**Interpreting Beaver Run Project Results for Year 1: Some Considerations**

Every effort has been made to provide the most accurate results possible, given our resources and methods. As you read over the findings, please keep in mind the following:

* pH is a measure of the concentration of hydrogen ions in water. A hydrogen ion is called a proton, and the more protons that are present in water, the more acidic the water is. Because it is a log scale, each pH unit represents a 10x change in proton concentration. Water is considered acidic if it has a pH < 7.00, neutral if it has a pH = 7.00, and basic if it has a pH > 7.00. Water with a pH of 3.00 is 10x more acidic than water with a pH = 4.00.

Natural waters in our region (streams, lakes, etc.) can have a slightly basic (or alkaline) pH because of naturally occurring minerals that have dissolved in the water (e.g., from running through or over limestone beds). In the presence of abandoned coal mines, however, water can become very acidic. Sulfites and/or sulfates in coal can react with water to form sulfuric acid, which can reduce the pH to a level that cannot support life in the stream.
* total dissolved solids (TDS) measures constituents dissolved in water. In the field, a meter measures the electrical conductivity of the water and an algorithm determines the corresponding level of TDS. The more solids there are dissolved in water, the easier it is for water to conduct electricity. While natural waters will always contain dissolved minerals (e.g., calcium, gypsum), high TDS values may be observed in contaminated sites. From a regulatory standpoint, values of 500 mg/l or greater are indicative of impaired surface waters.
* note that a few sampling sites (1, 6, 16, 16A) exhibit high values for certain tests (e.g., very low pH, high conductivity or TDS, and/or high levels of iron, calcium, magnesium, manganese). These sites are not currently exposed to shale gas development, but have been impacted by historic coal mining activities. Water moving through remnant coal at abandoned mine sites produces chemical reactions below and above the surface, yielding acid mine drainage. Acid mine drainage is characterized by low pH, high levels of dissolved solids (high TDS, high conductivity), and elevated concentrations of minerals.

* the samples shown here are spot samples – they represent a snapshot in time when the water was collected, and not an average value for each day.
* to date, no spills or other events have been reported that might affect the chemistry for sites sampled.
* potential effects on water quality from drilling could manifest over short or long time periods. We anticipate that the monitoring project will continue for many years.