NAPL Removal: Surfactants, Foams, and Microemulsions
Stephanie Fiorenza, Clarence A. Miller, Carroll L. Oubre and C. Herb Ward (Eds.); CRC Press, Boca Raton, FL, 2000, 552 pp., US$ 87.95, ISBN 1-56670-467-7

This book (project report) is one of the work products of the Department of Defense research projects guided by C. Herb Ward of Rice University (Houston, Texas). Several of the previous monographs produced by Dr. Ward and his colleagues have been reviewed in previous issues of this journal.

This book, the longest one in the series I have seen yet, is divided into three major sections:

1. Field demonstration of the surfactant/foam process for remediation of a heterogeneous aquifer contaminated with DNAPL.
2. Field demonstration of single-phase microemulsions for aquifer remediation.
3. Design and evaluation of a full-scale implementation of the single-phase microemulsion process.

The problem addressed by this innovative technology is as the title suggests; non-aqueous phase pollutants, e.g. trichloroethane (TCE) as well as other chlorinated solvents whose removal by the conventional pump-and-treat process has proved unsuccessful. To enhance removal, researchers have turned to surfactants that may enhance removal by solubilization and/or mobilization of the contaminant yielding a more effective, uniform sweep of the contaminated soil. The first chapter of the book reports on a field demonstration of the process.

The second major section of the book documents laboratory and field investigations on the use of surfactants/alcohol mixture to solubilize a complex NAPL as a single-phase microemulsion. The aforesaid mixture was evaluated both in the laboratory and in the field.

The third major effort for the project was a field demonstration of the surfactant/foam technology. The process involved the injection and extraction of a surfactant solution into the subsurface to solubilize and mobilize the NAPL. The process was enhanced by the injection of air into the injection wells after the surfactant was added. This section summarizes the laboratory and field pilot-scale demonstration results.

As usual with the previous reports, there are extensive data-containing appendices reporting on analytical procedure and scale-up drawings and cost estimates.

Together, these project reports will provide a valuable repository of hazardous waste site cleanup information.

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