

Lighting goes full circle with CMA Ecocycle

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Doug Rowe, Chief Executive Officer of CMA Ecocycle, discusses the company's efforts in keeping hazardous mercury waste out of landfill, and the challenges ahead at a government and corporate level.

The year was 1956, when a deadly disease struck the Japanese city of Minamata.

Located in the Kumamoto Prefecture on the island of Kyushu, the disease broke out in the Yatsushiro Sea coastal area. At first it was thought the disease was related to the nervous system, but an outbreak in May of 1956 prompted further investigation. The Study Group of Kumamoto University reported that the origin of the disease was intoxication, caused by eating fish and shellfish contaminated with a kind of metal. The contamination emerged through the release of the toxic chemical compound methylmercury in the industrial wastewater from the Chisso Corporation's chemical factory. At the end of the year, the number of identified patients reached 52, of which 17 had already died. By 1957, this unknown disease epidemic became known as Minamata disease. Boston University Sustainability estimates more than 2000 victims were recognised as having been poisoned with the disease as of March 2001.

The Japanese Ministry of the Environment's National Institute for Minamata Disease documented this history in the Minamata Disease Archives. More than six decades later in 2013, the United Nations has come together for a multilateral environmental agreement, Minamata Convention on Mercury, addressing mercury's adverse health affects. That same year, Australia signed the agreement, which seeks to ban new mercury mines, phase out existing ones, reduce and phase out mercury in a number of products, and a host of other measures. The convention also addresses the interim storage of mercury and its disposal once it becomes waste, and the management of sites contaminated by mercury. Australia has not yet ratified the agreement, but is considering it, according to the Australian Government Department of the Environment and Energy. If it does it will join more than 70 UN nations to ratify the agreement.

For experienced mercury recovery and recycler, CMA Ecocycle, the harsh lessons learned from the outbreak has led to a multimillion dollar environmental operation. Doug Rowe, Chief Executive Officer, says that if Australia ratifies the agreement, the company will be able to increase its recycling rates to handle all the mercury waste in Australia.



Lighting waste is crushed and separated to recover the mercury.

"There's a lot more attention on mercury than there ever has been before. We feel that if Minamata is ratified, we should see an uptake in recycling," Doug says.

He estimates that out of the 60 million globes in the market, the company processes only 10 per cent annually, which equates to approximately six million globes.

"One of the issues we're struggling with at the moment is we have a plant that's capable of handling 100 per cent of the lighting waste. If we had all our states working to full capacity, we could handle more than what our states generate and still import from overseas countries such as New Zealand, Indonesia and Noumea," he explains.

THE BEGINNING

CMA Ecocycle's humble beginnings commenced as a silver recovery business from x-rays in 1996. Back then, it was known as Ecocycle Industries. But as digital technologies took over the imaging industry, the company needed to find something else to complement its business. As a result, CMA Ecocycle looked to other areas of the recycling sector. Mercury, which is considered hazardous waste, is found in fluorescent lighting, batteries, thermometers, dental amalgam and many industrial wastes. Doug says that the company's clients in the silver industry led to CMA's expansion into mercury. On two fronts, the company was able to ascertain technology that could separate silver and mercury from dental fillings and batteries, as well as hazardous lighting waste. Doug says its main foray ended up being the lighting market due to demand. In around 2000, CMA purchased mercury recycler ARA and invested in state-of-the-art equipment never seen in Australia before.

"Sixty to seventy million lights are brought into Australia each year and we saw an opportunity to keep mercury out of landfills across Australia," Doug says.

"In 2000, we were the only company in the market fully recycling and processing all lighting wastes. Environmental Protection Authority (EPA) got involved in the early stages and gave a grant to ARA. From there, it grew very slowly but there was not a lot of support.

"We looked at the older technology ARA had in play and we were concerned that while they were recovering the fluorescent tubes, glass, aluminium and powder, there was no way of getting the mercury out of the phosphor powder."

SYSTEMS AND PROCESSES

With the acquisition of ARA, CMA Ecocycle made an \$8 million investment and set up a lighting recycling facility in almost every state and territory. The investment comprised recycling and mercury separation technologies, including CMA's LP600 lighting waste processing plant and batch process distillers.

"The European markets and the United States were well ahead in the mercury recovery space. We felt that there was an opportunity to give something back to the community as the return on investment wasn't at all viable at that stage," Doug says.

In 2007, The CMA Corporation bought Ecocycle Industries and changed the name to CMA Ecocycle. In 2013, metals recycling company Recycal took over CMA Ecocycle and optimised its operations. To make the mercury separation process more efficient, CMA invested an additional \$4 million into plants in Perth, Queensland and Sydney. The glass, plastic, aluminium and other metals are all crushed and separated at

all of CMA's Sydney, Brisbane and Perth facilities. The revamped older equipment from Melbourne and Sydney is being deployed to the Adelaide and Tasmania factories.

A lot of CMA's waste is in fluorescent tubes. As an example, the tubes and globes arrive in stillages, boxes and bins and these are processed at the company's interstate plants. It gets crushed under vacuum, separated out from the metals, and CMA recovers the mercury from the powder via its distilling process.

The process sees this material go through an aerated tumbler to clean the glass and make sure all of the powder comes off. Then, via a strong suction system and through a cyclonic vacuum separation process, the company separates the glass from the powder. The metals are separated and sold for recycling and the glass can be used in a number of areas, including insulation and as a silica-sand-based product. Recently, the company used around 200 tonnes of this material in the development of concrete boundary walls in the expansion of its Tasmanian facility.

Drums of powder are sent to CMA's Campbellfield facility, located in Melbourne's north, and the mercury is recovered by feeding the phosphor powder into CMA's batch process distiller. Doug explains the process in some cases allows the mercury to come full circle and end up back in the dental industry to be used in fillings.

"We put the mercury into a thick ceramic-type kiln under vacuum, and we purge it with nitrogen during this process. We raise it to about 450-500°C. The mercury is then evaporated and goes through a frozen-like chilling chamber to come back into a pure liquid mercury. That mercury is 99.99 per cent purity and it is then sold onto the likes of Southern Dental Industries and we use it for dental amalgam."

Doug says that CMA provides pre-paid collection boxes to waste generators and the major collection companies with small quantities of lighting waste. Boxes are provided for fluorescent tubes, as well as cartons for globes and lamps such as compact fluorescent lamps. For organisations producing larger amounts of lighting waste, CMA Ecocycle provides on-site wheelie bins or large stillages. It also offers general collection services where tubes and fittings might be loose.

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■ Cover Story

◆ CMA Ecocycle, mercury recycling Australia, Minamata disease

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