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### **“Mining and Environment: The reality in Europe and around the world”**

Mining is the basis for industrial development and therefore crucial for the wellbeing of our societies. On the other hand, its environmental impact on vital resources as water, soil, and air has to be minimized. The improvement of remediation, treatment, prediction, and prevention of pollution related to metal production is crucial for sustainable development of the mining industry. Some of the biggest mining companies in the world have their origin in Europe (e.g. Rio Tinto, Clencore). Nowadays mining has only a small or local importance on the economy of the European Union and most of European countries are not important primary metal producer. Subsequent, mining related pollution issues have no priority for European research funding. Nevertheless, the waste material of thousands of years of mining history remains in the former European mining countries. Additionally, Europe has a high responsibility for the environmental impact of metal production around the world, as the European high-tech industries have high metal demands, which are produced mainly in developing countries, where the environmental pollution takes place. Recently, after some severe tailings dam failure accidents in the European mining industry (e.g. the cyanide spill in 2000 at Baia Mare, Romania; the tailings dam failure in 1998 at Aznalcóllar, Spain) the development of a directive was initiated in the European Commission, process, in which also members of the Mine Water Interdisciplinary Network Europe ([www.mwine.org](http://www.mwine.org)) are involved:

DIRECTIVE 2006/21/EC OF THE EUROPEAN PARLAMENT AND THE COUNCIL, March 15, 2006, on the management of the waste from the extractive industries and amending directive 2004/35/EC.

The member states are to adapt the directive within June 2008. This requires development of regulations to follow the directive, penalties for not complying with the directive by the operators, financial assurance system, monitoring systems etc.

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The directive requires the operators to:

- Develop a Waste Management Plan
- Develop a Major Accident Prevention Policy Plan
- Submit a Permit Application and obtain a Permit
- Involve the Public in the Permitting process
- Develop Reclamation and restoration plans to avoid contamination of soil, surface water and groundwater and avoid physical hazardous
- Develop monitoring plans
- The waste shall be characterized in such a way as to guarantee the long term physical and chemical stability of the structure of the facility and to prevent major accidents
- Implementation of the plans

Some of the Regulations and guidelines to be developed until May 2008 by EU work groups under the EU standardization committee are:

- Characterization (ABA, kinetic tests, sampling methods)
- Develop a classification system for waste facilities
- Financial Assurance system

Although the EU has recognized that exploitation of natural resources might be also vital in the future for Europe, the density of population and the sensibility of the population on environmental issues makes it very difficult that new mines could easily open in Europe. Therefore, the improvement of the regulation in respect of environmental management of industrial processes in Europe makes for the mining companies Europe less attractive for metal production due to increased production costs. This results in the migration towards developing countries, where the legislations are not yet as tight as in Europe.

The reality of mining and the environment can be very different depending on the country and the financial resources for this issue. In Germany after the reunification in 1989, 6.6 Mrd € were spent in order to remediate the uranium mining district of Wismut. In the Pyritic Belt in Southern Spain and Portugal, one of the strongest mineralized areas in the world, even after the Aznalcollar accident, only small remediation programs were implemented. This is mainly due to the lack of financial resources of the responsible counties and that the operating mining company went bankrupt after the accident. In Rumania, actually the typical process of mine closure can be observed. The state owned mining company can not compete any more on the world market and closes the mines without any closure plan.

In conclusion it can be stated, that with the improvement of the legislation in Europe, a program should also go hand in hand for the improvement of the legislations in the developing mining countries to prevent the migration of the mining industry. Integration of the environmental costs of metal production has to be included in the metal price in the future.