

A coupled modelling effort to study the fate of contaminated sediments downstream of the Coles Hill deposit, Virginia, USA

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Abstract This paper presents the preliminary results of a coupled modelling effort to study the fate of tailings (radioactive waste-by product) downstream of the Coles Hill uranium deposit located in Virginia, USA. The implementation of the overall modelling process includes a one-dimensional hydraulic model to qualitatively characterize the sediment transport process under severe flooding conditions downstream of the potential mining site, a two-dimensional ANSYS Fluent model to simulate the release of tailings from a containment cell located partially above the local ground surface into the nearby streams, and a one-dimensional finite-volume sediment transport model to examine the propagation of a tailings sediment pulse in the river network located downstream. The findings of this investigation aim to assist in estimating the potential impacts that tailings would have if they were transported into rivers and reservoirs located downstream of the Coles Hill deposit that serve as municipal drinking water supplies.

Key words ANSYS Fluent; Coles Hill; HEC-RAS; mining; numerical modelling; sediment transport; tailings