

Ultra-Filtration Studies of Actinides Americium, Plutonium, and Thorium in a Seasonally-Anoxic Lake in the Southeastern United States: Seasonal Cycling and Association with Colloids

Michael Schultz^{1,2}, William Burnett², Monika Takacs³, James Alberts³, and Tom Hinton⁴.

1. PerkinElmer Instruments and Florida State University, 801 S. Illinois Avenue, Oak Ridge, TN 37831-0895, (865) 481-2446, michael.schultz@perkinelmer.com

2. Department of Oceanography, Florida State University, Tallahassee, FL 32306-3048, Phone 850-644-6703; wburnett@mailier.fsu.edu

3. School of Marine Programs, University of Georgia, Athens, GA, 30602; (706) 583-0049; jalberts@darientel.net; mtakacs@arches.uga.edu

4. Savannah River Ecology Laboratory, University of Georgia, Aiken, SC 29802; thinton@srel.edu

In this study we present ultra-filtration experiments designed to determine the size fractionation of actinides in a seasonally-anoxic lake (known as Pond B) located at the Savannah River Site (Aiken, SC, USA). Actinides are present in the mBq kg⁻¹ range - an excellent far-field study site. Cycling of actinides in Pond B is the result of seasonal changes in the stratification of the lake. Minimum actinide inventories in the water column of Pond B occur at pond turn-over in October and November. After turnover, the inventories increase until maximum values occur in March and April. Data are presented for a well-stratified system (summer) and a well-mixed water column (winter). Particle size fractionation is resolved to four levels: raw water, <0.45 micron, colloidal fraction 0.45 micron - 10 kD, < 10 kD. Dominance of the colloid fraction for Am, Pu, and Th is highlighted.