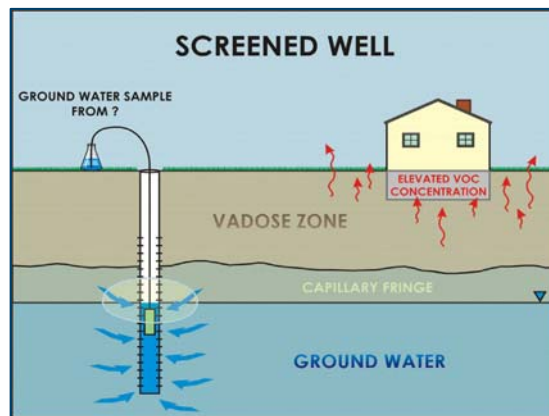


US EPA ARCHIVE DOCUMENT

Vertical Profiling of Contaminants in Ground Water at the Raymark Superfund Site, Stratford, Connecticut

Introduction

Vapor intrusion has recently become a major area of concern for EPA's Office of Research and Development, which has created a Vapor Intrusion Program. In order to perform risk assessment, it is important to evaluate volatile organic compound (VOC) intrusion from ground water into the basements of residences and other buildings. The recent development of the EPA Vapor Intrusion guidance document has raised questions regarding sampling methodologies used to evaluate potential health risk from vapor intrusion into homes and buildings in the vicinity of contaminated sites.



Background

The Raymark Superfund site in Stratford, Connecticut, manufactured friction and other products containing asbestos, lead, polychlorinated biphenyls, and 60 other hazardous chemicals. This resulted in excessive soil and ground water contamination, including a plume of dissolved-phase VOCs, primarily chlorinated solvents and daughter products. The plume is migrating beneath approximately 200 houses downgradient of the site, thereby increasing the risk of vapor intrusion and potential health risks.

Objectives

- Evaluate the use of contaminant concentrations in groundwater to determine potential risk of vapor intrusion into adjacent residences and buildings
- Determine the best method for vertical profiling of VOC concentrations at contaminated sites to assess potential vapor intrusion into residences and building

Approach

Field sampling will be conducted at the Raymark Superfund site in Stratford, Connecticut, and other potential sites, using discrete multi-level samplers (DMLS), passive diffusion bags (PDBs), and Geoprobe technology for collecting discrete level ground water and capillary fringe samples. For comparison purposes, ground water samples will also be collected using traditional sampling devices and techniques. Pumps will include a Grundfos submersible, bladder and peristaltic pumps. Low-flow purging and sampling techniques will be used when sampling with pumps. An inflatable well packer will also be used to seal off the air/water interface within at least two monitoring wells. The packer will not be used in wells with low water levels (less than 4 feet) because the additional length of the packer would potentially place the pump at the bottom of the well screen. One of the traditional pumps will be used to obtain samples while the packer is in place. The purpose of the packer is to determine whether VOC concentrations are being lost up the well casing during purging and sampling. These values will be compared to samples collected in the same manner with no packer in place.

Three to six wells will be sampled at the Raymark Superfund site. If another site (which has different contaminants of concern—petroleum hydrocarbons) is located, then additional sampling may be conducted in order to evaluate the various sampling techniques and devices for other contaminants of concern.

Experimental Design

The main objective of this study is to evaluate the use of DMLS units for vertical profile sampling to determine VOC concentrations in the capillary fringe and upper portion of the water column within monitoring wells. Wells will be sampled using different sampling devices and techniques in order to determine whether it is possible to obtain representative VOC concentrations from this subsurface zone.

The data obtained will aid federal and state agencies and environmental professionals in assessing contaminated waste sites where the potential exists for indoor vapor intrusion. The data will show whether this potential can be determined by sampling monitoring wells in the vicinity of homes or buildings, or where additional sampling (e.g., indoor air and sub-slab) should be conducted to properly evaluate each location. In addition, the comparison of several different sampling devices and techniques will provide information on establishing sampling programs, using the EPA vapor intrusion guidance. Results of this study should determine which methods achieved the most representative samples for VOCs (trichloroethylene, 1,1,1-trichloroethane, and 1,1-dichloroethene) and other contaminants.

Accomplishments

- Completed two field sampling studies comparing different sampling devices for ground water collection
- Data are currently being evaluated to compare concentration differences for trichloroethylene, 1,1,1-trichloroethane, and 1,1-dichloroethene
- Comparisons are being made for data collected using the DMLS, PDB, and Geoprobe for vertical profiling. These data are being compared to data obtained using peristaltic, bladder, and Grundfos pumps (with and without a packer) in three 2-inch diameter monitoring wells at the Raymark Superfund site in Stratford, Connecticut

Involvement in this project led to an invitation to participate in the EPA-sponsored Indoor Vapor Intrusion Seminar Series (in San Francisco, California; Dallas, Texas; and Atlanta, Georgia), as well as an invitation to give a presentation at the Indoor Air Quality Problems and Engineering Solutions Specialty Conference and Exhibition in Raleigh, North Carolina.

Future Tasks

Future tasks include additional sampling at different sites in order to evaluate these sampling techniques in different geological environments and potentially with different contaminants (i.e., petroleum hydrocarbons).

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