

# DETERMINATION OF DOMINANT METAL SEQUESTRATION PROCESSES IN A VERTICAL FLOW CELL SUBSTRATE<sup>1</sup>

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**Abstract:** Vertical flow cells may be employed to remove trace metals from mine drainage through a variety of partitioning mechanisms. Sequential extractions can then be used to obtain an estimate of metal partitioning in vertical flow cell substrates. Substrate samples were collected from two vertical flow cells that had been inundated for approximately 1.5 years. Preserved samples that had been collected prior to construction of the cells was also included in the study. Inflow, outflow, and porewater samples were also collected from the cells at or near the same time as the substrate samples. Mean inflow and outflow data indicate that cadmium, cobalt, lead, manganese, nickel, and zinc decrease significantly in the vertical flow cells. Modified Tessier extractions were used to determine the water soluble, exchangeable, organic, carbonate-bound, oxide or oxide-bound, and residual fractions of metals in the substrates. Preliminary results demonstrate that the vertical flow cells are removing metals through several sequestration processes including: sorption, complexing, concretion, and sedimentation. Spatial comparison of the porewater and sequential extraction analyses indicate possible preferential flow paths within the cells and that metals removal is occurring more efficiently in some areas of the cells than in others.

**Additional Key Words:** acid mine drainage, passive treatment, sequential extraction

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