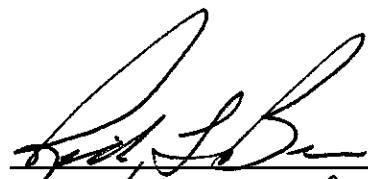
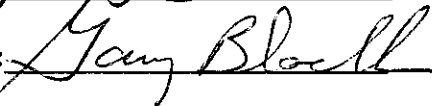


**BUREAU OF ENVIRONMENTAL REMEDIATION/REMEDIAL SECTION
POLICY
FILTERING WATER SAMPLES COLLECTED for METAL
ANALYSIS**

**BER POLICY # BER-RS-46
DATE: June 1, 2006**

PAGES: 3

Section Chief:  Date: 6/26/06
Bureau Manager:  Date: 7/11/06

REVISIONS

Revisor: _____ Date of Revision: _____

Section Chief: _____ Date: _____

Bureau Manager: _____ Date: _____

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This policy addresses the filtering of water samples collected for metal analysis that have been collected from direct-push locations, monitoring wells, or other sources that dissolved metals may be appropriate. Dissolved metals are those metals in an unacidified sample that pass through a 0.45- μ m membrane filter; suspended metals are those metals in an unacidified sample that are retained by a 0.45- μ m membrane filter; and total metals are the concentration of metals determined in an unfiltered sample after vigorous digestion, or the sum of the dissolved and suspended concentrations of metals (total metals are defined operationally by the digestion procedure).

Literature indicates that well construction, development, sampling, and field filtering can influence the concentration of metals quantified in ground water samples. Field filtering is often a smaller source of variability and bias compared to these other factors. Scientific evidence indicates that field filtering should not be necessary when: (1) wells have been properly constructed, developed and purged; (2) the sample has been collected without stirring or agitating the aquifer materials; (3) and turbidity is less than 5 nephelometric turbidity units (NTU).

Total metal analysis of ground water samples quantifies the metals contained in the suspended material or sediment in the sample as well as the metals dissolved in the ground water. The amount of sediment in a ground water sample is dependent on several items including but not limited to sampling method, purge volume/technique, geology, and development; controlling the amount of sediment in a sample is very difficult or impossible.

Filtering a sample will remove suspended particles and some colloids from the sample; a colloid is defined as a particle or particles having diameters less than 10 microns. Sediments and colloids may contain metals that are of natural origin and/or anthropogenic origin.

It shall be the policy of the Bureau of Environmental Remediation to filter ground water samples collected for metal analysis that are collected from direct-push sample locations.

Ground water samples collected from monitoring wells for metal analysis should be field-filtered if the turbidity is greater than 5 NTUs. If sampling techniques are such that a turbidity-free sample can be obtained, filtering may not be necessary.

Samples for dissolved metal analysis should be field-filtered through a 0.45- μ m filter prior to

acidifying the sample. Dissolved metal samples can be collected in an unacidified glass or plastic container, such as a cubitainer, and allowed to settle for a short period of time prior to filtering. If this time period exceeds two hours prior to filtering, it should be noted in one's field book and in reports. Immediately after filtering, the sample should be transferred into the appropriate sample container. If the sample container is not pre-acidified, the sample should be acidified on transferring into the sample container.

Total metals analysis of surface water samples quantifies the metals suspended and dissolved in the surface water. KDHE standards for surface water quality are based on total metals. When analyzing metals on surface water samples, it may be appropriate to collect samples for both dissolved metals and total metals.

Total metal analysis should be performed on ground water samples collected from drinking water sources such as PWS or domestic wells.

References:

Standard Methods for the Analysis of Water and Wastewater, 20th Edition, American Public Health Association, American Water Works Association, Water Environment Federation, Washington DC 1998.

Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020 USEPA, Cincinnati, Ohio, 1983.

United States Geological Survey Web Site found at: <http://www.usgs.gov/>.

United State Environmental Protection Agency Region 9: *Quality Assurance Field Sampling Procedures* Vol. 5 Part II (groundwater) December 1995.

Indiana Department of Environmental Management *Sampling and Analysis of Ground Water for Metals at Remediation Sites* WASTE-0057-NPD March 17, 2005.

Special Topics Subcommittee of the Science Advisory Board's Environmental Engineering Committee technical review of proposed guidance for collection of ground water samples for metal analysis, found at: www.epa.gov/sub/pdf/eec/9711.pdf.