

## TOWARDS SUSTAINABLE SEDIMENTS MANAGEMENT SOLUTIONS

### WASTE Focus 1

The limited capacities of technical landfill sites in terms of the volumes of polluted sediments to be managed and the priority given to recovery according to the hierarchy of waste management methods call for research into ways of sustainable sediment management, which are alternatives to disposal. Recent research efforts include the SOLINDUS and VALSOLINDUS<sup>1</sup> projects, which have opened up encouraging prospects.

#### Separating fractions, concentrating pollutants

The SOLINDUS project has made it possible, among other things, to create a semi-industrial sediment treatment platform in 19 stages (1 m<sup>3</sup>/h capacity), capable of producing 5 granulometric fractions with stable characteristics, despite the variability of the input materials, the finest of which (fractions F4 and F5)<sup>2</sup> contain most of the pollutants. A clean-up treatment of the F4 fraction using flotation has also been developed: using chemical reagents and the addition of air, the pollutants (Cu, Zn, Pb) are forced out and concentrated in foams which float on the surface. The share of polluted sediments is therefore reduced by concentration in a small quantity of matter. The stability of the fractions produced also makes them amenable to recovery.

#### Possible industrial applications

Industrial valorisation tests have been conclusive in the following areas:

- the validation (on 50 kg) of an incorporation of 5 to 10% of the F5 fraction or a mixture of the F4 and F5 fractions as a substitute for natural clay in the manufacture of bricks;
- the validation (on 40 kg) of an incorporation of 10 to 20% of the F5 fraction, mixed in particular with natural clay, in the manufacture of expanded clay aggregates.

The benefit of such applications lies in (i) the recovery

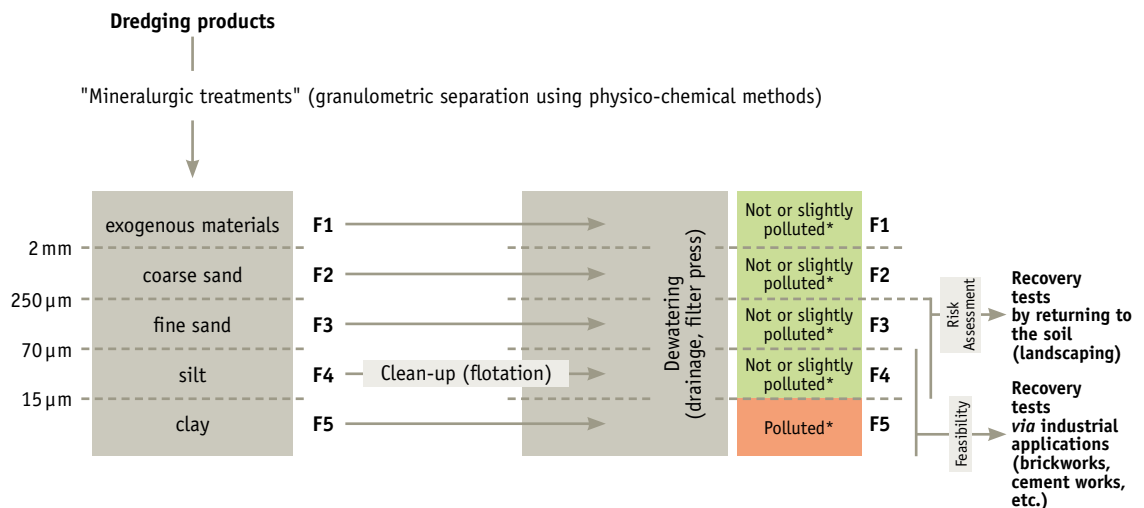
of the organic matter present in the sediment (calorific value), (ii) the destruction of organic pollutants, (iii) the recovery of the mineral fraction as raw material, (iv) the fixation of trace metals in an inert matrix that subtracts them from biogeochemical cycles.

#### Continue assessing the risks of return to the ground

With the VALSOLINDUS project, the feasibility of recovery (landscaping) of treated sediments (fractions F3 and F4)<sup>2</sup> by incorporation into the soil (0%, 20%, 50% and 100% of sediments) was also tested on test plots by monitoring the evolution of plant biomass (ray-grass), the evolution of biodiversity by colonisation and soil-plant transfers. In relation to the control plots, the biomass produced decreases but without bioaccumulation of metals. Ecotoxicity tests<sup>3</sup> indicate that there are no effects on nitrifying bacteria, but that earthworm reproduction is reduced, without causing mortality.

<sup>[1]</sup> Cofinancing by Wallonia - ERDF fund over the period 2007-2015; partnerships CTP, ISSeP, INISMa and DGO2 (SOLINDUS) and ISSeP, CTP, Carah, UMons and DGO2 (VALSOLINDUS) | <sup>[2]</sup> F3 (fine sand, 250µm - 70µm), F4 (silt, 70µm - 15µm) and F5 (clay, < 15µm) | <sup>[3]</sup> Inhibition test for the nitrification potential of nitrifying bacteria and reproduction and avoidance tests on the earthworm *Eisenia fetida*

Fig. WASTE Focus 1-1 Principles and objectives of the SOLINDUS and VALSOLINDUS projects in Wallonia



According to the criteria of the Wallonian Government Decree of 30/11/1995