

# Switching Nozzles Saves Waste-to-Energy Plant US\$100,000 per Year



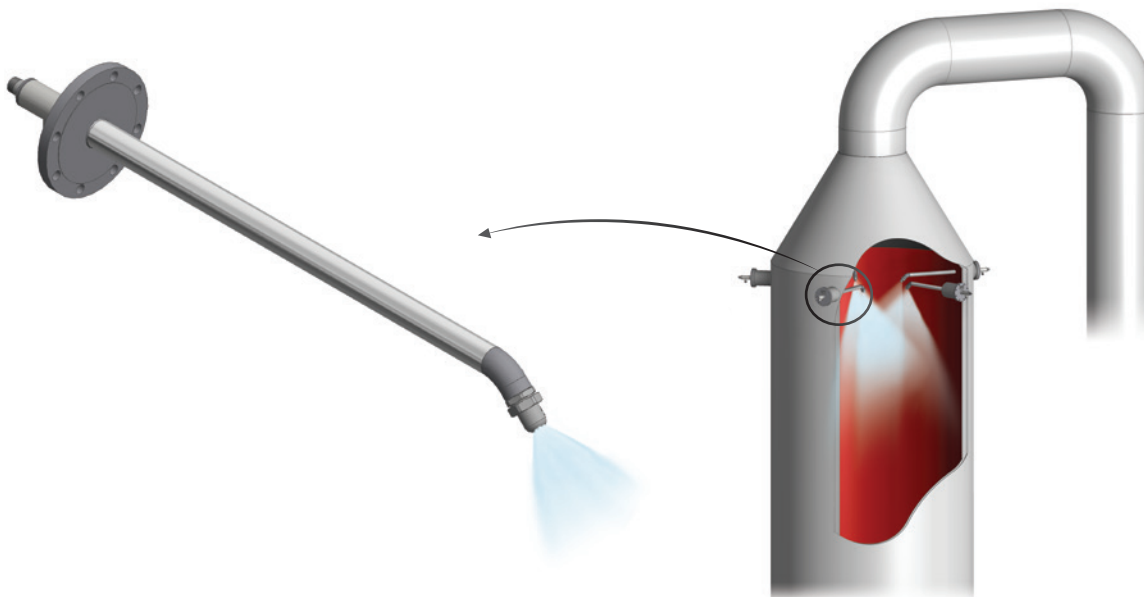
## Problem:

A New England waste-to-energy plant wanted to reduce the amount of costly compressed air and maintenance its spray dryer absorber required. A difficult-to-spray lime slurry injected into the SDA tower scrubs acid and other pollutants from the plant's exhaust gas stream. The previously used dual-fluid nozzle lances consumed a great deal of compressed air.

Frequent nozzle maintenance was also a problem. Two maintenance workers spent as much as three hours every day on the difficult and dangerous process of removing dried slurry that continually built up on the nozzles.

## Solution:

Spraying Systems Co. solved the plant's problems with a Computational Fluid Dynamics (CFD) analysis and FloMax<sup>®</sup> anti-bearding nozzles. Creating a CFD model of the SDA tower provided a better understanding of the gas flow through the tower in order to optimize spray performance of the nozzle lances. Based on the predicted airflow in the SDA, four FloMax nozzle lances were designed to generate the precise drop size required to optimize lime utilization and dryness while minimizing compressed air usage. The CFD model also determined the proper installation point for the nozzle lances, which were installed 112' (34.1 m) above the base of the 150' (45.7 m) tall SDA on 4' (1.2 m) long lances spraying at specific angles. The FloMax anti-bearding air caps have eliminated build-up on the nozzles, so daily nozzle maintenance is no longer required.





# Switching Nozzles Saves Waste-to-Energy Plant US\$100,000 per Year – Continued

## Results:

Switching to FloMax® nozzle lances reduced the compressed air used for the lime slurry injection by 675 scfm (1147 Nm<sup>3</sup>/hr). That allowed plant operators to shut down a 200 HP compressor dedicated to the previous injection system, saving approximately US\$70,000 per year. Adding the US\$43,800 annual savings in daily nozzle maintenance costs provided a payback period of 15 months.

Additionally, safety concerns for maintenance personnel are greatly reduced.

From a sustainability perspective, the emission compliance rate is much improved and turning off the 200 HP compressor has significantly reduced energy use.

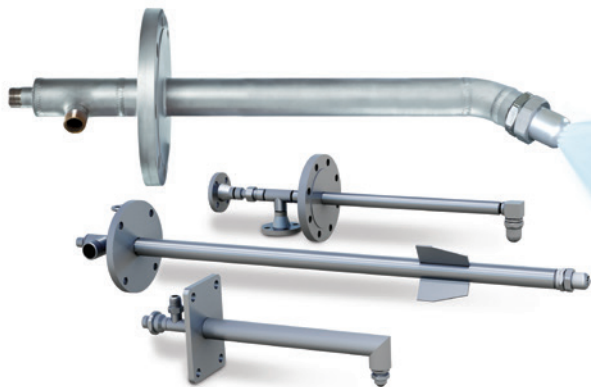
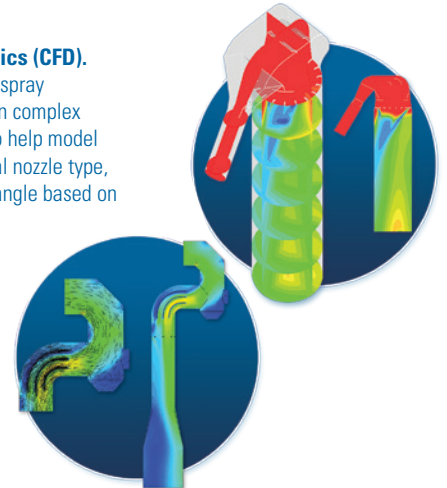
## A CLOSER LOOK AT THE SYSTEM

**FloMax Anti-bearding Nozzles** feature a patented air cap design to resist material build-up near nozzle orifices and prevent performance problems. These nozzles can last up to five times longer than standard nozzles before maintenance is required



### Computational Fluid Dynamics (CFD).

Dozens of variables can affect spray performance in a gas stream. In complex applications, we rely on CFD to help model gas flow and determine optimal nozzle type, placement, spray pattern and angle based on precise operating conditions



**Lances and Injectors.** We offer a full range of spray injectors. Our standard lightweight FloMax injectors are readily available in 0°, 45° and 90° configurations with quick-release or bolt-on flanges with optional adapters, cooling jackets, purge tubes and protective tubes



**Spraying Systems Co.®**  
Experts in Spray Technology

North Avenue and Schmale Road, P.O. Box 7900, Wheaton, IL 60187-7901 USA

Tel: 1.800.95.SPRAY    Intl. Tel: 1.630.665.5000  
Fax: 1.888.95.SPRAY    Intl. Fax: 1.630.260.0842  
www.spray.com



Case Study No. 204 ©Spraying Systems Co. 2015