Distinguishing Natural Methane vs. Impacts

**Using Methane Prediction Factors**

**WHY IS STRAY GAS A CONCERN?**

Stray methane gases and produced water associated with shale development have raised concerns about potential impacts to groundwater resources. Simple lines-of-evidence have been established to distinguish between naturally occurring methane vs impacts in residential water sources.

**QUESTIONS:**

1. What is normal water quality and variability?
2. What parameters should we analyze?
3. How do we analyze test results to distinguish natural methane concentrations from impact?

**KEY PREDICTION FACTORS FOR NATURAL METHANE LEVELS:**

Understanding three Prediction Factors (*Water type, Topography, and Redox state*) will help to answer the questions posed above.

**Water Type:** Different water types have predictable methane distributions; elevated methane concentrations are typically associated with sodium-rich water types.

**Topography:** Methane concentrations correlate with topography; typically higher in valleys vs uplands.

**Redox State:** Redox closely correlates with methane concentrations in pre-drill samples. Higher natural methane occurs in advanced redox states.

**KEY PARAMETERS TO ANALYZE:**

The following 22 parameters are useful indicators of natural conditions and possible impacts. Additional parameters may increase cost with no appreciable return.

**DISTINGUISHING NATURAL VS. IMPACT:**

Wells with post-drill methane concentrations exceeding expected ranges, based on aquifer dynamics and geochemistry, should be evaluated further.