SPAIN

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Regional Activity Centre for Cleaner Production

Ministry of the Environment Spain

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nº 49 Pollution prevention case studies

Improvements in the cleaning system: the CIP system (cleaning in place)

Company background

Big Drum Ibérica, SA (Reus, Spain)

Industrial sector

Agro-food industry. Manufacture of cake cones and packaging for ice cream.

Environmental considerations

The company Big Drum Ibérica, SA is dedicated to manufacturing auxiliary products for the ice cream industry; notably, cones and packaging for ice creams. The productive process is based on the preparation of a batter (flour, sugar, vegetal fats and lecithin) that is elaborated in a mixing tank. Later, it is transferred to tanks from where it is transported, by means of pipes, to the baking furnaces. Finally, once the batter is baked, it is rolled to conform the final product.

The cleaning system that was used was entirely manual and consisted of a pump of water propulsion to make the mechanical cleaning of the batter transport pipes from the mixing tank to the baking furnaces. Water consumption was high since the cleaning operation wished to push and dilute the batter as well as cleaning the pipes.

Background

The company generated wastewater from cleaning the pipes and other operations of preparation of the batter. In 1997, works began, along with an increase of the productive capacity and a general restructuring of the factory, to rationalise the productive process. The performance was made taking in account the following premises:

- To recover as much as possible the batter remains.
- To reduce the amount of water for cleaning the facilities.
- To reduce to the organic load of wastewater and thus improve the quality of its releases.

Summary of actions

The main objective of the project was the recovery of the batter remains and the reduction of the volume and the pollutant load of releases, by means of installing a system of «cleaning in place» (CIP).

The CIP is based on the following phases:

- Dry-cleaning of the pipes, by means of making a piston go through them impelled by compressed air, so that the batter is recovered.
- Rinsing with water, to drag out the batter remains of the pipe.
- Recirculating a basic solution, to de-scale and to sanitize the pipes.
- Final washing with clean water.

The use of this system has been accompanied by the construction of a recovery batter tank and by the construction of pipes of transport free of obstacles.

Furthermore, a wastewater treatment plant was installed based on three successive tanks for the separation of fats and the sedimentation of sludge, thus improving the quality of the wastewater released.

Photography of the installation

Cleaning system

Balances	OLD PROCESS	NEW PROCESS
Material balance		
Water consumption (%)	100	80
Wastewater to be treated (%)	100	78.7
Batter recovered for valuation (t/y)	0	76.8
Economic balance		
Valuation of the batter recovered (€/y)	0	3,692.62
Cost of water (€/y)	22,368.44	14,149.87
Cost of wastewater management (€/y)	13,274.55	4,327.29
Cost of maintenance – cleaning staff (€/y)	9,688.32	1,730.91
Savings and expenses		
Savings in water consumption (€/y)		8,218.57
Savings in the management of wastewater (€/y)		8,947.27
Maintenance expenses – staff (€/y)		7,957.40
Valuation (€/y)		3,692.62
Total savings (€/y)		28,815.86
Investment (€)		132,610.50
Payback period		4.6 years

Conclusions

By carrying out this project, the recovery of 76.8 t/y of batter was achieved, the later being externally valued as animal feeding. Furthermore, a reduction of the equivalent pollutant load and 70% of the volume of water used in the cleaning operations was achieved, considering that the reduction has been obtained by increasing 40% the production capacity.

NOTE: This case study only seeks to illustrate a pollution prevention example and should not be taken as a general recommendation.

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