

# PETROLEUM VAPOR INTRUSION FACT SHEET



## Introduction

Vapor intrusion (VI) occurs when vapors in the ground (from contaminated groundwater, soils, or other sources) seep into a building. Once inside a building, these vapors can accumulate and may create hazardous conditions. Petroleum VI (PVI) is a subset of VI that deals with specific petroleum vapors that migrate into an overlying building. PVI occurs when petroleum vapors enter a building from the subsurface through dirt floors, cracks in foundations, utility conduits, and other entryways. Common petroleum sources include gasoline, diesel fuel, and heating oil. Figure 1 shows two ways that vapor can enter a building: (1) through a sanitary sewer line and (2) through natural spaces in soil or bedrock.

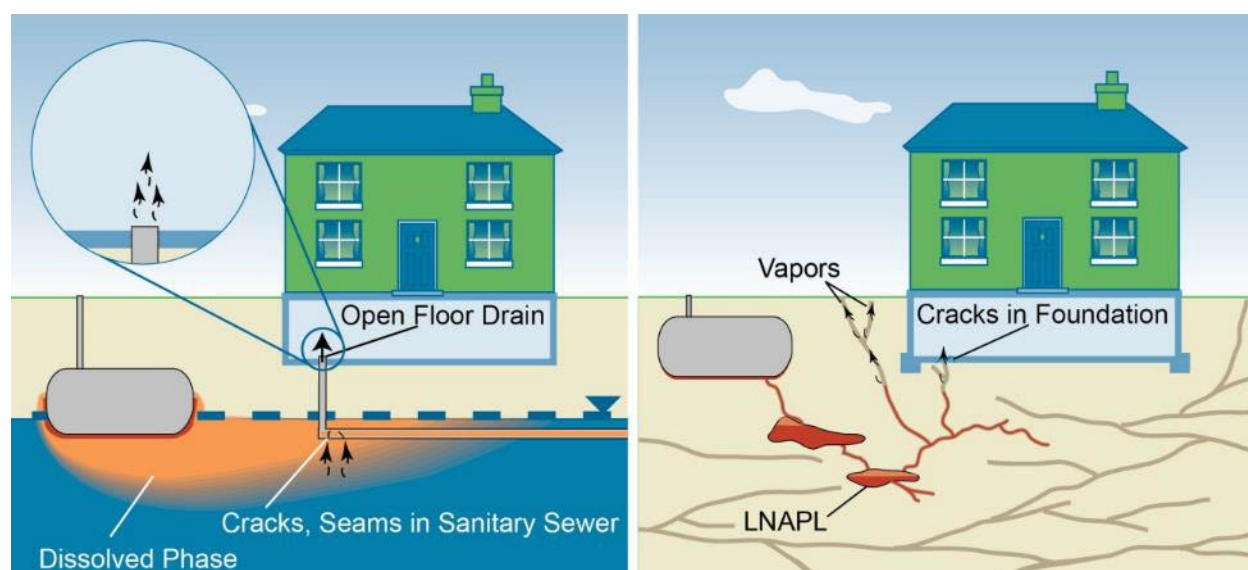


Figure 1. How vapors can enter a building.

## How Is PVI Different?

VI typically involves a wide range of chemicals that include petroleum compounds and solvents that contain chlorine and are used in industrial processes, including dry cleaning. Petroleum compounds (called *petroleum hydrocarbons*, PHC) are different from other compounds in that they degrade relatively quickly through aerobic biodegradation (see definition below) in unsaturated soil. Because of the rapid degradation of these compounds, PVI tends to affect smaller areas than other VI compounds, and the petroleum chemical vapors found at PVI sites tend to be less toxic than vapors from other vapor-forming chemicals or emerging contaminants.

## What Is Aerobic Biodegradation?

Aerobic biodegradation is a process through which certain naturally occurring bacteria in soil degrade petroleum into harmless compounds (ultimately, water and carbon dioxide) in the presence of oxygen. This process occurs in nearly all soil types, provided that the soil is relatively clean (meaning either not

contaminated or only slightly contaminated) and aerated. The presence of oxygen is required for aerobic biodegradation; without oxygen, the rate of degradation is much slower.

### What Is the Most Common Cause of PVI?

The most common cause of PVI is when PHC either dissolved in groundwater or a free phase come in direct contact with building structures such as sumps, basements, or elevator pits. The direct contact of petroleum with a building does not allow for biodegradation, which increases the likelihood that PVI will occur.

### Where Is PVI Most Likely to Occur?

PVI is most likely to occur near a source of petroleum in the environment. Sources may include any sites where petroleum has leaked to the environment from spills, leaking tanks, or ruptured pipelines.

Common types of sites include home or commercial heating oil tanks, retail gas stations, petroleum tank farms, petroleum pipelines, and any other sites that store or transmit petroleum.

### What Are the Health Effects Caused by PVI?

PVI may affect the health of occupants who breathe the vapors entering the building. These effects can be short-term (acute) effects caused by short exposure periods where concentrations of vapors are relatively high, and long-term effects through chronic exposures to lower concentrations of vapors.

Health effects may begin with nausea, headaches, or eye and respiratory irritation arising from acute exposure to petroleum vapors. Long-term, chronic exposures may affect various organs and organ systems and result in permanent health problems. Information about the health effects from exposure to chemicals can be found at the [U.S. Office of Safety and Health Administration Chemical Exposure Health Data website](#) or at the [Agency for Toxic Substances and Disease Registry website](#).

### What Do I Do If I Suspect That PVI Is Occurring?

Immediately report potential PVI conditions to first responders (fire department, police, the local or state environmental agency, or public health hotline, if one exists).

### Where Can I Find More Information About PVI?

More information can be found on the [U.S. Environmental Protection Agency's Office of Underground Storage Tanks Petroleum Vapor Intrusion website](#).