

SPAWAR Releases Review of Vapor Intrusion Best Practices

Guidance Improves Assessment of Indoor Exposure to Underground Vapors

PERSONNEL FROM THE Space and Naval Warfare Command (SPAWAR) have just released a resource for Navy site managers on current vapor intrusion assessment approaches.

Vapor intrusion refers to the movement of chemical vapors from contaminated soils or groundwater through the subsurface and into buildings (indoor air). This exposure pathway has been of interest to regulators and the public over the past

plumes originating from a single industrial location. The conditions of solvent concentrations in groundwater plumes, and the circumstances of the releases at that Colorado site are not unusual, and similar conditions are anticipated at hundreds

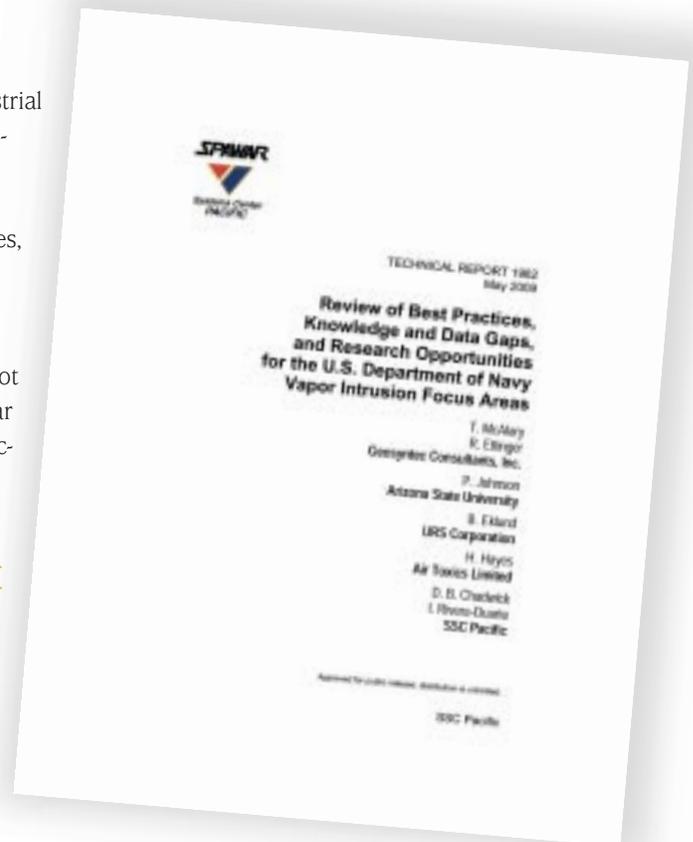
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decade mainly as a result of a well-publicized case in Colorado in the late 1990's. In this case, solvent concentrations in indoor air within several dozen homes and apartments were found to have been at least partially derived from chlorinated solvents in groundwater

of additional sites in the U.S. The case in Colorado illuminated this pathway for potential contaminant exposure, and resulted in an increased drive for assessment of vapor intrusion, and other input pathways of vapors to indoor air. However, current approaches to

assess vapor intrusion to indoor air are onerous, lengthy and expensive.

In response to the need for research and development on reducing costs and uncertainties associated with vapor intrusion, the Navy tasked a



The report is a resource to Navy site managers and the public on current assessment approaches in these focus areas, supporting improved vapor intrusion assessment by following a methodology accepted by the regulatory and scientific communities.

group of subject matter experts to identify existing best practices, knowledge and data gaps, and future research in assessment strategies. This effort was funded by the Navy Environmental Sustainability Develop-

ment to Integration (NESDI) program, under a project titled Improved Assessment Strategies for Vapor Intrusion, and resulted in the publication of SPAWAR Systems Center Pacific's Technical Report 1982.

The report reflects the opinion of the subject matter experts, and offers suggestions for research directions in the following three focus areas identified by a group of Navy end-users:

Looking for Sites to Demonstrate Selected Vapor Intrusion Assessment Technologies

OUT OF THE three technologies selected for development, the NESDI program is funding an effort to demonstrate the use of pressure cycling and quantitative passive samplers. Additionally, support for the demonstration of portable analytical systems has been requested from the Environmental Security Technology Certification Program.

Satisfactory completion of these efforts requires sites suitable for the demonstration of the technologies. Investigators are looking for demonstration sites with the following characteristics:

- The site must have one or more buildings located above a groundwater plume of dissolved volatile organic chemicals (VOC), preferably with one or more chlorinated solvents, at concentrations above 100 micrograms per liter.
- The groundwater plume should represent the only likely source of VOCs in the test area.
- Data on vapor concentrations in indoor air is highly desirable.
- Information on the characteristics of the hydrogeology of the site is required including:
 - Stratigraphy (rock layers and layering)
 - Hydraulic conductivity
 - Depth to groundwater
 - Groundwater flow direction
 - Seasonal variability
 - Nature and extent of dissolved contaminants

A site characterization report should be available providing delineation information for the dissolved plume in the vicinity of the test area and soil boring logs or monitor well logs that document geologic conditions in the test area.

Access to the test building must be available for installation of several (three to six) test points through the building foundation. These test points will be less than one-inch in diameter and can be located in storage closets or other out-of-the way locations.

Creation of either positive or negative building pressure must be possible through manipulation of the building heating, ventilation and air conditioning system or through the use of a box fan in a window or door.

The building should be accessible for conducting a three-day testing program involving manipulation of building pressure and the collection of indoor air and sub-slab gas samples.

At least three areas of about ten square foot (i.e., the top of two bookcases, a table by a corner, the walls in a corner of the room) should be available inside the building for the positioning of quantitative passive samplers and summa canisters for a week.

Access to most areas within the building is required for demonstration of portable analytical systems. This effort should take about three days.

Contact Ignacio Rivera if you are interested in participating in this study.

- Sub-surface sampling that minimizes intrusive sub-slab sampling
- Indoor air sampling methods to improve vapor intrusion exposure estimates
- Methods to differentiate between indoor and vapor intrusion sources

and scientific communities. Nevertheless, there are challenges that will impose uncertainties and complications to vapor intrusion assessment, making it an expensive undertaking, particularly for responsible parties with large numbers of sites each with large numbers of buildings, such as the Navy. The ultimate goal is to develop a robust and streamlined screening and assessment

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strategy that will be applicable and efficient at most Navy sites.

The strategy delineated by the authors is to support the development of techniques for the differentiation between vapor intrusion and background sources in indoor air. With feedback from a team of Navy users, three critical technologies were identified, including:

1. The use of pressure cycling for differentiation between background and vapor intrusion
2. The use of quantitative passive samplers for measurement of long-term average indoor air concentrations more representative of health exposures
3. The use of portable analytical systems for the identification of indoor areas of greatest concern

Two of these technologies, passive samplers and pressure cycling, are being demonstrated as part of this NESDI-sponsored project.

Information from TR 1982 was used in a new Navy guidance document, titled “Guidance for Environmental Background Analysis Volume IV: Vapor Intrusion Pathway.”

Technical Report 1982 is available to the public at www.spawar.navy.mil/sti/publications/pubs/tr/1982/tr1982cond.pdf.

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For More Information

TO LEARN MORE about the NESDI program, read the brochure entitled “All About the NESDI Program.” This brochure is available for download via the NESDI web site at www.nesdi.navy.mil or by contacting Lorraine Wass at ljwass@surfbest.net or 207-384-5249.

