



Interview with Jennifer Dolin

**“In the United States, the management of mercury waste is passionately debated.”**

*Jennifer Dolin is director of sustainable development and international affairs for Osram Sylvania, a subsidiary of German company Siemens and American market leader in lighting equipment. She previously worked for 10 years for the Environmental Protection Agency.*

**Do you already encourage your customers to recycle light bulbs at the end of their lifecycle?**

For a long time we have encouraged recycling of our products. Our service and maintenance subsidiary, Sylvania Lighting Services (SLS), includes a recycling clause in all its contracts with both large and small companies, and uses a third-party company to reprocess the lamps at the end of their lifecycle. Many customers, however, ranging from small businesses to national accounts, are not under contract to SLS. In 2006, in an effort to reach individuals and small businesses, and to provide an option and further

encouraged our distributors who were currently not providing recycling services to offer RecyclePack to their customers. It was a question of filling a gap by offering solutions – and it worked really well.

**Why launch this initiative?**

First, environmental responsibility is at the heart of our strategy. We have considerably reduced the mercury content of our products, for instance. At the start of the 1980s, a fluorescent lamp could contain up to 40mg of mercury. Today, the industry average is around 5.6mg. And we've made so much technological progress that we will achieve even lower levels. But there will be

at least one more passionately debated, much more so than other heavy metals. Several states have passed or are considering legislation to address end-of-life management of lamps, primarily CFLs. We foresaw this direction and teamed up with Veolia to offer a convenient program while we work towards an effective, national solution.

**Can you imagine taking things further?**

There are already a lot of regulations on electrical and electronic waste in the United States, but programs are happening on a state-by-state basis, which is not the most effective solution. For example, 10 states have banned the dumping of mercury-containing lamps, but not all have established an infrastructure for collecting and reprocessing them. We believe there should be a ban on the dumping of mercury-containing lamps at a national level.

At the same time, a bit like Europe, a visible fee could be applied, which would be paid to a non-profit organization run by manufacturers to finance recycling. Manufacturers are best placed to operate this organization themselves and coordinate the collection and recycling process collectively and in conjunction with the

recycling industry. Alternatively, we could end up with 50 different programs with an equal number of separate rules and regulations, established without input from those who would be most affected by them.

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education for all our customers including electrical distributors and end users, we established a joint lamp recycling website with Veolia Environmental Services in the United States. Here, these customers can order RecyclePack recycling kits. (editor's note: a pre-paid Veolia pack to send their light bulbs to Veolia for recycling). We also

set a limit: mercury is crucial to the functioning and lifespan of fluorescent and high intensity discharge (HID) lamps. So while these lamps still contain mercury, it will still be necessary to recycle them. Secondly, we expect new environmental legislation to emerge. In the United States, management of mercury waste is passion-



*recovered or new products, inventory management, quality inspections, waste collection and treatment.*"

## **A growth engine**

These new markets are especially important since, in developed countries, traditional waste treatment activities are due to stabilize. It still remains to better capture hazardous waste generated by local authorities, SMEs and individuals. But on the whole, the more important flows, those of large companies, are already treated. Furthermore, the industry tends to reduce its production of waste and, above all, relocate to Asian countries. According to a study by the firm Frost & Sullivan, in Western Europe volumes collected, which had grown by nearly 12% between 2001 and 2004, will only increase by 5% between 2004 and 2011<sup>9</sup>. The trend is identical in the United States, where hazardous waste landfills are already at overcapacity.

Recovery therefore appears to be a major growth engine and Veolia Environmental Services is devoting a significant R&D effort to it, involving both its special waste treatment sites and the company's research centers. What is at stake? The development of a technological foundation capable of covering a wide spectrum of waste, the use of the right procedure at the right time – the one which gives waste a sufficient value for its recovery to be profitable – and finally, the marketing of new products and recycled materials. *"It is a commercial advantage, but the challenge is also environmental,"* emphasizes Pascal Gauthier. *"Whether in relation to disposal of hazardous waste or its recovery, our core business is still combating the dispersion of pollutants. Today, for example, we produce zinc hydroxide at more than 95% purity. It would be simpler to be satisfied with a content of 75% to 80%. But that would mean we had not totally controlled our process and that we had manufactured materials containing pollutants."* That is why Veolia lobbied to include products resulting from recovery of hazardous waste in the framework of the REACH legislation.

In order to develop recovery, technology is not enough. *"Extracting non-ferrous metals from catalysts, for example, is not possible unless manufacturers sort their waste,"* notes Jean-François Nogrette, operations director for Veolia Environmental Services Management of special waste. *"We have an enormous market in front of us, but to capture it we must create services enabling sorting at a reasonable cost."*

The strategy therefore requires involvement from as early a stage as possible with the client, to modify procedures and habits to facilitate sorting, meaning no mixing of waste, to prepare for effective recycling or recovery. But it also means being involved from the design stage of manufactured products to prepare for the end of their lifecycle. In France, Veolia Environmental Services is therefore working with vehicle equipment manufacturers to facilitate recovery of batteries from future electric vehicles. Once again, a very new approach. The young waste treatment industry is clearly in the process of reinventing itself. ■

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<sup>9</sup> European Hazardous Waste Management Services Markets, Frost & Sullivan, July 2005.

## CUTTING-EDGE TECHNOLOGIES used in recovery

Analyzing the potential of new sources, developing innovative recovery procedures and expanding the range of their application and optimizing the performances of existing mechanisms. These are all focuses for progress which involve Veolia Environmental Services at an international level.

### Extreme cold and extreme heat: a world first

In 2006, Veolia Environmental Services Management of special waste achieved a world first at its Limay site by coupling a cryogenics line to an incinerator. Its objectives are to recover packaged waste such as paint pots, barrels of solvent waste and oil filters. These are first ground before being passed through a cryogenic tunnel where they are sprinkled with liquid nitrogen. This reduces the temperature of the homogenate components to  $-150^{\circ}\text{C}$  until they crystallize, which makes it easier to separate them. When it hardens, paint loses its adhesive properties and separates from the metal components it contains. The waste and packaged homogenate is then sorted using magnetic and mechanical procedures.

Paint residues and other waste are channeled towards the incinerator, while the packaging – metal or plastic – is recovered to be recycled. This technology enables recovery of metals for direct use in steel manufacturing.

### CO<sub>2</sub>: a new challenge to tackle

*In Sandouville, the Sedibex industrial waste incineration plant with energy recovery – operated by Veolia Environmental Services Management of special waste, on behalf of companies from the petroleum and petrochemicals sectors – has launched a research project into the recovery of CO<sub>2</sub>. “Our incinerators emit carbon dioxide,” explains Pascal Gauthier,*

*president of Veolia Environmental Services Management of special waste. “Although energy recovery avoids almost 50,000 tons of CO<sub>2</sub> and the waste treatment industry is not subject to emissions quotas, we must help in the fight against global warming.*

*Secondly, the client no longer needs to be delivered liquid CO<sub>2</sub> by truck, which saves on energy consumption and the greenhouse gas emissions related to transport, as well as the liquefaction and regasification of the CO<sub>2</sub>.”*

The difficulty is achieving a CO<sub>2</sub> purity rate of at least 98%, which means extracting from the gases emitted by the incinerators all the water vapor, oxygen and very low quantities of pollutants which remain once the smoke is purified. The chosen technology is currently undergoing approval in a lab trial, before being confirmed through an industrial pilot. At the same time, Veolia Environmental Services will launch a research project into underground sequestration of CO<sub>2</sub> at its Claye-Souilly site. This aims to approve CO<sub>2</sub> sequestration technologies and the possibility of storing gas in a saline aquifer, a type of porous rock. This type of underground pocket is very common throughout the world, which is why it appeals to the division, which has waste treatment sites on all five continents and will therefore be able to offer industrial clients sequestration of their CO<sub>2</sub>. The preliminary geological study began in March 2008. If it confirms the feasibility of the project at this site, the request for authorization to operate a pilot will be made during 2009. “The project has already aroused significant interest among our clients,” says Pascal Gauthier. “We have been contacted by big manufacturers, particularly from the petroleum and chemicals sectors, who want us to help them manage their CO<sub>2</sub> issues.”

### Gasification: an innovation used in recovery

In Midland, Michigan, Veolia Environmental Services has been awarded operation of a very innovative chlorinated organic liquid waste recovery unit at a Dow Corning chemicals plant. Developed and financed by Integrated Environmental Technologies, a group specializing in environmental technologies, it uses a very high temperature gasification technique, used for the first time in the United States for this type of waste. These effluents had previously been incinerated.

As a result of this procedure, it is possible to separate them into two reusable components: hydrochloric acid, reused in the Dow Corning plant's production process, and a synthesis gas, used as an energy source.

This contract is especially interesting since it will allow Veolia Environmental Services to acquire additional expertise in a technology with plenty of potential applications in the recovery of industrial effluents.

#### Towards re-use...

- Regeneration of catalysts.

Catalysts used to purify natural gas absorb more than 50% of their weight in sulfur and 20% in mercury.

This strong concentration of sulfur complicates the recovery of mercury during regeneration of the used catalysts.

Batrec, Veolia Environmental Services' Swiss subsidiary, has developed a procedure which corrects this problem. After thermal treatment, the two components are separated through distillation, then the mercury is condensed and recovered in the metallic form.

This procedure makes it possible to obtain more than 99% pure mercury.

- Regeneration of active carbons.

This same procedure makes it possible to regenerate active carbons used in the treatment of drinking water and waste water, by capturing the mercury, dioxins, heavy metals and organic waste which have accumulated in them.

This technology is currently undergoing tests at a pilot unit. In early 2009, Batrec will start up two industrial lines: one for catalysts, with a capacity of 1,000 tons per year, the other for active carbons, with a capacity of 3,000 tons.

