

# **Report as of FY2006 for 2006MO61B: "EEM Fluorescence Spectroscopy Fingerprints and Monitoring of NDMA and TTHM Formation Potentials"**

## **Publications**

- Articles in Refereed Scientific Journals:
  - Hua B, A. Koirala, K. Veum, J. Jones, T. Clevenger, B. Deng, 2007, Fluorescence fingerprints and total trihalomethanes and N-nitrosodimethylamine formation potentials, Environmental Chemistry Letters, 5(2), 73-77.

## **Report Follows**

## **EEM Fluorescence Spectroscopy Fingerprints and Monitoring of NDMA and TTHM Formation Potentials**

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### **1. Summary**

Excitation-emission matrix (EEM) fluorescence spectroscopy is becoming a valuable tool in water quality monitoring, based on identifying fluorescence emitting organic substances (fluorophores) present in water systems. This study continued our effort to apply the sensitive fluorescence EEM monitoring technique for water quality management. Specifically, the EEM approach was applied to the identification of the precursors of total trihalomethane (TTHM) and *N*-nitrosodimethylamine (NDMA) formation of the waters from 55 lakes in Missouri. Water samples were analyzed for their EEMs and the formation potentials of TTHM and NDMA. Comparing the EEM fingerprints with TTHM formation revealed that water with higher fluorescence intensity generally exhibited higher TTHM formation potential. Moreover, waters with fluorescence center at excitation: 290-310 nm/emission: 330-350 nm were related to high NDMA and TTHM formation potentials. The results suggest that EEM fingerprints could be used as surrogate parameters for monitoring TTHM and NDMA formation potentials. The study also monitored the fluorescence fingerprints and major fluorescent components in waters from a landfill, a wastewater treatment plant effluent, and Missouri River. Humic-like, protein-like and xenobiotic-like fluorophores identified from EEMs were consistent with recent published studies. The three sample sources were clearly differentiated based on their fluorescing composition.

### **2. Graduate and undergraduate students training**

This project has provided partially supports to two master level graduate students, Mr. Amod Koirala who defended his thesis July 2006, and Mr. Benjamin Teymouri who defended his thesis in May 2007.

### **3. Information Access**

#### Journal papers:

Hua B, Koirala A, Veum K, Jones J, Clevenger T, Deng B (2007) Fluorescence fingerprints and total trihalomethanes and *N*-nitrosodimethylamine formation potentials. *Environmental Chemistry Letters*, 5(2), 73-77.