

Fact Sheet

TUBING SELECTION FOR GROUNDWATER-MONITORING SAMPLING PUMPS

BACKGROUND

One concern with any sampling method that involves pumping the sample to the surface is that there may be interactions between the sampling tubing and the sample as it is pumped to the surface. These interactions could include sorption of organic solutes, desorption of sorbed organic contaminants, and leaching of organic constituents from the tubing. We would expect that these interactions would be exacerbated in deep wells where long tubing lengths are required, and in wells where slow-flow pumping is used.

FINDINGS

Static study. Twenty different flexible and rigid tubings, including eight fluoropolymers (various types of Teflon) and four polyethylenes were tested. The tubings were exposed to a test solution that contained eight organic solutes (two nitroaromatics and six volatile organic compounds [VOCs]). The results showed that the rigid fluoropolymers were the least sorptive tubings. Leaching was a problem for some materials but not for the polyethylenes or rigid fluoropolymers.

Dynamic studies. In these studies, well water contaminated with trichloroethylene (TCE) was pumped through five different types of tubing (that ranged in their relative sorptiveness). The two fluoropolymers were the least sorptive tubings, both initially and at equilibrium. There were instances when the less expensive low-density polyethylene (LDPE) tubing did not bias TCE concentrations. These conditions were when either a faster flow rate was used (1 L/min) (although a longer equilibration would be needed for very deep wells, 500 ft or more) or when sampling relatively shallow wells (50 ft or less) at a slow flow rate (100 mL/min).

No leaching of organic constituents was observed under the conditions of this study. However, desorption of sorbed TCE was a problem when slow-flow rate pumping was used, regardless of the type of tubing used. Thus, tubing that is used in groundwater sampling pumps must be either thoroughly decontaminated after each use or else dedicated to the well.

PUBLICATIONS

Parker, L.V., and T.A. Ranney (1997) Sampling trace-level organics with polymeric tubings: Part 1. Static studies. *Ground Water Monitoring and Remediation*, **17**(4): 115–124.

Parker, L.V., and T.A. Ranney (1998) Sampling trace-level organics with polymeric tubings: Part 2. Dynamic studies. *Ground Water Monitoring and Remediation*, **18**(1): 148–155.

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