

MINE WATER MANAGEMENT IN EUROPEAN ENVIRONMENTAL POLICY: AN ASSESSMENT OF RECENT LEGISLATIVE DEVELOPMENTS¹

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Abstract. Since its creation, the European Union (EU) has developed a substantial amount of environmental legislation in the form of directives, regulations and decisions which are applicable to all the Member States. However, mining policy in the EU has been driven mainly by industrial considerations: the energy extractive industry being covered by the Directorate General Transport and Energy (DG TREN) and non-energy by DG Enterprise. For historical and economic reasons mining had been specifically excluded from much of the environmental policy developed by DG Environment. In the aftermath of the Baia Mare accident, the European Commission created a Task Force that proposed a plan of action with ideas for new legislation. They included the amendment of the Seveso II Directive and the production a document on Best Available Techniques (BAT) for the environmental control of mineral processing, similar to those produced under the Integrated Pollution Prevention and Control (IPPC) Directive. The main policy development has been a new Directive on the management of waste from the extractive industry, currently under discussion and expected to be approved in 2005. This article reviews the coverage of mine water in European legislation before and after these recent legislative changes from the point of view of the Water Framework Directive. Six critical issues are identified: the need to cover energy and non-energy industries, full life-cycle approach, mine water in the BAT document, mine voids in the mine waste initiative, abandoned mines and the whole catchment approach. The conclusion is that although the new policies constitute a substantial improvement in the regulatory framework of the EU, they address only some of the key issues. In particular, the full life-cycle and catchment approaches have not been sufficiently taken into account by legislators.

Additional Key Words: Water policy, waste management, extractive industries, European Directive

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Introduction

Mining is a centuries old industrial activity that was present to at least some extent in all countries in Europe. The importance of the industry declined in the 20th century as coal production ceased to be the main source of energy, and together with metal mining, became less competitive in the global market. Younger (2002) provides a synopsis of the growth and decline of European coal mining, with the development of large coalfields in the 19th Century in the UK, northern France, Belgium, Germany, Poland, the Donbass Basin (Ukraine) and the Central Asturian Basin (Spain). In the case of metal mining, some 75% of the total current production is concentrated in Finland, Sweden, Ireland, Portugal, Spain and Greece. In contrast to the decline of coal and metal mining, the production of industrial minerals has expanded in many countries and represents an important fraction of the world production for certain commodities (IPPC Bureau 2004).

Since its creation, the European Union (EU) has developed a substantial amount of environmental legislation in the form of directives, regulations and decisions which are applicable to all the Member States. They include horizontal legislation which covers general environmental management issues and sectoral legislation covering, amongst other, air quality, waste management, water quality, nature protection and industrial pollution control. However, mining policy in the EU has been driven mainly by industrial considerations: the energy extractive industry being covered by the Directorate General dealing with energy (DG TREN) and non-energy by DG Enterprise. For historical and economic reasons mining had been specifically excluded from much of the environmental policy developed by DG Environment.

This changed drastically after two consecutive catastrophic event: the Aznalcóllar (1998) and Baia Mare (2000) tailings dams failures. In Aznalcóllar (SW Spain) some 3 Mm³ of pyrite-rich sludge and about 4 Mm³ of acid waters flowed in a torrent through a 50 m-wide breach that developed in the dam following slippage of the dyke toe (see Fig. 1). The sludge and water engulfed the Río Agrio and the Río Guadiamar into which the Agrio drains. The Guadiamar is one of the principal freshwater sources of the Coto de Doñana, a Biosphere Reserve of exceptional importance for migratory birds and other wildlife. In Baia Mare (Romania) a tailings pond burst released approximately 100,000 m³ of tailings dam water containing up to 120 tonnes of cyanide (CN) into the nearby Lapus River. The pollution traveled downstream into the Somes and Tisa Rivers into Hungary before entering the Danube. The contaminant plume of CN/Cu, devastated large numbers of plants and aquatic animals in these river systems. After Baia Mare, regulation of the environmental impacts from the extractive industries has become a focus of attention for European environmental policy. Following the recommendations of the Baia Mare task force (CEC 2000), the European Commission (EC) initiated a legislative process to cover the glaring omissions in the European environmental policy framework exposed by these accidents (Kroll et al., 2002). The crafting of a new proposed Directive on the management of waste from the extractive industries (CEC 2003) has been the most important element of this process.



Figure 1. Aznalcóllar tailings dam failure (Photo: Junta de Andalucía)

The European Commission Framework 5 project “Environmental Regulation of Mine Waters in the European Union” (ERMITE) ran from February 2001 to January 2004. The goal of this project was to provide integrated policy guidelines for developing European legislation and practice in relation to water management in the mining sector. ERMITE was a multidisciplinary project involving expertise on water resources, mining, ecology, economy, law, institutions and policy. Its main policy objective was to bring attention to the importance of water management in the mining sector and help improve the current legislative proposals. It was particularly focused on highlighting the policy requirements from a catchment management perspective. The Hydrogeochemical Engineering Research and Outreach (HERO) group of Newcastle University was the technical coordinator of the ERMITE project and in charge of the interface with policy-making. Intensive interaction with the European Commission and other policy actors allowed the project to have a demonstrable impact on the policy process. In order to achieve this objective the project paid particular attention to the development of interfaces with stakeholders involved in the policy process. One critical interface has been the activity of the HERO group as technical advisors to the World Wide Fund for Nature (WWF) European Water Policy office. WWF has been heavily involved in the policy process triggered by the Aznalcóllar and Baía Mare accidents. The work of this organization was a catalyst for all the ensuing policy activity. Through this interaction HERO is still (2005) involved in the development of the proposed Directive on mining waste.

In this paper the policy context of the environmental regulation of mining activities in Europe is analyzed. Specifically, the focus is on the policy developments recommended by the Baia Mare Task force, presenting a number of criteria that should be fulfilled from the point of view of mine water management. The article finishes with conclusions about the extent to which these criteria have been fulfilled with the recent legislative developments.

European Policy Context

Table 1 shows the main EU Directive relevant to mine water issues. Several authors (Krämer, 1999; Hámor, 2002; Ginige, 2002; Kroll et al. 1992) have analyzed the degree on which mining is covered by European Legislation. The general conclusion of all these authors is that mining industry was in a favored situation when compared with other industrial sectors.

Amezaga (2005) examined in more detail the issues specifically related to mine water. Mining was excluded from the Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC) which requires specific industrial activities to be subject to operating permits addressing the overall impact of the production process including water pollution. These permits are based on Best Available Techniques (BAT) documents about that particular industrial process. Mining was also excluded from the Seveso II Directive (96/82/EC). This Directive imposed certain measures (e.g. emergency plants on and off-site, information for the adjacent population, monitoring requirements for public authorities) to be applied to establishments where dangerous substances are present in certain quantities (as defined by the Annex 1 of the Directive). It was included, but with greater freedom of interpretation, in the Environmental Impact Assessment Directive (97/11/EC). The assessment is compulsory for dams that store in excess of 10 million cubic meters, and quarries and open-cast mines where the surface area exceeds 25 hectares. Other installations are left to the judgment of the authorities.

Table 1. European Union legislation relevant to mine water issues.

Waste Framework Directive	75/442/EEC (91/156/EEC)
Landfill Directive	1999/31/EC
IPPC Directive	1996/61/EC
Seveso II Directive	1996/82/EC
Environmental Impact Assessment Directive	85/337/EEC (97/11/EC)
Habitats Directive	92/43/EC
Environmental Liability	2004/35/EC
Dangerous Substances Directive	76/464/EEC
Groundwater Directive	80/68/EEC
Water Framework Directive	2000/60/EC

The inclusion or not in waste legislation has been a contentious issue due to the clause of the Waste Framework Directive (75/442/EEC) stating that mining waste would be excluded where they are already covered by other legislation, interpreted by the European Commission as referring exclusively to European legislation. However, recent rulings from the European Court of Justice (ECJ) have clarified this issue. In *Palin Granit Oy v Vehmassalon Kansanterveystyön kuntayhtymän hallitus* (case C-9/00) a Finnish court requested under Art. 234 EC Treaty that the ECJ clarify the definition of wastes for unused quarry stones, over granite blocks from a Finnish quarry. The final ruling on 18 April 2002 (ENDS, 2002a) established that materials such as topsoil, waste rock, overburden or tailings from extraction activities are waste when they fulfill the definition in Article 1(a) of the Waste Framework Directive (“*substance which the holder discards or intends or is required to discard*”). A key case has been that of *Avesta Polarit Chrome Oy* (Case C-114/01) which originated from an application by a Finnish company for an environmental license in respect of a site that was changing from opencast to underground mining (ENDS 2003). The ECJ was asked two questions by the Supreme Administrative Court of Finland:

1. Are leftover rock and residual sand to be regarded as waste?
2. Does other legislation within the meaning of Article 2(1)(b) of the Waste Framework Directive mean exclusively the European Community’s own legislation?

The final ruling of the ECJ (11 September 2003) was full of surprises. First, it concluded that the leftover rock and residual sand are waste unless the holder “uses them lawfully for the necessary filling in of the galleries of that mine and provides sufficient guarantees as to the identification and actual use of the substance to be used for that purpose.” This means backfilled material is to be considered residue and not waste, provided its use for this purpose was permitted. Second, it ruled that “national legislation must be regarded as other legislation...if it results in a level of protection of the environment at least equivalent to that aimed at by the directive, whatever the date of its entry into force”. It must be noted that the conditions attached for national legislation to qualify are very stringent. This ruling came in the middle of the discussions for the new Directive on mining waste that will be discussed later, and it had important implications for the management of mine water in voids, as backfilled material would not enter in the scope of the Directive.

The key piece of water legislation in the EU is the Water Framework Directive (WFD) (Directive 2000/60/EC). This Directive seeks to manage water quantity, quality and ecology at the river basin scale for all waters (rivers, lakes, coastal waters and groundwaters). A key requirement of the Directive is the production of river basin management plans (Art. 13) specifying how the environmental objectives set for that basin will be achieved within the timescale set (Art. 4: aim of achieving good surface and groundwater status, and achieving standards for protected areas at the latest by 2015). On the face of it, the WFD ought to improve the regulation of mining activities, since it specifies in Art. 11 (1) “measures required to prevent significant losses of pollutants from technical installations, and to prevent and/or to reduce the impact of accidental pollution incidents” and “systems to detect or give warning of such events”. Art. 5 of the Directive requires the characterization of pressures and impacts in a river basin by 2004. Mining is not explicitly mentioned, but it is clear that pollution from mining sources has to be included in this analysis and, accordingly, in the program of measures included in the river

basin plans. This has been confirmed by the guidance documents of the Common Implementation Strategy for the WFD (CIS-WFD Guidance Document No. 3 2003). However, there is a very fundamental gap in the structure of the Directive. Due to the exemption of mining from the IPPC Directive there is no relevant Community legislation addressing the preventative control of mine water pollution. By any standards, this amounts to a very privileged treatment of that particular sector by the regulator. The key point that mining is precisely the sector in which early decisions in the design of a site can have an impact for decades or more after closure (ERMITE Consortium 2004) seems to have been overlooked entirely by everybody involved in the development of European water policy. And of course, the requirements of Art. 3 (f) of the IPPC Directive which says, “the necessary measures are taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state” do not apply to mining. This, in practice, leaves the whole burden of control to the expertise of the water regulator, which in most cases lacks appropriate knowledge of mining operations, upon which any remedial measures must be based if they are to be effective.

Policy Developments After the Baia Mare Task Force

In the aftermath of the Aznalcóllar and Baia Mare accidents, the EC finally took steps to address the continuing risks of pollution from mining activities. It created an International Task Force chaired by the Commission (March 2000) to follow-up these events and propose a plan of action. The Baia Mare Task Force (2000) recommended an urgent review, and possible adaptation of existing EU legislation relating to the environmental safety of mining operations. The EC implemented these recommendations in full, and with speed.

The Baia Mare Task Force (2000) had particularly recommended three key actions:

- amendment of the Seveso II Directive,
- publication of a document on Best Available Techniques (BAT) for mineral processing, similar to those produced under the IPPC Directive, and
- an initiative on the management of mining wastes.

Conspicuously, the Task Force with its narrow focus on tailings dam safety failed to identify the need for a water-related initiative (Kroll et al. 2002). Thus, the Baia Mare Task Force report effectively resulted in the narrowing of the mining-related environmental policy agenda within the European Commission to mining waste, which theme was itself then narrowed to the management of certain types of waste facilities and accidents. Most importantly, the development of a proposed new directive was defined as a waste initiative, and as such it became the policy domain of the particular unit within the Commission dealing with waste.

The discussion about mining in the Seveso II Directive became convolved in a wider review of the Directive following accidents in other industrial sectors (Toulouse, Enschede) and studies on carcinogens and substances dangerous to the environment (Kroll et al. 2002). Thus it was that the question of mining accidents became only one of several issues covered in this particular policy process.

Although the IPPC Directive does not include mining per se, a special BAT document was commissioned on the management of tailings and waste rock in mining activities. The IPPC

Bureau at the JRC-IPTS was given the task of developing this document following the same procedures laid down for the BAT documents (BREFs) formally required by the IPPC Directive. However, as mining is exempt from the IPPC Directive, the legal basis of this BAT document will not be that Directive but the aforementioned Commission communication on ‘safe operation of mining activities’ (COM (2000) 664f). After some debate, the mining sector expressed its willingness to participate in the development of BAT document, which has since been compiled to ‘first full draft’ status by an “expert” group comprising public authorities and industrial representatives.

For the purpose of this paper, the key policy initiative was the development of a completely new proposed directive on mining waste. This proposed directive was intended to be based on article 175 (1) of the Treaty, and as such it would follow the complex co-decision procedure for a Directive of the European Parliament and of the Council. This procedure includes sequential steps involving the European Commission, the European Parliament and the European Council. The European Commission has a central role as the originator of legislation. The first step is completely controlled by the Commission. In this particular case, it started with the communication after Baia Mare (COM (2000) 664f) and finished with the official presentation by the Commission of a proposal for a Directive on the management of waste from the extractive industries (CEC 2003). The content of a new directive is predominantly shaped by the Unit in charge, which in this case being a waste-focused Unit precluded any awareness of mine water issues. However, as it has been demonstrated above this piece of legislation is critical to cover the gap in European water legislation. So it is very important that all water issues involved in the management of mining waste are properly covered by the directive.

Table 2 Steps in the development of the proposed new directive on mining waste

EC Communication COM(2000)664f	(23.10.2000)
1st Working Document (based on Landfill Directive text)	(15.06.2001)
2nd Working Document (fresh text)	(04.02.2002)
3rd Working Document	(05.06.2002)
Proposed Directive on Mining Waste by the Commission	(02.06.2003)
First Reading Plenary vote by European Parliament	(31.03.2004)
European Council common position	(18.03.2005)
Second Reading Plenary vote by European Parliament.....	(06.09.2005)

Table 2 shows the evolution of the proposed directive through the legislative process. It was initiated with a working document produced by the waste unit of DG Environment which was a carbon copy of the recently approved Landfill Directive. After three public versions of the working document and one version for internal publication the Commission published their text for the proposed Directive in June 2003. The text then went to the European Parliament which added a number of amendments in March 2003. This amended text was considered by the

European Council, which represents the governments of the Member States. The Council approved its version in March 2005. The European Parliament voted again amendments to the text of the Council in September 2005. It is expected that the final text will be approved before the end of this year.

Mine Water Policy Requirements

Based on the analysis of the European policy context, a number of issues can be defined that should have been taken into account in the policy process described above.

1. The integration of the energy and non-energy mining activities which have been treated by the EC as being independent, in spite of their commonality of process and management techniques of mine water.
2. The desirability of taking a full life-cycle approach to the environmental regulation of mining activities, as opposed to concentrating exclusively on accidental pollution (e.g. dam breaks) and management of waste facilities.
3. The scope of the draft BAT document should be expanded to encompass key mine water issues as well as wastes.
4. The need to ensure that the strong links between mine wastes and the mine voids they created are taken fully into account in the design of management strategies in the mining waste initiative.
5. The key environmental issue in the mining sector is pollution from abandoned mines. The new Directive should require EU Member States to launch national 'rolling programmes' of remediation for pollution associated with abandoned mine sites. Sites should be prioritized and address sequentially according funds availability.
6. The degree to which the policy initiatives take into account the scale of the river basin unit defined by the WFD, and the need for the implementation plans for the WFD to incorporate specific guidance on the management of mine water pollution.

Assessment of Policy Developments

Seveso II

In its original proposal the European Commission [COM (2001) 624f] amended the Directive to include only chemical and thermal processing of minerals and related storage operations and tailings disposal facilities, as long as they involve dangerous substances regulated by the Directive. The European Parliament introduced new amendments calling for an extension of the scope to all mining activities. Under the final agreement, the Directive covers chemical and thermal processing operations and storage related to those operations plus operational tailings disposal facilities containing dangerous substances, when used in connection with both chemical/thermal and mechanical/physical processing of minerals. The Directive 2003/105/EC of 16 December 2003 amending the Directive 96/82/EC was published in the Official Journal on 31 December 2003. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 1 July 2005.

BAT for Management of Tailings and Waste-Rock

The IPPC Bureau established a Technical Working Group (TWG) in June 2001 to develop a technical document that would contribute to the knowledge available to prevent accidents from tailings and waste-rock disposal facilities and provide technical support for legislative activities of the European Commission (e.g. proposed Directive on mining waste). Usually, TWGs are organised to facilitate the exchange of information between the European Union's Member States and industry under the IPPC Directive but this TWG was set up with the only legal basis of the Communication of the Commission after the Baia Mare Task Force [COM (2000) 664f]. The TWG decided that within the scope of the work were activities related to mineral processing, tailings and the waste-rock management of ores that have the potential for a significant environmental impact or that can be considered as examples of good practice. The document covers 14 metals, 10 industrial minerals, coal only if processed (lignite is not covered) and oil shales. The issue of abandoned mines is not addressed in the work.

Proposed Directive on the management of waste from the extractive industry

The Common Position of the Council (CEU 2004) is quite close to the Commission proposal and does not include most of the amendments from the 1st Reading of the Parliament. Paradoxically, the recent vote of the 2nd Reading in the newly elected Parliament has not supported many of the amendments previously introduced by this entity. This means that the final text will certainly resemble the Common Position of the Council. The scope is still reduced, with inert waste and unpolluted soil excluded from Articles 7, 8, 11(1) and (3), 12, 13(4), 14 and 15 unless they are in a Category A (higher risk) facility, which is an improvement from the Commission's position. Article 10 (Excavation voids) is kept nearly with the same contents as in the Commission's proposal, which practically guarantees that this ERMITE contribution to the policy process will appear in the final version of the text. The Parliament has introduced the words "*waste and other extracted materials*" to ensure that the stability of and prevention of pollution from backfilled materials are included in the Directive. Article 11 (Prevention of water status deterioration, air and soil pollution) is also very similar to the Commission's version. So it maintains the strong water status deterioration wording introduced in the first versions of the working documents but it doesn't include that paragraph suggested by ERMITE which reproduced the provisions of The UK's Mines (Notice of Abandonment) Regulations 1998. However, this paragraph was reintroduced in the 2nd Reading of the Parliament and may reach the final version. Regarding abandoned waste facilities, a new Article 18a (Inventory of closed waste facilities) goes further than the Commission and makes mandatory to draw up and maintain inventories of closed facilities (including abandoned facilities) which cause a serious impact or have the potential to cause it. Article 19 (Exchange of information) only requires exchange of information with a view to developing methodologies relating to the fulfillment of Article 18a and the rehabilitation of closed facilities, falling short of requiring any remediation at all.

Conclusions

The overall picture at the European level is that the policy framework for mine water management has improved considerably since the Aznalcóllar and Baia Mare disasters. The combination of the four policy developments described above guarantees a much higher degree of environmental protection. However, the resulting framework is still quite patchy from the perspective of mine water management. The strong waste bias of the main policy initiatives has

prevented the emergence of a more comprehensive regulatory regime. The outcomes of the policy process can be analyzed using the 6 criteria presented above.

1. The outcome has been quite satisfactory in relation to overcoming the artificial segregation of mining activities. The scope of all initiatives includes both energy and non-energy activities. However, the energy lobby did succeed to win the exception of including coal only if processed (lignite is not covered) in the BAT document.
2. This is one of the main failures of the current approach. With its focus on the management of waste facilities it has created a regulatory regime that does not correspond to current best practice in the industry, where the whole site is treated in an integrated manner with preparation of the post-closure phase from the very beginning of the design. Attention to full life-cycle management of waste facilities did improve during the discussions of the proposed Mining Waste Directive. However, it is only the version arising from the 1st Reading of the European Parliament that presents a satisfactory framework. This version was weakened in the 2nd Reading and will not appear in the final text.
3. The BAT document (IPPC Bureau 2004) does include techniques for the prevention of emissions to water with, amongst others, sections on seepage management (4.3.10) and techniques to reduce emissions of water (4.3.11). However, the treatment of these subjects is very parsimonious (passive treatment is covered in one page and a half) and does not provide enough operational information. This is partially compensated with the inclusion of practical examples in the Section 3 (Applied Processes and Techniques). The main problem with the BAT is its very focused scope, which only covers the following topics in active mines (although some examples of recently closed mines are discussed):

- Waste-rock management
- Mineral processing relevant to tailings management
- Tailings management
- Topsoil and overburden if they are used in the management of tailings.

This is very far from providing a comprehensive BAT framework for the management of mine water in mining operations.

4. Thanks to the efforts of ERMITE, Article 10 of the Mining Waste Directive will cover excavation voids. However, the necessary measures for the prevention of pollution at closure are only included in the version arising of the European Parliament.
5. Together with the scope this is the big remaining open issue. Only the version of the 1st Reading of the Parliament included the duty of restoration of abandoned sites (not only waste facilities). As it stands, the version of the Council will only force countries to draw lists of abandoned waste facilities and not actually to do anything about them. This entails three major mistakes. Firstly, drawing lists only of abandoned waste facilities will miss the main sources of pollution which are the mining voids, as the UK experience has demonstrated. Secondly, only the duty to start a program of remediation will guarantee that something is actually done about the worst cases. Thirdly, the Water Framework Directive will force anyhow to restore some of these sites. The UK experience has shown that the most cost-effective way of doing it is with national remediation programs which

can harness the necessary expertise and bring economies of scale and not with the ad-hoc remediation of independent sites

6. One of the successes of the ERMITE project has been the cross-referencing of the WFD with the proposed Mining Waste Directive. However, the implications of this connection have not been yet appreciated by any of the policy actors, except for WWF. The WFD team at the European Commission is too busy with the implementation strategy of the WFD to champion the river basin perspective in the discussions about the environmental regulation of mining, and they lack the expertise to appreciate the implications. ERMITE has produced thorough guidelines to minimize the mining impacts in the water environment (ERMITE Consortium 2004). The Common Implementation Strategy working groups should produce a similar document.

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Literature Cited

- Amezaga, J.M. 2005. Harmonising Policy and Technology: Environmental Regulation of Mine Waters in the United Kingdom and European Union. PhD Thesis. University of Newcastle-Upon-Tyne, UK.
- Baia Mare Task Force 2000. Report of the International Task Force for Assessing the Baia Mare Accident. December 2000.
- Commission of the European Communities 2000. Communication on Promoting sustainable development in the EU non-energy extractive industry. COM (2000) 265 final.
- Commission of the European Communities 2003. Proposal for a Directive of the European Parliament and of the Council on the management of waste from the extractive industries. COM (2003) 319final.
- Council of the European Union 2004. Proposal for a Directive of the European Parliament and of the Council on the management of waste from the extractive industries- Political agreement. (2003/0107 (COD)).
- ENDS 2002. European Court rules again on the meaning of “waste”. ENDS Report 328, May, pp. 55-57.
- ERMITE Consortium 2004. Mining Impacts on the Fresh Water Environment: Technical and Managerial Guidelines for Catchment-Focused Remediation”. In Younger P.L., Wolkersdorfer C. (eds) Mine Water and the Environment, Suppl. Issue 1. Berlin: Springer: ca. 80

- Ginige T. 2002. Mining waste: The Aznalcóllar tailing pond failure. *European Environmental Law Review*, March 2002, 76-88. <http://dx.doi.org/10.1023/A:1014710720079>.
- Hámor T. 2002. Legislation on mining waste management in Central and Eastern European Candidate Countries. Joint Research Centre of the European Commission, Ispra, EUR 20545 EN, 196p.
- IPPC Bureau 2004. Draft Reference Document on Best Available Techniques for Management of Tailings and Waste-Rock in Mining Activities. European Commission, JRC-IPTS, IPPC Bureau.
- Krämer L. 1999. El accidente de Aznalcóllar y el derecho Comunitario ambiental. *Revista Mensual de Gestión Ambiental*, 5, 13-24.
- Kroll A., Amezaga J.M., Younger P.L., Wolkersdorfer C. 2002. Regulation of Mine Waters in the European Union: The contribution of scientific research to policy development. *Mine Water and the Environment*, 21, 193–200. <http://dx.doi.org/10.1007/s102300200043> 0.
- Younger P.L. 2002. Coalfield closure and the water environment in the EU: Perspectives from the Fifth Framework research community. *Transactions of the Institution of Mining and Metallurgy (Section A: Mining Technology)*, 111, A201-A209. <http://dx.doi.org/10.1179/mnt.2002.111.3.201>.