Aberjona Aquifer Pump Test
Conducted by the USGS
December 4th, 1985 to January 3rd, 1986

Aberjona River - Salem Street Bridge
Aberjona Aquifer Pump Test

- 30 day test run from Dec. 1985 to Jan. 1986
- Well G - 700 gpm, Well H - 400 gpm
- 127 observation wells at 72 well sites and in 10 streambed piezometers at five stream sites.
- Streamflow into and out of the study area was measured hourly.
- For the duration of the test, water levels in a selected number of wells were recorded continuously, while levels in remaining wells were recorded intermittently by hand methods.
Why do a pump test? What were they trying to determine?

- Does the cone of depression from the wells impact the potential source areas for contamination?
- How is the Aberjona River affected by pumping?
  - Does it contribute water to the discharge from the wells?
  - Does it act as a groundwater divide during pumping?

Why were these questions important in the trial?

Results of the Pump Test - Streamflow

- Aberjona River flow prior to test (wells not pumping):
  - 12.0 ft³/s upstream of wetland
  - 13.7 ft³/s downstream of wetland
  - Net gain of 1.7 ft³/s
- Aberjona River flow at end of test (wells pumping):
  - 12.0 ft³/s upstream of wetland
  - 10.7 ft³/s downstream of wetland
  - Net loss of 1.3 ft³/s
- What was Pinder’s contention about contribution of water to the aquifer from the Aberjona River? Why was he wrong (based on the above data)?
Results of the Pump Test - Groundwater Flow

- App. 50% of well discharge is derived from the Aberjona River.
- Cones of depression form during pumping and draw groundwater toward the wells.
- Aberjona River ceases to be a groundwater divide during pumping.
- Groundwater flows from all defendant properties into the wells.

From Methany and Bair, 2001, The Science Behind A Civil Action

Water Table contours after pump test, January 1986.

Potentiometric Surface on January 3, 1986 After Pumping Wells G & H for 30 Days

Scale in feet
Contour Interval = 2.5 feet
Well G = 700 gpm
Well H = 400 gpm
From Methany and Bair, 2001, The Science Behind A Civil Action

Simulated TCE Movement
1980 to 1986
Correlation: 0.5
Model of contaminant transport, Wells G and H, Woburn, MA
Scott Bair and Maura Meheny, Ohio State University