature and the disequilibrium that are generated by the human activities in the environmental protection and human health context. In these domain a lot of researches during the time was made regarding the natural and technogene risks upon the Banat's lands and a lot of risk factors was analysed, including the heavy metals in rocks and soils dispersing, the importance of impact studies in the context of agricultural sustainable development and also a human collectivity protection achievement. We must not ignore the impact of the parental materials whereon the soils are evaluated and also the climatic conditions that imprint their properties upon the all area evolution that today a natural and anthropics pressure suffer. Also, the factors that influence the potential polluted processes are multiple and very different, they can block and stop the pollutants for a different period of time or can deliver the pollutants in the soils and than they can be accessible for the plants. So, any studies of these theme are welcome and it can complete other researches that are made or can be a point of start to another future studies.*

Rezumat: *În această lucrare am studiat consecințele activității antropice din zona Culoarului Bistra din perspective protecției mediului. Am considerat că activități antropice cu impact major asupra mediului sunt cele determinate de activitatea oțelăriei electrice de la Oțelu Roșu și exploatarea carierelor de marmură din zona Ruschița. Excavarea permanentă a acestora a determinat antrenarea unor cantități însemnate de metale grele atât la nivelul solurilor, cât și în apele de infiltrație și ulterior în cele de suprafață. Lucrarea de față trage un semnal de alarmă referitor la modul de intervenție a omului în natură și la dezechilibrele pe care le determină acțiunile sale, referindu-ne la impactul atât asupra mediului înconjurător, cât și asupra sănătății umane. În acest domeniu au fost întreprinse de-a lungul timpului o serie de cercetări referitoare la riscurile naturale și tehnogene pe terenurile Banatului, fiind analizați factorii de risc, dar și răspândirea mai ales a metalelor grele în rocile și solurile din Banat, ca și importanța realizării unor studii de impact pentru a asigura dezvoltarea durabilă a agriculturii și implicit a colectivităților umane. Nu trebuie ignorate materialele parentale pe care a evoluat învelișul de sol, ca și condițiile climatice care și-au pus amprenta asupra evoluției întregului areal, care astăzi suportă presiunile factorilor naturali dar și antropici. De asemenea, factorii care influențează dinamica proceselor potențial poluante sunt multipli și foarte variați, aceștia putând bloca și stoca poluanții pe diverse perioade. De aceea, orice abordare a acestei tematici este binevenită și nu poate face decât să completeze cercetările anterioare și să constituie poate un punct de vedere și de pornire pentru o cercetare ulterioară.*

Key words: *environmental protection, steel work, marble quarry.*

Cuvinte cheie: *protecția mediului, oțelărie electrică, cariera de marmură.*

INTRODUCTION

Bistra Couloir is situated in the north-east part of the Caraş-Severin County; it is orientated from the east to the west on the Bistra River flowing direction, having 20 km in length and 10 km in width. It is continued on their north part with the Transylvanian Iron Gates, that made the binding with the Haţeg Depression and in the east part it is connected with Caransebeş Depression.

The environmental protection from the human activity perspective is a major problem of the present society, being the consequence of the ecological equilibrium breaking between humans and nature.

In the studied area, the great problems of the environmental protection are the ferrous metallurgy and the dumps from Oţelu Roşu, but also the excavation works of marble quarries from Ruschiţa area [5].

Ruşchiţa excavation contributes to the area pollution through the dislocation of an enormous mass of rocks, with a high content of heavy metals. After the mineral wash the tail water are sloped in the Rusca River, an affluent of Bistra [3]. The heavy metals are dangerous due to their toxicity and stability. Also, these are not biodegradable, therefore the effect of pollution with heavy metals are feeling a good long time [1].

MATERIALS AND METHOD

For this paper, we analyse a lot of studies from Caraş – Severin Environmental Protection Agency regarding the environmental factors state. Also we analyse the Govern Orders that establish the maximum values of the pollutants.

The experimental dates are compared with the maximum allowable values from O 462/1993 and the emitted concentrations are compared with the admmissive maximum concentrations (CMA) by the STAS 12574/1987.

In this context, we established the level of the pollution in these area, and their effects upon the human health.

RESULTS AND DISCUSSION

The major pollutant effect in the studied area is represented by the steel work from Oţelu Roşu, a ferrous metallurgy society that functioned until 30.07.2007, after that was close up, and than the activity restart in 2004 august [3].

As we specified, from the steel work activity, without the principal and secondary products that are improved, results a lot of wastes, wastes that are evacuated in the environment, how we can see in figure 1 [5].

The pollutant effects from this steel work are felled at all the environmental factors: air, water and soils.



Figure1. The dust emanation

The air pollution is due to the uncontrolled emissions in the air, fact that are illustrated in the figure 1.

Through the production process a high quantity of material in dust form, oxides, gases, were discharged that were carried out for various distances by the air currents movement and laid down on the herbaceous vegetation and forest litiera [2].

From the analyses utilised in the Raport of the Environmental State by Caraş-Severin Environmental Agency and according with the standard that are based on the maximum admissible value of the major pollutants, we observe that the urban areas from the researches zone (Oțelu Roșu and Caransebeș) are medium polluted. In these area, the maximum admissible values of one pollutants are over run (e.g. the value of the suspension dusts is 0.132 mg/m^3 , value that was recorder in 2001, and the maximum admissible value is 0.075 mg/m^3). The excess tends on this parameters suggest that the industrial activity is the major causes of the pollution.

So, from the steel work activity the more toxic effect have the suspension dusts and the sedimentable dusts, in their composition the major compound being 60 % of iron oxides, the other part being formatted by calcium, manganese, sulphur and nitric oxides, that generate the acid rains [2].

The frequently pollution of the atmosphere by the dusts from the steel work activity are feeled by reason of depuration gases filters absence.

The technologies that are applied in the Oțelu Roșu steel work activities are based on the noxes capture system from the area where over run frequently are recorded. The emissions in the atmosphere are by the air shafts.

There are not used decontamination systems of the gases fluxes. The emissions are in the air, based by the pollutant dispersion, through the atmospheric dynamics. The dates show that the pollution level are high and complex, containg gases, aerosols and other substances unidentified [4]. All the pollutant substances have a synergetic effect and have tends to concentrate and aggregate in all the environment compounds.

The air pollution effects upon the human health are based on:

- The pollution with the combustion gases (NO_x , SO_x , CO , CO_2), that can produce an irritant action, the appearance of some acute respiratory affection determinates;
- The sulphuric aide and sodium hydroxide inhalation that can a serious produce intoxication;
- The pollution with the dusts an acute respiratory affection generates.

The pollution that is generated by the steel work from Oțelu Roșu, without the air pollution effect, has an acidification effect upon the soils. In that way, the nutritive sources of the microorganisms are reduced. On the other hand, the air charging with these oxides an acid rains determinate. These acid rains also change the ration between the humic and fulvic acids and these acids, with the heavy metals, forms a series of chemical compounds that have a high degree of solubility [4].

Regarding to the water, like an environmental factor, we can appreciate that the heavy metals salts toxicity, in the diluted solutions, are made by the cations, the toxicity of the anions being lower.

The heavy metal salts hydrolise and affects the aquatic organisms, by the pH value decrease and the number of the species and individes are also reduced. The different toxicity of the cations is shown in next relation: $\text{Cr}^{6+} > \text{Cr}^{3+} > \text{Zn}^{2+} > \text{Fe}^{2+} > \text{Ni}^{+} > \text{K}^{+} > \text{Mg}^{2+} > \text{Na}^{+}$.

We specify that in the monitoring sections from Water Branch Banat, on the Bistra River, regarding to the heavy metals, the maximum admissible value of the cupper and chrome was over-passed. For cupper, in Voislova section, the average value that was recorded in 2005 was $11.92 \text{ } \mu\text{g/l}$ and in 2006 was $19.00 \text{ } \mu\text{g/l}$. For chrome, in the total form, the average value

was 3.00 µg/l in the year 2005, in the same control section. We specify that these control section, Voislova, are in the upstream of the steel work of Oțelu Roșu, so the sources of impurification are not the activity of these steel works [5].

The direct toxicity of the heavy metals are owed to the fact that they are unbiodegradable and the half time are so longer, so the pollutant effect persist many time.

Regarding to the soils pollution effect, these are made by the suspension substances that are emanate from the steel works and that are leaved on the soils surface. The more polluted areas are around the primary sources of emissions.

Also, the slag and the rubble, resulted by the industrial activity, are deposited on the right hand of the Bistra River, on the dump.

During the maneuvers of transport and storing, high quantity of dust and slag are loosed from vehicles that are unsealed and uncovered. In the windy periods the stored materials are transported to the neighborly surface from the agricultural found. Also, these materials are carried out from the dump surface where permanent more and more deposits take place.

So, these deposits are an important source of air pollution, but also to surface and subsurface waster pollution and to soils pollution.

We want to specify that an environmental monitoring system does not exist, all the effects are visually.

The uncontrolled deposition of the wastes, agriculture black out determinate. The surfaces that are occupied with these types of waste are about 12 ha. But serious problems appear also on the soils around this place, because of the material dispersion by the wind [3].

Other sources of pollution in the studied are represented by the Ruschița excavation. These exploitation from Ruschița area contributes to the area pollution through the dislocation of an enormous mass of rocks, with a high content of heavy metals.

Although the Bistra area are acknowledged like an area with high agricultural potential, we considering that to these area are not conferred an adequate significance in the environmental protection context, considering also the fact that the area have a major geogene apport of heavy metals grows from the rocks alteration from Poiana Rusca Montain.

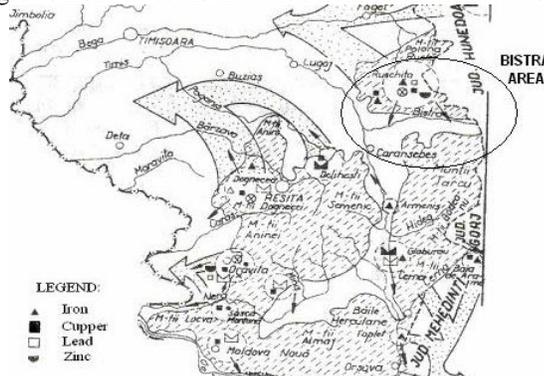


Figure 2. The Bistra area localisation in Banat and the Ruschița area localisation in Bistra area

Although the mining activities are stopped, the Ruschița mine represents an area with a high ecological risk, because of the grove risk of crashing. The major impact is generated by the gushing water that has a high content of heavy metals and cyanides.

The mud-setting ponds from the preepuration process of the excavation works have a high content of sterile, which are trained by the air streams and are deposit on the different distances according with the proportion and wind rate. These dusts have more heavy metals,

like Pb, Zn, Mb, Mn, Fe, Cd, but also Al₂O₃, CaO, SiO₂, S.

CONCLUSIONS

From the steel work activity, beside the main and secondary exploited products (steel and semi finished), result a series of wastes whose evacuation it's made in environment (SO₂, dusts, vapors of H₂SO₄)

We observed that all the environmental factors are exposing at the nocive effect of the improper activities of the steel work from Oțelu Roșu, in different proportions.

To the air, the impact is generated by the sulphure dioxide, nitric oxide and dust. To the water, the stress factor is represented by the residual waters. On the soil level, the degradation is materialized by the dump slag. Schematic exposures of the effects that are generated by the steel work activity are presented in figure 3.

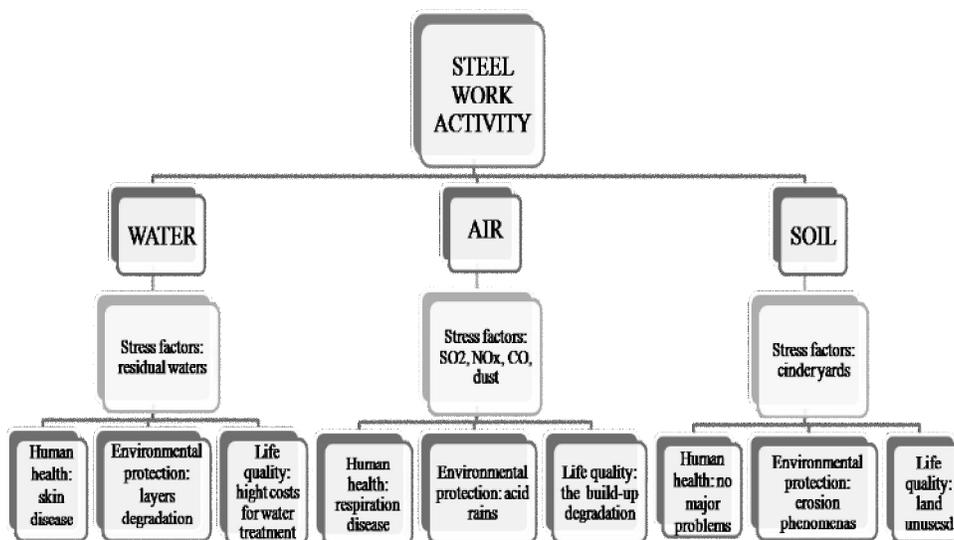


Figure 3. The impact of steel work activity upon the environment

Within a radius of 1-1.5 km beside the emissions sources of the pollutants any bird's nest isn't. The present in the atmosphere of the pollutants are not supported by the fauna, that's determinate the territory abandon and the biological disorder produces.

The pollution by the pollutants that have an irritant action, the appearance of some acute respiratory affection determinates (*bronhic hiperreactivity*).

The location of the steel works inside the Oțelu Roșu city, near the inhabited areas, a permanent danger to the human health is.

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