

Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Development of a CFD Model for Secondary Final Settling Tanks in Water Pollution Control Plants MINWEI GONG, SAVVAS XANTHOS, KRISH RAMALINGAM, JOHN FILLOS, Dept of Civil Engr, City College of New York — To assess performance and evaluate alternatives to improve efficiency of the New York City the Wards Island Water Pollution Control Plant (WPCP) FSTs at peak loads, a 3D CFD model has been developed. Fluent was utilized as the base platform, where sub-models of the Suspended Solids (SS), settling characteristics, density currents and SS flocculation were incorporated. This was supplemented by field and bench scale experiments to quantify the coefficients integral to the sub-models. Model calibration and validation have been carried out by using the extensive set of data collected. The model can be used to evaluate different modes of operation, alternate hydraulic and solids loading rates, as well as addition of auxiliary components such as baffles to improve process performance. The model is being used to compare potential benefits for different alternatives of design and operation of the existing FSTs. After comparing series of inlet baffles, a baffle with 4 horizontal and 7 vertical slots has been recommended for installation in the FSTs. Additional baffle type, configurations and locations within the tank are also being evaluated to improve the performance of the FSTs especially during periods of poor settling and peak flow conditions.

Minwei Gong
Dept of Civil Engr, City College of New York

Date submitted: 08 Aug 2007

Electronic form version 1.4