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**Safe operation of mining activities:
a follow-up to recent mining accidents**

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1. INTRODUCTION

The Danube pollution caused by a cyanide spill following a damburst of a tailings pond in Baia Mare/Romania and an accident that occurred in 1998 in Aznalcóllar/Spain where a damburst poisoned the environment of the Coto Doñana National Park have increased public awareness of the environmental and safety hazards of mining activities.

The Baia Mare accident showed that in the region surrounding the operation in question, the level of public knowledge and understanding of risks inherent in mining and related industrial processes was very low. It also showed that there was insufficient communication between the various levels of authorities and between the authorities, the Non Governmental Organisations (NGOs) and the public concerning emergency preparedness, emergency response and damage prevention options and possibilities.

The accidents have also raised the question of the effectiveness of Community policies intended to prevent such disasters and have highlighted the need for a review of environmental policy in this area.

The Commission has already laid down its policy towards promoting sustainable development in the EU non-energy extractive industry, including metal mining, in its Communication of 3 May 2000¹. The objective of this Communication, which should be seen in this context, is to give an account of the accidents and to inform the Council and the European Parliament in more detail about some of the actions announced in the previous Communication, focussing on accident prevention in relation to metal mining activities. The objective is also to provide an opportunity for the principal stakeholders concerned, notably industry, NGOs, Member States and other interested parties, to give their views on these actions. The Communication was established in close consultation with the Baia Mare Task Force (see section 3.1.). For factual elements concerning the Baia Mare accident, the paper relies to a large extent on the UNEP/OCHA report², published in March 2000 (see section 3.2.).

2. OVERVIEW OF MINING ACCIDENTS INVOLVING DAMBURSTS WORLDWIDE

In the past ten years, a number of mining accidents have happened world-wide. In 1992, a damburst at the Summitville Gold Mine in Colorado/USA caused the complete loss of aquatic life along a 25 km stretch of the Alamosa river. In 1993, masses of sludge and rubble buried a gold miner's settlement in Ecuador causing the death of 24 people. In 1994, a similar accident at the Harmony Gold Mine in South Africa killed 17 people and destroyed 80 houses. In 1995, 2,5 million cubic meters of cyanide solution from the Omai Gold Mine in Guyana contaminated the river Essequibo causing massive loss of aquatic life. In 1996, on Marinduque Island on the Phillipines, 3 million tonnes of poisonous sludge from a copper mine flowed into the river Boac flooding 20 villages.

¹ COM(2000) 265 final, 3.5.2000.

² Cyanide spill at Baia Mare Romania, UNEP/OCHA assessment mission, March 2000.

While the accidents described above happened outside Europe, two more recent mining accidents in Europe have raised the question of the safe operation of mining activities in the EU Member States and in the candidate countries for accession to the European Union, together with the adequacy of relevant Community legislation in this area.

2.1. The “Aznalcóllar” accident³

The accident occurred on 25 April 1998 in the installation of Boliden-Apirsa which exploited a mine at Aznalcóllar, Boliden-Apirsa had acquired the mine in 1987, while the mine had been in exploitation for a considerable number of years already.

The mine produces zinc-, silver-, lead- and copper-concentrates from a pyritical ore body. The pyritical ore, which also contains arsenic, cadmium, thallium and other metals in lower concentrations, is broken in the mine installations and milled down to a rather fine grain. Then, different metal compounds are separated from this fine-grained ore with the help of a flotation process, where water is used, to which sulphur dioxide (SO²) calcium hydroxide (Ca(OH)²), copper sulphate pentahydrate and an organic compound are added as agents, in order to promote flotation.

At the time of the accident, the tailings (the waste resulting from the above process) was discharged into an artificial pond (tailing pond), a common method for managing and disposing of this type of waste. The pond covered a surface of about 1.5 km² and contained, at the time of the accident, about 31 millions tons of sludge. Around this pond, a dam had been erected to contain the tailings; the dam was regularly increased, as more quantities of tailings were added. The main material that was used for the construction of the dam came from the mining activity itself.

In the night between 24 and 25 April 1998, the dam around the pond broke at a length of about 50m. Some three million m³ of sludge and four million m³ of acidic waters were discharged into the adjacent environment, where about 4.500 hectares of land on the border of the Coto Doñana National Park were polluted, and into the river Guadiamar. The major part of the sludge remained in the neighbourhood of the pond, where layers of sludge with a thickness up to two meters were found, the thickness decreased progressively with large parts of the affected land being covered with a layer of about 20 cm, but diminishing down to some millimetres. No damage to humans occurred. The question of whether the accident was foreseeable, and therefore preventable, is still subject to investigation.

Local, provincial and regional authorities and the operator of the mine undertook emergency work to contain the sludges and waters, in particular in order to protect the natural reserve of Coto Doñana. Clean-up work continued during most of 1998 with additional re-cleaning of some areas in 1999. The sludge and contaminated soil were brought and disposed of in the old pit of the mine of Aznalcóllar in the north of the tailing pond. The tailings pond is currently undergoing decommissioning. Following authorisation from the regional government of Andalusia, the mining operation restarted in 1999, temporarily using the old pit of Aznalcóllar for tailings disposal.

³ A number of factual elements have been taken from World Wildlife Fund, Analysis and evaluation of the clean-up activities of the toxic spill in Guadiamar river (1998).

2.2. The “Baia Mare” accident

On 30 January 2000, a dam at the Aurul smelter of the "Baia Mare" goldmine at Sasar/Romania broke. An estimated 100,000 m³ of mud and wastewater with a 126 mg/litre cyanide load entered through de-watering channels into the Lapus River, a tributary to the Somes (Szamos) river and from there into the Tisza river and the Danube upstream of Belgrade and finally entered the Black Sea. The acute transboundary pollution had the potential of having a severe negative impact on biodiversity, the rivers' ecosystems, drinking water supply and socio-economic conditions of the local population.

Romania, Hungary and the Federal Republic of Yugoslavia performed sampling and analyses. Measurements on 1 February 2000 at Satu Mare on the Somes showed a maximum concentration of cyanides reported to be 7.8 mg/litre (compare with maximum limit value for surface waters of 0.01 mg/litre). A 30-40 kilometre long contaminated wave wiped out flora and the fauna of the central Tisza River with damages estimated of hundreds of thousands of €. The cyanide plume was measurable at the Danube delta, four weeks later and 2000 km from the spill source.

Acute effects, typical for cyanide, occurred for long stretches of the river system down to the confluence of the Tisza with the Danube: phyto- and zooplankton were down to zero when the cyanide plume passed and fish were killed in the plume or immediately after. The Hungarian authorities provided estimates of the total amount of fish killed in excess of one thousand tons, whereas the Romanian authorities reported that the amount of dead fish reported was very small. According to the Yugoslavian authorities a large amount of dead fish appeared in the Yugoslavian part of the Tisza river. No major fish kills were reported from the Danube. Soon after the cyanide plume passed, the aquatic micro-organisms recovered rapidly. Long-term effects on bio-diversity will have to be shown from further analysis. Environmental experts fear that some rare and unique species both of flora and of fauna have been endangered, e.g. the five ospreys living in the Hortobagy National park in Hungary. It is difficult to assess the exact damage caused by the accident as the river had been subject to long-term chronic pollution from the mining activities in the region.

Timely information exchange and precautionary measures taken by the Romanian, Hungarian and Yugoslavian authorities, including a temporary closure of the Tisza lake dam, mitigated and reduced the risk and impact of the spill. The water supply of the two largest cities along the Tisza River, Szolnok (120,000 inhabitants) and Szeged (206,000 inhabitants) was not endangered due to the prompt action of the local authorities.

Villages close to the accident site were provided with alternative water sources, but were allegedly not informed about the spill sufficiently early. Downstream drinking water was not affected because of the use of alternative supplies and deep wells. Consequently, immediate human health risk seems to be minimal from this spill alone, but chronic health impacts due to long-term pollution by heavy metals are possible.

The spill occurred in an area already contaminated with heavy metals from a long history of mining and metal processing. Upstream locations unaffected by this particular spill also contained high levels of some heavy metals. Thus, the accident occurred in a region with a number of poorly maintained and operated plants and

flotation ponds containing cyanide and/or heavy metals, many of which are leaking continuously. There is a risk of further pollution of surface and groundwater as well as soils due to continued leaking or acute accidents.

3. IMMEDIATE FOLLOW-UP ACTIVITIES

Following a preliminary assessment of the consequences of the “Baia Mare” accident, the following steps were considered necessary to address the continuing risks of pollution from mining activities:

- Creation of an international Task Force chaired by the European Commission
- Immediate technical assistance to Hungarian and Romanian authorities
- Evaluation of needs for financial assistance based on assessments of the damage and formulation of restoration projects
- Reinforcement of the EU's civil protection capabilities
- Extension of the ongoing Commission study on environmental hotspots in the mining industry to include the candidate countries
- Review and possible adaptation of existing EU legislation
- Acceleration of preparations of legislation on environmental liability.

Furthermore, the Commission at present is collecting information from the EU Member States as well as from the candidate countries for accession to the European Union on the number, location and capacity of installations performing the mineral processing of sulphide ores and the mineral processing of ores containing gold using the cyanide process. It is particularly interesting to investigate whether tailings ponds used in these installations are properly managed or if they pose environmental risks, through chronic pollution and/or through a high risk of failure.

3.1. The “Baia Mare” Task Force

This Task Force is led by a representative nominated by the European Commission. Its six members are high level officials from the EU Commission and international, regional and national bodies for protection of the environment. The secretariat of the Task Force is in Vienna, on the premises of the Commission for the Protection of the Danube River.

The mission of the Task Force is to establish what happened, assess the damage and propose actions to remedy the negative impacts. It will also propose actions to keep the general public fully informed about the situation. To prevent any similar accident to happen in the future the Task Force will identify potential hotspots in the Danube river basin and make suggestions to reduce risks.

The Task Force held its first meeting in March 2000 in Brussels in the offices of the European Commission. At the meeting the Task Force agreed on the practical implications of its remit:

- Establish what happened and apportion the causes of the spill as precisely as possible.
- Assess the damage and propose actions to remedy the negative impacts. It will take a longer-term view on what needs to be done to restore ecological balance to the effected areas. It cannot become involved in any consideration of 'compensation' as such.
- Keep the public informed through a two way process of communication, working through established and recognised Non Governmental Organisations (NGOs).
- Identify other 'hot-spots' in the mining and extractive industries.
- Make suggestions to reduce further risks and, if necessary recommend whether (in the opinion of the members of the Task Force) the existing regulatory framework is adequate.

At its second meeting in April 2000, the UNEP/OCHA Report giving results of their on-site assessment was studied by the Task Force. The Task Force has held six meetings so far.

As part of its mandate, the Task Force has published an *Inventory of High Risk Sites* in the mining, extractive and ore-processing industries in the Tizsa river basin (<http://europa.eu.int/comm/environment/enlarg/home.htm>).

The final report from the Task Force will be made public on completion by the end of the year 2000. European metal mining industry has offered to assist the Task Force.

3.2. The UNEP/OCHA Report on the Cyanide Spill at Baia Mare/Romania

Following requests from the Governments of Hungary, Romania and the Federal Republic of Yugoslavia (FRY), and consultations with the European Commission and the UN Office for the Co-ordination of Humanitarian Affairs (OCHA), the Executive Director of the United Nations Environment Programme (UNEP) announced on 18 February 2000 that a team of international experts would be sent to the affected area to carry out a scientific analysis of the environmental damage caused by the spill.

The mission was a joint venture of UNEP and OCHA, organized by the Joint UNEP/OCHA Environment Unit, and headed by the Director of UNEP's Regional Office for Europe. Its terms of reference included an independent, scientific description of the spill, the situation and events causing it, the collection and review of data related to the spill and its environmental implications, and the preparation of recommendations for future action and prevention.

The mission represented a useful model for inter-agency cooperation and multi-disciplinary rapid assessment work. It was limited in size, scope and time, and consequently not intended to provide a full overview of the emergency and its implications. It mainly represented environmental input to a process of international investigation and reviews by, inter alia, the Baia Mare Task Force.

The mission, which lasted from 23 February to 6 March 2000, combined sampling, analysis, interviews with relevant national and local experts, discussions with national authorities, affected populations and local Non Governmental Organisations (NGOs).

Experts from seven countries (Austria, Czech Republic, Finland, Germany, Norway, Sweden, Switzerland) were selected at very short notice to travel to the affected areas. The range of expertise included in the team covered chemistry, ecotoxicology, biology, process engineering and dam engineering.

The team assembled in Bucharest in Romania, then traveled to the breach site in Baia Mare before crossing the border into Hungary and followed the river system down to the FRY border. Finally, sampling was undertaken along the Danube in the FRY. The mission divided into seven key areas of investigation:

- Dam site construction and management to understand how the breach occurred
- Emergency planning and early warning systems
- Drinking water implications for communities potentially affected by contamination of groundwater wells and public drinking water supplies
- Surface water quality including chemical, biological and eco-toxicological impacts
- Sediment and soil impacts, especially with regard to heavy metal releases
- Sampling and analytical methods employed by different local and national authorities to examine potential discrepancies in the measurement of contamination
- Interviews and contacts with local authorities, NGOs and representatives of the population to assess the social and economic context and implications of the spill.

The report of the UNPE/OCHA Assessment Mission was published at the end of March 2000 and can be downloaded from: <http://www.natural-resources.org/environment/BaiaMare/index.htm>).

4. THE “BAIA MARE” ACCIDENT FROM A TECHNICAL POINT OF VIEW – PROJECT DESCRIPTION AND LESSONS TO BE LEARNT

This chapter contains descriptions of the company and its project. Without prejudging the results of the Baia Mare Task Force, it identifies the most probable reasons for the cyanide spill and possible lessons to be learnt from the accident.

4.1.1. Company Description

The Company that operated the processing plant for exhausted mining tailings in Baia Mare, Romania, is called Aurul S.A. It is a joint stock company mainly owned by Esmeralda Exploration Limited of Australia (50%) and by Remin (Romanian State owned)(44.8%). Esmeralda is a small company operating only this plant in Baia Mare. Following the accident Esmeralda has been put into administration.

4.1.2. Project description

Previous production of ores in the Baia Mare area by Remin had left behind large quantities of tailings with a low content of gold and silver. These dams restricted further urban development of the city and were also a cause of serious environmental problems. The tailings heaps were located in the middle of the city and polluted surface and groundwater as well as causing drifting dust - in particular in the summer months. The project was therefore set up to clean up the sites, following an international tender; after the development of new processing technologies, the re-processing of these tailings had become technically and economically feasible.

The "Baia Mare Tailings Retreatment Project" was designed to process 2,500,000 t.p.a. of tailings from old mining activities. To make it available for the gold leaching process it was sprayed with water jets, so that the slurry could be pumped to a thickener. From there, the slurry went to a ball mill, mostly in order to polish the surface so that cyanidation would be more effective. The fine slurry of ore and water then entered the so-called Carbon-in-Pulp (CIP) plant.

The residues from the CIP process were pumped from the plant to the tailings dam located approximately 7 kilometres south of Baia Mare in the area of Sasar village. Before starting the operation, a new 96 ha tailings pond was constructed with earth dams and a plastic liner. The construction consisted of an inner embankment and a lower outer embankment. The outer embankment was not intended to catch water from a spill, but rather to collect leachate and rain water running off the inner embankment.

As soon as operations started, the coarser fractions of tailings were used to continue construction of the dam. For that reason, a series of hydrocyclones spaced along the top of the tailings dam was used. The finer fraction, together with the water used, was discharged into the pond behind the dam. After the slurry had settled, the decanted water was recycled back into the leaching process, to minimise the total use of cyanide in the process.

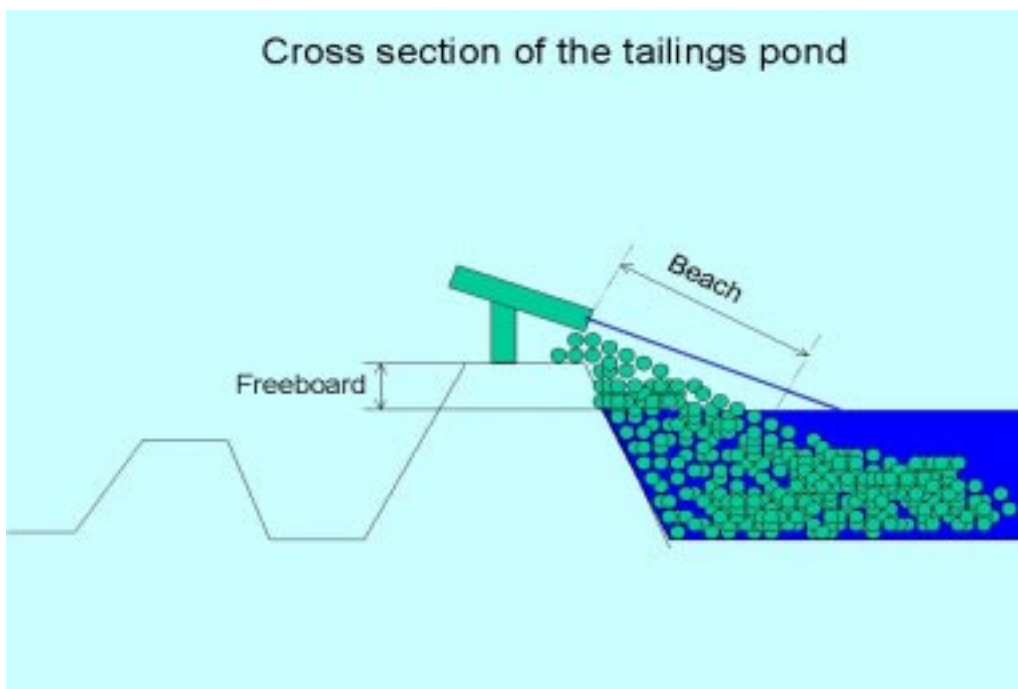


Figure 1. Cross section of the tailings pond

To summarise, the tailings pond in some respects performed a similar role as a mining heap or a landfill, where the ground ore is disposed of. After the tailings pond had reached its final shape and volume, the remaining water would be pumped away or evaporate.

4.1.3. *Circumstances of the spill*

After extreme weather conditions (ice and snow on the tailing pond, high precipitation – 36 l/m²), the tailings deposited on the inner embankment became soaked. Stability was affected, causing local displacement and this subsequently developed into breach of approximately 23 m. The water released through the breach filled the area between the two embankments and spilled over the outer embankment.

4.1.4. *Lessons to be learnt from the accident*

It should be noted that the use of cyanide is currently the preferred method, for environmental as well as for economical reasons, for processing gold containing ores and is common practice around the world. The design and management of tailings ponds, be it in relation to gold mining or other extractive activities, is highly dependent on site-specific conditions. This may include the terrain and the mineralogy where the pond can be constructed, the type of waste, and the climatic conditions.

Aurul S.A. recycled the cyanide-bearing water in a "closed cycle". Aurul S.A. decided to opt for the "closed cycle" to save costs on neutralisation chemicals and cyanide. As a result, the tailings pond constituted a risk, in so far as it continuously contained high levels of cyanide. Romanian experts estimated that about 120 tonnes of cyanide were spilled into the river.

When operating tailing ponds after the processing of gold-bearing ore with the cyanide process, the cyanide can be destroyed with, for example, sodium hypochlorite before pumping the water with the residues into the tailings pond. After sedimentation, the water is either discharged or pumped back into the process and mixed with cyanide again. The most obvious measure to prevent accidents in case of excess water in the pond is to ensure that the dam is well engineered and constructed of appropriate material to withstand the foreseeable load. The provision of back-up containment is a secondary measure to reduce the impact on the environment in the event of a dam break and where the pond liquor is more hazardous, for example where no treatment of the cyanide takes place, the consequences of a spill are greater thus justifying such further measures.

Additional storage capacity could be achieved by constructing additional dams to catch any spilled water. Other measures include the possibility to discharge extra water from the pond in order to lower the water level in the pond in case of a sudden rise of the water level due to high precipitation. Furthermore, the management and continuous build-up of the tailings pond requires careful attention, especially as regards the balance between solids and water in the dam and how this balance is affected by, for example, heavy precipitation. This involves closely monitoring the size of the "beach" (i.e. the area from the top of the inner embankment to the water line; see Figure 1.) as well as of the "freeboard" (i.e. the difference between the top

of the dam and the water level; see Figure 1.). In addition, the accident is also a reminder that the design and management of a tailings pond must take into account the worst foreseeable weather conditions, such as heavy rain or snow, as well as how the operation of the pond is affected by temperatures below zero. These proposals give an idea as to what could be done when designing and operating tailings ponds of this type to minimise the risks of an accident.

Finally, a key issue highlighted by the accident has been the influence of ineffective permitting and enforcement procedures and capabilities in creating the circumstances in which dams with design flaws could have been constructed and given permit authorisation. According to the UNEP/OCHA report, the plant had received 22 individual environmental and public health permits before operations were allowed to start. These permits took a total of seven years to obtain. In Romania, it remains a problem today that there is no effective overall co-ordination between the many different bodies involved in permitting and that a single organisation can oversee overall regulatory and technical aspects. There is great concern that other existing facilities in the accession countries, in a wide range of industries, may have received inadequate regulatory control and may currently pose environment and health threats. As a result, the need to improve permitting procedures and also to enhance the resources and capabilities of the regulatory agencies involved will require additional consideration.

5. CURRENT SITUATION WITH REGARD TO EXISTING COMMUNITY ENVIRONMENTAL LEGISLATION

There are a number of existing Community legal instruments which address the environmental aspects of mining activities.

5.1. Council Directive 85/337/EEC⁴ as amended by Council Directive 97/11/EC⁵ on the assessment of the effects of certain public and private projects on the environment and the UNECE Espoo-Convention on Transboundary Environmental Impact Assessment⁶

Council Directive 85/337/EEC as amended by Council Directive 97/11/EC, the so-called EIA Directive, requires an environmental impact assessment of a large number of economic activities, including mining activities and dams in case such activities are likely to have significant impacts on the environment.

The EIA Directive puts emphasis on the preventive approach since it requires an assessment of the likely environmental effects of activities before authorisation is given. Such assessment shall be reflected in an environmental report that has to be taken into account by the competent authority granting authorisation. Envisaged mitigation measures form part of such assessment. An important factor in the impact assessment procedure is the involvement and participation of the public within the given regulations. The resulting comments have to be carefully considered by the competent authority. Such a participatory approach ensures transparency, early

⁴ OJ L 175 of 5 July 1985.

⁵ OJ L 73 of 14 March 1997.

⁶ OJ C 104 of 24 April 1992.

involvement and information of the public and helps identifying and mitigating risks for the environment.

The EIA Directive also implements the UNECE Espoo-Convention on transboundary impact assessment. This Convention was signed in 1991 and entered into force in 1997. Currently, there are 30 Parties to the Convention, including the European Community. Mining activities and dams are also listed in this Convention. In case of the likelihood of a significant transboundary environmental impact of a planned project, the affected Parties have to be notified and all relevant information on the project including the environmental report has to be submitted so that the public liable to be affected gets the opportunity to comment. The results of such transboundary consultation have to be taken into account by the competent authority of the Party that is responsible for granting authorisation to the project.

5.2. Council Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community⁷

Pollution caused by discharge of dangerous substances to the aquatic environment is covered by this Directive. However, it does not address accidental pollution. 18 substances including cadmium and mercury were regulated in five ‘Daughter’ Directives by setting Community-wide emission limit values and quality standards for the aquatic environment. For relevant pollutants, which have to be identified out of a wide range of other substances including cyanides and heavy metals, the Member States must establish national emission reduction programmes. The programmes must include legally binding water quality objectives and deadlines for implementation of certain emission reduction targets. In relation to mining activities there is a considerable pollution potential from certain dangerous substances which may cause a deleterious effect on the aquatic environment. The identification of such a pollution leads to a requirement of authorisation of discharges containing the relevant pollutants. Hence, an effective pollution control of point sources from mining would be possible under the Directive.

5.3. Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances (Seveso II Directive)⁸ and UNECE Convention on the Transboundary Effects of Industrial Accidents⁹

The Directive aims at the prevention of major accidents which involve dangerous substances and the limitation of their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community in a consistent and effective manner.

The core novelty of Seveso II consists in the introduction of an obligation for industrial operators to put into effect *Safety Management Systems* including a detailed risk assessment using possible accident scenarios. Such a risk assessment plays a key role in preventing major accidents.

⁷ OJ L 129 of 18. May 1976, p. 23.

⁸ OJ L 10 of 14 January 1997, p. 13.

⁹ OJ L 326 of 3 December 1998, p. 1.

The classical field of application of Seveso II are chemical plants and storage facilities where dangerous substances are present in quantities above certain threshold levels.

Article 4 e) of the Directive excludes *the activities of the extractive industries concerned with exploration for, and the exploitation of, minerals in mines and quarries or by means of boreholes* from its scope. Moreover, Article 4 f) excludes *waste land-fill sites*.

These exclusions go back to the original Seveso Directive of 1982 that excluded *extraction or other mining operations* as well as *installations for the disposal of toxic and dangerous waste which are covered by Community Acts in so far as the purpose of those Acts is the prevention of major accidents*.

When the Proposal for Seveso II was presented to Council and European Parliament, the Explanatory Memorandum justified maintaining the above exclusions by saying that "*although these areas present a major accident potential, they do not fall easily within the framework of the proposal given special needs or special hazards*."

The Seveso II Directive leaves some margin for interpretation of its coverage that could be used to exclude processing activities and/or tailing ponds or dams from its scope

The Directive also implements the UNECE Convention on the Transboundary Effects of Industrial Accidents. This Convention was signed in 1992 and entered into force in April 2000. Currently, there are 17 Parties to the Convention, including the European Community. The Convention aims at protecting human beings and the environment against industrial accidents capable of causing transboundary effects and at promoting active international co-operation between the Contracting Parties before, during and after such accidents. However, the Convention does not apply to dam failures, with the exception of the effects of industrial accidents caused by such failures.

5.4. Community Waste management legislation

5.4.1. Directive 75/442/EEC¹⁰ as amended by Directive 91/156/EEC¹¹ on waste

Article 2 of Directive 75/442/EEC on waste as amended by Directive 91/156/EEC establishes that waste resulting from prospecting, extraction, treatment and storage of mineral resources and the working of quarries shall be excluded from the scope of Directive 75/442/EEC where they are already covered by other Community legislation. At present there is no specific Community legislation on this type of waste. Therefore, Directive 75/442/EEC applies to waste from the extractive industry.

Article 4 of Directive 75/442/EEC establishes that Member States shall take the necessary measures to ensure that waste is recovered or disposed of without endangering human health and without using processes or methods which could harm the environment.

¹⁰ OJ L 194 of 25 July 1975, p. 39.

¹¹ OJ L 78 of 26 March 1991.

5.4.2. Directive 99/31/EC on the landfill of waste¹²

The deposit of waste in a pond is a waste disposal operation covered by existing EU legislation - Directive 99/31/EC on the landfill of waste. This Directive 99/31/EC came into force on 16 July 1999 and will be effective by 16 July 2001.

According to this Directive, the deposit of non-hazardous inert waste resulting from prospecting and extraction, treatment, and storage of mineral resources as from the operation of quarries is excluded from the scope of the Directive. However, waste from metal mining is generally not an inert waste. Thus, the Directive would apply.

The Directive lays down requirements concerning the authorisation of landfills, the technical construction of landfills, the types of waste acceptable at landfills and the monitoring procedures for landfills.

Although the Directive is not yet applicable, there are a number of requirements which are relevant to waste management in relation to mining activities.

- The location of the landfill must take into consideration *inter alia* the distance from groundwater or superficial water and the risk of flooding, subsidence, landslides or avalanches.
- Appropriate measures must be taken to control water from precipitation and prevent it from entering into the landfill body.
- The emplacement of waste on the site must be done in such a way to ensure the stability of the waste and the associated structures, particularly to avoid slippages.
- A monitoring programme for the control of water, leachate and gas is laid down. The monitoring results must be reported to the competent authorities.

It should be noted that the Landfill Directive was adopted primarily to regulate the disposal of waste into normal landfill sites. All the issues related to tailing ponds management have not been specifically considered in this Directive.

5.5. Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (IPPC Directive)¹³

All installations covered by Annex I of the IPPC Directive are required to obtain an operating permit from the competent authorities in the Member States. For “everyday pollution”, permits must contain emission limit values or equivalent parameters. These shall be based on the use of Best Available Techniques (BAT). In addition, permits must include provisions that deal with other conditions than normal operating conditions, relating to start-up, leaks malfunctions, momentary stoppages and definitive cessation of operations, where there is a risk that the environment may be affected.

¹² OJ L 182 of 16 July 1999, p. 1.

¹³ OJ L 257 of 10 October 1996.

The IPPC Directive covers the *overall* environmental impact of the production process, i.e. air, water and soil pollution, generation of process residues, use of energy, etc. The focus shall be on prevention rather than “end-of-pipe” abatement. In the Directive, a distinction is made between, on the one hand, new or substantially changed installations and, on the other hand, existing installations. For the former category, all provisions of the Directive apply since October 1999. For the latter, Member States have until October 2007 to ensure compliance.

Core extraction activities are not covered by the IPPC Directive, but activities of the kind undertaken at the Baia Mare site are already inside the scope of the IPPC Directive. Indeed, paragraph 2.5 (b) of Annex I covers “*installations for the production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes*”.

However, the IPPC Directive may not cover all sites in the European Union where tailings dams are used. They could either not be production sites (if they are in isolation from the actual site of production), not be producing *crude metals* (if they produce for instance *concentrates*), or not be regarded as landfills falling under category 5.4 of Annex I. of the Directive (“*landfills receiving more than 10 tonnes per day or with a total capacity exceeding 25 000 tonnes, excluding landfills of inert waste*”). However, most of the dams probably meet these thresholds.

The concept of ‘landfills’ is not defined in the IPPC Directive, but the Landfill Directive (99/31/EC)¹⁴ provides for a definition. According to Article 2 (g) of that Directive, a landfill means a *waste disposal site for the deposit of the waste onto or into land*. Storage of waste prior to recovery or treatment for a period less than three years as a general rule and storage of waste prior to disposal for a period of less than one year are excluded from the definition of a landfill. It should be noted that the Baia Mare and Aznalcóllar tailing ponds were not destined for temporary storage. On the basis of the above definition, it is likely that a vast majority of tailings dams are indeed covered through the present wording of Annex I.

6. FOLLOW-UP - THE ACTION PLAN

The recent mining accidents have illustrated a need for a review of Community environmental policy. This is particularly important in view of the EU enlargement. Therefore, the actions described below will be prepared in close co-operation with the candidate countries.

Discussions with Member States’ experts have started in view of changing the classification category of dangerous waste and including these wastes in the Hazardous Waste list. First conclusions are expected for the second half of 2000.

Furthermore, the Water Framework Directive, recently adopted upon by the Council and the European Parliament, calls for measures at watershed level including “*measures required to prevent significant leakage of pollutants from technical installations, and reduce the impact of accidental pollution incidents*”, and “*systems to detect or give warning of such events*”.

¹⁴ OJ L 182 of 16 July 1999.

From a civil protection point of view, the experience from the Baia Mare accident in Romania also clearly demonstrates a need for improvement of the early warning systems. The Commission has therefore proposed to establish a Community Mechanism for the co-ordination of the Civil Protection Interventions in case of Emergencies¹⁵.

Moreover, the White Paper on environmental liability¹⁶ contains proposals for the introduction of a Community environmental liability regime with the objective of improving the implementation of key environmental principles such as polluter-pays, prevention and precaution and of existing EU environmental laws, and also to ensure adequate restoration of the environment.

The Environment Council of Ministers of 30 March 2000 gave broad support to the proposal of the Commission to establish a framework Directive for this purpose. Such a proposal is under preparation and is meant to be presented before the end of 2001. Several studies need to be carried out beforehand, dealing with economic aspects such as competitiveness and insurability, and with valuation and restoration of damage to biodiversity, among other things. Account will also be taken of the opinions of the other European institutions and the comments of interested parties.

Apart from these activities, three key actions are envisaged. These would relate to industrial risk management, the management of mining waste and integrated pollution prevention and control.

6.1. Amendment of the Seveso II Directive

In terms of industrial risk management, the Seveso II Directive seems to be the most appropriate legislative tool to prevent major accidents involving dangerous substances. The Directive obliges industrial operators to put into effect Safety Management Systems, including a detailed risk assessment on the basis of possible accident scenarios.

In order to do away with the ambiguities contained in the Directive and described above, it is envisaged to amend the Seveso II Directive to unequivocally include the mineral processing of ores and, in particular, tailings ponds or dams used in connection with such mineral processing of ores. It is important to note that any such activity would only be covered by the Directive if dangerous substances are involved and if they are present in quantities beyond the threshold levels set out in the Directive.

This amendment will be prepared following the completion of the report of the Baia Mare Task Force. It will be part of a wider review of the scope of the Directive.

The explosion of the storage facility at SE Fireworks in Enschede/Netherlands earlier this year which resulted in a large number of deaths and injured persons has, in any event, created the need to evaluate the qualifying quantities assigned to pyrotechnic substances and to make proposals for amendments to the Seveso II Directive.

¹⁵ COM(2000) 593 final.

¹⁶ COM(2000) 66 final, 9.2.2000.

Moreover, already on the occasion of the adoption of the Directive, the Commission had been asked by Council to evaluate the qualifying quantities assigned to substances dangerous for the environment and the list of carcinogens contained in Annex I. This work has been carried out in two Technical Working Groups that have delivered their final reports in April 2000. These reports suggest to significantly lower the qualifying quantities assigned to substances dangerous for the environment and to extend the list of carcinogens contained in Annex I of the Seveso II Directive.

6.2. An initiative on the management of mining waste

The management of waste from extractive and quarrying activities requires detailed investigation. Mining waste is among the largest waste streams in the Community. Some waste streams, in particular generated by the non-ferrous metal mining industry, contain large quantities of dangerous substances, such as heavy metals. Although all metals are naturally occurring substances and are an essential part of everyday life, they are elements and therefore persistent in the environment. They need to be controlled below levels that constitute environmental harm although their concentrations in the environment can vary greatly due to natural proximity of metaliferous deposits. Once brought to the surface through mining activities metals and metal compounds tend to become chemically more available and deserve specific attention to prevent pollution.

Therefore, a study was launched in September 1999 on the existing legislation and practices concerning the management of waste from the extractive industry. The study will concentrate on the environmental issues of the management of mining waste as well as on the best practices, which could prevent environmental damage during the waste management.

The study was extended to include the candidate countries in which important mining activities are carried out (Hungary, Bulgaria, Romania, Poland, Czech Republic and Slovakia). The whole study should be finalised before the end of 2000 and will concentrate on the management of tailing ponds containing non-ferrous metal minerals. An inventory of main mining activities should be carried out at regional basis, as far as information is available. Difficulties are expected in the collection of information. With the available budget and time constraint, a detailed hot spots inventory of all abandoned and existing mines in these countries can not be drawn up. In the longer term, a research project on the environmental impact of mining waste in the candidate countries will be carried out by the Joint Research Centre in collaboration with other services of the Commission and the European Environment Agency. This study will consist of an inventory of toxic mining waste sites, a comparison of mining waste legislation and an assessment of the environmental consequences of mining accidents.

On the basis of the results of the study, which will be discussed with all stakeholders concerned, it will be possible to consider the need to adopt an initiative, in particular a Proposal for a Directive specifically focussing on the management of mining waste, which would consider site-specificity as well as significant differences between various sub-sectors of the extractive industry. This exercise will take place in 2001.

6.3. A BAT reference document under the IPPC Directive

In order to assist the implementation of the IPPC Directive in the non-ferrous metals mining sector, the Commission considers to organise an exchange of information concerning the management of tailings dams with a view to producing a special BAT reference document (BREF) on this subject. This task could be part of the ongoing BAT information exchange between Member States and industry, which is co-ordinated by the European IPPC Bureau¹⁷ of the Commission's Joint Research Centre. Work should start before the end of this year aiming at completion by the autumn of 2002. The BREF should deal with both techniques to reduce everyday pollution and techniques to prevent or mitigate accidents.

A BREF is not prescriptive in nature. It is intended merely as information for the guidance of the competent (national, regional or local) authorities responsible for issuing permits to installations that fall within the scope of the IPPC Directive. Apart from the authorities in the Member States of the European Union, there are several other interested target groups for a BREF, such as authorities in the candidate countries to the European Union, companies operating an IPPC installation in Europe, small and medium-sized companies within the relevant industry but not covered by the Directive, the scientific community, interested actors outside Europe, environmental organisations and, last but not least, the public at large.

A BAT reference document on the management of tailings dams would contribute to the knowledge about the measures that are available to prevent similar accidents in future. With this information at their disposal, the licensing authorities would be in a position to require that, in the European Union, installations using tailings dams meet the highest environmental standards that can be found world-wide (provided that they meet the 'availability' criterion of Article 2(11) of the IPPC Directive).

As discussed earlier in this Communication (see section 5.5), the IPPC Directive may not cover all sites in the European Union where tailings dams are used. If necessary, the scope of the IPPC Directive could therefore be clarified to explicitly include metalliferous tailings dams with an inherent risk of significant damage to the environment or human health. In addition, the processing of certain mining minerals and residues could be included. Such amendments could be considered in the context of an initiative on the management of mining waste (see section 6.2).

6.4. Input to the Baia Mare Task Force

The three key actions identified as a focussed follow-up to recent mining accidents, i.e.

- an amendment of the Seveso II Directive
- an initiative on the management of mining waste
- a BAT reference document under the IPPC Directive

will constitute an important input to the ongoing work of the Baia Task Force.

¹⁷ <http://eippcb.jrc.es>.