



CLEANER PRODUCTION

> CASE STUDY



THE SOUTH AUSTRALIAN
BREWING COMPANY PTY LTD

THE SOUTH AUSTRALIAN BREWING COMPANY

SUMMARY

Waste reduction initiatives have saved The South Australian Brewing Company (SAB) over \$500,000 in the past 24 months. The main focus of waste minimisation has been in brewing and packaging. Currently there are 27 projects addressing the minimisation of extract or beer losses and 13 projects addressing packaging waste. Other initiatives include raising of awareness, improving procedures and capital works. Some specific projects completed include:

- Reduction of filling losses, preventing the loss of 200,000 litres of beer per year.
- Extract recovery, using materials once disposed as waste in earlier production stages; savings \$40,000 per year.
- Water reclamation, reducing water costs by \$60,000 per year.
- Upgrade of storage and handling, replacing long pipe runs and complicated manifold systems to reduce cleaning; savings of \$55,000 per year.



Environment Protection Agency
Government of South Australia



THE SOUTH AUSTRALIAN BREWING COMPANY

Business Profile

SAB has a long history in South Australia dating back 140 years to the original West End Brewery built in Hindley Street, Adelaide. The company is the State's largest brewery and has 150 staff producing over 60% of the state's beer sales with brands such as West End, Southwark and Hahn. The company was acquired by Lion Nathan in 1993, becoming part of the largest beverage operation in Australasia.

Financial assistance provided

Energetic Consultants concluded the consultancy study with a grant of \$15,000 provided by the EPA's Cleaner Industries Demonstration Scheme.

Measures implemented

Application of Statistical Process Control (SPC); upgrade of water reclamation system on the bottle and can pasteuriser; process modification to recover extract from trub; new cellar piping.

Cleaner production motivators

Minimise product loss, reduce water consumption, improve effluent quality, increase profitability.

TRADITIONAL APPROACH

Filling of containers

Lack of rigorous housekeeping and maintenance procedures caused filling apparatus and fill detectors to fall outside of calibration limits (overfills and underfills). Excess beer was given away or wasted as an overflow. Rejected underfills also contributed to significant wastage.

Water usage

Water used in the pasteuriser was disposed to sewer after a single use.

Extract

The true value of process extracts was not known and was perceived to be waste. The extract was either disposed to landfill or used as stock-feed.

Storage and handling

Long pipe runs and manifold systems were regularly cleaned out using substantial quantities of water and chemicals. Residual product losses were also significant.

CLEANER PRODUCTION INITIATIVES >

The projects discussed here represent many initiatives implemented across the site that have delivered environmental benefit and cost savings. While many of the projects have required some capital investment, most savings have come through raising awareness on the cost of waste by implementing standard operating procedures and ensuring proper process control.

Benefits recommended and implemented >

Filling losses

Beer filling line

Overfilling of containers — cans, bottles or kegs — meant product down the drain. It increased the loading on the effluent plant and the total discharge to sewer; and wasted product which could otherwise be sold.

Overfilling also meant product given away. The cost of the odd bottle or can adds up to a huge cost for a year's production.

SAB evaluated all packaging lines using Statistical Process Control and identified areas of potential improvement.

Waste can be easily reduced by calibrating filling apparatus, ensuring fill detectors are working properly and working to standard operating procedures.



> Beer filling line

BENEFITS



ENVIRONMENTAL

Water	<ul style="list-style-type: none"> • Reducing filling losses prevents significant volumes of product from entering the sewer.
Resource conservation	<ul style="list-style-type: none"> • The 200,000 litres of liquid now being used in production and not being wasted, mean better use of available resources.

ECONOMIC

Investment	<ul style="list-style-type: none"> • Investment for calibration services and new devices of around \$50,000.
Productivity	<ul style="list-style-type: none"> • Total beer production productivity has increased by 2.5% — 200,000 litres of liquid is equivalent to 540,000 stubbies. Spillages, underfills (rejects, returns) and overfills have also been reduced

Savings, Outcomes	• Product savings	\$80,000
	• Underfill savings	\$10,000
	• Effluent savings	\$5,000
	• Cleaning time	\$5,000

Payback	<ul style="list-style-type: none"> • Payback has been estimated at less than six months
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Recovery of extract



Disposing of valuable product as waste represents a double cost: the cost of waste disposal and the cost of losing revenue generating material.

Addressing product wastage is a major part of the waste reduction initiative in brewing. SAB identified several areas where, by modifying processes, valuable extract previously being wasted can be recycled back into an earlier process stage.

For example, after the extract boiling stage, unwanted solids were removed in a whirlpool but a high percentage of valuable extract was also removed. The trub (the removed solids and extract) was sent off site as animal feed.

This process was identified as particularly wasteful. Now the extract is recovered from the trub and returned to an earlier production process. Unwanted solids are removed with the spent grain and extract loss has been almost eliminated from the whirlpool separation stage.



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> *Trub extraction storage tank*

BENEFITS	
ENVIRONMENTAL	
Water	<ul style="list-style-type: none"> • Removal of a waste with a high organic loading from landfill or water.
Resource conservation	<ul style="list-style-type: none"> • Resources once dumped as stock feed are now used in earlier production processes, reducing the volume of raw materials.
ECONOMIC	
Productivity	<ul style="list-style-type: none"> • Approximately \$40,000 worth of raw materials, no longer written off as animal stock feed, is now used within the production process.
Investment	<ul style="list-style-type: none"> • \$43,000 capital cost for process modification.
Savings, Outcomes	<ul style="list-style-type: none"> • Product savings \$40,000 • Waste disposal and waste handling savings \$2,000
Payback	<ul style="list-style-type: none"> • 1.1 year payback

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Storage and handling improvement

The old cellar area of SAB, with long pipe runs and complicated manifold systems, meant extensive cleaning was necessary between batches.

The cellar was recognised as being inefficient but it did not seem economical to upgrade. With the full cost of waste determined it became apparent that upgrading would improve environmental performance and make economic sense. A new piping layout was designed with waste reduction in mind. Piping lengths were minimised as were surface areas requiring cleaning.

BENEFITS

BENEFITS	
ENVIRONMENTAL	
Water	<ul style="list-style-type: none"> • Reduced volume and strength of wastewater from cleaning.
Resource conservation	<ul style="list-style-type: none"> • Less energy is required to pump, heat and cool reduced volumes in the piping network. Less water and cleaning chemicals are used. • Less beer is wasted.
ECONOMIC	
Productivity	<ul style="list-style-type: none"> • Direct savings estimated at \$55,000 for reduced beer waste, energy efficiency and less cleaning required. • Indirect savings come from improved operability; greater production flexibility and reduced cleaning time.
Investment	<ul style="list-style-type: none"> • \$84,000 capital cost for piping modifications.
Savings, Outcomes	<ul style="list-style-type: none"> • Water, beer, energy and cleaning savings \$55,000 • Wastewater savings (if wastewater charging were to be introduced, further savings of around \$10,000 could also be realised)
Payback	<ul style="list-style-type: none"> • Other savings in time and productivity are also likely to be realised. • Less than one year, including indirect savings.



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> A rotary filling machine

Water reclamation >

Water use is a key performance parameter for SAB and a yardstick for comparing to the world's best brewing companies.

SAB recently upgraded its water reclamation system on the bottle and can pasteuriser. The excess holding capacity of the system means that recycled water can be used in place of fresh water. It also means that less wastewater and heat is being discharged to sewer.

BENEFITS >

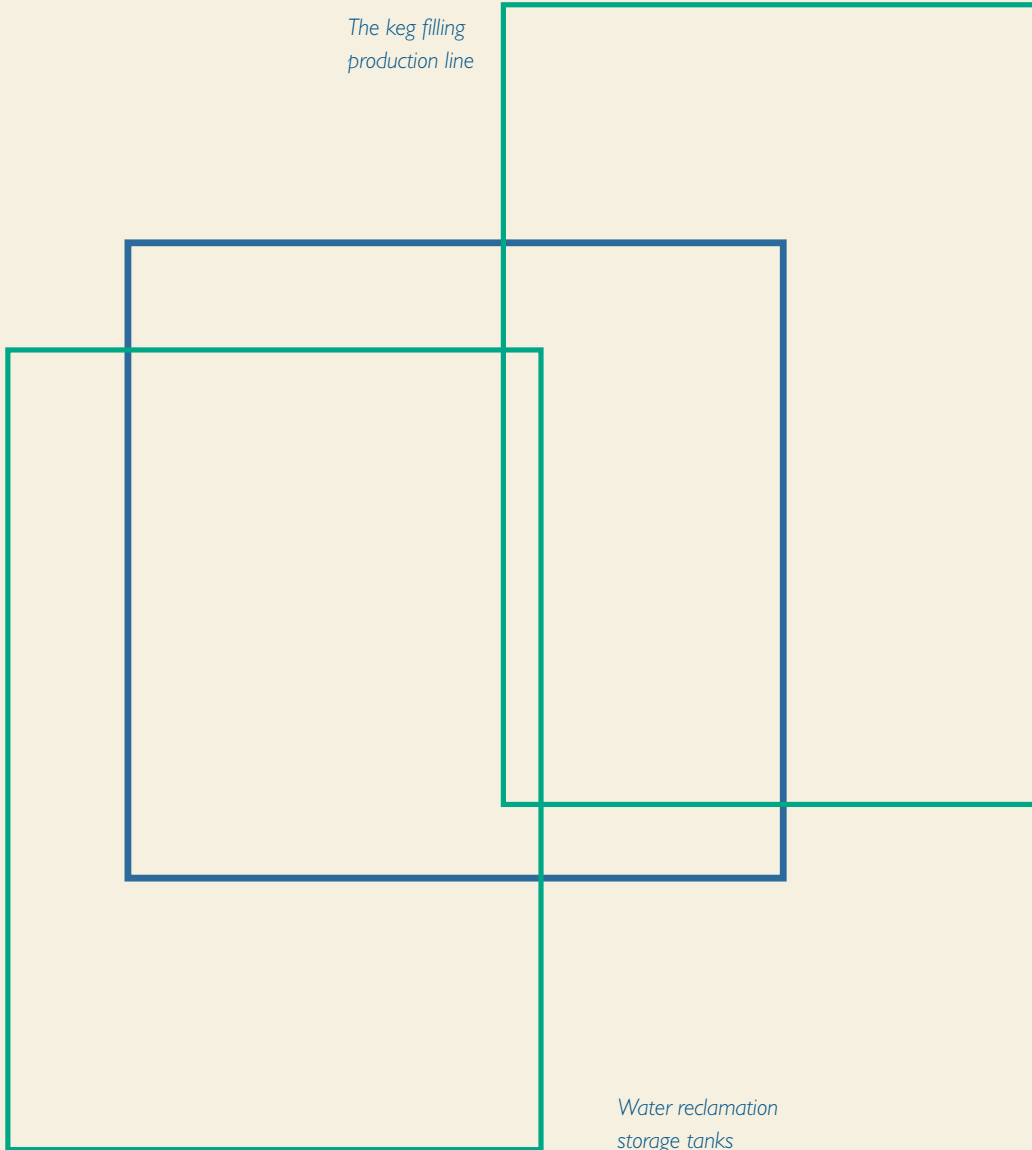
ENVIRONMENTAL	
Water	<ul style="list-style-type: none"> • Less wastewater entering the sewer.
Resource conservation	<ul style="list-style-type: none"> • Less fresh water used in the process because of reuse of water. • Savings in energy.
ECONOMIC	
Investment	<ul style="list-style-type: none"> • \$50,000 capital cost for modifying the PLC, upgrading transfer pumps and upgrading a heat exchanger.
Savings, Outcomes	<ul style="list-style-type: none"> • Water savings \$60,000 • Wastewater savings (if wastewater charging were to be introduced, further savings of around \$50,000 would also be realised)
Payback	<ul style="list-style-type: none"> • Ten month payback. (without wastewater savings)



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*The keg filling
production line*



*Water reclamation
storage tanks*

WHERE TO FIND ADDITIONAL INFORMATION

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