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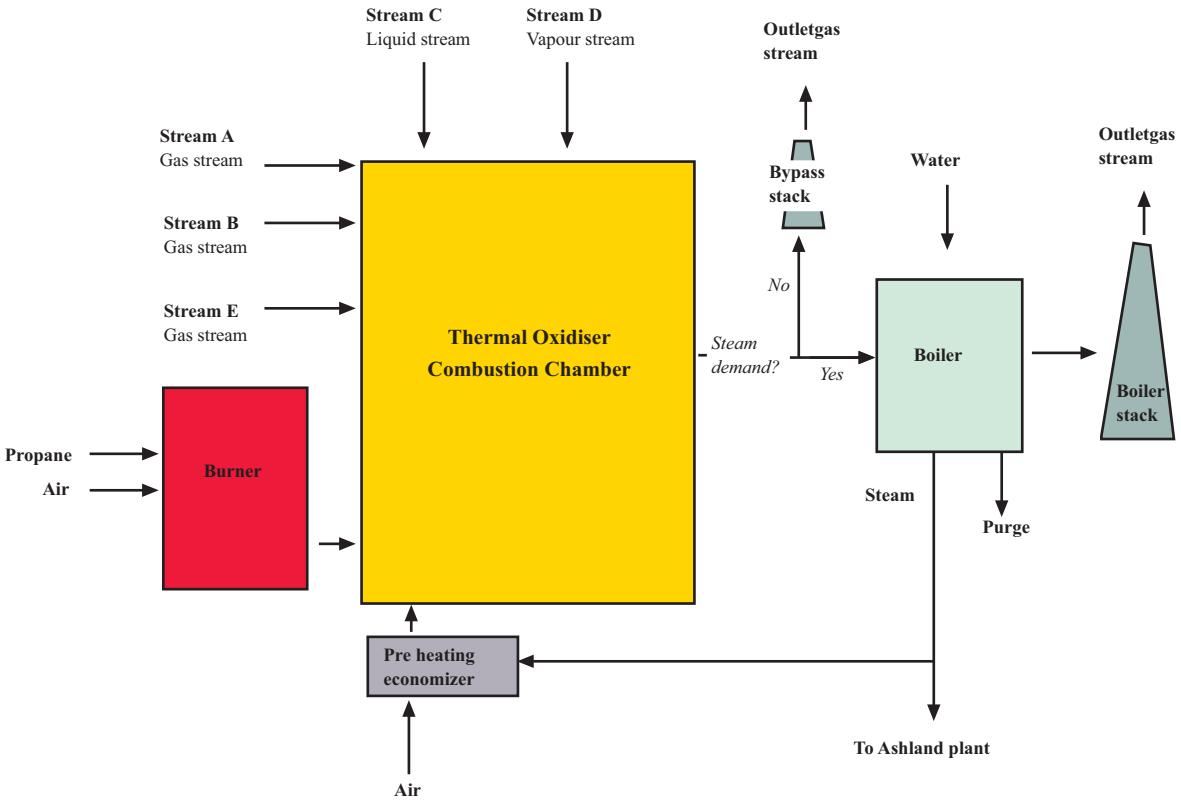
Regional Activity Centre for Cleaner Production
GOBIERNO DE ESPAÑA MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO
Generalitat de Catalunya
Government of Catalonia
Department of the Environment and Housing

No. 120 Pollution prevention case studies

Steam recovery from VOC and liquid waste thermal oxidation

Company	Ashland Chemical Hispania S.L. (Benicarló, Spain)
Industrial sector	Manufacture of other chemical products ISIC Rev 4 n. 202 (*International Standard Industrial Classification of All Economic Activities*)
Environmental considerations	The Ashland plant in Benicarló (Castelló, Spain) is an ISO 14001-certified site where environmental, health and safety prevention is a priority for the management.
Background	Both UPR and VER production is carried out in batch reactors. The UPR process occurs in several steps based on an esterification reaction where water is generated (distillates) from the reactor, removed and then treated as a liquid waste. The VER process occurs in several steps too, but in this case no waste is produced. At the same time VOC emissions are generated during the production process (reactors, tanks, loading/unloading operations, etc.).
Summary of actions	The technical alternative implemented replaced the former on-site oxidizer, which treated around 45% of the distillate waste generated on site, with a new thermal oxidizer capable of treating: o 100% of the distillate waste (hazardous waste) generated on site during the UPR process and, o Vents coming from process equipments (reactors, thin and blend tanks), storage tank vents and loading and unloading areas. The new TO has led to a significant reduction of the current fugitive VOC emissions; replacing the current VOC air treatment systems already installed on site (active carbon columns and scrubbers). At the same time, this equipment will reduce the gas propane consumption using a heat recovery system. The hot flue gases leave the combustion chamber and enter a waste heat boiler where they generate steam at 8 barg operating pressure. After the boiler, the steam generated will be separated in two main streams. The first one is delivered at the inlet of an air preheating economizer, in which the fugitive air together with a sufficient ambient air flow, will be heated up to get more thermal efficiency (as requested). The stream of steam not used to preheat the air is delivered for plant uses. The new thermal oxidizer has been designed to treat five different segregated streams, as shown in the figure below.

Diagram



Balances

	OLD PROCESS	NEW PROCESS
Total VOC emissions reduction	60%	99%
Distillate waste external treatment	55%	0%
Propane consumption	957 t	800 t
Energy efficiency improvement	–	10%
Investment	–	€3 M

Conclusions

Liquid-gas Thermal Oxidizer implementation has led to a reduction of VOC emissions and odours and to an increase of the current waste on-site treatment capacity.

The installation of the new Thermal Oxidizer system has reduced the environmental impact, reducing transportation risks, improving the energy efficiency of the plant and also the air quality of the environment.

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

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