Water Tech 2008 Abstract Submission

Application of ICP/MS Collision Cell Technology for the Analysis of Trace Metals in Marine Waters and Other Challenging Matrices

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Inductively Coupled Plasma Mass Spectrometry (ICP/MS) is the most widely used analytical technique for the measurement of trace metals in water. The technique uses characteristic isotopic masses to uniquely identify and quantify low concentrations of individual metal species. However, ICP/MS technology does suffer from interferences caused by polyatomic species that coincidentally have similar combined masses as the target metal species. These polyatomic interferences occur when there are high levels of contributing species such as Chloride (Cl), Calcium (Ca) or Carbon (C). High levels of these interfering species can impact the measurement of several environmentally important trace metals such as Arsenic (As), Chromium (Cr), Copper (Cu) and Zinc (Zn). Marine waters containing high levels of sodium chloride are examples of matrices that frequently create polyatomic interferences that result in compromised trace metal data. Other challenging matrices include brackish water, industrial effluents and wastewater streams. This presentation will focus on the use of ICP/MS sample preconditioning systems such as collision cells and dynamic reaction cells that effectively remove polyatomic interferences. The presentation will also include a discussion of the use of the improved low-level metals data in environmental monitoring and management.

The importance of using the appropriate technique for water analysis cannot be over emphasized. False positive results for trace elements and metals such as selenium and arsenic due to interference by chloride are great enough to exceed the Canadian Water Quality Guidelines (CWQGs). The consequences of perceived exceedences of the CWQGs may include:

- Crippling constraints being put on the operation and management of tailing ponds in the mining industry.
- Confusion and inappropriate mitigation measures being employed in management and/or recovery plans;
- Installation of costly water treatment facilities.
- Initiation of expensive monitoring programs

Presenting Author Introductory Biographies

Presenting Author: Phil Heaton, B.Sc., P.Chem

Phil Heaton received a B.Sc. degree in Chemistry from the University of Alberta in 1989 and is a Professional Chemist (P.Chem) registered in the Province of Alberta. Phil is a member of the American Chemical Society (ACS) and is also a member of the International Society of Environmental Forensics (ISEF). His areas of specialization include trace metal analysis in complex media and characterization of environmental contaminants. Phil's other areas of interest include laboratory automation and the application of chemometrics to complex environmental data. He frequently works with Maxxam's clients to design analytical programs for delineation and remediation projects. Currently Phil is Maxxam's Senior Manager of Technology Development in Western Canada.

Presenting Author: Edyta Jasinska, B.Sc.(Hons), Ph.D

Edyta Jasinska is an aquatic ecology and water quality specialist with more than 15 years of experience in the field. She received a B.Sc. degree with double major in Botany and Zoology from the University of Western Australia. Her Honours (Murdoch University) and PhD (UWA) theses each dealt with the ecology and evolution of groundwater ecosystems in caves and springs. Edyta completed three postdoctoral fellowships, one at the University of Calgary and two at the University of Alberta. Her research ranged from evaluating techniques for measuring stress in ecosystems, relating hydrogeology and landscape position to wetland biological processes, to activation of detoxifying enzymes in fish in response to pollutants. Since 1990, Edyta was contracted by several government departments to assess the health, mitigation and management requirements of wetlands, creeks, cave waters, and springs that were being impacted by human activities. In 2006, Edyta joined Golder Associates where she provides the assimilation, interpretation, and reporting of field investigations; literature reviews; input to multidisciplinary environmental impact assessments; and preparation of environmental monitoring plans.

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