GW Projects

1) You have been commissioned by the cities of South Bend and Mishawaka to identify an ideal location for a site where gasoline storage tanks will be built. Given that thirty years ago there was an accident at a previous site that contaminated valuable city gw resources it is of critical importance that these be located in a region that is safe. Using your capture zone models identify three different possible locations. Then run simulations of a potential spill assuming that the spill is made up of a contaminant that degrades and assess these proposed sites in more detail. BTEX is a typical compound in gasoline spills and degradation rates of different compounds vary from 0.1 day^{-1}, 0.01 day^{-1} and 0.0005day^{-1}

2) There is a superfund landfill north of Douglas road and it is known that contaminants are leaching into the soil. Based on capture zones for your major wells in your system should the cities of SB and Mishawaka be concerned? Notre Dame is currently concerned as it pumps water for its own use. You know the contaminants that are leaching in are coming in at concentrations of about 1 g/liter. However you are uncertain of degradation rates. Run simulations assuming three different degradation rates (fast, intermediate and slow 0.5 day^{-1}, 0.01 day^{-1} and 0.0001day^{-1}) and assess whether the university should or should not be worried.

   See http://www.epa.gov/Region5/cleanup/douglasroad/index.htm

3) Notre Dame has an ecohydrology experimental facility in Saint Patrick's park, where they are considering running a variety of tracer tests. If the concentrations they run are at 0.1 g/liter, will the river be impacted and if so what will the concentrations reaching the river be. Details are not well developed, but you know that contaminants that degrade quickly, at intermediate scales and slowly will be considered (fast, intermediate and slow 0.5 day^{-1}, 0.05 day^{-1} and 0.005day^{-1}). Based on capture zones of your major pumping wells in your model will any of they be at risk from these experiments?

4) The intersection of Eddy street and S Bend avenue (in fact the whole area south of Eddy street commons) is a site for new development, but there are concerns about previous industrial contamination there. It is known that large NAPL spills occurred there and it is known that the contaminants leaching into the soil degrade at a rate of about 0.05 day^{-1}. What is not known is the source concentration and different estimates suggest anything from 0.01 mg/liter to 1 g/liter. Based on your capture zones from the major wells in your system are any of these at risk? Run simulations of the contaminant field over the range of concentrations to assess concentrations that might be present.

5) During construction of the new St Joseph hospital workers unearthed spills of NAPL contaminants that we were previously not aware of. Thankfully the sources have now been removed. However it is not known how long they were there and it is estimated that they could be anything from 10 to 70 years old. Concentrations at the spills are estimated to be between 0.1 mg/liter and 10 mg/liter. Based on your major well capture zones should the cities of South Bend and Mishawaka be concerned for public water supply. How about the residents of Winding Brook park, a subdivision just south of the hospital where about half the houses have private wells for irrigation purposes. Run a simulation of the possible concentration fields assuming a degradation rate of 0.001 day^{-1} .

6) There was a major leak from one of the gasoline stations near the McKinley Town and Country Shopping Center that resulted in measured gw concentrations of 0.1 g/liter. Based on your well capture zones, should the city water supply managers be concerned? The spilled material is not well classified, but is known to degrade. Using a range of degradation rates from slow to fast study the possible region and impact of contamination. BTEX is a typical compound in gasoline spills and degradation rates of different compounds vary from 0.1 day^{-1}, 0.01 day^{-1} and 0.0005day^{-1}