WASTEWATER EFFICIENCY – W7

Eco-efficiency resources for the food processing industry

Reducing tradewaste charges

Wastewater can be a valuable resource for those businesses able to:

- *recover product*
- *generate energy*
- *treat and reuse the water on or off site.*

While treating wastewater can be expensive, recovery options such as reuse are becoming more viable due to:

- pressure to reduce potable water consumption through water restrictions
- increasing supply and disposal costs
- restrictions on discharge concentrations
- advances in affordable treatment technologies.

Strainers on drains can reduce waste entering wastewater system

Prior to investigating wastewater treatment, processors should ensure opportunities to reduce the demand for water in the plant have been thoroughly investigated. For example, the collection of final rinse water for use as the pre-rinse for the next batch will reduce water use and water generation. Refer to *Water efficient processing fact sheet (W2)* for more information.

Reducing the volume and improving the quality of wastewater discharged from the plant by implementing good housekeeping, such as dry cleaning, eliminating spills and installing drip trays, will also help to reduce wastewater cost. Refer to *Good housekeeping fact sheet (G2)* for more information.

Selecting a wastewater treatment system

When choosing a wastewater treatment system it is important to consider possible changes to the quality or quantity of wastewater produced by the plant over time and the suitability of the system to treat current and future needs. Building in flexibility will avoid system duplication whilst carrying out an eco-efficiency program can minimise the total effluent loads on a system saving capital and operational costs.

Most wastewater treatment systems require energy to operate, especially advanced treatment systems such as membranes. As a result, whilst the primary objective may be to reduce water use, increased energy use may cause unforseen problems for the site including increased energy costs, impacts on carbon generation and increased peak demand. These factors must be considered when considering wastewater treatment.

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Additional factors to consider include:

- energy use or potential to generate energy
- potential to recycle wastewater
- potential to recover product
- chemical costs
- space availability
- infrastructure requirements
- labour requirements including skills
- mains water charges
- maintenance requirements.

Processors should take into consideration the quality and quantity of wastewater produced and the quality of water required for its reuse. For example, the quality of water produced by energy intensive reverse osmosis would not usually be necessary for irrigation, but could be considered if the water was to be used within the process.

A treatment train approach of two or more treatment systems may provide a better solution then a single system. Table 1 outlines some treatment options for various contaminants.

Table 1: Common treatment techniques and their purpose

Contamination	Suitable treatments					
	Filtration	Membrane filtration	Ion exchange	Chlorination/ ozonation	UV radiation	Activated Carbon
Solids	X	X				
Salts, including hardness		X	X			
pH corrections						
Other chemical contaminants eg organic residues	X	X	X			X
Bacteria		X		X	X	
Viruses		X		X	X	
Protozoa		X		X	X	
Algae bloom (toxin)						X

Product recovery

The loss of material to the wastewater stream during processing is not only a loss of valuable product but adds to the pollutant load and tradewaste costs. Recovery, particularly using membrane technology, is becoming increasingly popular as the physical filtration process allows substances to be recovered chemically unchanged, making them more readily available for reuse. Refer to *Resource recovery from wastewater fact sheet (W8)* for more information on membrane technology.

Energy recovery

Energy can sometimes be recovered from high strength wastewater streams, such as those of dairy processing plants and breweries, using anaerobic digestion. Refer to *Energy recovery fact sheet (E5)* and *Resource recovery from wastewater fact sheet (W8)* for more information.

Wastewater recycling

Water recycling should only be considered once potential water reuse options and process optimisation has occurred. Currently government regulations allow food processors to use water that is either potable or that will not make the produce unacceptable.[1] This must be undertaken in accordance with regulatory approval and a food safety risk identification and mitigation plan.

While there has been some hesitation to embrace the use of recycled water in the past, changes in water management policy may help to increase acceptance. Refer to the *Alternative water sources fact sheet (W3)* for more information on water recycling.

For more information visit: The Queensland Water Recycling Guidelines[2]
www.derm.qld.gov.au/water/regulation/recycling/guidelines.html

and the Australian Guidelines for Water Recycling Phases 1 and 2.[3]
www.ephc.gov.au/taxonomy/term/39

The documents focus on water recycled through municipal treatment plants but can provide some guidance for internal recycling. A risk-based approach has been adopted and should be applied to any on-site water recycling. The Queensland Government is developing guidance documents on the recycling within food manufacturing processes.[4]

Third party install and operate

There are several water treatment companies who now offer to install and operate wastewater treatment systems on site, providing water back to the company for a fixed price. The third party can operate the whole system or just part of the treatment train.

The benefit for the food company is the supply of an alternative and secure water source at a reduced rate without the expense or problems of maintaining a complex treatment system. The third party operator benefits from the fixed income of the treatment system for a set period of time.

This option is becoming more accepted as food companies focus on their core business and outsource more tasks to third party specialists.

This series of fact sheets provides examples and suggestions to the modern food processor on how to achieve both economic and environmental benefits from eco-efficiency. Visit the project website www.ecoefficiency.com.au for more ideas and case studies.

1 Safe Food Production Queensland, Water Recycling, Department of Employment, Economic Development and Innovation www.safefood.qld.gov.au/images/PDF/dairy_dairy_products/water%20recycling.pdf
2 Queensland Water Recycling Guidelines, 2005, Department of Environment and Resource Management www.nrw.qld.gov.au/compliance/wic/guidelines_recycle.html
3 National Guidelines for Water Recycling, 2006, and Phase 2, 2007, Natural Resource Management Ministerial Council & Environment Protection and Heritage Council www.ephc.gov.au/ephc/water_recycling.html
4 Queensland Health, 2008, Pers Comm.

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This series of eco-efficiency fact sheets will demonstrate the importance of water in a modern food factory and suggest areas where savings can be made. The project website www.eco-efficiency.com.au has more ideas and case studies on water savings across the food industry.

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