WASTEWATER TREATMENT TO REDUCE DISPOSAL COST

Key Facts

Client: Orica

Site: Botany Groundwater Treatment Plant (GTP)

Location: Sydney, NSW

Purpose: To recover some of the waste discharged to the sewer and hence reduce trade waste costs.

Technology: Ultrafiltration

Supporting infrastructure supplied by Ixom:

- CIP system
- Feed, and process tanks
- Electrical panels & HMI
- Chemical Dosing systems

Capacity: 1 ML/day

Feed Water Source: Clarifier and backwash wastewater (TSS: 40 - 100 mg/L, turbidity: 20 – 35 NTU, total iron 3 - 10 mg/L)

Treated Water Quality: Turbidity < 5 mg/L and total iron < 0.5 mg/L

Contract Type: EPC (Turnkey)

Start-up: 2014

Benefits:

- Net saving of $500,000 per annum

BACKGROUND

The Botany Groundwater Treatment (GTP) forms a major component of the Groundwater Clean-up Project being undertaken by Orica to remediate contaminated groundwater arising from former chemical industry operations at Botany Bay.

The GTP generates wastewater from clarifier and backwash processes at 32 kL/hr, all of which was formerly discharged to the sewer.

In order to reduce trade waste costs, Orica and Ixom investigated the use of membranes to recover some of the water discharged to the sewer.

CUSTOMISED SOLUTION

Pilot Trial

Ixom trialled DOW outside-in PVDF ultrafiltration (UF) membranes in 2013. The trial assessed the suitability of the DOW membrane format and configuration, and enabled optimisation of system design parameters.

The feedwater quality to the UF system was particularly challenging as the water was highly biologically active, with the total iron being as high as 10 mg/L and suspended solids up to 45 mg/L. A range of different Chemical-Enhanced-Backwash (CEB) regimes were trialled in the process of optimising UF system recovery while achieving a CIP interval of two months.

The objective of the trial was to recover water of sufficient quality to allow it to be returned to the front end of the treatment process. From the trial results, reprocessing the wastewater with the UF was expected to provide annual savings of more than $500,000 by reducing trade waste costs.

Running the pilot trial had the following benefits:

- Demonstrated DOW membrane suitability to treat and recover this industrial wastewater
- Allowed operating parameters to be optimised to maximise water recovery and cleaning effectiveness

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CUSTOMISED SOLUTION

Full Scale Plant

The project execution strategy was developed with the objective of bringing the UF plant into operation as quickly as possible to enable the financial savings to be realised. This objective was achieved by adopting the following principles:

- Skid mounted design complete with skid-mounted electrical panels to maximise offsite mechanical and electrical works
- Early engagement of stakeholders to expedite site integration and commissioning
- Provision of dedicated technical support in the start-up and operation phases

The full scale 1 ML/d UF system was built and factory tested at the Ixom manufacturing facility in Adelaide prior to site integration and commissioning. The UF system includes DOW IntegraPac™ IP-51 modules and a pre-engineered skid, feed pump, back-wash pump, pre-filtration, filtrate tank, CIP equipment & chemical dosing pumps for CEB.

RESULT

The successful operation of the project demonstrates that ultrafiltration can be coupled with existing conventional processes to reduce waste volumes and trade waste costs.

The plant has been operating to specification since start-up.

The plant is delivering savings in excess of $500,000 per annum.

What's your challenge?

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