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Banning Cyanide

Banning Cyanide from Mining in the European Union

Legal Analysis

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Introduction

One of the branches of industry most criticized for its negative environmental impacts is the extractive industry. Mining is a major contributor to environmental damages. Some forms of mining, particularly those that use toxic materials are especially in the focus of public attention.

Using cyanide in mining is one of the most controversial methods: in January 2000, an Australian gold mining company in Romania called Aurul SA released cyanide into the Szamos – Tisza – Danube River system, causing one of Europe's largest ecological disasters. Toxic materials killed many organisms, which damaged ecological system, food chain and essential human use of the river. Similar disasters are a threat from the Rosia Montana mine once it opens in the future. To the delight of the mining industry, the European Commission rejected a proposed ban on the use of cyanide in 2010.[1]

Catastrophes like the above mentioned occurs from time to time. Despite these risks, the mining industry and governments to date do not have sufficient research data to demonstrate, that the usage of cyanide is the best available technology in mining.[2] Based on basic environmental law principles, like the precautionary principle,[3] the only reasonable way forward is to take the precautionary approach, which places the burden of proof to justify cyanide use in mining on those operating these mining facilities.

Internationally, several counties, like the Czech Republic, Greece, Turkey, Germany, Hungary, Costa Rica, Argentina, Ecuador, and some states of the United States (e.g. Montana) have banned cyanide leach technology in gold and silver mining.[4] In Korea, the cyanide leaching operations have stopped because of high labour costs and environmental issues.[5]

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[1] http://www.mining-journal.com/production-and-markets/ec-rejects-proposed-cyanide-ban.

[2] "Best available techniques" means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole. Article 2, point 12. Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control.

[3] The precautionary principle is detailed in Article 191 of the Treaty on the Functioning of the European Union. It aims at ensuring a higher level of environmental protection through preventative decision-taking in the case of risk.
From the Rio Conference, or "Earth Summit" in 1992, principle 15 of the Rio Declaration notes: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

[4] http://www.rainforestinfo.org.au/gold/Bans.html;
http://meic.org/mining/hardrock-mining/cyanide_mining/ban-on-cyanide-mining/i-137
http://www.serconline.org/mining/talking.html

The objective of J&E is to contribute to the general ban on use of cyanides in mining technologies, first and foremost in the extraction of precious metals at the European Union level, to prevent further accidents and environmental catastrophes.

I. Antecedents – why a ban on the use of cyanides in mining technologies is needed

I.1. About cyanides

Cyanide may be described as follows: "Any chemical compound that contains the cyano group (CN), which consists of a carbon atom triplebonded to a nitrogen atom. Inorganic cyanides are generally salts of the anion CN−. There are many cyanide compounds - some are gases and others are solids or liquids. Those that can release the cyanide ion CN− are highly toxic."[6]

Cyanide is fatal to humans and the environment. Cyanide poisoning can occur through inhalation, ingestion, and skin or eye contact. One teaspoon of a 2% solution can kill a person. In general, fish and other aquatic life are killed by cyanide concentrations in the microgram per liter (part per billion) range, whereas bird and mammal deaths result from cyanide concentrations in the milligram per liter (part per million) range.[7] Cyanide is highly poisonous both in the form of gas (hydrogen cyanide) and in the form of salt (sodium cyanide).

I.2. The use of cyanide in mining

Cyanide is mainly used for the mining of precious metals, like gold and silver. It helps dissolve these metals and their ores. In the cyanide process, finely ground high-grade ore is mixed with the cyanide; low-grade ores are stacked into piles (heaps) and sprayed with a cyanide solution.

In gold mining, a dilute cyanide solution is sprayed on crushed ore that is placed in piles (heaps), or mixed with ore in enclosed vats. The cyanide attaches to minute particles of gold to form a water soluble, gold-cyanide compound from which the gold can be recovered. Cyanide is used in a similar manner to extract silver from ores. In the extraction of non-precious metals, such as copper, nickel, cobalt, and molybdenum, cyanide is used in the milling and concentration processes to separate the desirable metals from the wastes. Consequently, cyanide and related compounds often are contained in discarded mine wastes.[8]

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http://www.foeeurope.org/press/21.02.02_Cyanide.htm

[5] Lee, J., H.T. Song, J.-M. Yoo. Present status of the recycling of waste electrical and electronic equipment in Korea. In: Resources Conservation and Recycling, Vol. 50, No 4, 2007, pp. 380-397. In: Sustainable Innovation and Technology Transfer Industrial Sector Studies: Recycling – From E-Waste to Resources. United Nations Environment Programme & United Nations University, 2009, pp. 32.

[6] Guidebook for Evaluating Mining Project EIAs. Environmental Law Alliance Worldwide (ELAW), Eugene OR 97403, 2010. p96.

[7] http://www.serconline.org/mining/fact.html.

[8] http://www.serconline.org/mining/fact.html.

Beneficiation includes different kind of physical and/or chemical separation techniques. Wastes from these processes include waste rock dumps, tailings, heap leach materials (for gold and silver operations), and dump leach materials (for copper leach operations). Leaching involving the use of cyanide is a kind of beneficiation process, usually used with gold, silver, and copper ores, that merits separate attention because of the serious environmental and public safety impacts. With leaching, finely ground ore is deposited in a large pile (called a 'leach pile') on top of an impermeable pad, and a solution containing cyanide is sprayed on top of the pile. The cyanide solution dissolves the desired metals and the 'pregnant' solution containing the metal is collected from the bottom of the pile using a system of pipes.

Even high-grade mineral ores consist almost entirely of non-metallic materials and often contain undesired toxic metals (such as cadmium, lead, and arsenic). The beneficiation process generates high-volume waste called 'tailings,' the residue of an ore that remains after it has been milled and the desired metals have been extracted (e.g., with cyanide (gold) or sulfuric acid (copper)).If a mining project involves the extraction of a few hundred million metric tons of mineral ore, then
the mine project will generate a similar quantity of tailings.[9]

The use of cyanide compounds by the mining industry, along with limitations in the analysis and monitoring of these compounds, raises serious concerns regarding environmental protection and public safety at mine sites using cyanide processing.

I.3. Environmental effects of cyanide use

Environmental hazards of cyanide usage and conflicts in relation to mining originate from different sources, like:

- water contamination;
- air contamination;
- soil contamination;
- impacts on the wildlife;
- human rights violations.

Water issues, water quality and the availability of water resources are undoubtedly most threatened from gold mining operations. The accidental release of material containing high concentrations of cyanide results in the death and/or contamination of most of the aquatic life of affected rivers, along with serious health effects on human beings and animals, and leaves water unsuitable to drink. Even though a majority of mining operators agree that cyanide degrades and disappears in water and, as an organic compound, through the effect of sunlight, it also easily combines with living organisms, and thus accumulates in the environment along with heavy metals such as those coming from soil leaching after deforestation.[10]

[9] Guidebook for Evaluating Mining Project EIAs. Environmental Law Alliance Worldwide (ELAW), Eugene OR 97403, 2010. p6.
[10] Environment Alert Bulletin 8: Gold Prices On The Rise, Environment Under Pressure. United Nations Environment Programme, DEWA / GRID-Europe, 2006, p3.

Airborne emissions occur during each stage of mining. Mining operations mobilize large amounts of material and small size particles are easily dispersed by the wind. Mines are responsible for emitting large amounts of dust into their surroundings, and this sector remains one of the most demanding in terms of energy needs[11] and thus has a high impact on the global environment.[12]

Soils are contaminated by heavy metals and by substances containing cyanide or mercury, either directly on the mining facility site, or via contaminated waters and air pollution coming from the mined ground. Soil erosion caused by soil washing processes, and aggravated by deforestation, can result in the release of noxious substances from the earth, which in turn contaminate downstream rivers and lakes.[13] One review of the environmental impacts of mining stated the following:

"*Mining operations routinely modify the surrounding landscape by exposing previously undisturbed earthen materials. Erosion of exposed soils, extracted mineral ores, tailings, and fine material in waste rock piles can result in substantial sediment loading to surface waters and drainage ways. In addition, spills and leaks of hazardous materials and the deposition of contaminated windblown dust can lead to soil contamination*."[14]

Wildlife is affected by mining through the removal of the vegetation and topsoil, by the displacement of fauna, by the release of pollutants and by the generation of noise.

Finally, gold mines often cause human rights violations, for example by forcing evictions and destroying the land and water that affected communities highly depend on. One report on mining from the International Institute for Environment and Development described the affect on communities as follows:

"*The displacement of settled communities is a significant cause of resentment and conflict associated with large-scale mineral development. Entire communities may be uprooted and forced to shift elsewhere, often into purpose-built settlements not necessarily of their own choosing. Besides losing their homes, communities may also lose their land, and thus their livelihoods."*[15]

Besides the threat originating from the "normal" operation, numerous accidents happen each year all around the world. Between 1975 and 2000 major accidents of gold mines derived from transport (14%), pipe failures (14%) and tailings dam mishaps (72%), affecting the life of thousands of people, destroying the affected flora and fauna and causing billions

[11] With extracted ore generally having a very low gold grade (the extraction of gold required for a single ring generates 18 tons of waste, significant amounts of energy are needed for processing the raw material. (See: "Mining, Minerals and Sustainable Development Project (MMSD, 2002): Breaking New Ground". http://www.wbcsd.org/DocRoot/ev8jEJvTiMYd4mJhGGHQ/finalmmsdreport.pdf).

[12] Environment Alert Bulletin 8: Gold Prices On The Rise, Environment Under Pressure. United Nations Environment Programme, DEWA / GRID-Europe, 2006, p3.

[13] Ibid.

[14] MINEO Consortium (2000) "Review of potential environmental and social impact of mining" http://www2.brgm.fr/mineo/UserNeed/IMPACTS.pdf.

[15] International Institute for Environment and Development (2002) "Breaking New Ground: Mining, Minerals and Sustainable Development: Chapter 9: Local Communities and Mines. Breaking New Grounds." http://www.iied.org/pubs/pdfs/G00901.pdf.

of Euros of damages.[1617] After such accidents, it takes years for the ecosystem to recover, and taxpayers are often responsible for the cleanup bill when the liable company files for bankruptcy.

I.4. Alternatives to cyanide in mining

Scientific data[18]shows that there are feasible alternatives to cyanide based gold and silver extraction. The U.S. Environmental Protection Agency lists several alternatives to cyanide,[19] including stach and sulfur for copper and zinc mining, and the Haber Gold Process (HGP) or the "YES-process" for gold and silver extraction.

For gold and silver extraction, the HGP has been tested by mining engineering groups, and results are promising. HGP has undergone preliminary and follow-up testing by mining engineering groups, which have concluded that HGP results in more gold recovery over a shorter period of time than the cyanide-leaching processes, with a cost comparable to, or less than, cyanide-leaching. In addition, HGP passed the California Department of Health Services Acute Aquatic Toxicity Bioassay test, which tests the toxicity of a substance on wildlife. One limitation of this data is that these claims are made by the Haber Inc. website and, although independent testing of HGP has been done, there are no public documents to verify these claims.

Another mentioned alternative is the cyanide-free biocatalyzed leaching process from YES Technologies, which is 200 times less toxic than cyanide. This technique could also save a lot of money: preliminary test results indicate that chemical reagent costs associated with this process could be 80% lower than cyanide.[20]

Nevertheless, regardless of the efforts to de-poison mining, recycling is still the best way to reduce mining waste. For every ounce of gold mined, the waste is measured in tons. Assorted tons are also generated by the mining of other metals and even non-metal substances. This waste has a significant effect on the environment and thus must be reduced.

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[16] Environment Alert Bulletin 8: Gold Prices On The Rise, Environment Under Pressure. United Nations Environment Programme, DEWA / GRID-Europe, 2006, p4.

[17] There is a chronological collection of accidents on the following page: http://www.rainforestinfo.org.au/gold/spills.htm.

[18] Environment Alert Bulletin 8: Gold Prices On The Rise, Environment Under Pressure. United Nations Environment Programme, DEWA / GRID-Europe, 2006.
http://www.serconline.org/mining/fact.html.
Guidebook for Evaluating Mining Project EIAs. Environmental Law Alliance Worldwide (ELAW), Eugene OR 97403, 2010.
Australian Government, Department of Resources, Energy and Tourism: Cyanide Management – Leading Practice Sustainable Development Program for the Mining Industry. May, 2008.

[19] United States Environmental Protection Agency: "Office of Compliance Sector Notebook Project: Profile of the Metal Mining Industry." 1995.

[20] Jesús Lara Pedraja, Diana Puzinaite, Jerneja Milost, Gerald Flöck, Vicsai Nóra-Csilla, Goncalo Silva, Laura Gourlay: Environmental issues in the border area between Hungary and Romania. Education and Culture DG Lifelong Learning Programme, final report 2009.

II. Cyanide and the European Union

II.1. The precautionary principle and the resolution of the European Parliament in 2010

The precautionary principle is a basic principle of the EU's environmental law. It materializes the conception that, contrary to the so called "end of pipe measures,"[21] environmental protection shall be based on a wise foresight. Pollution and degradation of the environment shall be prevented, rather than handled subsequently. And if there is scientific uncertainty regarding the harmful effects of an action, there must be positive proof to demonstrate safety.

Article 174 EC Treaty provides inter alia:[22]

Community policy on the environment shall contribute to pursuit of the following objectives:

- preserving, protecting and improving the quality of the environment,
- protecting human health,
- prudent and rational utilization of natural resources,
- promoting measures at international level to deal with regional or worldwide environmental problems.

Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay.

In preparing its policy on the environment, the Community shall take account of:

- available scientific and technical data,
- environmental conditions in the various regions of the Community,
- the potential benefits and costs of action or lack of action,
- the economic and social development of the Community as a whole and the balanced development of its regions.

According to this principle, member states are justified in adopting protective regulatory measures in situations of scientific uncertainty. Based on the precautionary principle, large scale mining activities using cyanide cannot be authorized when other feasible technologies exist that serve the same ends and the mining industry cannot demonstrate that cyanide the best available technology.

On this basis, in 2010 the European Parliament adopted a resolution[23]on the general ban on the use of cyanide in mining technologies in the European Union, and called on the

[21] Those measures or technologies are usually called "end of pipe" which are normally implemented as a last stage of a process or after the pollution or degradation have occurred, rather than making changes in the polluting technology itself at the beginning of the process.

[22] See Case C-157/96 National Farmers' Union and Others [1998] ECR I 2211, paragraph 64, and Joined Cases C-14/06 and C-295/06 Parliament and Denmark v Commission [2008] ECR [I 1649] of the Court of the European Union.

Commission to propose a complete ban on the use of cyanide mining technologies in the European Union before the end of 2011. The resolution makes numerous arguments justifying a general ban on the use of cyanide in mining. The resolution also highlights the precautionary principle as set out in the Rio Declaration on Environment and Development and in the Convention on Biological Diversity adopted in Rio de Janeiro in June 1992. Unfortunately, the Commission rejected a ban of cyanide in mining.

II.2. Other legal developments applicable to cyanide in the European Union

Other EU actions recognize the perils of cyanide-based mining techniques. For example, Directive 2003/105/EC of the European Parliament and of the Council of 16 December 2003 amending Council Directive 96/82/EC (Seveso II) on the control of major-accident hazards involving dangerous substances states that "[…] certain storage and processing activities in mining […] have potential to produce very serious consequences".

Furthermore, the use of cyanide in mining operations may violate the Water Framework Directive. Cyanide is a highly toxic chemical used in the gold-mining industry, one which qualifies as a main pollutant under Annex VIII to the Water Framework Directive[24] and which can have a catastrophic and irreversible impact on human health, the environment, and biodiversity. Under the Water Framework Directive, Member States are obliged to achieve and preserve the 'good status' of water resources and to prevent the pollution of water resources with hazardous substances.

However, 'good status' of water resources could also depend on water quality in a river basin located in neighbouring that uses cyanide mining technologies. The cross-border effects of accidents involving cyanide, particularly with regard to contamination of large river basins and groundwater supplies, emphasises the need for an EU approach to the serious environmental threat posed by cyanide mining.

Over the past 25 years more than 30 major accidents involving cyanide spills have occurred worldwide, the worst taking place 10 years ago, when more than 100 000 cubic meters of cyanide- contaminated water was released from a gold-mine reservoir into the Tisza-Danube River system, causing the largest ecological disaster in the history of central Europe at that time. There is no real guarantee that such accidents will not occur again, especially taking into account the increasing incidence of extreme weather conditions, including heavy and frequent precipitation events, as projected by the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

Despite the above mentioned antecedents, several EU Member States are still considering new projects for large-scale open-cast gold mines using cyanide technologies in densely inhabited areas. These projects pose further potential threats to human health and the environment.

[23] European Parliament resolution of 5 May 2010 on a general ban on the use of cyanide mining technologies in the European Union (2011/C 81 E/13).

[24] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

On the other hand, there are already certain EU member countries that recognized the hazards of cyanide use in mining and the irreversible environmental consequences of mining accidents. Such countries include the Czech Republic,[25] Hungary[26] and Germany.[27]

Furthermore political support for banning cyanide use in mining comes from the Joint Position on sustainable mining issued at their 14th Meeting on 25 May 2007 in Prague (Czech Republic), in which the Environment Ministers of the Visegrad Group of Countries (Czech Republic, Hungary, Poland and Slovakia) expressed their concerns about the hazardous technologies used and planned for mining activities at various sites in the region. The joint position recognized considerable environmental hazards with potential transboundary consequences from hazardous mining technologies.

While there are detailed legal regulations in the European Union that aim to prevent pollution and deterioration of the environment, accidents regularly occur even if a given industrial activity is in complete conformity with the relevant regulations. Even if executive enforcement is strong, human negligence still often leads to accidents. Therefore, banning the use of cyanide in mining is the only surefire way to prevent a cyanide-contaminated environment.

Furthermore, implementing existing legislation on cyanide mining also depends on the executive powers of each Member State, which is sometimes insufficient. For example, the Mining Waste Directive has not been fully implemented in some member states. The prudential rules and proper financial guarantees are still lacking, and operating companies do not have long-term insurance that would cover the costs incurred in the event of a future accident or malfunction. This puts the environment at great risk from the cyanide used in mining.

Practical examples and national court decisions from EU countries, like Bulgaria, Greece or Romania, shows that EU legislation (i.e. EIA Directive 85/337/EEC as amended by 97/11/EC and 2003/35/EC, the Mining Waste Directive 2006/21/EC, Directive 96/82/EC on the control of major accident hazards involving dangerous substances, as amended by Directive 2003/105/EC) is poorly enforced in the member states, particularly when it comes to large-scale precious metal mining.[28]

It is no wonder, that strong public protests are being organised against ongoing cyanide mining projects across Europe, involving not only individual citizens, local communities and NGOs, but also state organisations, governments and politicians.

[25] The Czech Republic introduced a general ban on cyanide technologies, through the amendment of Mining Act No 44/1988 in 2000.
[26] Through the amendment of Hungarian Mining Act No 48/1993 in 2009, Hungary introduced a ban on cyanide-based mining technologies on the whole territory of Hungary.
[27] The German decree passed in 2002 prohibited cyanide-leach mining.
[28] Daniel Popov, Maria Kadoglou, Stephanie Roth: Can existing EU legislation prevent a future cyanide spill? http://www.ngo.ro/date/17ef04f0530a65b2f4e73d9a4b5d99ea/Can_existing_EU_legislation_prevent_a_future_cyanide_spill_2.pdf

II.2. Alternative and environmentally conscious solutions

The Europe-wide ban on cyanide based mining technologies necessarily requires that the European Union and the UN systems develop, promote and apply safer mining alternatives, particularly those that do not use cyanide.

As described above, feasible alternatives to cyanide-based precious metal mining do exist, but they are not favoured by the mining industry because cyanide is the "cheapest" option, providing that companies can offload the risks onto the environment and the public.[29]

In the same time international examples show that e-waste and gold recycling is increasing worldwide. There is detailed regulation in the European Union[30] on the re-use and recycling of waste electrical and electronic equipment (EEE); however, in its current form, the directive does not duly serve the protection of the environment for many reasons, including an ill-advised fixed quota on waste collection despite the sales of such products increasing yearly.

Better and safer recycling is needed, both in the European Union and worldwide. According to a report by the United Nations Environment Program (UNEP), around 40 million tons worth of electronics end up in the trash annually. The appropriate handling of electronic waste (e-waste) can both prevent serious environmental damage and also recover valuable materials, especially metals such as aluminum, copper, palladium and gold.[31] Recycling these materials properly would assist in preserving the earth's stocks of raw materials, and the yield would be many times larger than that of traditional mines.[32]

There are promising examples pointing ahead and showing a shift to environmentally conscious solutions. Here is an example of a few innovative and profitable operations:

"Swedish miner Boliden produces approximately 15 tons of gold every year, with approximately two thirds coming from the recycling of metal and the remainder coming from cyanide-based gold mining.[33] The Belgian company Umicore[34] has moved out of the mining business and now focuses solely on reclaiming and recycling metals. It employs 13,720 people and in 2009 had a turnover of € 6.9 billion. It extracts metals such as gold from toxic e-waste; from the mountains of unwanted televisions, computers and cell-phones that the EU public generates each year.

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[29] Daniel Popov, Maria Kadoglou and Stephanie Roth: Why cyanide-based precious metal mining should be banned in Europe.
http://www.ngo.ro/date/17ef04f0530a65b2f4e73d9a4b5d99ea/Briefing_Cyanide_EU_April2010.pdf

[30] EU legislation restricting the use of hazardous substances in electrical and electronic equipment (Directive 2002/95/EC) and promoting the collection and recycling of such equipment (Directive 2002/96/EC).

[31] Sustainable Innovation and Technology Transfer Industrial Sector Studies: Recycling – From E-Waste to Resources. United Nations Environment Programme & United Nations University, 2009.

[32] Axel Bojanowski: Recycling Precious Metals - Treasure Trove in World's E-Waste. Spiegel Online International 02/24/2010. http://www.spiegel.de/international/world/0,1518,679871,00.html

[33] http://investors.boliden.com/files/press/boliden/Boliden_Annual_report_2009_en.pdf

[34] http://www.umicore.com/en/

The company describes its work as ''aboveground mining.'' Umicore produces 30 tons of recycled gold each year, from a tiny fraction of the mobile phones that are discarded.[35] Just this one Belgian company is producing nearly twice as much gold per year as Gabriel Resources intends to produce by blowing apart the Transylvanian mountains of Rosia Montana."[36]

Europe can take one of two paths for mining. On the first path, the Commission will act on the need for safer and more environmental friendly mining technologies and will recognize the vast potential of a market for recycling e-waste. On the second path, the Commission will continue to take big risks by counting on current EU legislation to assess and mitigate the risks of mining technologies on the environment.

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[35] http://www.nytimes.com/2008/01/13/magazine/13Cellphone-t.html
[36] Daniel Popov, Maria Kadoglou and Stephanie Roth: Why cyanide-based precious metal mining should be banned in Europe.
http://www.ngo.ro/date/17ef04f0530a65b2f4e73d9a4b5d99ea/Briefing_Cyanide_EU_April2010.pdf