ORICA WATERCARE

Case Study

Visy Industries

Client

Visy Industries

Project

Papermill Recycle Effluent Treatment

Location

Campbellfield, VIC Australia

Commission Date

July 2008

Figure 1: MIEX® System at Visy Industries

Project Summary

Visy Industries ('Visy'), a leading paper and packaging company, set a challenging target of reducing fresh water usage by 20%. Numerous technologies were evaluated that would enable recycling of treated whitewater back into the recycled paper manufacturing process. The MIEX® Technology was selected based on pilot scale results demonstrating true colour and charge demand reductions of 74% and 80%, respectively, therefore allowing treated whitewater to be reused for white top liner production.

Challenge

Rapidly growing populations and dramatically reduced water storages have placed immediate pressure on high water users, particularly industrial companies, to reduce water usage and increase water efficiency.

Visy produces a wide range of paper and packaging products and uses recycled papers for paper production. Recycled paper production at Visy consumes approximately 4,000 litres of fresh water per tonne of paper produced, which is below the industry average. Although Visy recycles over 95% of the fresh water used for recycled paper production, large volumes of trade waste are still discharged from Visy's Coolaroo site in Campbellfield, Victoria.

Whitewater from recycled paper manufacture is coloured and has a high charge demand. Highly coloured water negatively impacts the brightness of paper manufactured, while high charge demand increases the amount of chemicals required to produce recycled paper. The following table shows typical values for whitewater.

Table 1: White water parameters at Visy Industries

Visy Raw Effluent Parameters	
True Colour (Pt-Co)	250
Charge Demand (milliEq)	355
UV_{254} Absorbance (cm-1)	2.862
Turbidity (NTU)	390
Chloride (mg/L)	67
TDS (mg/L)	2350
BOD (mg/L)	1683
COD (mg/L)	3820

Solution

Visy investigated the MIEX® Process compared with coagulation, ozonation, and anaerobic processes for reducing colour and charge demand

MIEX®

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from white water. While these processes can reduce colour, high chemical demand and energy usage and large footprints associated with these technologies would likely be required to meet targets.

The MIEX® Technology is an advanced anion exchange process. The name "MIEX" comes from Magnetic Ion EXchange, because the resin beads contain a unique magnetised component within their structure, allowing them to act as weak individual magnets. These magnetic particles form rapidly settling agglomerates, enabling application under mixed conditions and allowing the process to be relatively unaffected by suspended solids. The very small resin bead size of around 200 µm provides a high surface area facilitating rapid kinetics.

The MIEX® Resin is used in a continuous ion exchange process incorporating resin contacting, separation, and regeneration. A single process vessel performs the resin contact and separation steps and resin regeneration occurs in dedicated equipment.

Initial laboratory testing of whitewater indicated that contaminants contributing to true colour and charge demand were amenable to removal by MIEX® Treatment. Therefore, further pilot scale testing was conducted to demonstrate long-term performance and optimise operating parameters.

Project Outcomes

A pilot plant trial incorporating PETAX™ prefiltration followed by the MIEX® Process demonstrated that the MIEX® Process can reduce true colour and charge demand by an average of 74% and 80%, respectively. The reduction in true colour is demonstrated in Figure 2.

The MIEX® Process was selected for full-scale implementation of a 1 megalitre per day (MLD) treatment plant based on technical feasibility, minimal plant footprint, and low energy use and waste volumes. This plant primarily treats effluent from the VP5 paper machine for distribution to the de-inking plant of the VP4 paper machine.

Figure 2: MIEX® Treated Effluent vs. Raw Effluent

Recycling whitewater treated by the MIEX® Process provides the following economic and environmental benefits to Visy:

- Site fresh water usage reduced by 15%, therefore helping to achieve the target of reducing overall fresh water usage by 20%
- Water security for recycled paper manufacturing, despite water restrictions
- Significant production savings via reductions in fresh water usage and trade waste production

MIEX®

Visit our website at www.miexresin.com or contact your nearest Orica Watercare office for more information or to inquire about a specific application.

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