



**HAL**  
open science

## Training project "Management of polluted sites and soils and mineral waste processing/recycling"

Fernando Pereira, Valérie Locurto, Virginie Ouya, Didier Graillet, Ana Cameirao, Julie Cazal, Jean-Michel Herri

### ► To cite this version:

Fernando Pereira, Valérie Locurto, Virginie Ouya, Didier Graillet, Ana Cameirao, et al.. Training project "Management of polluted sites and soils and mineral waste processing/recycling". 2èmes Rencontres Scientifiques: Réhabilitation et Valorisation des Sites et Sols pollués - 2nd Scientific Meeting: Rehabilitation of polluted Sites and Soils, RV2S/RSS 2018, Oct 2018, Saint-Etienne, France. Ecole Nationale d'Ingénieurs de Saint-Etienne, pp.141, 2018, Proceeding: 2èmes Rencontres Scientifiques : Workshop Réhabilitation et valorisation des sites et sols pollués; Proceeding: 2nd Scientific Meeting: Workshop on Rehabilitation of polluted Sites and Soils. emse-03152482

**HAL Id: emse-03152482**

**<https://hal-emse.ccsd.cnrs.fr/emse-03152482>**

Submitted on 25 Feb 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# TRAINING PROJECT

## "MANAGEMENT OF POLLUTED SITES AND SOILS AND MINERAL WASTE PROCESSING/RECYCLING"



Fernando PEREIRA (1, 3)  
 Valérie LOCURTO (2)  
 Virginie OUYA (2)  
 Didier GRAILLOT (1, 3)  
 Ana CAMEIRÃO (1, 4)  
 Julie CAZAL (2)  
 Jean-Michel HERRI (1, 4)

1 - Mines Saint-Étienne - Centre "Sciences des Processus Industriels et Naturels" (SPIN) - "Département Procédés pour l'Environnement et les Géo-ressources" (PEG) - Saint-Étienne (France), 2 - Mines Saint-Étienne - "Direction de la Recherche et de l'Innovation" (DRI) - Saint-Étienne (France), 3 - CNRS ("Centre National de la Recherche Scientifique") UMR ("Unité Mixte de Recherche") EVS ("Environnement, Ville et Société") 5600 - Lyon (France), 4 - CNRS UMR LGF ("Laboratoire Georges Friedel") - Saint-Étienne (France) [Contact : [fernando.pereira@mines-stetienne.fr](mailto:fernando.pereira@mines-stetienne.fr)].

### Context

The area of depollution is undergoing significant growth since 2000. The rehabilitation of polluted sites and soils was worth some 200 M€ in 2000, approached 500 M€ in 2010 and reached 560 M€ in 2012 (ADEME, 2013). After a two-year economic slowdown, a market analysis study (Xerfi institute, 2015) projected that the turnover of the companies concerned should grow of considerable form in the future. The regulatory backgrounds (in perpetual evolution) of the cutting back of raw materials (especially, metals) and the land resource (often situated in urban areas) optimization bring real growth opportunities to the sector.

### Description of the training

The training program will be specifically designed to answer to an identified expertise demand regarding mineral waste treatment schemes. It will provide tools to solve any shortcoming or challenge linked to the processing and recycling of contaminated mineral matrices (soils, sludge, sediments, excavated soil, byproducts and waste) and will be aimed at developing teachings useful in proposing sustainable, integrated and economically rational solutions that address the full range issues posed by these materials since their on-site management until their evacuation, treatment and reuse. All this taking into account the environmental and sanitary impacts that their implementation, treatment and reuse cause.



#### Methodologies for contaminated-site characterization

- Diagnoses implementation to fully understand the routes of exposure to harmful substances.
- Definition of the modalities for the site development and remediation.
  - Quantification and characterization of the contaminated mineral matrices volumes.



#### Processing/recycling techniques

- Treatments by isolation and containment and/or inerting techniques.
  - Treatments by oxydation/reduction.
- Treatments by extraction (mineral processing, hydrometallurgy, thermal treatment, venting, etc.).
- Treatments by degradation (phytostabilisation, phytoremediation, etc.).



#### Risks study

- Pollutant transfer processes in soils and underlying aquifers (bio-indication, etc.).
- Management tool for polluted sites and soils according to the use.
  - Experimental modeling/simulation.



#### Regulatory, territorial, social and economic approaches

- Organization and spatialization of the information.
- Tools for environmental impact assessment.
- Land and regulatory aspects.
  - Financing instruments.

### Objectives

Training expert engineers in the area of the management of polluted sites and able to:

- Manage project portfolios linked to the processing/recycling of contaminated mineral matrices (soils, sludges, sediments, by-products, etc.),
- Develop a circular economy with a sustainable development approach,
- Apply the engineering of environment to the sites remediation.

