Mass Balance of Water and Se in the TLDD Flow-Through Wetland Cells

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Executive Summary:
The TLDD flow-through wetland system consisting of ten cells has been operated from the spring of 1996 to winter of 2001 to determine the removal of selenium from tile drainage effluents from a nearby farm. The 50x250 ft. cells have been continuously monitored for water and Se inflows and outflows on a weekly basis. Standing water, seepage water, fallen litter, organic detritus and sediment samples within the cells were also periodically sampled. Attempts to obtain a mass balance on Se were constrained by data gaps. Therefore, UCD and UCB carried out a comprehensive sampling in September 2000. Over 1,000 samples of standing water, fallen litter, organic detritus, mineral sediments, and plant shoots and roots were collected that are now being analyzed. The project will develop the mass balance of water and Se in the wetland cells on a growing season, annual and 1996-2000 period in collaboration with DWR (for water and ET) and UCB (for volatilization, plant uptake and rhizosphere). The mass balance will be carried out at both global (input/output) and distributed (input/output + changes in standing water, sediment and plant compartments) levels. Next, a dynamic simulation model will be developed and calibrated to simulate water and Se flows at the distributed level. The calibrated and validated model will then be used to evaluate system performances under scenarios very different from the TLDD system (e.g., spatial dimensions, inflow rates and residence times, inflow Se concentrations, etc.) and contribute towards engineering design criteria for possible scaling up to operating systems.