

## **Grab Sample Protocol Version 3/10/2008**

### **Grab Samples**

'Grab sampling' refers to water samples obtained by dipping a collection container into the upper layer of a body of water and collecting a water sample (USGS File Report -00213). Grab samples are to be taken from May to October at select monitoring sites. For quality assurance/ quality control (QA/QC) purposes duplicate, blank, and spiked bottle sets are prepared and collected for one site each sampling period. These additional bottle sets are handled, prepared and filled following the same protocol used for regular bottle sets and samples. General water quality parameters are also measured with a freshly calibrated portable multi-parameter water quality instrument during grab samples and recorded onto data sheets.

Upon arrival at each site, the sampling churn is rinsed three times with distilled water. The goal of rinsing the equipment is decontamination, which is the removal from equipment, residues from construction and machining and the removal of substances adhering to equipment from previous exposure to environmental and other media (USGS Open File Report 00213). After rinsing with distilled water, the churn is rinsed three times with stream water. The churn is then fully submerged into the stream and filled to the lid with sample water. Completely filling the churn allows all samples to be filled from one churn; thereby minimizing differences in water properties and quality between samples.

Proper use of the churn guarantees the water is well mixed before the sample is collected. The churn should be stirred at a uniform rate by raising or lowering the splitter

at approximately 9 inches per second (Bel-Art Products, 1993). This mixing must continue while the bottles are being filled. If filling is stopped for some reason, the stirring rate must be resumed before the next sample is drawn from the churn. As the volume of water in the churn decreases, the round trip frequency increases as the velocity of the churn splitter remains the same. Care must be taken to avoid breaking the surface of the water as the splitter rises toward the top of the water in the churn.

Sample bottles and chemical preservatives used are provided by associated laboratories and were considered sterile prior to field usage. Sample bottles without chemical preservatives are rinsed with stream water from the churn 3 times before filling with sample water. In the case of bottles that contained chemical preservatives, bottles are not rinsed before sample collection and care is taken to avoid over-spillage that would result in chemical preservative loss. Collected samples are placed in coolers on wet ice with appropriate chain of custody forms filled out for transport to contracted laboratories for analysis.

### **QA/QC – Duplicate, Spike and Blank bottle sets**

To ensure laboratory and sampling accuracy and precision, one site every sampling period is randomly selected to receive three additional QA/QC bottle sets. These bottle sets contain duplicate, spike, and blank water samples. Duplicate, spike and blank samples are disguised with unique sample site IDs and times so the lab does not know the difference between QA/QC samples and the primaries samples that have been submitted for analysis. Duplicate samples are obtained using the same process as regular samples. These are used to assure the laboratory maintains precision within results.

A limited bottle set containing 'spiked' samples is also collected. Known concentrations of the appropriate analyte are added directly to the bottle to provide a sample with known levels of the specified analyte. Data forms containing the known spike concentrations are kept to verify that the lab is attaining accurate results. The spike concentrations that are used are determined based on past findings for each analyte. The spike concentrations should be between 5 and 50 times the minimum detection limit or between 1 and 10 times the ambient level, whichever is greater (Eaton *et. al.*, 1995).

Blank samples are utilized to assess accuracy of the analysis and verify that the handling and transportation of the samples in the field does not influence the results. Blank samples also evaluate the laboratory's sample handling and decontamination measures. Blank samples are collected by filling the sample bottles directly with distilled water. Sample bottles without chemical preservatives are rinsed with distilled water 3 times before filling with distilled water. In the case of bottles that contain chemical preservatives, bottles are not rinsed before being filled with distilled water and care will be taken to avoid over-spillage that would result in chemical preservative loss. All bottle sets are then placed on wet ice and are transported to the associated laboratories with appropriate chain of custody forms filled out. All grab samples are processed within known laboratory holding periods.

## **Bibliography**

Bel-Art Products. Churn Sample Splitter Instructions, 37805 Series. Pequannock, NJ, 1993.

Eaton, Andrew D., Lenore S. Clesceri, and Arnold E. Greenberg., ed. Standard Methods for the Examination of Water and Wastewater. 19<sup>th</sup> Edition. Washington D.C., 1995.

Lurry, D.L. and C.M. Kolbe. Interagency field manual for the collection of Water Quality Data. USGS Publication, Open File Report 00-213.