Assessment of Excess Mercury in Asia, 2010-2050

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This paper has been researched and prepared by Peter Maxson, Director, Concorde East/West Sprl, with all reasonable care and due diligence. While the author has greatly benefited from valuable contributions from a number of colleagues, he accepts complete responsible for the accuracy of the paper and the stated conclusions. Nevertheless, third parties who rely on information contained in this document, or their own interpretation thereof, do so at their own risk.

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Executive summary

This document is a revised version of the original assessment dated November 2008. It has been revised, to the extent feasible, to take account of comments kindly provided by Japan, Nepal and China.

The overall aim of this analysis is to provide a framework for better understanding future mercury flows within Asia – a framework necessary to inform discussions about managing excess mercury in the region. This analysis provided background information for the "Inception Meeting of the Asian Mercury Storage Project" that took place on 4-5 March 2009, in Bangkok.

The reduction of mercury supplies, and long term management of mercury, have both been identified as priorities by the UNEP Governing Council. It is imperative, therefore, that Governments and other stakeholders consider how to deal with excess mercury, since we know that elemental mercury, apart from being toxic, cannot be destroyed or degraded, and hence must be managed over the long term in order to avoid its re-entry into the global marketplace.

Importantly, mercury flows in Asia need to be better understood before subsequent steps are taken – which may include planning for the necessary storage capacity, discussing regional coordination activities, securing financial and technical support, identifying technical criteria (including site assessments) that constitute environmentally sound long-term storage, and developing the basic design of such a facility or facilities.

Present information suggests that future sources of mercury in the Asian region will include primarily mercury recovered as a by-product from various mining and smelting activities, from the cleaning of natural gas, from the closure/conversion of mercury cell chlor-alkali plants, and from other significant sources such as end-of-life products. Regional sources of mercury are compared in this analysis with regional uses, such as lamps, measuring devices, dental amalgam, etc., over the same time period in order to estimate excess mercury that will be generated in the region.

This analysis demonstrates that the Asian region is a significant net importer of mercury at the present time. The vast majority of the imported mercury is used for small-scale gold mining, and lesser amounts for product manufacturing, while China consumes much of its own mined mercury in the production of VCM/PVC. Therefore, the timing of the generation of excess mercury in Asia depends to a large extent on the timing and magnitude of demand reduction in these key sectors.

UNIDO and other experts have determined that mercury supply restrictions can contribute to significant demand reductions in small-scale gold mining. Subsequently, measures to influence supply and demand can be mutually reinforcing, and to some extent supply restrictions must precede demand reductions to be effective. Therefore,

for this region, planning for mercury storage may be especially important as an initiative to further encourage demand reduction.

According to the scenarios assessed in this report, mercury supply and demand in Asia are projected to reach a rough equilibrium beginning about 2014-2015. This time frame could be shorter if substantial additional by-product mercury is generated in response to stricter requirements imposed on the metal processing sector. On the other hand, this time frame could be longer if demand reduction in small-scale gold mining proves to be more difficult to achieve than the goals set out in the relevant UNEP partnership.

Furthermore, after 2017 the urgency of an Asian mercury storage capability is likely to depend on the rate of further demand reductions, the extent to which countries in the region wish to encourage these further demand reductions through supply restrictions, and the extent to which a regional solution is achieved (even though net supplies of excess mercury may occur in a relatively small number of countries).

In any case, substantial excess mercury can be expected in Asia after 2030. The quantity of excess mercury, mostly accumulated between 2030 and 2050, would likely amount to just over 5,500 tonnes. According to an alternative policy scenario, in which regional authorities may decide to move forward the storage of excess mercury, the quantity of mercury accumulated may be as high as 7,500 tonnes.

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1.1 Aims

The overall aim of this analysis is to provide a framework for better understanding future mercury flows within Asia – a framework necessary to feed discussions about managing excess mercury in the region. This analysis provided background information for the "Inception Meeting of the Asian Mercury Storage Project" that took place on 4-5 March 2009, in Bangkok. At that meeting, discussions focused on the possible need for a regional mercury storage facility or facilities, as the preferred – or most environmentally sound – option.

This research and analysis was carried out with the kind support of the Zero Mercury Working Group.[1] It is a revised version of the original assessment dated November 2008, and takes account of post-meeting comments kindly submitted by Japan, Nepal and China.

1.2 Context

The reduction of mercury supplies, as well as long-term management of mercury, have both been identified as priorities of the UNEP Governing Council. It is imperative, therefore, that Governments and other stakeholders consider how to deal with excess mercury, since we know that elemental mercury, apart from being toxic, cannot be destroyed or degraded, and hence must be managed over the long term in order to avoid its re-entry into the global marketplace.

Present trends suggest that as Asian mercury demand decreases with the gradual phase-out of mercury-containing products, there will be excess mercury generated in Asia from such sources as by-product mercury recovered from various metal mining and smelting activities, from the cleaning of natural gas, from the closure or conversion of mercury cell chlor-alkali plants, etc. Therefore, mercury flows need to be better understood before any subsequent steps are taken – such as planning for the necessary storage capacity, discussing regional coordination activities, securing financial and technical support, identifying technical criteria (including site assessments) that constitute environmentally sound long-term storage, and developing the basic design of such a facility or facilities.

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[1] The Zero Mercury Working group (www.zeromercury.org) is an international coalition of more than 55 public interest environmental and health non-governmental organizations from around the world, formed in 2005 by the European Environmental Bureau and the Mercury Policy Project/Ban Mercury Working Group. The aim of the group is to strive for 'zero' emissions, demand and supply of mercury, eventually eliminating the risks posed by mercury in the environment at EU level and globally.

1.3 Scope

The broader investigation into the feasibility of Asian regional capacity for the terminal storage of excess mercury has been structured in two initial phases. This assessment comprises the first phase; it responds to the need cited above by assessing the flows and quantities of mercury that may need to be stored. The second phase will focus on the location, design, financing and other practical requirements of an appropriate storage facility.

This assessment includes an analysis of the quantities of mercury arising over the next 40 years in the Asian region as a by-product from various mining and smelting activities, from the cleaning of natural gas, from the closure/conversion of mercury cell chlor-alkali plants, and from other significant sources such as end-of-life products. Regional sources of mercury are then compared in this analysis with regional uses, such as lamps, measuring devices, dental amalgam, etc., over the same time period in order to estimate excess mercury that will be generated in the region, and that could be stored at an appropriate facility or facilities.

2 The Asian region

In order to productively discuss mercury sources and uses in the region, it is necessary to first identify the countries that will be included in this analysis. While different groups of countries may be considered, this project will cover the subregions of East Asia and South Asia as indicated in Table 2-1. It should be noted that these are merely convenient geographical groupings and should not in any way be interpreted as regional groupings endorsed by the United Nations.

Table 2-1 Suggested Asian subregions and included countries

East and Southeast Asia	*South Asia*
Brunei Darussalam	Afghanistan
Cambodia	Bangladesh
China	Bhutan
Democratic People's Republic of Korea	India
Indonesia	Maldives
Japan	Nepal
Lao People's Democratic Republic	Pakistan
Malaysia	Sri Lanka
Mongolia	
Myanmar	
Papua New Guinea	
Philippines	
Republic of Korea	