

**TITLE:** Monitoring Well Fixed Survey Elevation Reference Point

**DATE:** March 23, 2010

**SUBJECT:** Fixed Reference Elevation Point on a Monitoring Well or Piezometer Used to Obtain Water Level and Depth of Well Measurements.

**BACKGROUND:**

Reliable water table and potentiometric surface maps are essential to any hydrogeologic investigation and the design, installation, and maintenance of an adequate ground water monitoring system. Accurate static water level elevation measurements from monitoring wells and piezometers must be obtained to create these maps. Total depth measurements also need to be taken at times to determine if the well is being maintained properly. Measurements should be taken relative to a measured fixed elevation reference point (typically the top of the monitoring well casing) that has been accurately surveyed, is clearly visible and permanent. Generally, and as required by some regulations, measurements often need to be accurate within  $\pm 0.01$  foot. Recommendations for obtaining water level measurements can be found in Ohio EPA's Technical Guidance Manual for Ground Water Investigations, Chapter 10: Ground Water Sampling (2006).

**GUIDANCE:**

To enable consistent and accurate static water level elevation measurements, monitoring wells should have a surveyed elevation reference point. For consistency, it is recommended that the reference point be on the north side of the inner well casing and be clearly visible with a notch or some other permanent method.

The established elevation of the referenced point should be based on mean sea level. Another datum can be used as long as it is consistent across monitoring well network. The degree of accuracy of the measured reference point may depend on the level of accuracy needed. However, some regulations require water level measurements to be accurate to the nearest 0.01 foot; therefore, it is recommended that this point be established to 0.01 feet by a licensed surveyor. For consistency, it is recommended that the reference point be on the north side of the inner well casing and be clearly visible with a notch or some other permanent method. The elevation of a reference point on all newly installed wells should be surveyed, and the elevation of an individual well should be re-surveyed when it:

- Has been damaged (e.g., by vehicle/heavy equipment).
- Shows evidence of frost heaving.
- Has been altered or modified (well cut shorter or extended).
- Shows evidence of settling over time.

In some cases, the entire network of wells may need to be resurveyed when there are unexplainable shifts in ground water flow direction that cannot be attributed to a single well. This is particularly true when the ground water table or potentiometric surface is flat and slight changes in elevation (even hundredths of a foot) could change the interpretation of flow direction and gradient.