

Workshop on Transport and Remediation of Chlorinated Solvents in Fractured Sedimentary Rocks at the former Naval Air Warfare Center (NAWC), West Trenton, NJ

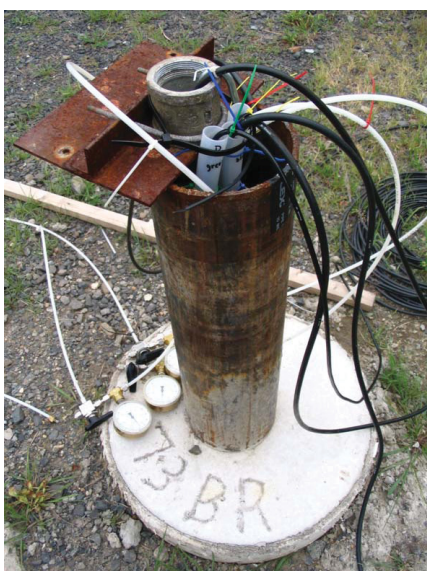
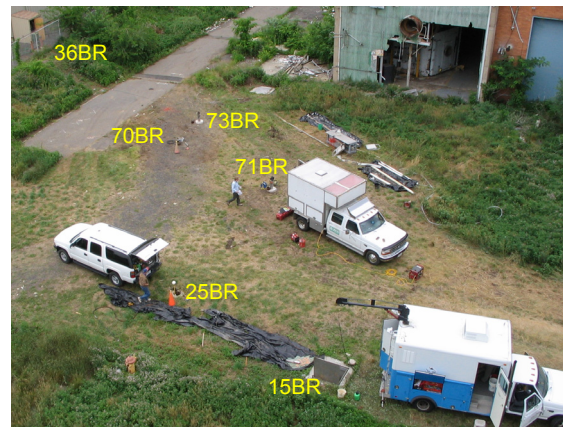
Thursday September 25, 2008, 8:00 am to 5:30 pm
 USGS NJ Water Science Center & NAWC Field Site
 West Trenton, New Jersey

Workshop overview:

This workshop will present results of multidisciplinary investigations conducted by the U.S. Geological Survey (in cooperation with the U.S. Navy, Geosyntec Consultants, and ECOR Solutions) of trichloroethene (TCE) distribution, transport, and biodegradation in fractured mudstones underlying the former Naval Air Warfare Center (NAWC).

Ground-water contamination at the NAWC:

Beginning in the 1950's, TCE was accidentally released to land surface in dissolved and pure phases, and has contaminated the underlying fractured mudstones that lie in the Lockatong Formation of the Newark Basin. TCE has been observed in ground water as deep as 60 m. Natural microbial reductive dechlorination has partially transformed TCE to cis-1,2-dichloroethene (cDCE), vinyl chloride (VC), and ethene. A pump and treat system has operated for about a decade, but dissolved contaminant concentrations remain high (up to ~100 mg/L TCE, ~18 mg/L cDCE, and ~2 mg/L VC), suggesting that substantial contaminant mass remains in the low-permeability part of the rock. A bioaugmentation pilot study was conducted to investigate enhanced biodegradation of TCE and its daughter products.



USGS investigations at the NAWC that will be discussed during the workshop:

- **Finding flow and transport paths** using hydraulic and tracer testing, geologic and geophysical characterization, and flow modeling.
- **Monitoring contaminants, geochemistry, and microbiology** using sampling from packer-isolated intervals of boreholes, in-situ downhole samplers, and methane extraction to quantify contaminant concentrations in the rock matrix.
- **Evaluating remediation effectiveness** by identifying processes controlling contaminant mass removal by pump and treat, monitored natural attenuation, and bioaugmentation; and by estimating mass removal rates using empirical calculations and numerical modeling.

See the full workshop schedule on the back of this flyer.

Workshop Schedule

8:00 Convene at USGS Office, 810 Bear Tavern Road, West Trenton, NJ

Introduction

8:15 – 8:30 Welcome and logistics

8:30 – 9:00 Overview of NAWC site, contamination, and USGS research

Microbial Degradation and Bioaugmentation of TCE, DCE, and VC in Fractured Rocks

9:00 – 9:30 Characterizing and monitoring biodegradation of TCE F.H. Chapelle or P.M. Bradley

9:30 – 10:00 Bioaugmentation to enhance natural biodegradation of TCE M.F. DeFlaun

10:00 Break

10:15 – 10:45 Simulating the injection and distribution of bioaugmentation amendments P.A. Hsieh

Geology Underlying the NAWC – Visit to outcrops

10:45 Walk to outcrops at I-95

11:00 – 11:30 Visit outcrops; overview of geology at NAWC P.J. Lacombe

11:30 Walk back to USGS office

11:45 **Lunch at USGS office** – Delivered from Doolittle's Deli; please bring cash for payment

12:45 Carpool to NAWC site (1 mile from USGS office)

Characterizing Geology, Flow, Transport, and Distribution of TCE, DCE, and VC

1:15 – 4:15 Break into groups and rotate among the following stations (45 minutes per station):

Station 1 Using rock core and gamma ray logging to develop site scale geologic framework P.J. Lacombe
At core shed

Station 2 Borehole flow logging to identify hydraulic connections J.H. Williams
At well 15BR or 7BR

Station 3 Monitoring vertical variability of TCE, DCE, VC, and geochemistry in rock matrix and packed-off intervals of boreholes D.J. Goode & T.E. Imbrigiotta
At well 73BR

Station 4 Aquifer testing to identify major flow paths and tracer testing to identify contaminant transport paths and processes C.R. Tiedeman & A.M. Shapiro
At well 36BR

4:30 Carpool back to USGS office

Open Discussion

5:00 – 5:30 Open discussion, questions, and comments on investigations at NAWC and their applicability to other contaminated fractured-rock sites All presenters and attendees

5:30 Adjourn

7:00 Dinner at Lambertville Station Restaurant – attendance optional

What to Wear: Please wear sturdy shoes and bring rain gear; the field visit will take place even if it is lightly raining. (In case of heavy rain, field presentations will be moved to the USGS office.) Ticks may be present at the site, so long pants are recommended.

Safety Notes: Please be especially careful of road traffic during the outcrop visits; we will be on an off-ramp of I-95. The former NAWC is a hazardous waste site. Please watch for slip, trip and fall hazards, and do not touch site materials with bare hands. There is no known air quality hazard at the site, but concentrations of volatiles are likely to be highest within open boreholes and well vaults.

Questions? Please contact Claire Tiedeman (tiedeman@usgs.gov; 650-329-4583), Dan Goode (djgoode@usgs.gov; 717-571-8783), or Kathy Davies (davies.kathy@epa.gov; 215-814-3315) with questions about the workshop. Additional information about the NAWC site and updates to workshop plans are available at <http://nj.usgs.gov/nawc>.