

This case study looks at the project submitted by the winner of the **environmental improvement** category of the 2004 Solvents Stewardship Awards: **Cognis Ireland Ltd.**

## ABOUT THE COMPANY



Cognis Ireland manufactures LIX® Reagents which are designed to extract non-ferrous metals at very high purity levels from ores by solvent extraction. The company is well known for its positive environmental record, receiving the National Better Environment award for Irish Industry on three occasions, in 1996, 1998, and 2003, as well as a European Award for commitment to sustainability in 1996 and an EU runners-up award for Cleaner Technology in 2004.

## ABOUT THE PROJECT

In the manufacture of its line of reagents, Cognis uses toluene as the reaction solvent. During the process methanol and methyl formate are generated as impurities, which remain in the toluene, rendering it unfit for reuse without pre-treatment. This pre-treatment had previously been achieved by washing the toluene with water at 45-50°C to reduce the impurity levels to an acceptable concentration for recycling; the water wash was then processed in the company's biological treatment plant.

In the new process, the toluene wash system has been replaced by a high-performance continuous solvent distillation unit, designed to ensure minimum waste generation and to minimise the environmental impact.

The new technology allows the by-products to be collected and used in an innovative way. The sulphur-, nitrogen- and chlorine-free fuel from the top stream is used in the site's CHP (a combined heat/power plant) process while the high purity toluene from the bottom is recycled in the process.

This brings a large number of benefits:

- Reduction in water usage
- Odour elimination and improved air quality in the process buildings
- Energy generation by secondary fuel contribution
- Reduction in non renewable fuel consumption (corresponding to a saving of 2.5 to 3% of the site electrical requirements)
- Reduction in biological sludge quantities to landfill by 30%

- Reduced emissions and odours from the site Waste Water Treatment Plant
- Improved toluene quality resulting in better process yields and less wasted raw materials
- Elimination of bottleneck in the process
- Savings in material and waste disposal costs

The company has been running a combined heat/power plant (CHP) on site and has calculated that the benefits in reduced fuel purchases alone amount to €70k per year. A major cost benefit has been in reduced sludge disposal costs for the water-borne contaminants from the process: the company calculates this saving at €435k in 2003. The overall economical benefits amount to some €638K per year although everybody agrees that the real beneficiary is the environment.



Toluene Distillation unit

## OPINION OF THE JURY

Solvent distillation is not in itself unique, but the main breakthrough comes from the ability to re-use the distillate – the undesirable components of the toluene stream – as part of the site fuel requirements. The jury was impressed by the effectiveness of this design, the numerous environmental benefits targeted (water, energy, air) and the impressive return on investment the company achieved.

## SOLVENTS STEWARDSHIP AWARDS

The Solvent Stewardship Awards promote and encourage best practice and continuous improvements in the use of solvents. Awards are presented to companies that best demonstrate improvements in health, safety and environmental aspects in their use of solvents. The jury of the 2004 awards was composed of representatives of the following organisations: European Chemical News, European Commission - DG Enterprise, European Aerosol Federation, European Association of Craft Small and Medium Sized Enterprises and the European Chemical Industry Council.

## MORE INFORMATION

For more information about Cognis Ireland, please visit [www.ie.cognis.com](http://www.ie.cognis.com) or contact Ciaran McCabe, Environment and Health Group Leader, Little Island, Co. Cork, Ireland