European deposits of black shale ores, in particular, the “Kupferschiefer”, contain considerable reserves of base, heavy, rare and precious metals (Cu, Ni, Zn, Pb, Ag, Zn, Co, Mo, Re, V, Se, Sn, Bi, Au, Pt, Pd, etc.) of which Europe is the main consumer. The black shale ores are typically poly-metallic ores with a variable proportion of sulphidic components. In black shale ores, metal-bearing compounds are dispersed as small-size particles and the valuable metals may be trapped in organic matter in the ore or in slimes.

The main milestones of the project are the following:
- Evaluation of the geological resources (geological modelling);
- Selection of metal-bearing components & biological consortia to be tested;
- Assessment of bioprocessing methods and determination of complementary hydrometallurgical processing routes for metals recovery;
- Risk assessment relative to wastes management of the new processing routes;
- Techno-economic evaluation of new processes from mining to metal recovery including social and environmental impacts.

The innovations should have a long-term impact on the mining industry with regard to the challenge of creating knowledge-based industries.

Two major difficulties restrict the exploitation of such abundant resources: Low efficiency of the conventional techniques from mining extraction to metallurgical processing; Environmental impact of the application of the conventional techniques.

Bioleaching processes are an industrial reality for the recovery of some metals (Co, Cu, Au) and the treatment of some minerals (sulphides). The potential of applications for the recovery of other metals (rare and precious metals) from other minerals (such as black shales) is very significant.

Three Black shale deposits, under natural conditions (Talvivaara), during mining (Lubin) and after mining (Mansfeld) have been chosen as targets of the project R&D actions. The social and economic benefits of this project would be the extension of the exploitation life of European mining sites in operation (Lubin) and to allow exploitation of new resources with considerable reserves (Talvivaara).
SEARCH FOR SUSTAINABLE WAY OF EXPLOITING BLACK SHALE ORES USING BIOTECHNOLOGIES

A SPECIFIC TARGETED RESEARCH PROJECT CO-FUNDED BY THE EUROPEAN COMMISSION (FP6 PROGRAMME)

Contract - NMP2 - CT - 2004 505710

VISIT OUR WEB SITE:
http://bioshale.brgm.fr

GENERAL INFORMATION

- Duration: 3 years (start date 1st October 2004)
- Total budget: 3.4 M€ (EC 2.3 M€)
- Partnership: 13 Partners/8 European countries
- Project efforts: 553 MM (+226 MM Universities Own resources)
- Reporting: 22 Deliverables

CONTACT/PROJECT COORDINATION

Dr. Patrick d'Hugues
Environment & Process Division
3 Avenue Claude Guillemin BP 6009
45060 Orléans cedex 2 – France
tel. +33 2 38 64 35 96, fax. +33 2 38 64 36 80
e-mail: p.dhugues@brgm.fr - bioshale@brgm.fr