

## **GROUND-WATER MONITORING FOR PESTICIDES IN AGRICULTURAL AREAS OF PENNSYLVANIA—A LONG-TERM PLAN**

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### **ABSTRACT**

Monitoring programs for pesticides in Pennsylvania ground water began as part of the Rural Clean Water Program in 1982 with a 43-well program in agricultural and nonagricultural areas of Lancaster County; in 1991, 38 additional wells were sampled. In 1993, the U.S. Geological Survey (USGS) National Water-Quality Assessment (NAWQA) began monitoring for pesticides in selected agricultural and urban settings across Pennsylvania adding 216 rural wells as monitoring points in the process. These monitoring programs included GC/MS analysis of samples and shared a common design based on whether the aquifer was carbonate or noncarbonate bedrock. The likelihood of detecting atrazine was significantly higher in water from carbonate aquifers in agricultural settings compared to noncarbonate rural residential settings.

In 1997, the Pennsylvania Department of Agriculture and USGS began a cooperative program to monitor ground water for pesticides. This program has just completed its first decade and, combined with other USGS monitoring, has eliminated spatial data gaps. Monitoring data are now available at sub part-per-billion concentrations for water from 609 shallow (< 250 ft depth) rural-domestic wells in the major hydrogeologic settings including the unconsolidated aquifers comprised of stratified valley fill deposits in glaciated settings. Determining if concentration changes are taking place is difficult with available data. Documenting concentration changes at selected wells is the focus of the next three years of monitoring. Thirty wells in vulnerable settings (carbonate aquifers underlying agricultural areas) sampled in 1993-1997 will be resampled in 2008-2009 and waters will be tested by USGS for the same suite of compounds using analytical methods comparable to the original testing. In addition, testing for degradates or breakdown products of the parent pesticide compounds will be expanded.

### **KEYWORDS**

Ground water, pesticides, wells, vulnerable aquifers.