

# USING A DYNAMIC MODEL TO OPTIMISE THE QUAKERS HILL WWTP INTERMITTENTLY DECANTED AERATED LAGOONS (IDAL's)

**Darren Dwight, Kathryn Harries, Evelyn Rodrigues**, *Quakers Hill WWTP*, Sydney Water Corp.  
**Adrian Reid**, Chemical Engineering Dept., University of Sydney.

Since 1996/1997, the EPA has imposed combined load limits on St Marys, Riverstone and Quakers Hill STP's. The Quakers Hill share equates to a target of 0.20mg/L phosphorus and 5.2mg/L total nitrogen, with future phosphorus targets anticipated to be as low as 0.03mg/L. To meet these limits continuous optimisation and upgrades are taking place. In 1997, the Production Team stress tested the plant to determine its full potential. This led to an increase in the design capacity of the plant by 30%, to 130 000 e.p. This also delayed and probably saved capital expenditure by \$20 million.

The Sydney University Chemical Engineering Department uses six monthly Industrial Placements to provide certain final year students with extended hands on experience. The needs of Sydney University and Quakers Hill STP presented an ideal opportunity to develop a calibrated dynamic model of the IDAL at Quakers Hill STP, to better understand the interrelationships that exist on the plant.

The model has greatly assisted team optimisation projects by accurately quantifying how ammonia, nitrate and COD change as a function of RAS, WAS and aeration intensity. The key benefit is quantifiable outcomes to proposed maintenance, capital works and optimisation changes. Such as improving denitrification, by over 10%, by reducing the air in the selector distribution channel and introducing a stirring phase at the beginning of the settling cycle.

This presentation will summarise the recommendations of the model that the plant team will be investigating, in light of meeting future plant performance targets, overview the plan in place to trial these recommendations and provide results to date.