Ground Water Quality and Geochemistry

Course Description

This course will introduce the chemical principles needed to understand equilibrium chemical reactions in ground-water quality and geochemistry, and discuss relevant case studies of contaminant fate and transport. The focus will be on chemical reactions that occur in natural waters that affect water quality in the subsurface. Topics covered include: (1) a review of aquatic chemistry; (2) a review of organic chemistry and microbiology; (3) major ion geochemistry; and presentations of case studies of the fate and transport of (4) organic compounds (sewage, hydrocarbons and solvents), and (5) metals (Zn, Cd, Cr, As, Pb, Hg). An introductory college-level chemistry course will be expected as a minimum prerequisite for those attending this course.

COURSE SCHEDULE:

Introduction
Principles of Aquatic Chemistry
Principles of Organic Chemistry and Microbiology

Break

Groundwater Geochemistry
Study: Cape Cod Sewage Plume
Fate and Transport of Hydrocarbons

Lunch

Fate and Transport of Solvents
Fate and Transport of Metals (Zn, Cd, Cr, As)

Break

Fate and Transport of Metals (As, Pb, Hg)
Case Studies of Metals Fate and Transport
Summary
COURSE INSTRUCTOR:

Stephen P. Garabedian, PhD

Stephen Garabedian is an independent hydrogeologist and lecturer working in the New England Region. Steve worked for the U.S. Geological Survey for 30 years, having conducted hydrologic and water quality studies in New England and the Western United States, supervised hydrologic studies in Massachusetts and Rhode Island, and managed the USGS Conte Research Lab in Turners Falls, Massachusetts. His education includes a BS in Geology from the University of Connecticut, an MS in Geology from Penn State, and PhD in Civil Engineering from MIT. He has taught a number of courses on hydrogeology and ground-water hydrology for Boston-area Colleges and Universities, along with short courses for the LSPA.