

SA WATER
SOUTH AUSTRALIA

Anammox for the reduction of nitrogen from sludge dewatering effluent case study

Reducing sewage treatment costs and greenhouse gas emissions with
efficient nitrogen removal

AUGUST 2012



WATER SERVICES
ASSOCIATION OF AUSTRALIA

Conventional methods of dewatering sludge in sewage treatment present an ongoing problem of nitrogen loads discharged into the Gulf at Adelaide. A trial-scale anammox reactor will test the cost efficiency and sustainability of an energy-and-cost effective biological process for removing nitrogen, already widely accepted and practiced in Europe.

COMMITMENT TO ENVIRONMENT BEHIND SEARCH FOR BETTER METHODOLOGY

Nitrogen loads discharged into the Gulf via treated wastewater are an on-going problem with regard to seagrass and habitat restoration. For this reason, SA Water recognises the need to invest in sustainable ways of further reducing nitrogen loads discharged to sea. SA Water also has a commitment to improve energy efficiency of wastewater treatment and reduce greenhouse gases emissions.

BIOLOGICAL PROCESS PROMISES EFFICIENT SOLUTION

Anammox (Anaerobic ammonium oxidation) is widely accepted as an energy and cost-effective biological process for removing nitrogen from wastewater, with a number of full-scale plants already existing in Europe. In contrast to the conventional activated sludge (AS) process, the anammox process requires 60% less oxygen and is up to 90% more cost effective. In collaboration with SA Water's Alliance partner; Allwater, this study will investigate the efficacy of the anammox process as a cost-effective and sustainable means of removing nitrogen from sludge dewatering effluent (SDE), as an alternative to AS treatment. SDE is a small waste stream from sludge dewatering and digester processing in wastewater treatment plants, which is very high in ammonia and low in bioavailable carbon. SDE can contribute to 10-20% of the total nitrogen load of the AS process, resulting in higher operational cost and unfavorable carbon/nitrogen ratio for denitrification. SDE should be treated separately and one of the most sustainable and cost-effective technologies available is the anammox process.

TRIAL PROJECT AN AUSTRALIAN FIRST

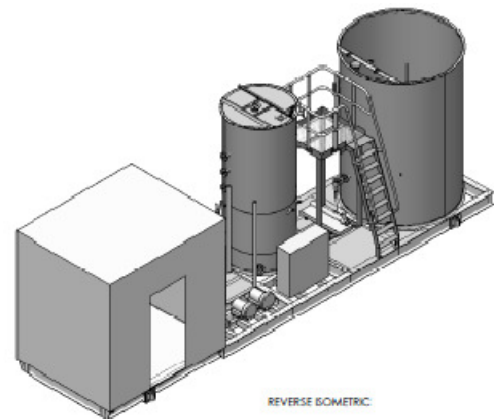
A demonstration-scale anammox reactor is under construction at SA Water's Bolivar wastewater treatment plant, which is based on the Cleargreen®

process developed by SUEZ Environnement. This will be the first demonstration scale anammox reactor in Australia, and is scheduled to commence operation in September 2012.

This is a joint project between SA Water, Australian Water Quality Centre, Allwater, Degremont/Suez, BEGUN IN MARCH 2012.

Outcomes from this project are expected to lead to significant savings in aeration requirements, an increase in the nitrogen removal capacity of the existing activated sludge process and therefore reduced nitrogen loads discharged into the Gulf. This project could have potential implications for greenhouse gas mitigation efforts on two fronts: reductions in electricity-related greenhouse gas emissions that would otherwise arise from aeration requirements; and reductions in Nitrous oxide emissions.

This Project will provide a range of benefits to SA Water as well as the community and environment. This will include reductions in wastewater treatment costs and net greenhouse gas emissions and improved water quality compliance.



The anammox reactor currently under construction at Bolivar waste water treatment plant.

SA WATER

SA Water is the water utility wholly owned by the government of South Australia. It delivers water and sewerage services to almost 1.5 million people across the State.