National Cleaner Production Centre in South Africa(NCPC-SA)

Implementation of Resource Efficiency (Water Optimisation) Interventions

Company name	Amalgamated Beverage Industries (ABI)- Premier Place
Sector	Agro-Processing
Initial collaboration with NCPC	2014
Year of intervention	2015
Systems of intervention	Water Systems

1. BACKGROUND

1.1 Company profile

Amalgamated Beverage Industries (ABI) is the leading soft drink business in the international SABMiller plc group of companies. ABI has 5 manufacturing plants in South Africa (Midrand , Pretoria, Devland, Phoenix and Premier Place). ABI is a non-alcoholic beverage company which is responsible for approximately 60% of Coca-Cola's sales in South Africa. This makes ABI one of the largest producers and distributors of Coca-Cola brands in the southern hemisphere.

1.2 Plant profile

The ABI Premier Place manufacturing plant is approximately 20 years old and functions mainly as a returnable glass bottling (RGB) beverage facility. The beverages are filled into 300ml, 500ml and 1.25L bottles. There are 3 production lines that operate within the facility. Lines 1 and 4 operate on a daily basis to meet production requirements. Line 2 operates intermittently (around 20% of the other two lines), as and when required.

1.3 Nature of challenges

ABI Premier Place as a part of SABMiller PLC is required to meet company objectives and high-level resource efficiency targets that are set by the organisation. To this end, all SABMiller manufacturing plants have been set the target of attaining water usage ratios of 1.8 hectolitre (hl) water consumption per hectolitre of beverage produced by 2020. The water usage ratio at ABI Premier Place in 2014 was approximately 2.2 hl water per hl beverage produced. A decline in production volumes has also resulted from reduced demand for returnable glass bottles (RGB) and places pressure on management both from a cost and resource consumption perspective.

2. OVERVIEW OF IMPLEMENTATION

2.1 RECP capacity building

ABI Premier Place has participated in both the Industrial Energy Efficiency programme and Resource Efficiency and Cleaner Production (RECP) programmes, offered by the National Cleaner Production Centre – South Africa (NCPC-SA). To this end, management is currently undergoing expert-level training in Energy Management System implementation. A detailed energy systems optimisation assessment was also conducted on the compressed air system during the latter part of 2014.

A resource efficiency and cleaner production assessment (with a specific focus on water) was conducted through the National Cleaner Production Centre - South Africa (NCPC-SA) during October 2014 and the necessary technical and advisory support provided. The assessment culminated in a number of water savings improvement opportunities being identified, ranging from low-cost to capital intensive recommendations. An awareness raising session was also conducted in line with the recommendations identified in order to ensure a holistic approach towards resource efficiency.

3. KEY ACHIEVEMENTS

Key Outcomes/Results table

Implementation Period	**18 January 2015 – 18 March 2015**
Total Number of projects	**1**
Monetary savings in ZAR	**R190,697**
Water savings in hectolitre (hl)	**70,083 hl**
Total investment made ZAR	**R 32,000**
Payback time period in years	**< 1 month**

**R1, 144,179 / annum (extrapolated savings)
**420,500 hl / annum (extrapolated savings)

4. THE APPROACH

The on-site assessment was conducted during October 2014. A detailed site water balance was compiled and several opportunities for water savings improvement opportunities identified.

A summary of the savings benefits for the identified opportunities are:

- 280,720hl water reduction annum which equates to a 12% reduction of total current water consumption.
- A total identified savings of approximately R3, 800,000 with a total investment cost of ± R2, 770,000.

A regression analysis of the water consumption for 2014 revealed a correlation (R^2) value of 0.93, which indicates that Production is a fairly accurate driver for the volume of water consumed. The base consumption (at times of zero production) was calculated to be 39,063 hl / month.

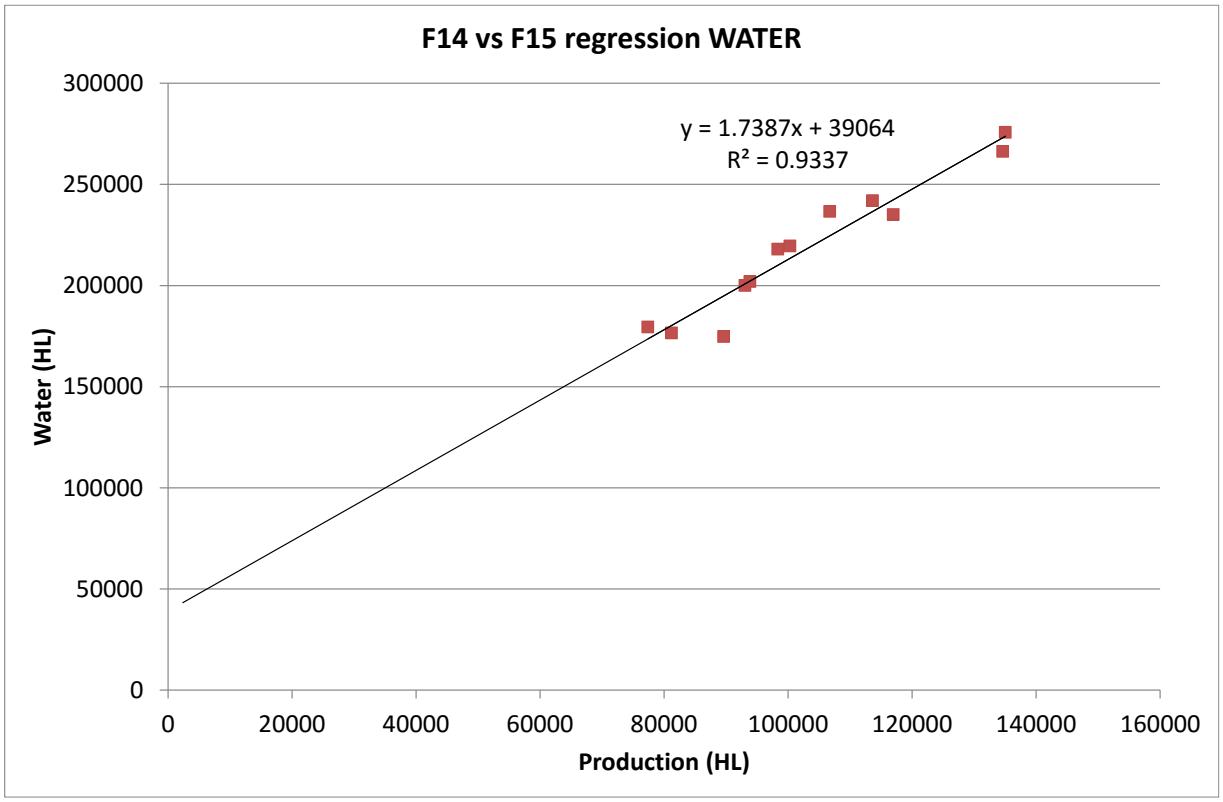


Figure 1. Regression analyses of production and water consumption.

6. SELECTED RESOURCE EFFICIENCY OPTIMISATION INTERVENTIONS

The opportunities identified in the resource efficiency assessment became the action plan for the Water Minimisation project. Investments, savings and payback as well as dates and responsibility were assigned to the projects identified.

Water Re-use and CIP Optimisation

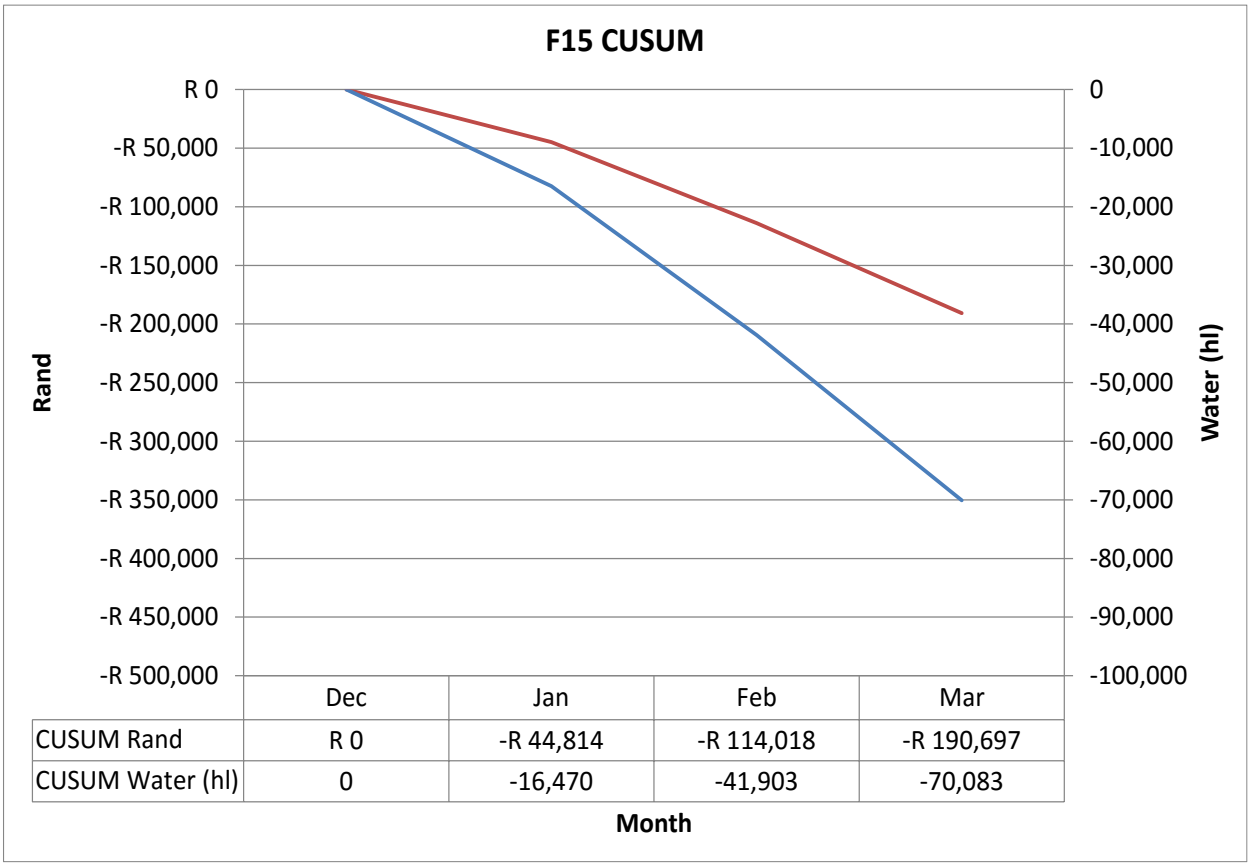
Water Re-use Savings	
Actual Cost Savings	R190,697
Actual Water Savings	70,083 hl
Cost of Project	R32,000
Payback Period	1 Month

There was no water recovery on the rinse steps in the cleaning-in-place (CIP) systems. The cleaning programmes are normally a 3 step (rinse, caustic wash, rinse) or a 5 step programmes (rinse, caustic wash, rinse, acid wash, rinse). Standard operating practice in bottling plants is to make use of the final rinse steps for the first rinses in the CIP or for alternative use in the process.

A 40m stainless steel 3 inch pipe was installed in January 2015, in order to divert the rinse water from the CIP process to an existing “reclaim tank”. The CIP controller was reprogrammed and included the dumping of the first 15% of the rinse water with the rest being diverted to the reclaim tank. The reclaim tank was previously used to supply cleaning water to the bottlewasher area as well as lubricant make-up. This tank was topped up with municipal water on a daily basis. Subsequent to the intervention the tanks did not require any additional top up.

Figure 3. Picture of the reclaim tank.

The cumulative sum of savings since the implementation (18 January 2015 to 18 March 2015) is indicated in the figure. These figures were extrapolated to determine annual savings.



	Dec	Jan	Feb	Mar
CUSUM Rand	R 0	-R 44,814	-R 114,018	-R 190,697
CUSUM Water (hl)	0	-16,470	-41,903	-70,083

Figure 4. Cumulative sum of savings.

Other water minimisation activities

Ongoing leak management programme have been put in place to ensure that losses are more effectively, tracked, managed and controlled.

7. FUTURE PROJECTS:

- The backwash water from the water treatment and bottle washer softening plants will be treated and incorporated into the blending tank prior to feed into the process. This is estimated to result in a further 8% reduction in specific water consumption.
- A lubricant recovery system is being designed to re-introduce clean lubricant from the lines in the feed. This will result in a multitude of benefits such as reduction in lubricant usage, decreased COD concentration levels in the effluent as well as reduced water consumption.
- An effluent pH correction system that was not functioning will be re-commissioned which will result in a reduction in the amount of hydrochloric acid being used for effluent caustic level neutralisation.

8. LESSONS LEARNED:

- Initially all of the rinse water was recovered resulting in contamination of the reclaim tank. The recovery programme was subsequently altered in order to reject the first 15% of the rinse water to avoid the possibility of product recovered into the reclamation tank.