

# Zeewolde WWTP Reduces Biologic Solids Production and Produces Phosphates for Re-Use.

The Cannibal® System in Action.

## Introduction

The WWTP of Zeewolde in the Netherlands is treating the municipal wastewater of the city of Zeewolde and is one of five WWTP's, which is run by the Water Board of Zuiderzeeland, a government controlled body. This WWTP is built on reclaimed land and receives only municipal wastewater. The performance under the present operation is such that the facility achieves very low phosphate and nitrogen limits, without the need for chemical additions.

The plant is designed for a PE of 50,000 but is only serving a PE of 35,000. The population being served by this WWTP is expected to increase in the near future.

## The Challenge

The operational costs of removing excess sludge are very high in the Netherlands. Due to present legislation, all the municipal waste activated sludge (WAS) must be incinerated. This leads to high costs for all the Dutch Water Boards.

The challenge Siemens faced, was to reduce the operational costs for WAS disposal, but keeping the excellent effluent quality and not impacting the WWTP design capacity. The Water Board was concerned that any sludge reduction would release phosphate, which was otherwise removed through sludge disposal and could impact their effluent quality. In addition, chemical dosing would also increase the operational cost of the facility.

## The Solution

Siemens proposed the Cannibal® Solids Reduction System. The Cannibal® Solids Reduction System uses a side stream biological batch process aimed at reducing the amount of biological WAS. The total yield of the WWTP would be dropped below 0.3 kg/kg BOD, effectively reducing the WAS production by 70%.

## The Cannibal® System

The Cannibal® System is based on taking a certain amount of activated sludge which is stressed in the "Interchange BioReactors." The stressing of this sludge is done by a special regime of mixing and reducing the oxygen level in the interchange activated sludge (IAS) reactor. After a period of time, a batch of the IAS is returned to the main process where the IAS is cannibalized, further reducing the amount of generated WAS.

## The Approach

In order to prove the reliability and the performance of the Cannibal® System, Siemens did a pilot study on site. This pilot study achieved a 70% WAS reduction and showed the reliability and the performance to the Water Board whilst addressing their concerns of still being able to achieve a high quality effluent.

In order to deal with phosphates being released, Siemens added an additional step to the Cannibal® System, a separate chemical phosphate removal (and possible reuse) step.

## Design Solution

The Cannibal® System has been installed in two decommissioned tanks, located next to the WWTP. The two 1,200 m<sup>3</sup> tanks were converted to Interchange BioReactors, the heart of the Cannibal® System. The installation further consists of three small blowers, two mixers, chemical dosing installation and the Smart Cannibal™ Control System. The Cannibal® System has been started up since March 2010.

Case Study  
Zeewolde WWTP

Water Technologies

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### Siemens Added Value

- Reducing the yearly operating costs by €100.000
- Opening the door for phosphate reuse
- Leader in combined effort with the customer and a research party (TNO) to obtain a special grant of nearly €500.000 for combined Biosolids Reduction and phosphate recovery
- Supplying all the equipment required for the combined Cannibal® System and phosphate recovery installation

### Project Facts

- Project: >300.000 kg of sludge reduction per year
- Customer: Waterschap Zuiderzeeland (Water Board Zuiderzeeland, the Netherlands)
- End User: WWTP of Zeewolde
- Sludge reduction with phosphate recovery
- New and Innovative Technology for the region
- Process started up March 2010



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