

## 6.0 ISSUES BEYOND THE MERCURY RESEARCH STRATEGY

The *Mercury Research Strategy* describes ORD's research program to reduce the scientific uncertainties related to mercury and methylmercury risks. There are, however, additional issues that the *MRS* Writing Team believes are important but which lie outside the scope of the mercury research program. These include science activities not considered "research," but that inform research efforts. Another issue is the development and implementation of mechanisms that encourage future research partnering external to EPA.

### 6.1 SCIENCE ACTIVITIES THAT GO BEYOND RESEARCH

In the process of preparing the *MRS*, ORD identified three science activities that provide data and information important to the success of the Agency's mercury risk assessment and risk management efforts. These three activities are: (1) improving mercury emission inventories and collecting source emission data, (2) monitoring mercury in various media, and (3) understanding the international implications of mercury. Each is described below in greater detail, as is ORD's suggested approach for addressing them. Furthermore, the information developed from these three activities will help EPA attain the goals identified in the Agency's *Mercury Action Plan* and in other documents including: *A Multimedia Strategy for Priority Persistent, Bioaccumulative and Toxic (PBT) Pollutants; Deposition of Air Pollutants to the Great Waters: Third Report to Congress*; and *North American Regional Action Plan for Mercury - Phase II* (Federal Register, 1998; EPA, 2000a; CEC, 2000). Resulting data and insights will allow for periodic adjustments in implementation of the *Mercury Research Strategy*.

#### 6.1.1 Improving Mercury Emissions Inventories and Collecting Source Emissions Data

EPA collects data on mercury sources and releases from the National Toxics Inventory (NTI); it is the most comprehensive mercury emissions inventory of U.S. anthropogenic sources available. Nevertheless, EPA's current understanding of mercury sources and their characterization needs enhancement. The NTI provides a compilation of emissions estimates for all listed hazardous air pollutants (HAPs) for point, area, and mobile sources. It incorporates information from the Toxics Release Inventory (TRI), which includes manufacturers' submitted estimates of facility emissions to EPA, state and local inventory data, and data from other special studies. With respect to available information, EPA's TRI does not include mercury estimates

for U.S. anthropogenic sources; that will change for the 1999 reporting period (due in 2001). In the 1999 reporting year, mercury releases of 10 pounds or more must be reported (Federal Register, 2000). The 1999 TRI inventory will not contain information on mercury species. EPA is gathering mercury emission data, for coal-fired utilities as part of the Utilities Information Collection Request (ICR). The ICR does contain some speciated mercury data.

EPA needs to better quantify, characterize, and inventory mercury released from domestic, non-combustion anthropogenic sources, diffuse area sources, and natural sources. There is also a need for data showing trends in mercury releases from these sources, both domestically and internationally. These trends will demonstrate the effectiveness of mercury source reduction efforts. An inventory of national and international speciated mercury is essential to effectively model mercury releases from human activities and predict deposition and concentrations in the environment. ORD is exploring how best to address these needs with the Program Offices (particularly OAR, OW, OPPTS, and OIA). ORD has adjusted the *MRS* to focus more effort on anthropogenic releases of mercury from non-combustion sources. This will be done as part of the risk management for non-combustion sources research area.

#### 6.1.2 Monitoring Mercury in Various Media

While no comprehensive, national monitoring network for mercury has been developed, an increasing number of mercury monitoring activities are underway. EPA and others have developed ambient air and deposition monitoring networks that address mercury (with other pollutants) on local or regional scales (EPA, 2000a; CEC, 2000). There is, however, a need for statistically-representative monitoring data that provide a baseline against which progress in mercury risk management can be measured. ORD recognizes the need to develop and implement such a network, including the tracking of indicators to demonstrate changes in mercury concentrations in the environment. In particular, data are needed on both fish tissue (the primary route of human and wildlife exposure) and susceptible populations. This biomonitoring would track mercury concentration trends in both humans and fish.

EPA is preparing an Action Plan for mercury, one of the twelve priority pollutants identified in the *Draft Persistent Bioaccumulative Toxics (PBT) Strategy* (Federal Register, 1998). This action plan recommends the development of a comprehensive and focused *National Mercury Monitoring Strategy* (which may be expanded to include other PBTs). The monitoring strategy is intended to harmonize

monitoring programs underway by federal and state agencies and to achieve efficient and comprehensive mercury analyses on a national scale. It will include atmospheric, water, soil/sediment, and tissue monitoring. A weighted sampling design is envisioned for long-term monitoring on a broad scale. More intense monitoring, including key interacting variables, will be proposed for a set of sentinel sites. While ORD will participate in the design and implementation of this *National Mercury Monitoring Strategy* and consult in the network's operation, it does not intend to operate the network. The operation of a monitoring network of this magnitude lies outside of ORD's mission, and must be a coordinated effort among the Program and Regional Offices, states, and other organizations.

### **6.1.3 Understanding the International Implications of Mercury**

It is increasingly clear that the atmospheric, transboundary nature of mercury needs to be considered as part of any mercury risk management effort in the United States. Based on the *Mercury Study Report to Congress* (EPA, 1997a), the estimated emissions of mercury from the U. S. are relatively small when compared to releases worldwide. Mercury, like other hazardous air pollutants, is both a global and national issue. A better understanding of how mercury cycles through the global environment is essential to achieve the effective management of mercury risks. The most pressing questions that remain regarding mercury revolve around mercury transport, transformation, and fate from emission release point through bioaccumulation in fish. In addition, a better understanding is needed of mercury chemistry, thermodynamics, and kinetics, both in the atmosphere and aquatic ecosystems.

On the global front, EPA's Office of International Activities and Office of Air and Radiation are contemplating the development of an *International Mercury Strategy*. The strategy will set the framework and rationale to guide the Agency's efforts, in concert with other organizations and the international community. The international strategy will focus on collecting scientific data, building international partnerships, and influencing risk management decisions, all with the goal of preventing or reducing mercury risks worldwide. ORD plans to contribute to the development and implementation of this strategy.

## **6.2 FOSTERING FUTURE RESEARCH PARTNERSHIPS**

Engaging and partnering with a variety of stakeholders will enhance ORD's mercury research program. ORD wants to strengthen research links to the regulated community, in order to gain their participation and sponsorship of mutually beneficial mercury research. It is seeking links to states, communities, and tribes, in order to gather insights

from decision makers at various community levels on their mercury research needs. The *MRS* Writing Team has worked closely with EPA's Program Offices and Regions to understand their research needs and involve them in the development of the *Mercury Research Strategy*.

ORD is now engaging other organizations in order to exchange information on mercury research and development activities and to advance its mercury research program. One area deserving attention involves Native Americans, particularly those individuals and tribes who rely on fish for a significant part of their diets. ORD will work through the newly-formed Tribal Science Council and as appropriate, the Arctic Monitoring and Assessment Program, to engage Native Americans on mercury issues. In both cases, these engagements will inform ORD's mercury research program, and in particular, the risk communication research area. Involvement with the international community will be pursued under the auspices of the *International Mercury Strategy* as it evolves in the coming months and years.

Examples of existing partnerships and potential opportunities for partnering with federal, private, public, and academic organizations are described in Chapter 4.0. For example, ORD has partnered with the U. S. Geological Survey (USGS) in establishing a USGS/EPA Mercury Roundtable. The Roundtable sponsors regularly scheduled meetings for the staffs of the two organizations to discuss science and its role in affecting policy related to mercury. Both organizations anticipate that this forum will evolve into a more broadly-based Federal Mercury Roundtable in the coming months. One outcome of this federal agency engagement is envisioned to be a biennial conference on federal agency mercury and methylmercury research. This conference will bring together not only EPA and USGS researchers, but others in the public and private sectors conducting pertinent research on mercury.