



Exploitation of mineral raw materials and environmental impact of mining

L. Filippov

Work load: 10 h lectures

6h : Field trip

8 h: Practical work

Number of credits: 2ECTS

► *Intended learning outcomes:*

After completion of the course, the student will have knowledge on the environmental impact of mining.

Industrial sites, of which mining sites are a special case, catalysts for human activity, are today, when they are shut down or even while they are still in activity, objects of mistrust. Sometimes important issues in land use planning because of their location, these are complex objects where natural objects (soil, subsoil, original ecosystems) and objects resulting from human activity are superimposed. Their description and their treatment mobilize very varied disciplines, ranging from earth sciences to sociology, linked to economic activity, their rehabilitation is very often guided by unscientific considerations (for example "the urgency", "the precautionary principle"...). The future executives that we train will be immersed in these debates and they will have to make reasoned and reasoned decisions.

This module will make it possible to put in relation the knowledge already acquired during their course and to put it at the service of the comprehension of the objects and the past and present phenomena constituting a studied industrial site. Contributions will be made to complete this training.

Upon completion the students will have the:

1. Ability to describe the condition of an abandoned mining site, to estimate the risks and to consider the interventions leading to its restoration
2. Ability to set up an administrative file related to mine sites at the end of their life



► *Contents:*

INTRODUCTION (N. Sauzay)

1. Definitions: Hazards, risks
2. Legislative and normative aspects, post-mining administration: soil and subsoil law, mining code, ICPE, Seveso, waste categories, standards (ISO 14000, discharges), environmental responsibility

MINING SITE ENVIRONMENT

1. Problems of the industrial environment. Specificities of the mining environment (Ph. Marion)
2. Environment in post-mine context. Analysis and recognition of health and environmental risk (A. Stephant)
3. Acid mine drainage, Monitoring of the water quality, hydrogeology and hydrogeochemistry of abandoned mines (L. Filippov)

SITE REHABILITATION

1. The site of an old pyrite mine exhibiting AMD phenomena will be visited at the start of this module: 1 day (2 teachers).

CASE STUDY

Work on documents concerning a specific site and comprising parts falling under the regulatory constraints "mining code" and "ICPE"; techno-economic aspects of a final DADT work stoppage file; two and a half days (animators: N. Sauzay, Ph. Marion, A. Chagnes). The objective of this summary work is a fictitious filing of the file with the competent authorities.

► *EIT Overarching Learning Outcomes (OLOs)*

This course mainly contributes to two overarching learning outcomes:

EIT OLO 1: How to manage the closed mine site

EIT OLO 6: Field trips to ancient mining sites for environmental assessments and evaluation of the impact of tailings on the water quality and the proposition of the rehabilitation methods based on the onsite observation and in situ measurement of some physical chemistry parameters

► *Prerequisites :*

Essential (ENSG S5 to S7 core curriculum, or equivalent): Contents of modules 1a and 2a ENSG or their equivalent: resistance of materials, geomechanics, fluid mechanics and transfer phenomena, hydrogeology, geochemistry and water chemistry, mineralogy

Desired (ENSG or other specializations): Mineralogy (S8), geology (S8).

► *Assessment methods:*

Technical visit report (in groups of 2 or 3) and weekend case study report (groups of 4)