

**NEW LOW CONCENTRATION SURFACTANT APPROACH FOR
SURFACTANT ENHANCED AQUIFER REMEDIATION (SEAR)**

Jeffery Harwell*
Prapas Lohateeraparp
The University of Oklahoma
Norman, OK 73072
Voice: 405-364-9726
Fax: 405-329-1602
jharwell@ou.edu

Tzu-Ping Hsu
Zhixun Lin
Olivia Pierce
Ben Shiau
Surbec Environmental, LLC
Norman, OK

During the development stage of SEAR, surfactant concentrations typically range between 3 to 8 wt% for NAPL remediation. More recently, a low concentration approach (less than 1wt% surfactant) and has become successfully to complete full-scale remediations for the removal of NAPLs at numerous UST, petroleum, and hydrocarbon contaminated sites throughout the United States, Taiwan, and Japan. In addition to significant saving on chemical use, advantages of using a low surfactant concentration include minimizing or eliminating the reuse and recycling of the recovered surfactant, improving the above-ground treatment efficiency and, a shorter time period for residual surfactant to biodegrade. The effectiveness of low concentration surfactant systems requires a system that can be fine-tuned for the specific NAPL at the contamination site. Field results show that more than 95 % of the subsurface NAPL can be pumped to the surface with the injection of between one and two pore volumes of surfactant. Depending on soil permeability, surfactant injection can be completed in a period ranging from as little as 2 to 3 weeks, to as much as 2 to 3 months.

###