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

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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 turnover 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.