

## Susceptibility Analysis for the Village of West Lafayette

### Susceptibility Analysis:

The aquifer that supplies drinking water to the West Lafayette wellfield is susceptible to contamination. This determination was made because of the following reasons:

- < The sand and gravel aquifer has a depth to water of approximately 40 feet below the ground surface;
- < The sand and gravel aquifer material is continuous to the surface and is very sandy;
- < A water quality evaluation indicates that volatile organic compounds (VOCs) have been detected in both the raw and treated water, implying that a pathway exists from the ground surface to the aquifer;
- < A documented VOC plume exists immediately to the southeast and downgradient of the wellfield; and
- < Potential significant contaminant sources exist within the protection area.

Water quality data collected to meet public water supply requirements provide a direct measurement for the presence of contamination in drinking water. Water quality data were evaluated using the drinking water compliance database available at the Ohio EPA. The available data indicate the presence of several volatile organic compounds in the aquifer at West Lafayette's wellfield. Results of this sampling indicate that from 1991 through 2000, vinyl chloride has been consistently detected in both raw and treated samples ranging from 0.50 µg/L to 2.18 µg/L. This determination is limited by the sampling that is performed for the water system. The Maximum Contaminant Level (MCL) for vinyl chloride is 2 µg/L. A documented contaminant plume consisting of trichloroethylene and its breakdown products exists immediately southeast of West Lafayette's wellfield. Vinyl chloride is a breakdown product of trichloroethylene. Due to the presence of this plume, the Village installed a new treatment system in 1999 which included two air strippers to remove volatile organic compounds from the raw water.

Consequently water quality results indicate that West Lafayette's source of drinking water has shown the presence of volatile organic compounds. Therefore the likelihood for West Lafayette's source of drinking water to be contaminated from other sources is high and it is critical that potential contaminant sources are handled carefully with the implementation of appropriate protective strategies.

The Village of West Lafayette has identified 14 potential contaminant sources that lie

within the determined wellhead/source water protection area, two of which are located within the inner management zone (or one-year time-of-travel zone). The types of potential contaminant sources present are gas stations, oil/gas wells, underground storage tanks, above ground storage tanks, an old dump, industrial facilities, salt storage, roadways, and railways. Because of these potential sources of contamination that exist within the wellhead/source water protection area, the sensitivity of the aquifer, and the VOC detections, the Village of West Lafayette's wellfield is considered to be highly susceptible to contamination. Implementing appropriate protection strategies for the potential contaminant sources will help reduce the likelihood of additional contaminants affecting the aquifer.

### **Protection Activities:**

Protective strategies are activities that help protect a drinking water source from becoming contaminated or further contaminated. Implementing these activities can provide a number of long-term benefits, including protecting the health of the consumers; preserving water resources for future generations; avoiding the expense of cleaning up a contaminated water supply or finding alternative sources of water; and preserving or enhancing the economic value of the area by securing an abundant supply of clean water.

Protective strategies that the Village of West Lafayette may consider while developing its protection plan are outlined in the July 1996 report "*Non-point Source Pollution in Wellhead Protection Areas - Phase 1: Wellhead Protection Study in West Lafayette*", prepared by the Ohio EPA. Some of these include:

**General Recommendations:** Education of the businesses in the area informing them that they are in a drinking water protection area can be very beneficial. Ohio EPA's Office of Pollution Prevention can visit businesses and provide recommendations on how they can modify their processes, materials and practices to generate less pollution in a cost-effective and technically feasible manner.

**Town Dump:** The old town dump is located in the one year time of travel zone. It probably received various household chemicals, which could contribute to VOC's in the ground water. If structurally sound barrels of material were buried there, the Village may want to consider cleaning up the site.

**Storm Water Basin:** A primary potential path for contamination of the aquifer are surface water bodies, such as storm water basins. A storm water basin for Fairview Manor Mobile Home Park exists in the one year time of travel zone. Among the protection strategies that should be considered are: (1) leaving a buffer strip of grass or other vegetation around surface water bodies; (2) properly maintaining retention ponds; and (3) avoiding pesticides use in buffer strips around surface water bodies.

**French Drains:** Fifteen french drains were located throughout West Lafayette during the potential contaminant source inventory in 1996. French drains are used to facilitate drainage in the low-lying areas, and may also facilitate movement of a wide variety of surface water contaminants into the aquifer. French drains are characterized as Class V wells. It is a state and federal requirement that all Class V wells be reported to the Ohio EPA. Please contact Valerie Orr in the Underground Injection Control Unit at (614) 644-3125 and provide her with the status of the french drain and for information on reporting them to the Ohio EPA.

**Aboveground storage tanks:** Among the protection strategies that should be considered are: (1) placing tanks in a paved area surrounded by a dike system to provide containment, (2) performing preventive maintenance on the storage tanks and piping systems to detect potential leaks before they occur; and (3) using dry absorbent materials to clean up spills.

**Underground storage tanks:** Among the protection strategies that should be considered are: (1) using spill and overflow protection, (2) performing preventive maintenance on storage tank systems to detect potential leaks before they occur; and (3) using dry absorbent materials to clean up spills.