Application of Automated Systems for Clean Composite Sampling

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Biographical Sketches of Authors

Jamie Heisig-Mitchell coordinates and conducts field sampling activities for the Technical Services Division of the Hampton Roads Sanitation District. These activities include ground water, storm water and ambient water quality monitoring as well as VPDES discharge monitoring. She provides training in clean metals sampling to HRSD employees and any interested Virginia municipality personnel. A recent graduate of Old Dominion University, she earned an M.S. in Biology for her research in marine ecology.

Danny Barker is an Environmental Scientist with the Hampton Roads Sanitation District where he has 15 years of experience working in HRSD's Technical Services Division. He was the project manger and primary developer of HRSD's clean composite sampling system, currently under review by the Patent and Trademark Office in Washington DC. Additionally, he designs and manages environmental monitoring programs for various regulatory and research activities. He served as a member of the Virginia Water Monitoring Council Steering Committee and is currently serving on the Virginia Association of Municipal Wastewater Agencies Permit Review Committee. He earned his B.S. in Biology from Old Dominion University.

Norman LeBlanc has over 25 years experience in the field of water quality management with respect to discharges from publicly owned treatment works (POTWs) to estuarine and near shore coastal waters. As Chief of Technical Services for the Hampton Roads Sanitation District, his major responsibilities include all NPDES, biosolids and air permitting activities for nine major POTWs. He represents AMSA on the SETAC Metals Pellston conferences, moderated the regulatory session at Argentum VI on Silver in the Environment and served on the National Water Quality Monitoring Council and the USGS Advisory Committee on Water Information. He also served six years as a member of the Research Council for the Water Environment Research Foundation and is a member on the EPA SAB Review Panel on the Report on the Environment. He did his undergraduate studies in physical oceanography at New York University and his graduate studies in physical oceanography at Old Dominion University.

Abstract

The quality of data used for regulatory purposes such as establishing wastewater permit discharge limitations and in determining the compliance status of dischargers must meet very high standards due to the legal liability of this data. The quality of trace metal data may be compromised due to contamination of samples during collection, preparation, storage and analysis. The use of clean techniques for sampling and analysis is critical to obtaining representative and accurate data.

To address these issues, an automated sampling system involving the collection of an "intermediate" composite sample was developed. The sample is split into total recoverable and dissolved fractions upon sample completion. Filtering after composite completion reduces sample labor costs, decreases the risk of sample contamination from increased sample handling, and increases the probability of obtaining a representative sample. Though earlier studies demonstrated that dissolved metal concentrations do not change over the 24-hour time period prior to sample filtration, concerns about the accuracy of dissolved data collected in this manner continue to arise. To further address these issues and to test the applicability of the automated composite sampling system to the collection of mercury for EPA 1631, a prior study comparing dissolved metals concentrations in grab and composite samples was expanded to provide a more robust data set and to include mercury analysis. Results demonstrate that automated composite sample concentrations are not significantly different than those obtained by manual grab sampling and that delays of up to 48 hours in filtration/preservation do not significantly affect the sample values.

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