Biotechnological slurry process for excavated-soil decontamination

PhD-student: René Kleijntjens
Promotor: Prof. ir K.Ch.A.M. Luyben
Supervisor: Dr ir R.G.J.M. van der Lans (Hydrodynamics, scale-up)
Institute: Delft University of Technology, Department of Biotechnology, section BioProcess Technology
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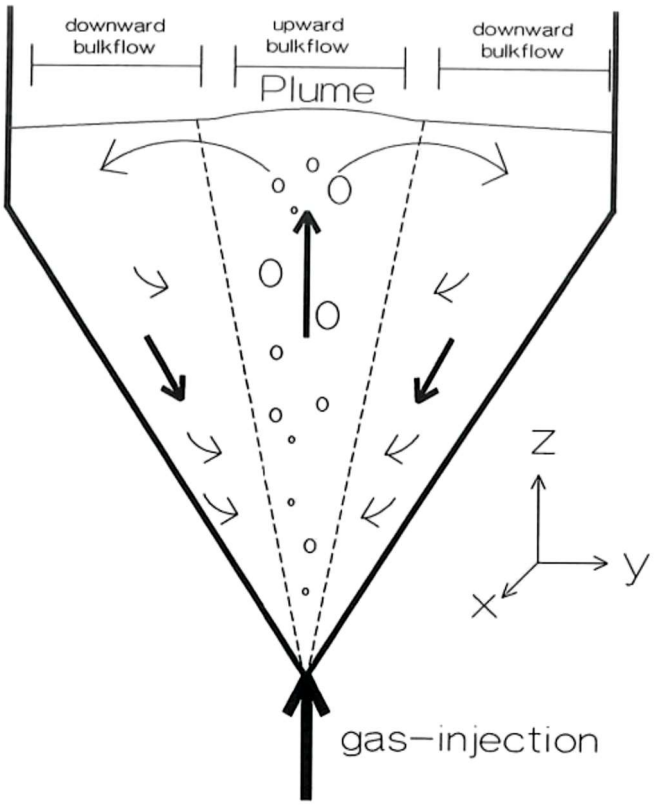
Description



The environmental threat originating from contaminated land (and contaminated groundwater) have been recognized as a serious problem. One of the first operational techniques for soil decontamination was thermal treatment. However, a major disadvantage of thermal treatment is the poor quality of the product. To decontaminate soil without destroying its fertility, biological techniques are considered attractive remediation alternatives.
In this project the development of a biotechnological slurry process for the decontamination of excavated polluted soils is described. The slurry process is especially designed to decontaminate soils polluted with organic compounds (e.g. oil). Crucial in the slurry process is the use of three phase (soil-water-air) suspension bioreactors. In these bioreactors, natural microbial communities are used, originating from polluted harbour sludge.
In order to design a large-scale reactor, the proper design parameters are identified. Both kinetic experiments at 40 liter scale and hydrodynamic experiments at 4 m^4 are carried out. The latter has a - new – geometry: The Dual Injected Turbulent Separation (DITS) reactor. In this reactor, the coarse soil fraction (particle size larger than ≈700 m) is fluidized at the bottom, while the polluted fines are kept in suspension in the bulk. Subsequently the fluidized fraction is withdrawn. Once the coarse fraction has been removed, the fines are further processed in a cascade of air agitated slurry reactors. Final step is the remixing of both fractions in a dewatering section.

Dissertation

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