

An important Public Health Evaluation has been completed under the guidance of the Navy and Marine Corps Public Health Center. The Public Health Evaluation was designed to evaluate the potential short and long-term health risks associated with living in the Naples area as a result of inadequate trash collection, uncontrolled open burning of uncollected trash, and widespread dumping of waste, including chemical and other hazardous waste.

Launched in 2008 and completed in June 2011, the Public Health Evaluation involved the collection of air, water, soil and soil gas samples from throughout the region to identify whether there are potential health risks.

For details and background information, visit the website listed at the bottom of this page.

## Your Health: Facts for Navy Families in Naples

# About: Vapor Intrusion Investigation at Capodichino and Support Site

The Vapor Intrusion Investigation Report is a technical document that describes the U.S. Navy's environmental sampling methods for investigating whether there are underground contaminants at Capodichino and the Support Site in Gricignano that may have impacted the indoor air quality of facilities on base. The investigation was one part of the Navy's comprehensive Public Health Evaluation study, and like the Public Health Evaluation, it assessed health risks that could be associated with widespread dumping of waste in the region, including chemical and other hazardous waste.

This fact sheet provides an overview of the vapor intrusion investigation and the findings, which indicated that it is safe to live and work at Capodichino and the Support Site.

The report can be found in Volume I of the Phase II Naples Public Health Evaluation report, posted on the website listed at the bottom of this page.

### Why did the U.S. Navy conduct a vapor intrusion study?

During Phase I of the Naples Public Health Evaluation, the Navy detected chemicals called volatile organic compounds (VOCs) in water samples collected from irrigation wells located on Capodichino and the Support Site in Gricignano. These chemicals were detected at concentrations above health protective limits established by the U.S. Environmental Protection Agency (USEPA). Although the groundwater is not used for drinking purposes, the presence of VOCs in the groundwater was an important finding, given the chemicals' ability to vaporize. When in a vapor form, the chemicals can migrate upwards through soil into the indoor air of an overlying building through cracks or gaps in the building's foundation. This process is called vapor intrusion (see Figure 2 on page 3). If vapor intrusion occurs, occupants are at risk for inhaling contaminants in the indoor air. The specific VOC of concern was tetrachloroethene (PCE). PCE is a manmade chemical that is widely used in the dry cleaning of fabrics and degreasing of metals.

To determine whether vapor intrusion was occurring on Capodichino and the Support Site, the Navy performed a vapor intrusion investigation. The investigation was designed as a step-by-step sampling process to provide information on whether there were VOC vapors beneath buildings on base and, if so, whether there were pathways for these underlying vapors to enter the buildings. Once data were collected, the Navy determined whether vapor intrusion was occurring and whether there were health risks to occupants.

### How was the vapor intrusion study conducted?

#### **Sampling process**

The vapor intrusion investigation included a building evaluation, the collection of soil gas samples, indoor air samples, and outdoor air samples.

#### **Step 1: Determine whether there were contaminants beneath buildings on base**

If there were VOC contaminants beneath buildings on base, then there could be the

potential for vapor intrusion. If VOC vapors were present, they would be detectable in the soil gas. Thus, samples were collected using a soil gas sampling technique where a small hole was drilled through the basement or ground floor of a building to extract a soil gas sample from the soil underneath the building.

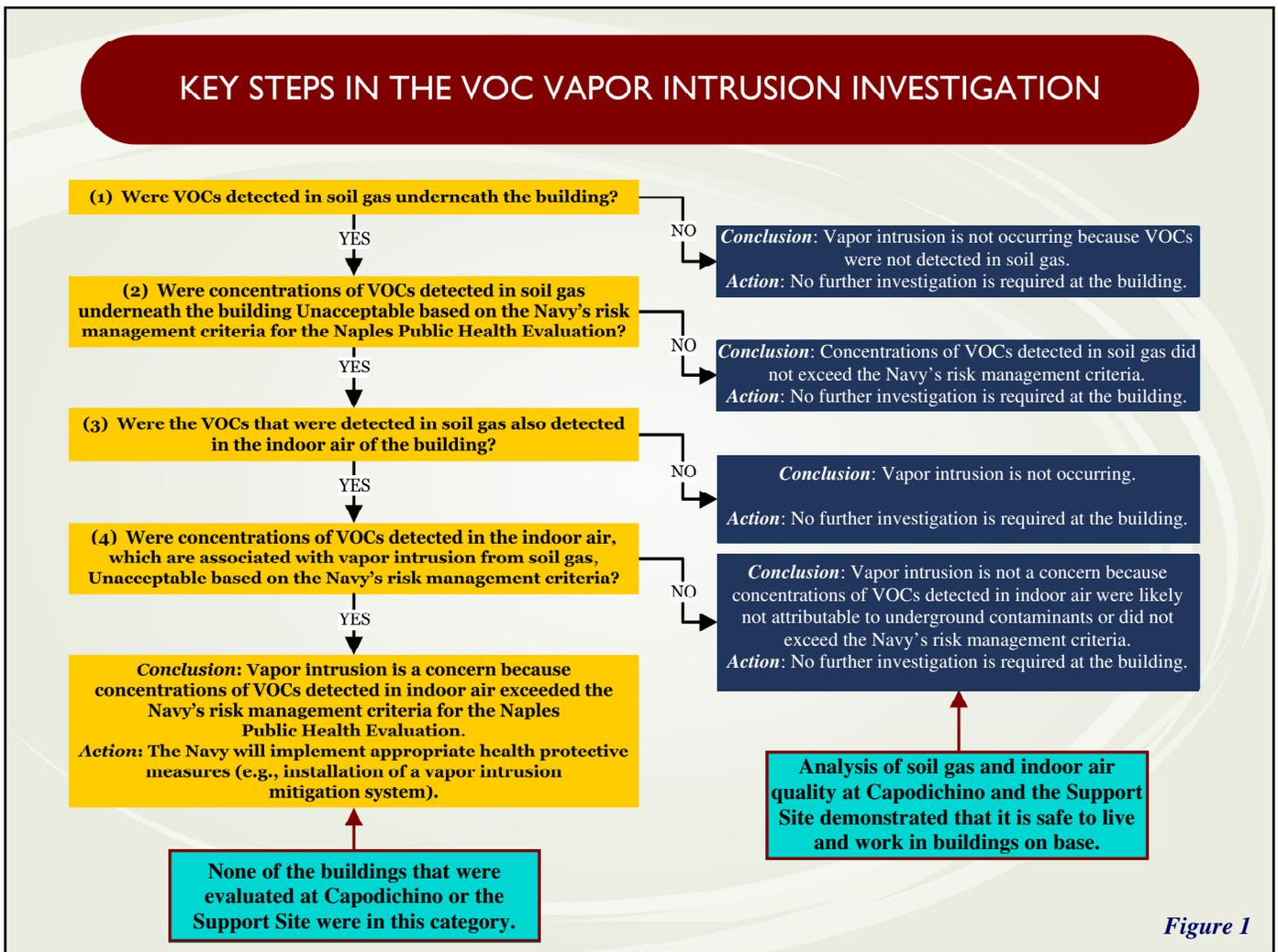
Soil gas samples were first collected from a few residential buildings on Capodichino and the Support Site. Testing of the soil gas samples detected a few VOCs, including PCE, above the USEPA’s health protective limits. The chemicals and concentrations that were detected varied among sampling locations.

To confirm the testing results, the Navy re-sampled these locations, and to further investigate the PCE findings, the Navy collected samples from nearby buildings. Most of the additional soil gas samples also showed PCE above USEPA limits.

**Step 2: Determine whether there were pathways for these contaminants to enter the building**

Because PCE was detected above USEPA limits, the Navy conducted a survey of all buildings on Capodichino and the Support Site to explore potential vapor intrusion pathways. Without pathways, underlying vapors cannot enter the indoor air of an overlying building. The building survey also provided information on facility use and other building characteristics.

The Navy subsequently collected more soil gas samples to further investigate the preliminary PCE findings and to achieve a systematic, geographical coverage of the bases.



None of the buildings that were evaluated at Capodichino or the Support Site were in this category.

Analysis of soil gas and indoor air quality at Capodichino and the Support Site demonstrated that it is safe to live and work in buildings on base.

Figure 1

**Step 3: Determine whether there were contaminants in the indoor air of the building**

Indoor air sampling was the next investigative step in determining whether vapor intrusion was occurring. Indoor air samples were collected at facilities on Capodichino and the Support Site that had elevated levels of PCE in soil gas samples. In addition, indoor air and soil gas samples were collected from nearby facilities if occupied by sensitive populations, such as children. PCE levels in soil gas samples led to five locations for indoor air sampling: (1) Capodichino Child Development Center; (2) Capodichino Medical Clinic; (3) Capodichino Water Treatment Plant Operator’s Office; (4) Capodichino East Gate Pass and ID Building (Building 468); and (5) Gricignano Support Site Naples American High School.

**Step 4: Determine whether the indoor air contaminants were attributable to vapor intrusion or to outdoor air**

Important to the collection of indoor air samples was the simultaneous collection of outdoor air samples. Vapor intrusion can occur when contaminants enter a building from underneath. But the air inside a building can also come from outdoor air through open doors and windows. By comparing the soil gas and indoor air samples to the outdoor air samples, the Navy could assess whether the presence of contaminants in indoor air was a probable result of vapor intrusion or a probable result of contaminants from outdoor air. In addition to the simultaneous outdoor air samples,

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*The report is available on the Naples Community Health Awareness website. It can be found in the Phase II, Volume I, Naples Public Health Evaluation report.*

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data from the year-long ambient air quality monitoring study were used.

**Step 5: Determine whether there were health risks**

In general, when sampling data are received from the laboratory, the Navy compares the results to the standards set by the USEPA and to the Navy’s risk management criteria, to determine whether detected chemical concentrations exceed health protective limits. For chemicals that exceed health protective limits, the Navy assesses whether the chemicals may pose health risks to children and adults.

**What were the findings?**

**It is safe to live and work at Capodichino and the Support Site**

The Navy’s analysis of soil gas and indoor air quality at Capodichino and the Support Site demonstrated that it is safe to live and work on Capodichino and the Support Site.

Even though PCE in indoor air samples was detected in some of the five sampling locations, the Capodichino Child Development Center appeared to be the only location where PCE in indoor air could be

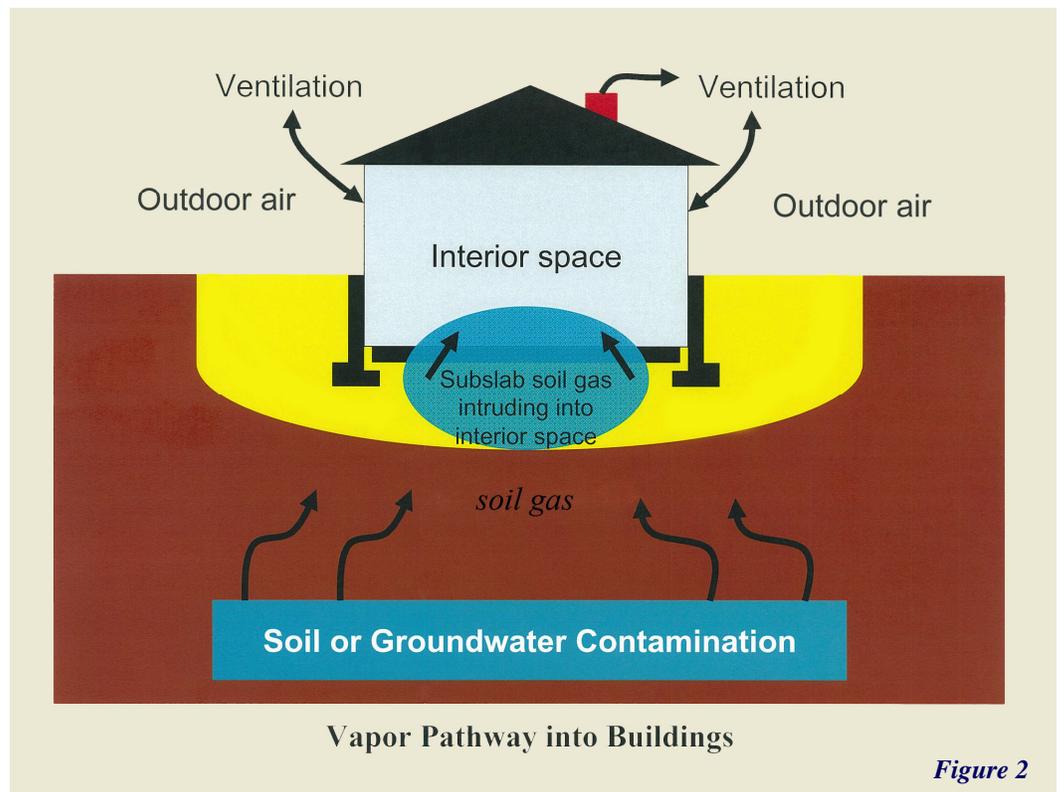


Figure 2



For more information contact:

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attributable to vapor intrusion. This determination was based on the fact that PCE levels inside the CDC were slightly higher than typical outdoor air levels. However, PCE inside the CDC was not found at levels that would harm children or staff. For the other four locations, because indoor air levels of PCE were either not detected, similar to, or below typical outdoor air levels, PCE in indoor air samples was not likely associated with vapor intrusion. In all cases of indoor air sampling, it is safe for children and adults to continue their normal daily activities in these buildings.

### What did the Navy do as a result of these findings?

Because children may be more sensitive to chemical exposures, as a precautionary measure and to address the PCE, the Navy installed a vapor intrusion mitigation system at the Capodichino Child Development Center. Although PCE was not found at a level that would harm children or staff, the Navy took protective measures for continued health protection. The Navy is also monitoring the indoor air to ensure the vapor intrusion mitigation system is working properly over the long term. In addition, the Navy sealed possible pathways that may have allowed vapors to enter the building.

The Navy notified Child Development Center management, staff and parents about the sampling results in July 2009 and continued to provide updates as work progressed. Communication included briefing management, presenting findings at a staff meeting and holding an information session for parents. In addition, an information letter and fact sheet was distributed to staff and parents. Communication to other Navy personnel in Naples was accomplished through All Hands e-mails, articles published in the *Panorama*, and information distribution to *Stars and Stripes*.

### What actions can you take?

- Review the Vapor Intrusion Investigation Report available on the Naples Community Health Awareness website that is listed at the bottom of this page. The report can be found in Volume I of the Phase II Naples Public Health Evaluation report. If you have questions about the report, please contact the Environmental Health Information Center. Health professionals are available to answer your questions and meet with you individually.
- Continue to stay informed about environmental health through the Naples Community Health Awareness website, *Panorama*, AFN radio and television, All Hands e-mails, your chain of command and the Environmental Health Information Center.
- For more information about vapor intrusion, download the “Vapor Intrusion” fact sheet and the “Understanding Vapor Intrusion: A Guide to Key Concepts and Principles” video, from the Naples Community Health Awareness website.
- For more information about PCE, visit the Agency for Toxic Substances and Disease Registry at [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov) or download the “Volatile Organic Compounds” fact sheet from the Naples Community Health Awareness website.

