

Mercury Levels in SA Water Resources Probed

Today, very little remains known about the extent of mercury pollution in South Africa, because until now most studies have been in response to emergency incidents and effluent spills. To address this knowledge gap, the South African Mercury Assessment (SAMA) Programme was set up in March 2006 with the aim of developing a framework for mercury-related research. Sue Matthews reports.

SAMA is a partnership programme with representatives from government, academia, industry, and parastatal and non-governmental organisations. "We suspect that South Africa's mercury emissions are not as high as has been suggested because the estimated emissions were based on volumes of coal combustion and gold production, yet the gold industry has largely phased out the use of mercury," says Dr Joy Leaner of the CSIR's Natural Resources and the Environment Group.

Dr Leaner serves as coordinator of the SAMA Programme, and is also the project leader for a recently initiated research project – funded by the Water Research Commission (WRC) – to investigate mercury levels in South African water resources.

Mercury is particularly dangerous once it gets into water, because under certain conditions it is converted into methylmercury – a more toxic form. It is readily taken up by phytoplankton and then accumulates up the food chain, with the result that people eating contaminated fish on a regular basis soon experience the symptoms of mercury poisoning.

The main focus of the WRC project is to conduct a national survey of mercury levels in water resources by sampling water, sediment, and freshwater fish and invertebrates from all 19 of South Africa's water management areas (WMAs). Sampling sites were selected on the



Sampling water for mercury analysis.

Courtesy of CSIR

basis of their proximity to likely sources of mercury emissions, and those shown to have markedly high levels of mercury will be identified as 'hotspots' for more intensive study.

Coal-fired power stations are the primary source of mercury emissions globally, and given that most of South Africa's power stations are located in Mpumalanga – where 80% of the country's coal is produced – the Olifants and Upper Vaal WMAs will come under special scrutiny. Another major mercury emitter is the cement industry, which uses coal as a kiln fuel. Although the cement industry is more evenly distributed throughout South Africa, there is a concentration of facilities in the Crocodile (West) and Marico WMA, which will be thoroughly sampled by the research team.

"We'll also be focussing on the Barberton area," reports Dr Leaner, "because artisanal gold mining took place there in the past. Worldwide, mercury is still used by small-scale miners to form an amalgam, after which it is burnt off over an open flame.

Obviously this is a threat to their own health, as well as to people who consume mercury-contaminated fish from freshwater ecosystems nearby."

An important aspect of the current research focus on mercury is the development of local capacity in mercury sampling and analysis. Much can be learned from international experts from the University of Con-

necticut, which – together with the University of Stellenbosch – is a collaborator on the WRC project. At present, all samples collected by the project team are sent to the US for analysis, but the American collaborators are helping to set up a mercury laboratory at the CSIR.

"Our intention is to develop a large-scale reference laboratory, so that the CSIR can provide analytical services to others," says Dr Leaner. "We'll adhere to the methods of the USA's Environmental Protection Agency, which are considered standard protocols."

Technical expertise of this kind is likely to become all the more important if South Africa follows the example of the USA and EU, where tighter controls on mercury emissions are being introduced. In the meantime, the national survey will yield a better understanding of mercury pollution in South Africa, providing support for future government initiatives aimed at addressing the problem.

(Article reprinted courtesy of CSIR)

