30b Modeling Pilot-Scale Cross-Flow Filtration of Simulated Nuclear Waste

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The authors conducted pilot-scale tests with simulated nuclear waste and a sintered stainless steel cross-flow filter to evaluate the impact of operating parameters on performance. The filter unit contained seven tubes each 10 feet long, 5/8 inches inner diameter, and 0.5 micron pore size. The demonstration used a batch size of 300 gallons. The axial velocity varied from 12 – 26 ft/s, the transmembrane pressure from 15 – 65 psi, and the insoluble solids concentration from 0.03 – 4.5 wt % to determine their impact on filter flux. The authors used statistical techniques to determine how well the data fit classical filtration models, and to develop a model to fit this data. The steady state model included resistance terms for the filter, the cake, and the flow through a porous bed.