

Port of San Diego Sediments Treatability Study

General Outline of Scope of Work

PNL Tasks

1. Design and setup laboratory apparatus for reactive cap barriers.
2. Simulate transport phenomena throughout cap and sediment region to optimize design.
3. Work with USC personnel on conducting lab experiments
4. Collect contaminated sediments from Port of SD
5. Submit final report to Port of SD

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USC Tasks

1. Provide laboratory and equipment to conduct experiments.
2. Provide technical support on mathematical modeling of system
3. Provide graduate student to assist in lab setup and perform lab experiments
4. Provide computational resource to conduct simulations



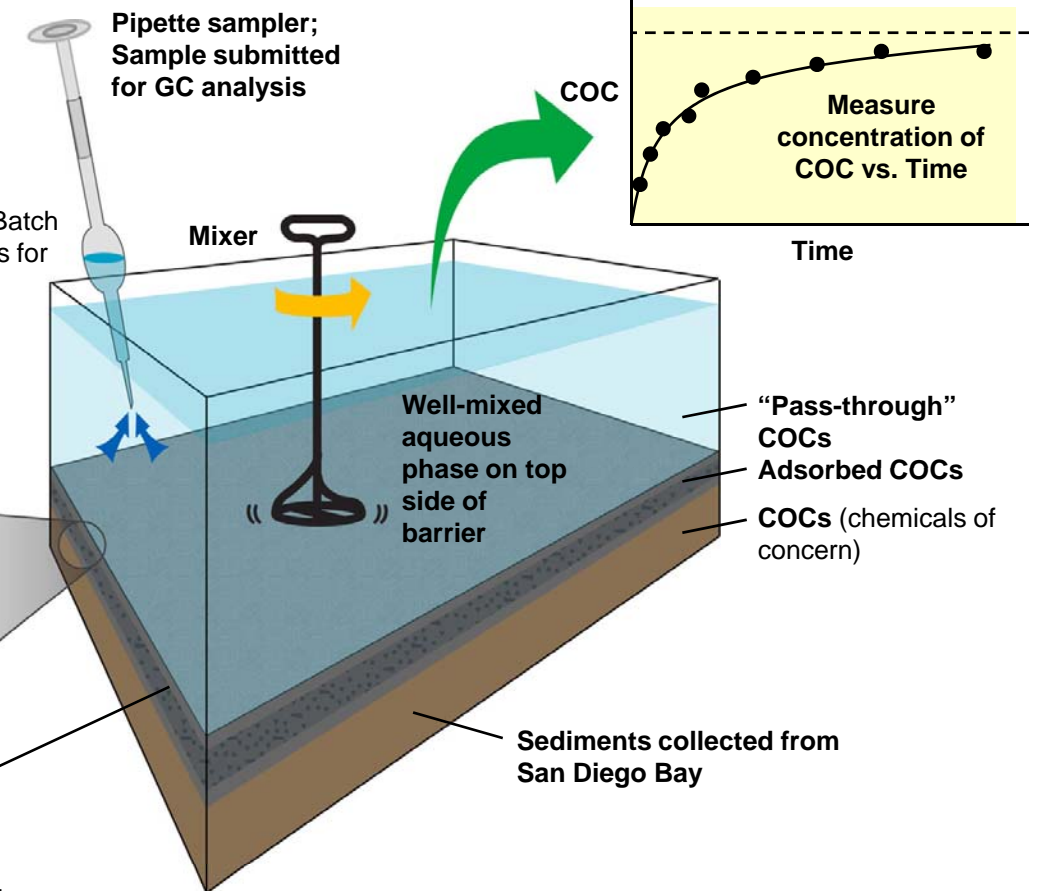
Cap
Contaminated Sediment
Continuous Water Flow

Photograph of Reactive Cap Barrier over Sediments Test Apparatus

Schematic of Batch Test Apparatus for Reactive Cap Simulation

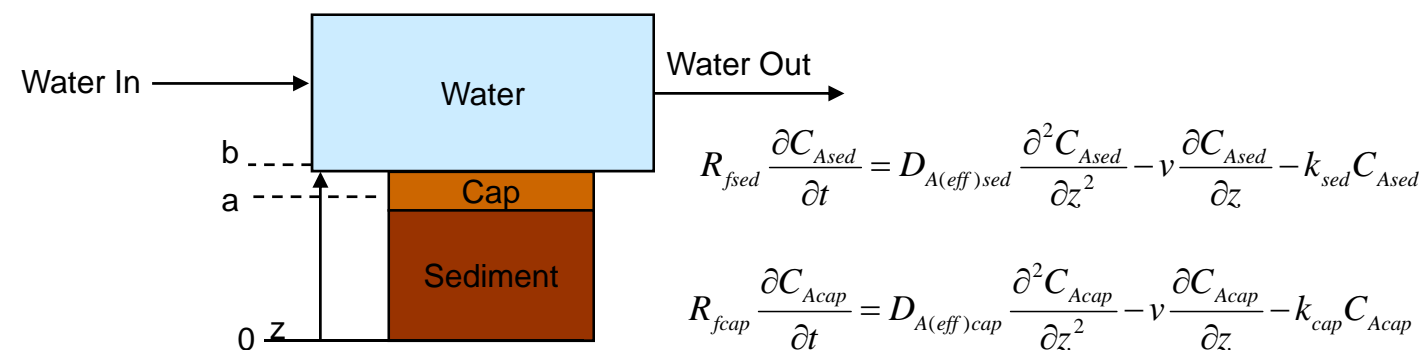
Geotextile layer
Activated carbon layer
Geotextile layer

Sandwiched Cut-off barrier



An example of an adsorptive/reactive, aqueous environment, containment barrier system. Blow up shows activated carbon layer sandwiched between geotextile membranes. (For commercial barrier types, see www.gseworld.com).

Mathematical Modeling Approach



General Approach

1. Create a well-mixed environment over the cut-off barrier.
2. Monitor diffusion/ convection across the barrier.
3. Build descriptive mathematical models
4. Predict performance with simple mass balance equations
5. Vary the barrier type