Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Transient Simulation of Accumulating Particle Deposition in Pipe Flow JAMES HEWETT, MATHIEU SELLIER, Department of Mechanical Engineering, University of Canterbury — Colloidal particles that deposit in pipe systems can lead to fouling which is an expensive problem in both the geothermal and oil & gas industries. We investigate the gradual accumulation of deposited colloids in pipe flow using numerical simulations. An Euler-Lagrangian approach is employed for modelling the fluid and particle phases. Particle transport to the pipe wall is modelled with Brownian motion and turbulent diffusion. A two-way coupling exists between the fouled material and the pipe flow; the local mass flux of depositing particles is affected by the surrounding fluid in the near-wall region. This coupling is modelled by changing the cells from fluid to solid as the deposited particles exceed each local cell volume. A similar method has been used to model fouling in engine exhaust systems (Paz et al., *Heat Transfer Eng.*, **34**(8-9):674-682, 2013). We compare our deposition velocities and deposition profiles with an experiment on silica scaling in turbulent pipe flow (Kokhanenko et al., *19th AFMC*, 2014).

James Hewett
Department of Mechanical Engineering, University of Canterbury

Date submitted: 27 Jul 2015 Electronic form version 1.4