

CYANIDE, MINING AND ENVIRONMENT

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Abstract

Cyanides in the mining sector has reached, lately again, the topic of the media. The vast majority of the Romanian public ever likes the idea that the use of cyanides in mining sector must be prohibited. This report presents information and technical references duly substantiated in this topic. Why cyanide is considered the most dangerous product for the environment in Romania? Why is the cyanide dangerous in mining sector? Why is the cyanide dangerous only in mining sector? Why are we stigmatizing, in general, mining activity? Which is the international practice in the area?

Key words: gold extraction, cyanidation, cyanide effects, pollution with metals, objective information

1. Introduction

After the year 2000, "cyanide in mining" has become a favourite topic for various press campaigns and an existential subject for certain non-governmental organizations NGOs. As we know, in Romania there is no longer a lot of independent press, however, it cannot be just that the reason for all campaigns conducted on this topic. Almost in unison, everyone is informed about, is against mining and is, in particular, against the use of cyanide in mining. From where does come this feature so well defined and unusually uniform in Romanian society? It has been taught at school? No. Romanian school treats balanced the subject. The mining industry is the basis of the industry and cyanide is a chemical toxic product like many other similar products.

Is it showed us by the experience of cyanide use in mining sector? No. Cyanide is used for 100 years in mining (especially in Baia Mare) in less restrictive conditions than at present and it is not known to be caused the death of someone, it did not generate occupational diseases, it did not affect the health of a socio professional category or an area geographically defined in the immediate vicinity of the plants where it has been used.

The reason for which the subject "Cyanide" become the favourite subject for the campaign, has been the lack of information and the interest to manipulate the good faith public. The action of manipulation was manifested from the press as the subject is always something warm and good capitals, a bit of scandal and the hysteria created will sell well on the first page and from the part of those concerned in the field (players on stock exchange, concurrence) which lustful the idea of obtaining large profits, even to finance certain NGOs for directed militant activity. In a total

melee, all mining industry is associated with cyanide, all tailing ponds are with cyanide, all over flows cyanide. The subject "down mining activity" "down cyanide" is trendy.

The good faith public has felt into the trap of manipulators. The subject "cyanide", "cyanide in mining" is circulated actually by a wide unsuspecting audience. Everyone knows, exactly as in football. Everyone is agreed that they must be against, relying on a single word, which give the shivers: "cyanide"... Specialists in the field should not be asked because they all "are sold!" There is no money from a realistic presentation of the truth, from boring discussions in technical commissions or listening to a specialist...

Unfortunately, authority in Romania has not tried and does not endeavour to restore the debates on this subject at a technical level to settle things in their seats, to listen to the specialists in the field, to study what are the advantages/disadvantages of mining activity, which are Romanian economic interests and then to objectively inform the population and work out the activity from existing blockage.

2. Which are the effects of cyanide on human being and the environment?

Cyanide is a chemical industrial substance very used, very valuable and definitely a poison that acts quickly and that in the absence of the first-aid can kill you in a few minutes. Cyanide is removed from the body through the liver, does not cause cancer and shall not take teratogenic or mutagenic effect (6), (2), (9). People who suffer nonfatal poisoning returned completely quickly and experience has shown that if people are not exposed to concentrations far beyond the limits for long periods of time, there were no long-term effects. Cyanide does not accumulate or depose, and therefore chronic exposure to sublethal concentrations does not cause the death of the

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individual. Although it is a highly toxic substance which must be used with great care, it is seldom the cause of accidental death.

Cyanide has a low persistence in the environment and is not acquired or stored by any studied mammal. It has not been reported any biological development of cyanide concentrations in the food chain. Once released into the environment, cyanide is degraded by: complexation, precipitation, adsorption, oxidation, chemical reaction with sulphur, volatilization, biodegradation, hydrolysis (1). In conclusion, the cyanide is dangerous to the environment especially in the case of uncontrolled discharges and acute intoxications.

Cyanide is not dangerous for the environment on medium and long term.

3. World practice of using cyanide in mining and industry

Cyanide is used in present in the whole world, in hundreds of industrial operations and in the manufacture of the consumer products. It is a unique compound which, owing to the characteristics of its outstanding is used in the chemical, food and metallurgic industry. The technology based on cyanide is used in conditions of safety in approximately 400 gold mines from all over the world to some of the most modern gold mines in Europe, including in Finland, Sweden and Spain.

In mining sector and, in particular, in gold mining, cyanide is used since the nineteenth century as a dissolution agent of gold and silver, but is used, too, to sulphuric mineral floatation as lubricant and depressant. Thus, we can say that cyanides have been generalized for almost all mining activities which worked ores with Au, Ag, Cu, Zn, Pb, Mo etc content. For example, in Maramures cyanide has been used in each processing plant in operation.

Cyanidation of gold ores is a safe extraction technology, less harmful to the environment, allowed by the European Union legislation (Directive of European Parliament and Council 2006/21/EC applied in Romania through HG 856/2008) which has created a strict laws structure in order to ensure the use of cyanide in complete safety. The EU considers the process with cyanide the best technology currently available and has established the most stringent standards in the world for cyanide concentrations in tailing ponds (8).

The European commissioner for environment, Dr. Janez Potočnik, stated in the 23rd of June 2010, in a statement made on behalf of the European Community Commission (5): "Following a further analysis of the problem, the Commission considers that the prohibition of the total amount of cyanide in mining activities is not justified from

environmental and health point of view. The existing legislation, in particular with regard to the extractive industries waste management includes requirements precise and stringent, which ensures an adequate level of safety for mining waste management facilities" hereafter also said: "In the absence of better alternative technologies with a lower environmental impact, a general prohibition of cyanide use would necessitate the closure of existing mines which operate under the safety conditions. This would be detrimental to the employment places, without an added-value for health and environment"

4. The consequences of mining activities on the health of the population and environment in the mining area of Baia Mare and Maramures

In Maramures County there were 7 processing plants that used cyanide, located in Baia Borsa, Baiut, Căvnic, Baia Sprie, Central Flotation Baia Mare, Sasar and Transgold plant Baia Mare. The two factories in Baia Mare (Sasar and Transgold) had as specific object the gold extraction and have used the highest cyanide quantity.

With all that the cyanides have been generalized to the processing plants in Maramures county, there are not known cases of cyanide intoxication, have not been registered diseases caused by this substance, are not recorded public health suffering because of occupational diseases (4). Specific chronic diseases to mining and metallurgy activities were silicosis and lead poisoning (intoxication with lead) which have no connection with the cyanide.

The environment has been seriously affected by mining activity. They have remained a series of tailing ponds (17) and hundreds of mining waste deposits, groped around mining localities. Even if it has used the cyanide for ore processing and tailing ponds resulted, this substance breaks down quickly in the environment and does not accumulate. The major problem in these tailing ponds is acid drainage, silica dust generation, solubilisation and dispersal of heavy metals (Pb, Cu, Zn, Fe, Cd, As, Mn, etc.) (4) and not cyanide. By the existence of these tailing ponds, pollution is still present in mining localities, even if the mining industry is closed since more than 10 years. The meteoric waters penetrate into the tailing pond body, react with iron sulphide (pyrite) and generate sulphuric acid, which finally mobilizes the heavy metals ions found there. National Administration "Romanian Waters" monitors the quality of discharged waters from these ponds and the indicator cyanide content is far below the accepted limits. For many of tailing ponds the cyanide indicator is not followed because cyanide is absent.

5. Why it is cyanide considered more dangerous in mining than in other industries?

In Romania mining activity is associated with the existence of the "tailing ponds with cyanide". Indeed, at a given moment, there were five ponds with significant concentrations of cyanide in Romania: Meda tailing pond in the town of Baia Mare (was disbanded by processing, gold recovery and wastes deposited in accordance!), the Sasar tailing pond in Recea, Bozanta tailing pond, Aurul tailing pond in Recea, Baia de Aries tailing pond. The other ponds, even if cyanide has been used in the processing of the material, had low concentrations and, as such, did not represent a danger on the environment from this point of view.

The common feature of these ponds (in particular in the case gold-silver and sulphuric ores), is that they are seriously pollute the environment (water, air, soil) with silica dust, with heavy metals, with acid drainage (4) and occupy large land areas, surfaces definitively removed from the agricultural or forestry use. These ponds will require monitoring and tracking on undetermined periods of time.

The tailing ponds with cyanides submit more important problems to the environment than a tailing pond where cyanide is present in the low concentrations. To these tailing ponds, there is the possibility of poisoning wild animals (in particular birds), which can consume water from the pond, there are releases of hydrocyanic acid in atmosphere, there is the risk of an accident with large amounts of cyanide in the environment. The risk associated with such a pond is significantly higher than in a pond where the concentration of cyanide is reduced.

In order to eliminate these environmental problems specific to the activity of gold and silver extraction from ores and bring these tailing ponds at a risk level similar to a cyanide-free tailing pond, the Romanian government has imposed a series of regulations: through HG 856/2008 Article 49 paragraph (3) transposing into national legislation the European Parliament and Council Directive 2006/21/EC, prohibit the discharge of solution with cyanide in tailing pond at concentrations in excess of 10 ppm (3).

The permitted concentration is one less dangerous, similar concentrations of cyanide are allowed even in foodstuffs intended for human consumption. Practically, through this government decision, possible negative effects of cyanide on the environment have been reduced to the minimum and the risk of using cyanide for gold ores processing becomes similar to the risk of using it in other industries (plastics, drugs, foodstuff etc). The consequences of this decision for gold ores

processing plants is that the cyanide destruction is mandatory in the rooms of processing before it is discharged to tailing ponds. Thus, in mining sector, as in other industries, from now on it will be used cyanide only in enclosed chambers, properly secured and the risks associated with tailing ponds from cyanide point of view were reduced, becoming insignificant. With the compliance of these conditions, cyanides in mining sector are not more dangerous than its use on other industries.

If we still look at the consequences of HG 856/2008 Article 49 paragraph (3), we realize that all the fuss concerning the prohibition of cyanide in mining sector has no longer support, because the specific risk associated with this item no longer exists. There is no difference anymore between a company which uses cyanide in foam manufacture, for example, or its use in mining activity. Both industries will use only cyanide in enclosed and secured chambers and will not discharge uncontrolled waste in the environment. If it insists on below for cyanide prohibition in mining, meant that the industries are treated differently in the disfavour of some of them, by interest, habit or ignorance. Neither the slogan "We want mining, but without cyanide" used by populist politicians which speculate the population positive feeling effects for mining (where the employees have enjoyed safety and predictability) obviously, no longer has support, as the Regulations referred to above, the risks associated with the gold extraction from gold ore with cyanide has become similar to the risk associated with the preparation of any other type of sulphuric ore (Cu, Pb, Zn, Mo, etc).

Information is conveyed that countries such as Germany, Czech Republic or Hungary have prohibited the use of cyanide in mining. We can say, without mistake that for those countries mining industry does not submit interest. None of these countries has any significant naturally reserves and activity in this area so that they did not seek solutions or a positive compromise, similar to that between EU and Romania, governed by the HG 856/2008. Let us not forget that in Germany and Czech Republic operates some of the largest cyanide producers in the world! Thus, the risk associated with such chemical substances is much higher than a usual mining activity, because they produce and transport impressive amounts of cyanide from CyPlus factory from Hanau, Germany (the largest world producer) and Draslovka from Kolin, Czech Republic. Both factories are built in localities, not in desert areas and the producers are not demonized and denigrate for the job. They are respected as companies with activity in chemical industry, they respect specific regulations of the country, they pay taxes and are serious employers.

6. Why mining is not desired in Romania ?

In addition to the fear of the miners installed in 1990, followed by their stigmatization, in the last years in Romania it was born the frustration that, by private companies in mining, the foreign capital wants to take advantage, in fact, of the subsoil richness, leaving behind polluted land and wastes. Thus, the idea was born that better would be without mining, than to be deprived of subsoil richness and remain with the pollution. Actually the frustration is manifested by the slogan "We do not want cyanide!"

It is clear that, for Romania, a responsible mining activity should be cost-effective and with minimal impact on the environment. This is possible by a governmental correct management of the problems in such a way that the exploitation and capitalization of the resources to be on the benefit of Romania. We know that the exploitation and capitalization of mineral resources has been the engine of human society and companies with mining activities may give to national economy exactly the impulse which it needs to be put back on track.

The major environmental problem of a new mining project (for example gold ore at Roșia Montană or any other type of ore), is not the technology with which are extracted minerals and useful metals, the use or not of the cyanide, but assuming the existence during operation and after, of large cavities following operation and huge waste deposits which will, surely, occupy tens or hundreds hectares, which will pollute post-operation and which should be monitored an undetermined period of time.

7. Conclusions

Mining activity is the basis of the industry. The development of certain regions in Europe depends on the development of mining industry, including that of gold ores exploitation. Sweden, Finland, Spain, Greece and other EU Member States have recognized this fact and allow the use of modern treatment process of gold ores with cyanide. A responsible mining may initiate in Romania a revival of the industry in general and multiple materials benefits, employment places, profit, taxes etc. Why are we campaigning for the prohibition of cyanide in mining and we are not campaigning for the prohibition of its use in: food industry, pharmaceutical industry, plastic material industry, furniture industry etc.

Government and all of us must militate for a responsible mining activity. The concerned ministries and the government should remove, with technical and economic arguments, maneuvers by which the population is misinformed and hysterical. Because of cyanide it has been died at "Colectiv" club in Bucharest (which is proven by the official survey) and not in mining exploitations. The government should analyze the problem, from a technical point of view, distantly, with specialists from the ministry and from the field, to correctly and objective inform population, taking into account legitimate Romanian economic interests.

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