

# Dupont and GE Join Forces to Conserve Water at Dutch Fluoroproducts Plant

New Water Treatment Solution Yields 44% ROI and Saves 265,000 m<sup>3</sup> of Water

## Challenge: Conserving Scarce Municipal Water

With its low-lying coastal geography, the Netherlands has long needed to carefully manage its water resources. For centuries, it has been a world leader in the conservation and protection of scarce drinking water supplies.

This commitment to water conservation has been particularly evident at the DuPont de Nemours manufacturing complex at Dordrecht. "We have a strong corporate commitment to minimizing the environmental impact of our manufacturing processes," says Rob Rasenberg, Technology Manager, Du Pont de Nemours (Nederland) B.V. "The heat exchangers of our cooling towers require large volumes of water, and we are continually seeking ways to conserve this natural resource."

The cooling tower of the Dordrecht Fluoroproducts plant, for example, utilizes 265,000 m<sup>3</sup> (70 million US gallons) of high-quality, purified water each year for the production of Teflon™ and other fluoride-based materials. Until last year, this cooling tower makeup water — equivalent to the amount of water consumed by five thousand Dutch residents — was purchased from the local municipal water company.

"The challenge was finding an alternative source of water of sufficiently high-quality," explains Rasenberg. "We need to avoid biological contaminants, corrosion, and scale deposits that could harm our



equipment, reduce cooling efficiency, and require cumbersome cleaning efforts involving significant labor, downtime and chemical usage."

## Solution: Tapping Unused Wastewater

In 2002, as part of the ISO 14001 environmental management certification process, GE Water & Process Technologies engineers recommended that DuPont utilize the outflow from a groundwater purification plant as an alternative to the use of potable municipal water for the cooling tower makeup water at the Dordrecht Fluoroproducts plant.

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The purification system was built in the mid-1990s to remediate decades-old fluoride pollution at the Dordrecht plant. The purified water was previously discharged into the Merwede River in the Rhine-Maas Delta.

“The outflow of the groundwater purification plant was a wasted resource. We simply needed a treatment and monitoring system to ensure that the water could be safely used in our cooling towers,” says Rasenberg.

Laboratory tests performed at GE verified the feasibility of utilizing the purification plant’s outflow without any adverse effects on the existing heat exchange equipment and the cooling tower. GE engineers specified a chemical treatment regime for biological control with continuous dosing of Spectrus\* OX1272, as well as treatment for corrosion control and scale inhibition. The new treatment regime utilizes almost identical chemical doses as the treatment required for the municipal water source, but the Spectrus OX1272 is introduced further upstream in the feed water coming from the purification plant.

“The engineering team at GE was able to prove to our satisfaction that we could safely use the water from the purification plant without any detrimental effect on our equipment,” said Rasenberg. “We worked closely together to design a system to link the purification plant to our Fluoroproducts cooling tower, with an automated monitoring system to ensure that we meet the quality standards we set for the cooling tower makeup water.”

DuPont has installed a PaceSetter\* Platinum system from GE to automatically measure the turbidity and conductivity of the groundwater purification system outflow and perform chemical dosing. If the turbidity or conductivity levels exceed a safe threshold, the PaceSetter Platinum system will automatically divert the groundwater purification system outflow to a buffer tank and turn on the municipal water feed. In addition to providing automated control, the system also provides off-site monitoring capability.

## Results: Conserving Water and Reducing Costs

The project was completed in January 2005, saving €170,000 (US\$215,900) in municipal water charges during 2005, with intermittent usage of the new water source, while the system was being optimized. On a going-forward basis, the reuse of the purified water will result in annual savings of €230,000 (US\$292,100). Not only will the plant avoid purchasing 265,000 m<sup>3</sup> (70 million US gallons) of municipal water each year, but the groundwater purification plant will also avoid discharging 265,000 m<sup>3</sup> (70 million US gallons) of water from the purification plant into the Merwede River.

The total cost of the project, including the PaceSetter Platinum system and all piping and pumps was €445,000 (\$565,150). This investment will produce an internal rate of return of 44%. “We have achieved an excellent financial return on this investment, in addition to the environmental benefit of reusing a water supply that would otherwise be wasted,” said Rasenberg.