Gesellschaft für Anlagen-
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Analysis of options for the environmentally sound management of surplus mercury in Asia and the Pacific

Final Report

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Executive Summary

Mercury in Asia and the Pacific

Mercury is recognized as a toxic substance that poses a serious threat to human health and the environment. Nevertheless, large quantities are still used for the manufacture of products and in industrial processes. For the Asia Pacific region, more specifically East-, Southeast and South Asia, the total demand in 2005 was around 2,100-2,700 t according to a study by Concorde from 2009.[1] In the near future fluctuations in these figures are expected. Demand for mercury for the production of vinyl chloride monomer and manufacturing of fluorescent lamps is likely to increase, while demand for other products such as batteries and measuring devices will probably decline. In the long-term, it is expected that the demand for mercury will decline faster than supply from sources such as mining, decommissioning of chlor-alkali plants, non-ferrous metal production, natural gas production and recycling of mercury-containing waste.

More specifically, it was calculated that, starting in 2029, supply would become higher than demand, leading to an excess supply of mercury of about 5,500 t between 2029 and 2050. This represents a calculation for the regional level (Asia-Pacific). A surplus may occur sooner if countries decide to implement measures to reduce mercury demand, especially for artisanal small-scale mining. In that case, an excess mercury supply of up to 7,500 t may occur between 2027 and 2050. On a national level, an excess supply is possible as soon as a country decides to stop the export of excess mercury. The study by Concorde identified non-ferrous metal production (zinc, gold) as the most important source of future excess supply. In these industrial sectors, mercury may be produced in elemental form or as a compound (like mercury (I) chloride, calomel) during the cleaning of process gases. In addition, the management of mercury-containing waste is a growing concern in the region. Many countries in the region lack separate collection systems for hazardous waste in general and for mercury waste in particular. Combined with inadequate capacities of countries to store, treat and dispose of mercury waste in an environmentally sound manner, this situation leads to the disposal of such wastes under doubtful, unsafe conditions in landfills and open dumps that could be a source of later emissions.

[1] Concorde (2009) Assessment of excess mercury in Asia, 2010-2050,

Elemental mercury: Removal from the market – storage – disposal

The reduction of supply is regarded as a priority in the overall goal of reducing the mercury-related risk to human health and the environment. Elemental mercury, as well as mercury compounds that are produced by recycling, as a by-product of metal production or by other sources, may enter the market as commodities. If the supply exceeds the demand for socially accepted uses, the surplus of elemental mercury and mercury compounds should be removed from the market in order to prevent unwanted export, use and release to the environment. The report describes and analyses general concepts that could be utilized to support such removal by storage, stabilization and disposal.

The US warehouse concept for storing elemental mercury above ground and the EU approach of underground disposal of hazardous wastes are both promising approaches to the management of the regional mercury surplus. Although there is little doubt about the technical applicability of these concepts in the Asia Pacific Region, the full feasibility of their implementation still has to be shown on a site-specific basis. Preliminary calculations found that the storage of 5,500 t of elemental mercury in one centralized warehouse would probably cost in the order of USD 20 million for a 20-year period, and include additional costs for further storage or disposal. Above ground storage of elemental mercury is a sustainable solution if political, economical and institutional stability can be guaranteed for the full operation time of the corresponding facility.

Underground storage of elemental mercury is still under discussion. The implications of this approach, especially regarding additional safety requirements, are yet unknown, so that a detailed cost analysis is impossible at this point. In Europe, however, storage of stabilized mercury has already been practised in underground disposal facilities.

Stabilization