

Analysis of Subsurface LNAPL Body Evolution

Anna Skinner and Tom Sale¹

Department of Civil and Environmental Engineering, Colorado State University

Abstract. Subsurface releases of petroleum liquids (LNAPLs) evolve through time. Initially there is active expansion of LNAPL bodies. With time, LNAPL bodies tend to stabilize and eventually disappear. Unfortunately, processes controlling the evolution of LNAPL bodies, including the benefits of active remediation, are poorly understood. To better understand the evolution of LNAPL releases in the subsurface a series of laboratory sand tank studies were conducted. In support of laboratory studies, models are being developed. Sand tank studies were performed using MTBE as an analog LNAPL due to volatility and solubility considerations. With MTBE, the entire life cycle of an LNAPL body can be observed in days. Different treatment remedies have been simulated. Results to date show that depletion of LNAPL over time can be modeled using combinations of first and zero order rate equations. Ongoing work is focused on resolving appropriate depletion rate constants at field sites. The overarching objective is to provide decision makers with tools that anticipate the benefits of investments associated with remedial actions. This in turn will support development of sustainable remedies for LNAPL sites.

¹ Groundwater Environmental Hydrogeology Program
Civil Engineering Department
Colorado State University
Fort Collins, CO 80523-1372
Tel: (970) 491-8413
e-mail: TSale@engr.colostate.edu