

Internship proposal 2019 – 2020 Master 2 or 3rd year of Engineering School

Offer date: 09/12/2019

Title: Experimental study of the polluted soil remediation using surfactant foam injection in heterogeneous aquifers

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Internship laboratory: Bureau de Recherches Géologiques et Minières (BRGM) at Orléans (6 mois);
Collaboration with Bordeaux University

Internship duration: 6 months, from February (or March) to July (or August) 2020

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Context and objectives

The injection of foam presents an innovative alternative and a large industrial application interest for in situ remediation of contaminated soil, especially, for aquifers with significantly high permeability and strong heterogeneity. The use of foam for environmental remediation is not well developed because of significant differences in its application contexts (compared to Enhanced Oil Recovery). In petroleum engineering, foams are used at high depths in consolidated rocks at high pressures and temperatures, while in the case of soil remediation operations; they must be implemented in unconsolidated shallow soils. The foam injection conditions and formulations should be therefore different for remediation applications. Although the technique appears promising, a better understanding of the mechanisms and their modeling are still necessary before considering its application on a pilot scale. Moreover, a priori evaluation of its generation and injection conditions is also required.

For this purpose, this internship aims to 1) find suitable liquid foam enable to reduce pollutant from contaminated soil in heterogeneous aquifer conditions; 2) evaluate the impact of presence of pollutant on the generation and stability of the foam in porous media. The effect of foam on pollutant recovery will be tested for a series of chosen surfactants in a 1D column in presence of pollutants. These experiments will first be carried out in surfactant-saturated columns by co-injecting the surfactant with gas to produce foam. This step will test the generation and propagation conditions of the foam in porous media.

The intern will also participate, through his experimental results and knowledge of the bibliography, the development of the phenomenology of foam flows in porous media. The intern will benefit from the supervision of a PhD student, in addition to that of his internship advisors, to be accompanied in this research work.

Profile of candidate

The intern must have a solid knowledge in fluid mechanics or petroleum reservoir engineering. Knowledge on flow and transport in porous media would be appreciated.

How to apply

A cover letter, a CV and transcripts are to be sent to the supervisors of the internship.