

Fracture mapping in a tunnel system and at nearby outcrop on the Runcorn Peninsula, UK, suggests the need for a review of the potential pathways for pollutant transport in Permo-Triassic sandstone aquifers. Sediment infilling is pervasive in the largest sub-vertical multi-layer fractures in the study area, both at the surface and to a depth of about 40 m below ground level. Sediment infill is inferred to have formed in situ. The conventional models of pollutant transport in fracture networks assume that they comprise open fractures, with pollutant mobility depending on fracture connectivity (a function of density, length, orientation and intersection) and aperture. The presence of extensive sediment fills in fractures will materially change their permeability, thereby reducing pollutant flux, and be of significance in the assessment of risks arising from chemical spillages. There has been little or no substantive evidence for such fills in Permo-Triassic sandstones in the UK, apart from observations at outcrop and anecdotes of sand being pumped from boreholes. Here, we report surface and rare, but complementary, subsurface observations of extensive fills in the Cheshire basin, and argue that they will only act as preferential pathways where they crosscut low-permeability horizons such as mudstones.