

LANL Order
Reference

Practical Guide for Ground-Water Sampling

by

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Purging

The volume of stagnant water which should be removed from the monitoring well should be calculated from the analysis of field hydraulic conductivity measurements. Rule-of-thumb guidelines for the volume of water which should be removed from a monitoring well prior to sample collection ignore the actual hydraulic performance of the sampling point. These 3-, 5- or 10-well-volume purging guidelines are a liability in terms of time, expense, and information return from the sampling activities.

For example, the calculated well purging requirement (e.g., >90% aquifer water) calls for the removal of five well volumes prior to sample collection for a particular well. Field measurements of the well purging parameters have historically confirmed this recommended procedure. During a subsequent sampling effort, however, twelve well volumes were pumped before stabilized well purging parameter readings were obtained. Several possible causes could be explored: 1) A limited plume of contaminants was present at the well at the beginning of sampling and inadvertently discarded while pumping in an attempt to obtain stabilized indicator parameter readings; 2) The hydraulic properties of the well have changed due to silting or encrustation of the screen, indicating the need for well rehabilitation or maintenance; 3) The flow-through device used for measuring the indicator parameters was malfunctioning; or 4) The well may have been tampered with by the introduction of a contaminant or relatively clean water source in an attempt to bias the sample results.

The calculated well purging requirement should be verified in the field by the in-line monitoring of the well purging parameters (e.g., Eh, pH, T, and Ω^{-1}). In-line measurements provide the most representative data for these constituents and verify the reliability of the hydraulic evaluation of the sampling point or well (2,77). These chemical constituents further aid in the interpretation of water quality changes as they are affected by hydrologic conditions. Modifications to the electrode cell in flow-through measurement instruments have resulted in their improved performance in the field (78). The components of an instrument of this type are shown in Figure 2.17.

Documentation of the actual well purging process employed should be a part of a standard field sampling protocol. Figure 2.18 presents a one-page form which may be used for documenting field sampling operations at each sampling point.

Sample Collection

The initial hydrologic and well purging measurements necessary for reliable ground-water sampling should be entered into the same field notebook as that used for the discrete samples for field or laboratory determinations. Regardless of the level of analytical detail in the monitoring program, it is essential that all samples be collected properly and that the actual conditions during each sample collection be completely documented. One member of the sampling staff should be designated as responsible for this documentation.