

Padre-Partnership for Acid Drainage Remediation in Europe

L. Alakangas¹, B. Azzie², A. P. Jarvis³, L. Lindahl⁴, J. Loredó⁵, F. Madai⁶,
I. F. Walder⁷, Ch. Wolkersdorfer⁸

¹Luleå University of Technology, Sweden; ²Golder Associates, Ireland; ³University of Newcastle, UK; ⁴SveMin, Sweden; ⁵Oviedo University, Spain; ⁶University of Miskolc, Hungary; ⁷Kjeøy Research & Education Center, Norway; ⁸Cape Breton University, Canada

Key Words Acid rock drainage, mine leachate, PADRE, mining wastes, mitigation

Extended Abstract

Acid drainage is recognized of being the single greatest environmental challenge in the mining sector worldwide. Both, active and abandoned mine sites from as far north as Spitzbergen down to far south Mediterranean Europe are effected by mine drainage, the majority of them being acidic and adding substantial pollutant loads to the environment. European mine water problems usually emanate from abandoned mines of which several thousand can be found in nearly all European countries. Similar problems have been recorded on a worldwide scale though the huge problems are often connected to active mining operations.

When the "European Mining Waste Directive", was first discussed, European policy makers were not aware of the problems connected to mine waters and wastes. In the frame of several EU funded projects (e.g. PIRAMID, ERMITE), some of the authors were able to interact with the policy making process in a positive way. Yet, it became clear that mine drainage research in Europe has to be concentrated to avoid unnecessary duplication of results in all the European research groups. A similar move already had been done on a worldwide scale forming the Global Alliance consisting of INAP (International Network for Acid Prevention), MEND (Mine Environment Neutral Drainage, Canada), and ADTI (Acid Drainage Technology Initiative, USA), and, as a new member, PADRE (Partnership for Acid Drainage Remediation in Europe), SMIKT (Sustainable Minerals Institute Knowledge Transfer), WRC (South African Water Research Commission), SANAP (South American Network for Acid Prevention), CNAMD (Chinese Network for Acid Mine Drainage), and INAD (Indonesian Network for Acid Drainage).

PADRE (www.PADRE.IMWA.info) is a commission of IMWA (International Mine Water Association) and partner of the Global Alliance convened by INAP. PADRE was founded in 2005 by Prof. Paul Younger and Prof. Christian Wolkersdorfer with the aim of fostering best practice, based on the latest research, in the remediation of acidic drainage from active and abandoned mine sites throughout Europe. In 2010, a reorganisation of PADRE

was performed with aim to increase the cooperation between industry, consultants and researchers regarding Acid Rock Drainage and its prevention and mitigation in Europe. The plan is to present a new Executive Council of PADRE in 2011 with updated statutes, and initiate annual workshops. PADRE wants to become a counsellor for those interested on issues concerning Acid Rock Drainage in Europe.

As such, PADRE is endeavouring to ensure that professionals developing solutions to mining pollution are aware of the complimentary work of others across Europe, and that internationally significant work conducted in Europe is effectively rolled out to a global audience.

Besides many other subjects, such as mine water treatment or mine water management, PADRE members are involved in work related to the legislation of mine wastes in Europe. European Union legislation for wastes from the extractive industry strongly influences approaches to mine waste/water management. However, because Europe-wide legislation is subject to national-level transposition and implementation, the overall picture of mine waste/water management in Europe is complex. There are nevertheless some research and development themes that are common across Europe. These include efforts to improve characterisation and prediction of drainage, the development of small-footprint passive treatment systems, and the development of approaches for compiling risk-based inventories of wastes from the extractive industry at a national scale. In addition, there is an increasing emphasis on identifying more sustainable approaches to mine waste and water management, such as the use of waste products for remediation, and the recovery of valuable metals from abandoned mine waste streams. There is also a collective concern to understand and assess the long-term geotechnical risk, and therefore avoid in the future, catastrophic tailings dam failures, such as the most recent at the Ajka bauxite residue depository in Hungary in October 2010.

The main objective of PADRE is to successfully address water problems in Europe that occur during the exploration, planning, operation, and clo-

sure of mines as well as after the closure of mines and at mine waste storage facilities. PADRE is a network that aims to achieve this overall goal by pursuing the following objectives and to provide guidance on such matters as:

To promote international best practice in the stewardship of waters, soils and subsoil environment on European sites subject to the generation and migration of acidic drainage.

To provide a network and collaborative platform foster collaborative, for European and international research and development into techniques for the prediction, characterisation and abatement of acidic drainage in Europe.

To promote dissemination of knowledge of current best-practice and innovations relating to acidic drainage prediction, prevention and remediation, with particular reference to European conditions, including the evolving framework of relevant EU legislation.

To advance the training of present and future generations of European professionals who will engage in the art and science of acidic drainage prediction, prevention and remediation.

To actively collaborate with a Global Alliance of organisations based in other continents which share similar objectives.

Relevant Literature (PADRE, ERMITE, PIRAMID)

Amezaga J M, Younger P L. 2004. ERMITE: Supporting European Policy making on Mine Waste and Waters. In: Jarvis A. P., Dudgeon B. A., Younger P. L. mine water 2004 – Proceedings International Mine Water Association Symposium, vol. 1. Newcastle upon Tyne: University of Newcastle: 41–46.

Betlem G, Brans E H P. 2002. The Future Role of Civil Liability for Environmental Damage in the EU. Yearbook of European Environmental Law; 2:183–221.

ERMITE Consortium, [eds. Younger P, Wolkersdorfer Ch.]. 2004. Mining Impacts on the Fresh Water Environment: Technical and Managerial Guidelines

for Catchment Scale Management. Mine Water and the Environment; 23(Supplement 1):S2-S80.

Kroll A, Amezaga J M, Younger P L, Wolkersdorfer Ch. 2002. Regulation of Mine Waters in the European Union: Contribution of Scientific Research to Policy Development. Mine Water and the Environment; 21(4):193–200.

PIRAMID Consortium. 2003. Engineering Guidelines for the Passive Remediation of Acidic and/or Metalliferous Mine Drainage and similar Wastewaters. Newcastle Upon Tyne: University of Newcastle Upon Tyne: 166.

Wolkersdorfer C, Hasche A, Tschapek J, Veselic M, LeBlanc M. 2002. Scoping Study: Applicability of PIR Systems to mine waters in Eastern and Southern Europe. In: Prokop G., Montag I., Spausta G., Kiss G. Karlsruhe: Proceedings, First Image-Train Cluster-Meeting: 151–159.

Wolkersdorfer Ch, Younger P L, Bowell R. 2004. PADRE – Partnership for Acid Drainage Remediation in Europe. Mine Water and the Environment; 23(4):181–182.

Wolkersdorfer Ch, Younger P L, Bowell R. 2006. PADRE – Europäische Partnerschaft für die Sanierung saurer Grubenwässer (Partnership for Acid Drainage Remediation in Europe). Wissenschaftliche Mitteilungen; 31:213–217.

Younger P L. 2001. Passive Treatment of European Mine Waters: the European Commission's 'Pyramid' Project. Belo Horizonte: Proceedings, IMWA Symposium Belo Horizonte: 1–10 [CD-ROM].

Younger P L, Wolkersdorfer Ch, Bowell R J, Diels L. 2006. Partnership for Acid Drainage Remediation in Europe (PADRE) – Building a better Future founded on Research and best Practice. ICARD 2006, vol. 7. St. Louis: Proceedings, International Conference of Acid Rock Drainage (ICARD): 2571–2574 [CD-ROM].