GROUND-WATER FLOW PATHS, TRAVEL TIMES, AND POTENTIAL CONTAMINATION SOURCES DETERMINED NEAR THE CITY OF INDEPENDENCE, MISSOURI, WELL FIELD

The Independence, Missouri, well field supplies water from the Missouri River alluvial aquifer to about 250,000 people. Knowledge of the ground-water quality near the well field is limited. However, future expansion of the well field, planned commercial development adjacent to the well field, and present land-use activities near the well field have caused concerns about potential ground-water contamination. Numerous potential point and nonpoint sources of ground-water contamination exist within and adjacent to the Missouri River alluvial aquifer but potential nonpoint sources of contamination are the most widespread. In 1994, a 2-year study was initiated to select possible well locations and screened-interval altitudes for wells in a ground-water monitoring network around the expanded Independence well field based on ground-water flow paths, ground-water travel times, and the locations of potential sources of contamination. The results of this study are presented in a report released by the U.S. Geological Survey, U.S. Department of the Interior, in cooperation with the city of Independence, Missouri.

Brian P. Kelly, author of the report stated, “The heterogeneous distribution of clay, silt, sand, and gravel cause variable ground-water flow rates within the alluvial aquifer. The ground-water flow rate through clay is extremely low compared to the ground-water flow rate through gravel. The ground-water monitoring network for the Independence well field was designed using a computer simulation of ground-water flow that accounts for precipitation, river stage, well pumping rates, and the variation of ground-water flow rates and time of travel to the well field. Because ground-water flow paths and travel times are known at any point in the aquifer, the locations of wells within the monitoring network were selected to correspond to a known time of ground-water travel to the well field. Therefore, detection of a contaminant in ground water from a specific well will indicate the time for the contaminant to reach the well field and the probable source of the contaminant.”


***USGS***