MERCURY DEPOSITION IN PENNSYLVANIA: STATUS REPORT

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Introduction

Mercury (Hg) is a naturally occurring element in our environment. It enters the atmosphere as a result of natural events, such as volcanic eruptions, or anthropogenic activities, such as the combustion of fossil fuels, especially coal. Mercury is persistent, bioaccumulative, and toxic. Because of these properties, it poses potential human health implications, especially for pregnant women, developing fetuses, and young children. Mercury is also toxic to wildlife, especially fish, birds, and fur-bearing mammals, that consume organisms contaminated with mercury. Human exposure to mercury occurs almost exclusively through fish consumption (U.S. EPA, 1997). Because of potential health risks, forty states in the United States and seven Canadian provinces currently have some form of mercury fish advisories for their water bodies (U.S. EPA, 1999a, 1999b).

Concerned over the toxicity of mercury and its potential impact on humans and the environment, The Environmental Protection Agency (EPA) conducted a detailed assessment of the magnitude of U.S. mercury emissions by source, the health and environmental implications of these emissions and depositions, and the availability and cost of control technologies. This assessment, entitled *Mercury Study Report to Congress* (U.S. EPA, 1997) was required under section 112(n)(1)(B) of the Clean Air Act Amendments of 1990, Public Law No. 101-549, 42 U.S.C. 7412 (U.S. Congress 1990). Information presented in the following paragraphs was obtained from the *Mercury Study Report to Congress* (U.S. EPA, 1997) and EPA's *Mercury Research Strategy* (U.S. EPA, 2000a). Information was also obtained from a report on the *Deposition of Air Pollutants to the Great Waters: Third Report to Congress* (EPA, 2000b),an Environmental Protection Agency web site on mercury: http://www.epa.gov/mercury/information.htm, and from the National Research Council's report on *Toxicological Effects of Methylmercury* (National Research Council, 2000). As the state-of-the-science for mercury is continuously and rapidly changing, these reports and the information presented in them as well as in this report represents the current state-of-knowledge on the topic.

Mercury's toxicity level in the environment depends on its chemical form. Mercury exists in the atmosphere in primarily four forms: gaseous elemental mercury vapor ($Hg°$) or metallic or zero valent mercury; gaseous divalent mercury Hg_2^{2+} (mercurous) or Hg^{2+} (mercuric-Hg (II)); particulate-bound mercury (Hg_p), both $Hg°$ and Hg^{2+}; and organic mercury (mainly methylmercury (MeHg). Elemental mercury is a heavy, silvery-white liquid metal at typical ambient temperatures and pressures. The vapor pressure of mercury is strongly dependent on temperature, and it vaporizes readily under ambient conditions. Consequently, elemental mercury ($Hg°$) is not found in nature as a pure, confined liquid, but instead exists as a vapor in the atmosphere. It is insoluble in water and is less chemically active than the other forms of mercury. As a result, its removal rate is slow and thus can be transported in the atmosphere thousand of miles from its emission source. Consequently, gaseous elemental mercury vapor ($Hg°$) is the major component of the global circulation of atmospheric mercury (Schroeder and Munthe, 1998).

Gaseous divalent mercury (Hg_2^{2+} and Hg^{2+}), also called reactive gaseous mercury (RGM), can form many inorganic and organic chemical compounds; however, mercurous mercury (Hg_2^{2+}) is very unstable under ordinary environmental conditions and therefore is generally not found in the atmosphere. Mercuric mercury (Hg^{2+}) is less volatile than Hg_2^{2+} and more water-soluble than $Hg°$.

Mercuric mercury may be found in the gas phase or bound to airborne particles. Both gas-phase and particulate Hg^{2+} are readily removed from the atmosphere by precipitation. Oxidation processes in the atmosphere and in cloud water can also convert elemental mercury to Hg^{2+}. Because of its high solubility, gas-phase Hg^{2+} may be removed from the atmosphere within a few ten to a few hundred miles of the source. Particular-phase mercury may be deposited at intermediate distances from the source depending on the size of the aerosol (Schroeder and Munthe, 1998).

Methylmercury (MeHg) is the most toxic of the organic mercury species. While some MeHg is found in precipitation, most of the MeHg occurring in lakes and other surface waters as well as in soil, sediments and biota, is generated by microbially mediated transformations of Hg^{2+} (Schroeder and Munthe, 1998). These processes seem to be accelerated under acidic conditions (Driscoll, et al., 1995). Methylmercury is a neurotoxin and teratogen, which bioaccumulates up the food chain by a factor of a million or more. Human and wildlife exposure to mercury is due primarily from the consumption of contaminated fish (U.S. EPA, 1997). Other organic mercury compounds that may be found under normal environmental conditions are: mercuric salts ($HgCl_2$, $Hg(OH)_2$, and HgS); methylmercury compounds, methylmercuric chloride (CH_3HgCl) and methylmercuric hydroxide (CH_3HgOH); and, in small fractions, other organomercurics, such as dimethylmercury and phenylmercury.

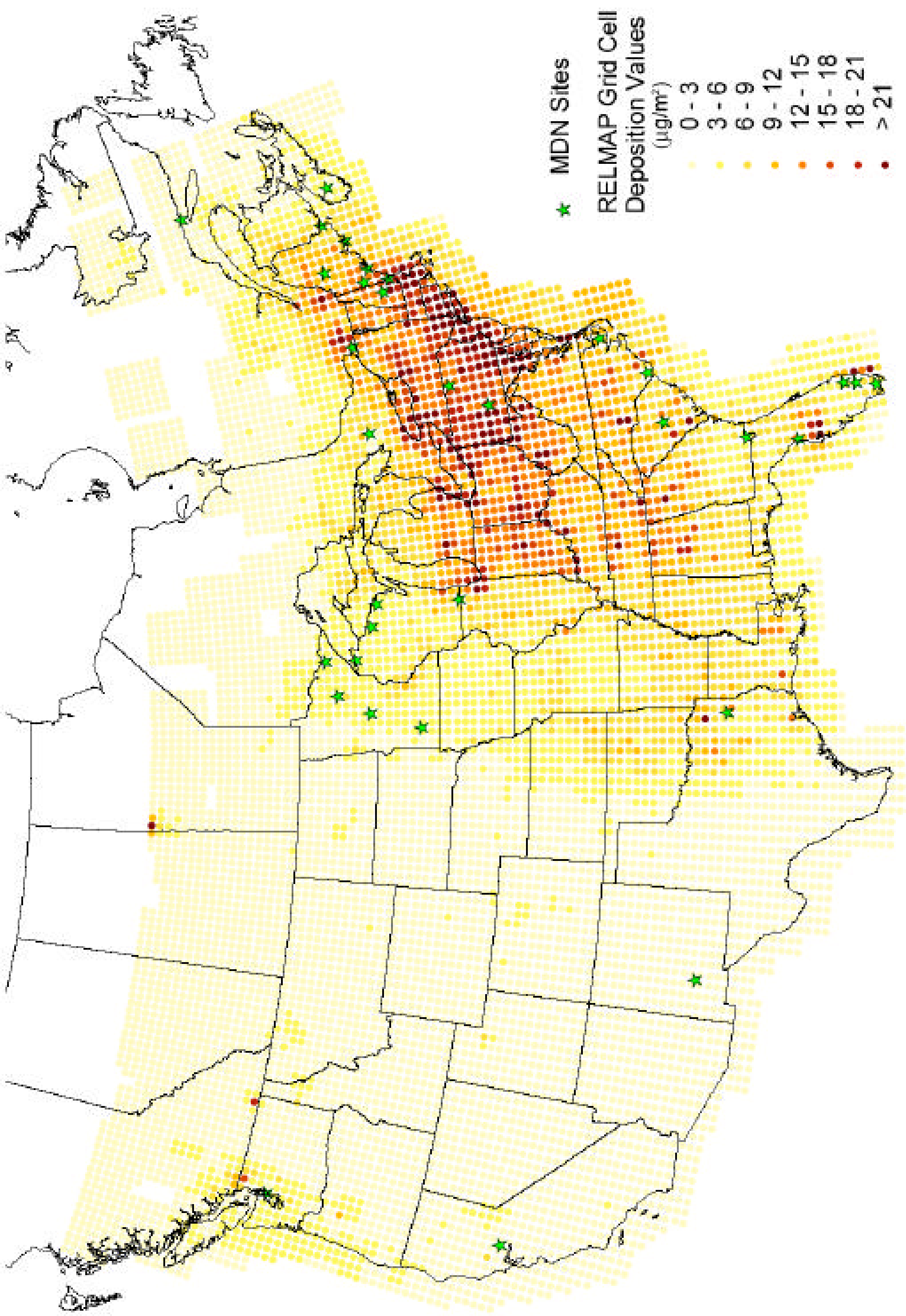
Mercury Emissions and Deposition in the U.S.

Since the 19th Century, the total amount of mercury in the environment has increased by a factor of two to five above pre-industrial levels (Mason et al., 1994). Over the years, some mercury compounds have been specifically developed as pesticides, fungicides, and germicides to be used on grains, in paints, and with vaccines. Because mercury is an excellent conductor of electricity, it has been widely used in products, such as batteries, electric switches, thermostats, thermometers, and barometers. Because mercury and its compounds are persistent, bioaccumulate in the environment, are toxic to humans, and pose ecosystem risks, the use of mercury in many products, such as paint and batteries, has decreased significantly the past several decades (U.S. EPA, 1997b).

The sources of mercury emissions to the atmosphere in the United States can be broadly classified as re-emitted mercury, natural mercury emissions, and anthropogenic mercury emissions. Re-emitted mercury is mercury that was previously deposited on the Earth's surface following either anthropogenic or natural releases and is re-emitted to the atmosphere by natural biologic or geologic processes. Natural mercury emissions occur when geologically-bound mercury is released during natural processes, such as volcanic activity. The mobilization and release of mercury by human activities is referred to as anthropogenic mercury emissions. Anthropogenic emissions can be classified as point or area sources. Based on EPA estimates of anthropogenic mercury emissions (U.S. EPA, 1997b), point sources accounted for all but 2.2% of the 158 tons emitted in 1994-95. The largest point sources of mercury emissions in the United States are combustion sources which accounted for 86.9% (137.9 tons/year) of the total 1994-95 anthropogenic emissions inventory. The largest single combustion source is coal-fired utility boilers which accounted for 32.8% (51.6 tons/year) of the 1994-95 inventory. Other major contributing point combustion sources include municipal waste incinerator (29.6 tons/year, 18.7%), medical waste incinerators (16.0 tons/year, 10.1%), and hazardous waste combustion (7 tons/year, 4.4%). Manufacturing sources accounted for approximately 10% of the 1994-95 mercury emissions with the majority of these point sources resulting from chlor-alkali production (7 tons/year, 4.5%), Portland cement production, excluding hazardous waste-fired (5 tons/year, 3.1%), and pulp and paper manufacturing (2 tons/year, 1.2%). On a global scale, the amount of mercury released annually from natural sources has been estimated to be between 2000 tons per year (Nriagu and Pacyna, 1988) and 3000 tons per year (Jackson, 1997). Global anthropogenic emissions have been estimated to be between 3560 tons per year (Nriagu and Pacyna, 1988) and 4000 tons per year (Jackson, 1997). The uncertainties associated with these estimates can be significant and are discussed by Schroeder and Munthe (1998).

The deposition of mercury from the atmosphere occurs by two mechanisms: wet deposition and dry deposition. Wet deposition occurs when reactive gaseous mercury (primarilyHg^{2+}) dissolved in precipitation is deposited on the surface of the Earth. Particulate-bound mercury is also deposited by this mechanism, but is a relatively minor component (in most areas) when compared to dissolved Hg^{2+}. Dry deposition occurs when both gaseous and particulate forms of mercury are deposition on the Earth's surface. The amount of mercury at any one location is comprised of mercury from the natural global cycle, the global cycle perturbed by anthropogenic activities, as well as regional and local anthropogenic sources. In addition to air emissions, mercury may also enter an ecosystem through direct water discharge or past uses of mercury, such as in paints or fungicide applications to crops. Current research indicates that natural sources, industrial sources, and recycled anthropogenic mercury each contribute to about one-third of the current mercury burden in the global atmosphere (Pirrone et al, 1996). However, more recent measurements suggest that natural mercury emissions may be larger than past estimates (Lindberg et al., 1998).

Routine monitoring for mercury deposition was not initiated in the United States until January 1996 when the National Atmospheric Deposition Program (NADP) initiated the Mercury Deposition Network (MDN). Connsequently, very limited data were available to describe spatial and temporal patterns in mercury deposition in the United States at the time EPA undertook the mercury study (U.S. EPA, 1997). As a result, in its assessment on the fate and transport of mercury in the environment (U.S. EPA, 1997b), EPA relied on computer simulation modeling to describe the environmental fate of emitted mercury. Two models were used in this analysis: The Regional Lagrangian Model of Air Pollution (RELMAP), for assessing regional scale atmospheric transport and the Industrial Source Code model (ISC3), for local scale analysis. EPA's ISC3 model was used to predict average annual concentrations as well as wet and dry deposition fluxes that result from emissions within 50 km of a single source. In contrast, RELMAP (Bullock et al., 1997; Eder et al., 1986) predicts average annual atmospheric mercury concentrations as well as wet and dry deposition fluxes for 40 km^2 grids across the continental United States. Model predictions were based on anthropogenic emissions from sources identified in EPA's 1994-95 inventory (U.S. EPA, 1997b). The predicted results from RELMAP were added to a uniform elemental mercury background concentration of 1.6 nanograms per cubic meter (ng/m^3) which represents natural and re-emitted anthropogenic sources of mercury worldwide (Fitzgerald and Mason, 1996). The results of these simulations are shown in Figure 1. The model simulations indicate that the highest deposition rates from anthropogenic and global sources of mercury are predicted to occur in the southern Great Lakes and Ohio River Valley, the Northeast (including Pennsylvania) and scattered areas of the


MDN Sites
RELMAP Grid Cell
Deposition Values
(µg/m²)
0 - 3
3 - 6
6 - 9
9 - 12
12 - 15
15 - 18
18 - 21
> 21

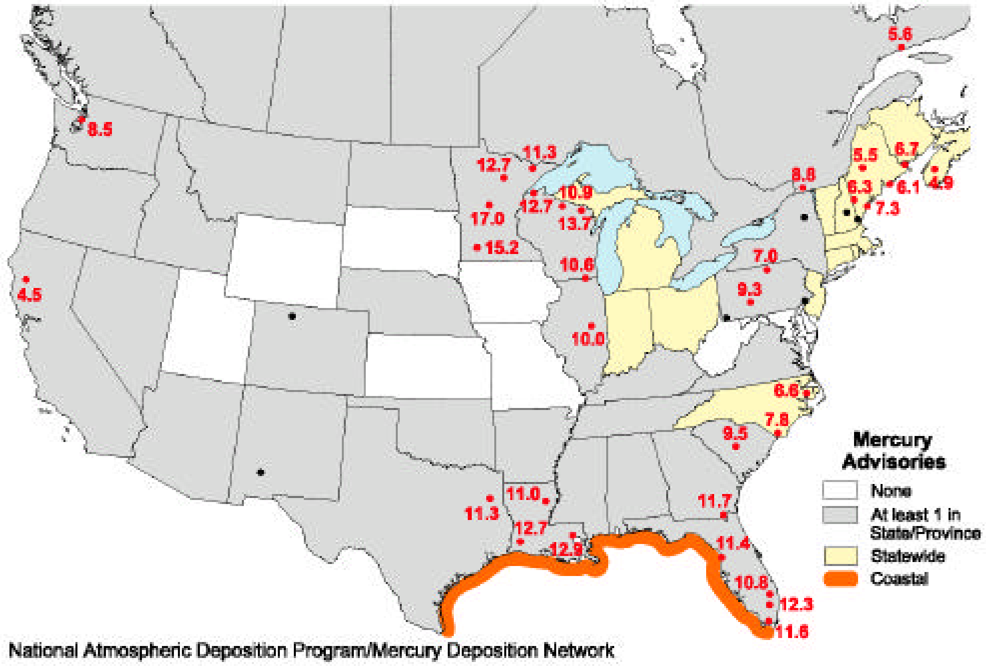
south, with the most elevated deposition in central and south Florida (U.S. EPA, 1997c). The computer simulations also suggest that about one-third of the United States anthropogenic emissions (approximately 52 tons) are deposited on the lower 48 states; an additional 35 tons of mercury from the global reservoir is also deposited on the lower 48 states bringing the total mercury burden to approximately 87 tons annually. For a detailed description of the mercury deposition modeling effort by EPA, readers are referred to the *Mercury Study Report to Congress: Volume III, Fate and Transport of Mercury in the Environment* (U.S. EPA, 1997c).

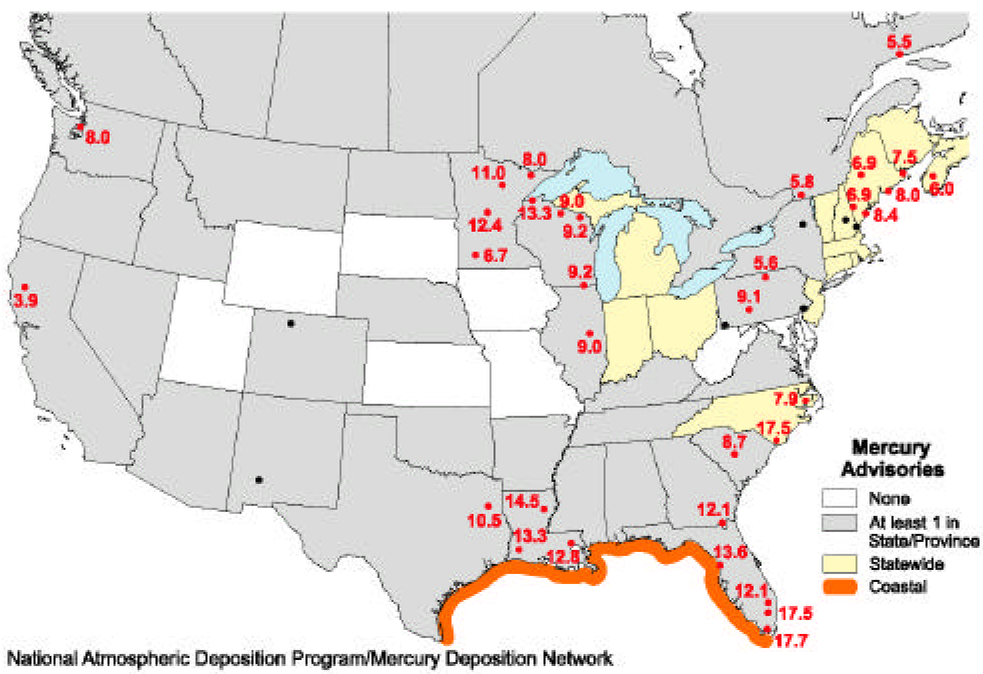
When atmospheric mercury is deposited on aquatic and terrestrial ecosystems, biological transformations occur that produce methylmercury. The bioaccumulation of methylmercury by aquatic organisms, such as clams, crayfish, plankton, etc., and their consumption by fish and small mammals is the primary mechanism by which methylmercury enters the food web. Because of the bioaccumulation effects of methylmercury, the concentration of methylmercury in fish may be several orders of magnitude higher than the concentrations in the aquatic ecosystem inhabited by the fish. The consumption of contaminated fish by both humans and wildlife (e.g., loons, ducks, eagles, otters, mink, etc.) is the primarily means by which mercury enters organisms at the top of the food chain. For a detailed discussion on the fate and transport of mercury in the environment, readers are referred to the *Mercury Study Report to Congress, Volume III* (U.S. EPA, 1997c); for an assessment of the ecological and human health effects, refer to *Volume V* and *Volume VI* (U.S. EPA, 1997d and 1997e, respectively).

Environmental Concerns

Methylmercury is know to be toxic to humans causing permanent damage to the brain and kidneys. Developing nervous systems in both humans and animals are particularly volnerable to methylmercury exposure. Consequently, pregnant women and young children are particularly sensitive and are at greatest risk to exposure. Chronic, low-dose prenatal methylmercury exposure from maternal consumption of fish has been associated with subtle neurotoxicity problems, such as poor performance on neurobehavioral tests, particularly tests of attention, fine-motor function, language, visual-spatial abilities and verbal memory (National Research Council, 2000). The most severe effects of mercury contamination reported in adults from high dose exposure in Japan and Iraq include mental retardation, cerebral palsy, deafness, blindness, and dysarthria (National Research Council, 2000). Because of the potential risks to humans, particularly pregnant women and young children, forty states in the United States and seven Canadian Provinces have issued mercury fish advisories for some water bodies located in their boundaries including coastal waters in the Gulf of Mexico (Figure 2). Superimposed upon Figure 2 are the 1999 volume-weighted average mercury concentrations (upper figure) and estimated wet depositions (lower figure) for all MDN sites that met the network data completeness criteria. Despite the number of advisories, based on an analysis of dietary surveys reported in the *Mercury Study Report to Congress* (U.S. EPA, 1997d), typical fish consumers in the U.S. are not in danger of ingesting harmful levels of methylmercury as reflected by the relatively low amounts of fish consumed by the typical U.S. citizen.

The impacts on wildlife (fish, birds, and fur-bearing mammals) from exposure to methylmercury are described in detail in the *Mercury Study Report to Congress, Volume IV*: *Assessment of Exposure*





Mercury concentration in ng/L (top) and estimated deposition in µg/m² (bottom), 1999.

to Mercury in the United States (U.S. EPA, 1997d). Like human impacts, mercury toxicity in wildlife is related to the consumption of bioaccumulated mercury in less complex organisms within their food web. Overall, wildlife (e.g., fish, birds, and fur-bearing mammals) appear to be more susceptible to mercury effects when they are located in ecosystems that experience high levels of deposition, inhabit ecosystems already impacted by acidic deposition or have characteristics other than low pH that result in high levels of mercury bioaccumulation in aquatic biota, and are species that are likely to experience high levels of exposure because of their feeding preferences (U.S. EPA, 2000a). Fish toxicity is highly variable and dependent on species, size, life stage, and age along with a number of environmental factors. The effects of methylmercury may result in death, reduced reproduction, impaired growth and development, behavioral abnormalities, altered blood chemistry, reduced feeding rates and predatory success, and effect oxygen exchange. Some signs of acute mercury poisoning are represented by emaciation, brain lesions, cataracts, and an inability to capture food. Evidence suggests that effects can be detected in water concentrations between 0.1 and 1.0 microgram per liter (µg/L) for some species. Symptoms of mercury poisoning in birds include muscular in-coordination, falling, slowness, fluffed feathers, calmness, hyperactivity, hypoactivity, and drooping eyelids. Liver and kidney damage, neurobehavior effects, reduced food consumption, weight loss, spinal cord damage, reduced cardiovascular function, and impaired growth and development have also been reported. Impacts on fur-bearing mammals, such as mink and otter, are less well known due to the limited number of studies and confounding effects of other stressors, such as habitat fragmentation and inbreeding (U.S. EPA, 2000a).

In the *Mercury Study Report to Congress*, (U.S. EPA, 1997a) EPA found that "a plausible link exists between past and present, human-induced atmospheric emissions of mercury in the United States and increased concentrations of mercury that have been found in the environment and in freshwater fish". However, EPA goes on to say that an apportionment between mercury sources and mercury in environmental media and biota cannot be described in quantitative terms with the current scientific understanding of the environmental fate and transport of the pollutant. Based on modeled mercury deposition estimates (Figure 1) and the number and location of mercury fish advisories in the United States and Canada (Figure 2), the problem appears to be most severe in the Great Lakes and Northeast regions of the United States, in the Canadian Maritime Provinces, and in South Florida. Many lakes and streams in these areas contain fish with mercury levels above state (0.5 to 1.0 mg/L) and U.S. Food and Drug Administration (1.0 mg/L) action levels for human consumption (U.S. EPA, 1997).

The Mercury Deposition Network

The Mercury Deposition Network (MDN), coordinated through the National Atmospheric Deposition Program (NADP), was designed to study and quantify spatial and temporal trends in the deposition and fate of mercury in the atmosphere. The NADP began monitoring trace chemicals in precipitation at 18 sites in 1978 in order to describe and study "acid rain" related problems. It has since grown to a network of more than 220 sites throughout the U.S. (More information on the NADP is available at http://nadp.sws.uiuc.edu). In 1995, following a year of field testing

(Vermette et al., 1995), the NADP began "transition phase" mercury monitoring at 17 sites in preparation for the acceptance of MDN into NADP, which occurred in January, 1996. Between 1996 and 1999, 41 MDN sites were in operation across the U.S. and Canada for at least part of the period. As of January 2001, 52 sites were active in the U.S. and Canada; and an additional 12 are proposed (Figure 3). Mercury deposition data from MDN will be an important input to atmospheric and multi-media models designed to assess the fate and consequences of mercury emissions and will provide feedback to better assess the trends in mercury deposition. Plans are to continue operation of the MDN for at least ten years. Thus, the MDN database will be particularly useful to help evaluate the effectiveness of EPA mandated controls on mercury emissions to the atmosphere (U.S. EPA, 2000a). This report summaries the results of mercury monitoring at four MDN sites located in Pennsylvania through May, 2000. The results are compared to similar data collected at selected MDN sites throughout the United States and southern Canada.

Network Design and Operation

Both wet and dry deposition are important processes for the movement of mercury from the atmosphere to land and water surfaces. The Mercury Deposition Network (MDN) is a wet deposition network and does not attempt to measure dry deposition of mercury. The main reason for this is that dry deposition methods are based on indirect measurements that are largely experimental and difficult to implement at isolated sites using personnel with a wide variety of backgrounds. Wet deposition measurements, on the other hand, are based on direct collection techniques that use standardized methods and equipment that are relatively easy to implement and operate at remote sites. Although dry deposition of mercury is very important in terrestrial systems (Lindberg et al., 1992) other studies have estimated that wet deposition is the most important atmospheric process for movement of mercury to water bodies (Lamborg et al., 1995; Mason et al., 1997; Scherbatskoy et al., 1997). Since the primary environmental problems associated with mercury deposition are fish contamination and human health risk associated with consumption of contaminated fish (U.S. EPA 1997), wet deposition is probably the most important atmospheric deposition process for assessing mercury's environmental impact.

Sampling Site Locations

Sites in the MDN are designed to evaluate regional wet deposition patterns. They were selected using an established set of siting criteria (Bloom and Crecelius, 1983). Most of the sites are in rural areas at least 10 to 20 kilometers from major air pollution sources and at least 100 meters from local sources. All sites are in open, grass-covered areas well away from overhanging vegetation and buildings. About half of the MDN sites are collocated with NADP acid precipitation collectors. One of the MDN sites (WA18) is in a residential area in Seattle, WA. Deposition at this site may not be directly comparable to other sites in the network in terms of regional representativeness because of its close proximity to potential local mercury sources. The location of active and proposed (as of January 2001) MDN sites are shown in Figure 3. Site names and full descriptions are available on the NADP web site: http://nadp.sws.uiuc.edu. Seven sites were in operation in Pennsylvania as of January 2001 (Figure 3). These sites are located in Tioga County (PA90) near Wellsboro, in Cambria County (PA13) near Cresson, in Erie County (PA30) near Erie, in Greene County (PA37)

MDN Sites

(January 2001)

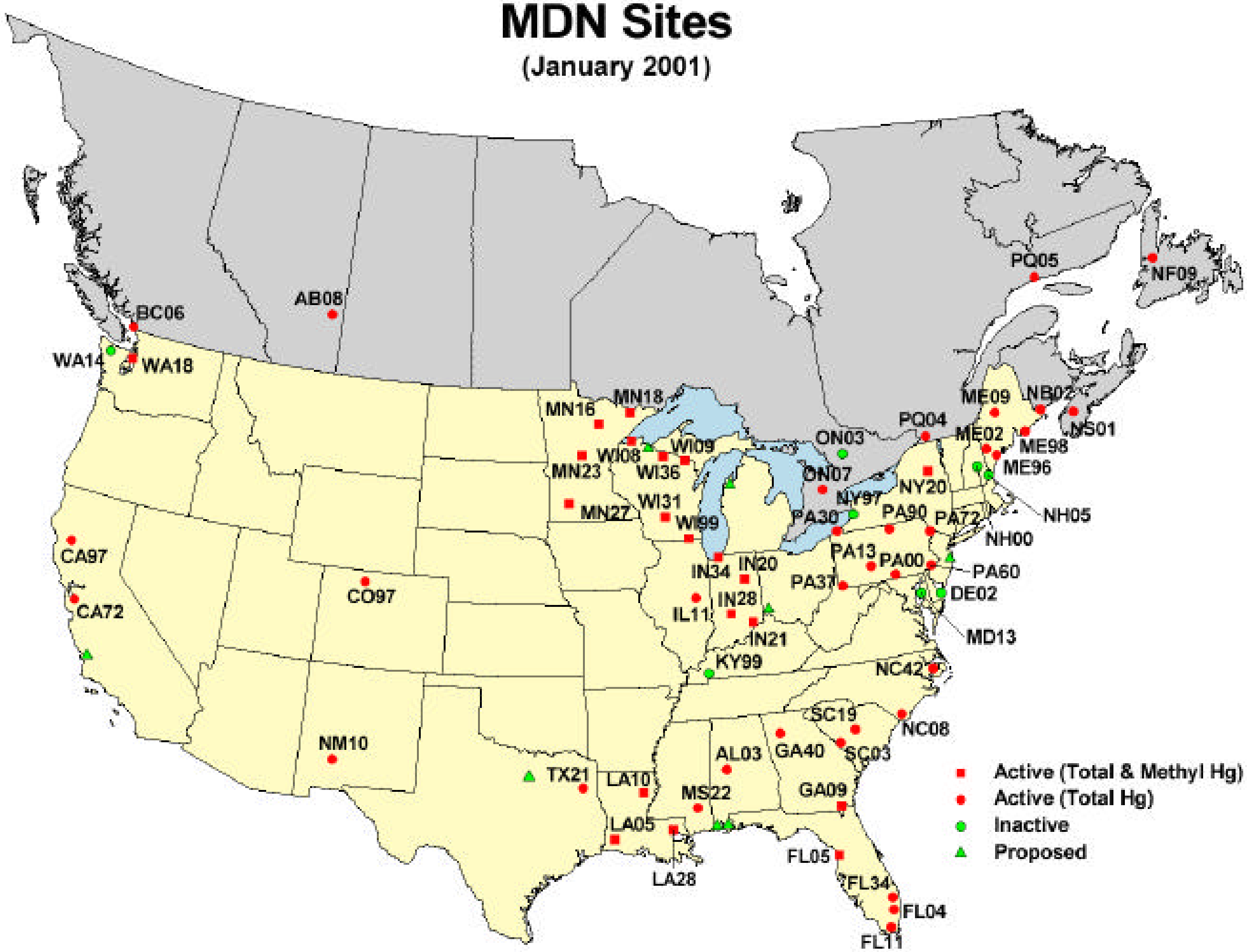


Table 1. The location of Mercury Deposition Network (MDN) sites in Pennsylvania as of January 2001.

Site	Latitude	Longitude	County	Elevation (meters)	Sampling Started
PA00	39° 55′ 23″	77° 18′ 28″	Adams	269	11/16/00
PA13	40° 27′ 00″	78° 33′ 00″	Cambria	739	01/07/97
PA30	42° 09′ 21″	80° 06′ 48″	Erie	580	06/20/99
PA37	39° 48′ 58″	80° 17′ 06″	Greene	1140	05/11/99
PA60	40° 07′ 00″	75° 53′ 00″	Montgomery	49	11/23/99
PA72	41° 19′ 00″	74° 50′ 00″	Pike	212	09/15/00
PA90	41° 48′ 00″	77° 11′ 00″	Tioga	476	03/01/97

near Holbrook, in Adams County (PA00) near Arendtsville, in Montgomery County (PA60) near Valley Forge, and in Pike County (PA72) near Milford. The latitude, longitude, elevation, and the date sampling was initiated at each of the Pennsylvania MDN sites are given in Table 1. Six of the Pennsylvania sites are supported by The Pennsylvania Department of Environmental Protection, Bureau of Air Quality Control in cooperation with the Pennsylvania Bureau of State Parks (PA30 and PA90), The National Park Service (PA13 and PA60), The U.S. Forest Service, Northeast Forest Experiment Station (PA72), and The Pennsylvania State University, Fruit Research and Extension Center (PA00). The seventh Pennsylvania site (PA37) is supported by The U.S. Department of Energy/Federal Energy Technology Center and is operated by Advanced Technology Systems, Inc.

Sampling Methods

In establishing the MDN, The National Atmospheric Deposition Program (NADP) has sought to ensure uniformity in commitment, in sampling protocols, and in analytical techniques and procedures. These are the ingredients essential to a successful network design and operation. To this end the NADP/MDN monitoring program has designated specific precipitation collection equipment to be used throughout the network which allows precipitation to be recorded, collected and verified. A strict weekly sampling protocol and a clear definition of sample types further makes comparisons between sites possible.

A modified Aerochem Metrics Model 301 Automatic Sensing Wet/Dry Precipitation Collector used in the NADP/MDN was designed to sample precipitation for mercury and (potentially) other trace metals, simultaneously. Modifications include the downsizing of the original orifice to a 128 mm diameter and the addition of a second wet-side orifice of the same diameter. The two wet-side orifices (a glass sampling train for mercury collection and a Teflon or Polyethylene/Teflon sampling train for the collection of other metals) allows for the simultaneous sampling for total mercury and other metals. *If not needed, the precipitation collected in the second orifice drains out the bottom of the collector*. The mercury sampling train is designed so that the sample will contact only glass surfaces to minimize contamination. Precipitation is caught in a glass funnel and stored in a two-liter glass bottle, previously charged with 20 mL of dilute hydrochloric acid (0.12 M) used as a preservative. This is sufficient acid to maintain a pH of less than 2 in the sample bottle to prevent microbial action. The two-liter bottle holds a maximum volume equivalent to 12.7 cm (five inches) of precipitation. The sampling train for total mercury consists of a 124 mm (inner diameter) borosilicate glass funnel, a thin (3 mm inner diameter) capillary tube, and a 2-liter borosilicate glass bottle. Even though connections between the funnel and the capillary tube and between the capillary tube and the sample bottle are not air tight, the sampling train effectively inhibits evaporation during the weekly sampling period. Additional modifications include: Teflon-coated lid supports and Teflon-wrapped lid sealing foam pads; flexible sleeves at the base of the lid arms; an insulated enclosure around the collector base; and a thermostatically controlled heater and fan to maintain a given temperature range within the enclosure and to melt snow collected in the funnels.

Sample Types

Between precipitation events the mercury wet deposition sampling train is covered by a motor-activated lid. When precipitation occurs, a sensor activates the motor which moves the lid from the wet deposition side to a dry side plastic bucket. In the discussion that follows, samples will be referred to as ***Wet-Side*** for the mercury deposition samples or ***Dry-Side*** for the dry-side bucket. Material collected in the dry-side bucket are not analyzed by MDN. Definitions of sample types are as follows:

> ***Wet-Deposition-Only Sample:*** A Wet-Side sample that has been exposed only to precipitation and that has been protected from dry-fall during rain free periods. Dry deposition exposures of less than 6 hours in any sampling period and less than 30 minutes at the end of any single event are considered insignificant. This is the type of sample normally collected in MDN.
>
> ***Bulk Sample***: A Wet-Side sample that has been exposed continuously to both wet and dry deposition for the entire sampling period. This can occur when the sampler motor fails and the lid is "stuck" in the open position for the whole sampling period.
>
> ***Undefined Sample***: Any Wet-Side or Dry-Side sample that does not meet one of the above definitions *(i.e.* part-week or unknown duration of exposure to dry deposition).

Field operators receive a pre-cleaned sampling train each week. Every Tuesday, the exposed sampling train is removed and returned to the Mercury Analytical Lab at Frontier Geosciences, Inc., Seattle, WA, along with the sample bottle containing any collected precipitation. All operators wear plastic gloves when handling the sampling train and follow special procedures to avoid contaminating the sample. Any overflow from the bottle is collected and measured but is not included with the sample sent to the lab. Each site is also equipped with a Belfort weighing-bucket rain gauge (Belfort Instruments, Baltimore, MD) that provides a weekly chart with rainfall amounts. Pennsylvania MDN sites are also equipped with standard non-recording funnel-type rain gauges. Rainfall increments as small as one mm can be measured. The recording rain gauge has an "event recorder" that marks the chart each time the lid on the Aerochem Metrics sampler opens and closes. This indicates whether the sampler was properly open during wet periods and closed during dry periods. The precipitation amount measured by the recording rain gauge is used to calculate wet deposition. If no rain gauge chart is available, the volume from the non-recording gage is used as a back-up. In the unlikely event that volume measurements from both rain gauges are not available, the "bottle catch" rainfall amount is used as a substitute.

Glassware Preparation

Precipitation samples are collected and stored in 1-liter borosilicate glass bottles with Teflon-lined, phenolic resin caps. Initial cleaning is by heating to 70 °C for 48 hours in 4 M HCL, followed by a thorough rinsing in low-Hg (< 1 ng/L) distilled deionized water (DDW). The caps are cleaned by soaking for 48 hours in 0.1 M HCL, at room temperature. Before use, bottles are filled with DDW containing 5 mL of BrCl in concentrated HCL, capped, and placed in a low-Hg (< 15 ng/m^2), Class-100 clean air station for 24 hours. Bottles are then emptied, thoroughly rinsed with DDW, and allowed to dry for several hours in the clean air station. Each bottle receives 20 ± 0.5 mL of 0.12 M HCL (Hg < 0.5 ng/L), and the lids are tightly fastened. While still at the clean air station, the bottles are enclosed in new polyethylene bags and packed into polyethylene foam-lined shipping containers.

The funnels and capillary tubes are cleaned by rinsing in HNO_3 followed by rinsing in DDW. The openings to the funnel and tube are wrapped in aluminum foil and the glassware placed in a muffle furnace at 500 °C for 4 hours. After cooling, the aluminum foil is sealed around the openings. The funnel and capillary tube are placed in separate new polyethylene bags and packed in the shipping container.

Laboratory Analysis

Every precipitation sample collected by the MDN is analyzed at a single laboratory, the Mercury Analytical Laboratory (HAL) operated by Frontier Geosciences, Inc., Seattle, WA, for total mercury and methylmercury if desired by a site sponsor. The analytical methods used are those given in U.S. EPA Method 1631 and are described in detail by Liang and Bloom (1993). Briefly, upon arrival at the laboratory, the bottles are unpacked in the clean air station, and low-Hg (< 0.05 ng/mL), 0.2 N BrCl in HCL reagent is added to each bottle to give a final concentration of 1%. This reagent oxidizes all of the Hg present in the sample to Hg(ll). The caps are replaced, and the bottles are shaken for at least four hours to remove adsorbed Hg from the bottle walls and to fully oxidize any suspended particles.

Weighed sample aliquots (50-100 mL) are poured into 125 mL Teflon bottles prior for analysis. Two-hundred mL of 20% hydroxylamine-hydrochloride is added to each aliquot to eliminate free halogens; the aliquot is then poured into a purge vessel. To reduce the Hg(ll) back to Hg°, 300 µL of 25% $SnCl_2$ are added, and the sample is purged with ultra-pure nitrogen onto a gold-coated, silica trap. The traps are then analyzed for Hg by thermal desorption, dual gold trap amalgamation, and cold vapor atomic fluorescence. Peaks are quantified by peak height. The method detection limit for a 100 mL sample is about 0.1 ng/L (3 standard deviations of the reagent blanks).

The Standard Sampling Period

The sampling period is the interval between sampling train installation and sampling train removal. Typically, samples accumulate for one week. The sampling train is removed from the collector and replaced at or about 9 AM (0900 local time) each Tuesday. If it is raining or snowing at collection time the sampling train is changed after the precipitation stops, but in no case later than midnight on Tuesday. The wet-side sampling train is replaced weekly and sent to the HAL, even if no precipitation was collected during the sampling period. This standard sampling protocol results in 52 (53 some years) samples submitted for analysis per year.

Quality Assurance Samples

Quality assurance samples include: ***travel blanks, field blanks, and system blanks***. The ***travel blanks*** are bottles, which are shipped with the regular sampling train and stored unopened in the enclosure during the sample period. They are returned to HAL unopened after the specified period. ***Field blanks*** are samples from dry weeks where all equipment has operated perfectly and there is no indication of precipitation. In other words, the sampler is operating properly on inspection, the enclosure temperature is in the proper range, and the rain gauge and event recorder worked properly and showed no indication of any precipitation events. Even a single trace event disqualifies a sample from being a ***field blank***.

About once a year, site operators receive a 500 mL bottle labeled ***system blank*** containing pre-analyzed deionized water. This bottle is stored in the enclosure until a dry week occurs. At the end of the next sampling period with no precipitation, the operator opens the lid by wetting the sensor. The operator then pours half of the deionized water from the 500 mL bottle into the funnel in circular motions, wetting the sides of the funnel. The rinse water goes into the sample bottle. The sampling train and sample bottle are then collected according to the procedures for weekly sampling. The 500 mL bottle with the unused portion of the rinse water is capped and returned to HAL in the sample cooler with the sample bottle and sampling train.

Data Completeness Criteria

NADP/MDN criteria for data completeness include the following: 1) at least 75% of the year (or other summary period) is represented by valid samples; 2) there must be information on precipitation amount for at least 90% of the year; 3) there must be valid samples representing at least 75% of the

precipitation amount for the year; and, 4) total precipitation measured from the sample volume (bottle catch) must be at least 75% of the amount measured by the rain gage for the year.
Data completeness criteria are used to assure uniformity in the comparison of data collected at all MDN sites.

Summary Periods

Mercury concentration and deposition results are summarized on seasonal and annual periods. Unless otherwise noted, the annual period used in this report runs from December through November. Seasonal periods are defined as Winter (December-February), Spring (March- May), Summer (June-August) and Fall (September-November). These seasons were selected because they closely match seasonal climatic patterns observed in Pennsylvania. Although seven mercury deposition monitoring sites were in operation in Pennsylvania as of January 2001, concentration and wet deposition estimates are included in this report for only PA13, PA37, PA60 and PA90. As indicated in Table 1, sampling at PA00, PA30, and PA72 was initiated after June, 2000.

RESULTS AND DISCUSSION

Seasonal and annual volume-weighted mean concentrations and wet depositions of total mercury in weekly precipitation samples collected at four MDN sites in Pennsylvania from late 1997 through May 2000 are shown on Table 2. Weekly concentration and deposition measurements at each of these sites are listed in Appendix I. For comparative purposes, volume-weighted mean annual and seasonal mercury concentrations and depositions for all MDN sites that met MDN data completeness criteria are included in Appendix II and III. The seasonal summaries in Appendix II are based on a calendar year (January- December), while the seasonal summaries in Appendix III are based on consecutive climatic quarters (December-November). A summary of the mean annual volume-weighted concentrations and total estimated wet depositions for 1999 are shown in Figure 4 and Figure 5, respectively for all MDN sites that met or exceeded the 75% data completeness criterion. The annual period used in these summaries is January through December. Weekly concentration and deposition measurements for all MDN sites are available on the web at http://nadp.sws.uiuc.edu.

Total Mercury Concentrations

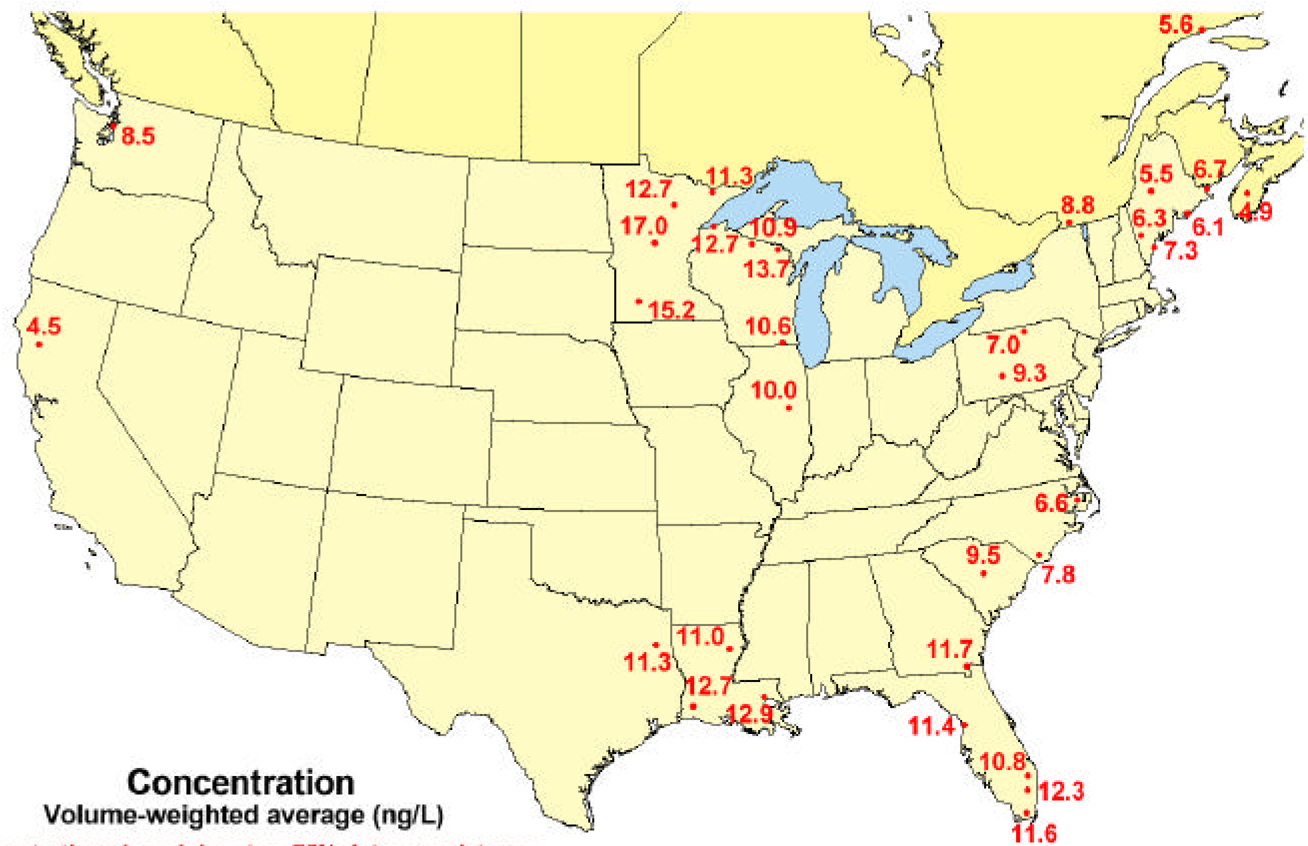
Weekly total mercury concentrations in precipitation in 1999 at the two Pennsylvania sites (PA13 and PA90) that were in operation for the entire year ranged from 1.7 ng/L to 44.0 ng/L at the Tioga County site (PA90) and from 2.2 ng/L to 55.4 ng/L at the Cambia County site (PA13). Total mercury concentrations at the Greene County site (PA37) ranged from 2.2 ng/L to 46.2 ng/L based on 29 weekly samples collected at the site in 1999. Only five samples were collected at the site in Montgomery County (PA60) in 1999 and are therefore not discussed in this report. The volume-

Table 2. Mean annual and seasonal volume-weighted mercury concentrations and wet depositions at four Mercury Deposition Network sites in Pennsylvania from 1997 through May 2000. Seasonal means were based on weekly samples collected from December-February (Winter), March-May (Spring), June-August (Summer), and September-November (Fall). Annual values are presented for both the traditional calendar year (January-December) and a climatic year (December-November).

		Volume-weighted Mean Concentration (ng/L)				Quarterly/Annual Deposition ($\mu g/m^2$)			
Site	Season	1997	1998	1999	2000	1997	1998	1999	2000
PA13	Winter	(10.52)	7.77	6.43	7.50	(0.93)	2.09	1.17	1.42
	Spring	12.59	8.34	9.42	8.76	3.84	3.00	2.65	2.58
	Summer	11.56	14.15	15.61	----	3.56	3.33	3.28	----
	Fall	3.84	13.80	6.98	----	1.52	2.00	1.75	----
	Annual[1]	(9.20)	10.33	9.59	----	(10.87)	10.42	8.85	----
	Annual[2]	(9.23)	10.12	9.26	----	(10.71)	9.92	9.10	----
PA37	Winter	----	----	----	5.62	----	----	----	1.49
	Spring	----	----	----	13.18	----	----	----	3.32
	Summer	----	----	14.16	----	----	----	1.99	----
	Fall	----	----	11.20	----	----	----	2.54	----
	Annual[1]	----	----	----	----	----	----	----	----
	Annual[2]	----	----	----	----	----	----	----	----
PA60	Winter	----	----	----	8.05	----	----	----	1.98
	Spring	----	----	----	11.59	----	----	----	3.73
	Summer	----	----	----	----	----	----	----	----
	Fall	----	----	----	----	----	----	----	----
	Annual[1]	----	----	----	----	----	----	----	----
	Annual[2]	----	----	----	----	----	----	----	
PA90	Winter	(11.50)	5.48	4.10	5.46	(0.67)	1.16	0.68	1.08
	Spring	10.07	7.67	7.61	7.00	1.61	2.33	1.44	1.93
	Summer	13.77	14.31	11.31	----	3.28	2.80	2.05	----
	Fall	5.81	9.55	5.42	----	1.47	1.34	1.09	----
		(10.19)	9.03	7.23	----	(7.26)	7.70	5.33	----
	Annual[2]	(9.66)	8.94	7.04	----	(7.19)	7.57	5.63	----

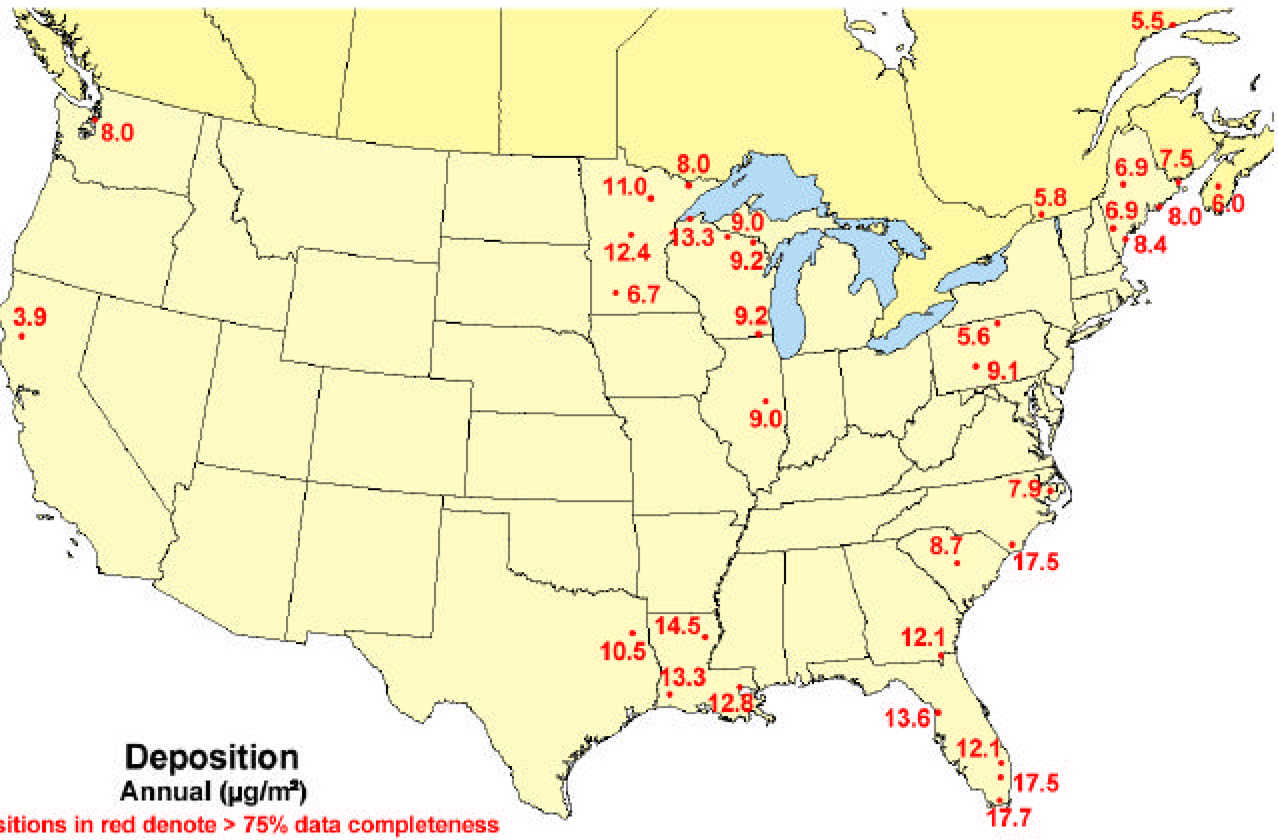
Values in parentheses represent incomplete quarterly/annual estimates.
[1]Annual Period (December-November).
[2]Annual Period (January-December).

MDN - 1999



Concentration
Volume-weighted average (ng/L)
Concentrations in red denote > 75% data completeness

MDN - 1999



8.0
3.9
11.0
8.0
12.4
13.3
9.0
9.2
6.7
9.2
9.0
5.6
9.1
5.8
6.9
7.5
6.9
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6.0
8.4
5.5
7.9
8.7
17.5
14.5
10.5
13.3
12.8
12.1
13.6
12.1
17.5
17.7
Deposition
Annual (µg/m²)
Depositions in red denote > 75% data completeness

weighted mean annual (January-December) concentrations at PA13 and PA90 in 1999 were 9.26 ng/L and 7.04 ng/L, respectively (Table 2). The mean annual concentration of total mercury in precipitation at the Cambria County site (PA13) in 1999 was almost identical to the mean at that site in 1997 and slightly lower than that recorded in 1998. At the Tioga County site (PA90), the mean annual volume-weighted concentration was substantially lower in 1999 than the previous two years. The concentration means at the two PA sites were are generally within the mid-range of values recorded across the United States and portions of Canada in 1999 (Figure 4). In general, mean annual volume-weighted concentrations in the United States were lowest in the Northeast and along the West Coast and highest in the Gulf states and around the Lake States. The highest mean annual concentration in 1999 (17.0 ng/L) was recorded at MN23; the lowest mean annual concentration was recorded at a northern California site (CA97). Mean annual volume-weighted concentrations for selected network sites from 1995 through 1999 are shown in Table 3. In general, the 1999 mean annual concentrations across the network were within the range of values reported since 1995. Overall, the 1999 network mean concentration was about 1.0 ng/L lower than reported in 1998 but slightly higher that the networks lowest mean observed in 1995. The addition of new network sites in 1999 account for much of the year to year variability.

Estimated Wet Mercury Deposition

Annual total mercury wet deposition estimates in the U.S. for calendar year 1999 are shown in Figure 5. Wet deposition across the 39 MDN sites ranged from 3.9 µg/m^2 to 17.7 µg/m^2. These values include zero deposition (no rainfall) weeks and estimated deposition for weeks with valid precipitation amounts but no mercury concentration measurements. In the latter cases, the seasonal, volume-weighted average concentration was used to estimate mercury deposition. The average annual deposition across the network was 10.7 µg/m^2 (Table 3). It is important to keep in mind that mercury deposition is the product of concentration and the amount of precipitation. Sites with high average mercury concentrations in precipitation are not necessarily the sites with the highest wet deposition of mercury and vice versa. For example, at NC08, the high deposition load (17.5 µg/m^2) relative to the annual concentration (7.8 µg/L) reflects extremely high rainfall during the third week of September that was associated with a tropical storm.

The annual (January-December) estimated wet deposition at PA13 and PA90 in 1999 was 9.10 µg/m^2 and 5.63 µg/m^2, respectively (Table 2). These values are lower than the amounts reported in 1997 and 1998, especially at PA90. Mercury deposition at this site in 1999 was generally lower than that reported at all other sites in the MDN (Figure 5 and Table 3). Wet deposition at the Tioga County site (PA90) was the second lowest level recorded in 1999 in the United States and southern Canada (Figure 5). This is indicative of low total mercury concentrations at the site and relatively low precipitation volumes. Historically, the lowest annual precipitation volumes recorded in Pennsylvania generally occur in Tioga County. Annual wet mercury depositions in 1999 at the two PA sites as well as the estimates reported in 1998 and 1997 are lower than modeled simulation estimates provided by EPA (Figure 1). Annual wet deposition estimates for selected network sites

Table 3. Volume-weighted average concentrations (ng/L) and wet deposition (µg/m²/yr) estimates of total mercury in precipitation at selected Mercury Deposition Network sites in the U.S. from 1995 through 1999[a].

Site ID	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	µg/L					µg/m²				
FL04	----	----	----	13.6	12.5	----	----	----	19.5	18.1
FL05	----	----	----	12.3	11.4	----	----	----	14.7	13.6
FL11	(7.9)	14.1	13.3	12.5	11.6	(32.0)	17.2	25.6	20.4	17.7
ME09	----	(4.0)	6.0	6.0	5.5	----	(5.5)	5.7	7.1	6.9
ME98	(3.6)	6.0	6.8	5.9	6.1	(5.2)	8.4	7.5	9.2	8.0
MN16	8.4	10.2	11.1	11.4	12.7	6.4	7.6	7.6	8.8	11.0
MN18	9.0	(14.2).	11.0	14.0	11.4	4.0	(11.1)	4.3	9.0	8.1
MN23	----	----	11.4	13.9	----	----	----	6.9	9.6	----
MN27	----	----	13.0	12.5	----	----	----	8.3	7.4	----
NC08	9.2	11.8	10.6	11.7	7.8	11.5	13.3	10.0	18.6	17.9
NC42	8.8	9.3	9.6	7.0	6.6	9.7	12.3	9.8	9.7	8.4
PA13	**----**	**----**	**9.2**	**10.1**	**9.3**	**----**	**----**	**10.7**	**9.9**	**9.1**
PA90	**----**	**----**	**9.7**	**8.9**	**7.0**	**----**	**----**	**7.2**	**7.6**	**5.6**
SC19	12.8	(11.4)	11.0	----	9.5	11.3	(10.2)	13.4	----	8.8
TX21	(8.1)	10.8	9.6	9.8	11.4	(4.0)	9.8	13.2	12.4	10.7
WA18	----	----	15.7	6.3	8.2	----	----	17.4	5.4	8.1
WI08	10.0	10.0	11.3	12.0	11.4	5.2	6.3	6.3	9.1	13.5
WI09	10.5	9.6	9.5	11.4	13.6	10.0	6.7	5.6	5.8	9.2
WI36	12.5	9.4	10.8	11.7	10.8	9.3	8.2	8.3	7.5	8.8
WI99	----	----	10.9	13.3	10.5	----	----	7.7	12.4	9.3
Mean	9.2	10.1	10.6	10.8	9.9	8.8	9.7	9.7	10.7	10.7

[a] Values in parentheses indicate that NADP completeness criteria were not met for this year. Other values are based on valid samples for at least 75% of the time and 75% of the precipitation amount for the year.

from 1995 through 1999 are shown in Table 3. In general, 1999 wet deposition estimates were within the range of values reported since 1995. Overall, wet deposition in 1999 was the same as that observed in 1998 and 1.0 µg/m² higher than reported in 1997 and 1996. The higher network means in 1998 and 1999 result from the addition of two Florida sites that received relatively high mercury deposition (Table 3) and not from a general increase in mercury deposition across the U.S.

Seasonal Patterns

In Pennsylvania, as well as at most MDN sites in North America and Canada, concentrations of total mercury in precipitation and mercury wet deposition estimates show a definite seasonal pattern as shown in Figures 6 and 7. Average summer (June-August) mercury concentrations for the entire

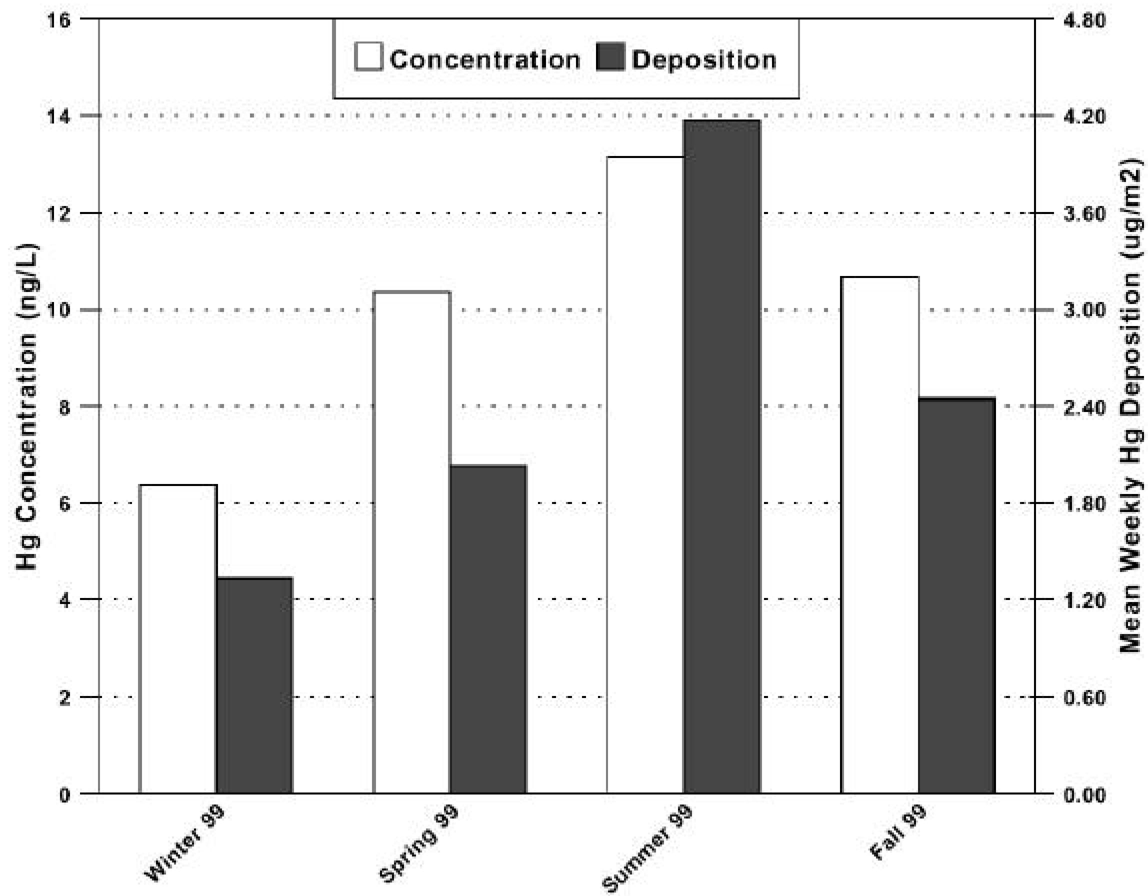

Figure 6. Average seasonal variation of total mercury concentrations and wet depositions at MDN sites in North America during 1999.

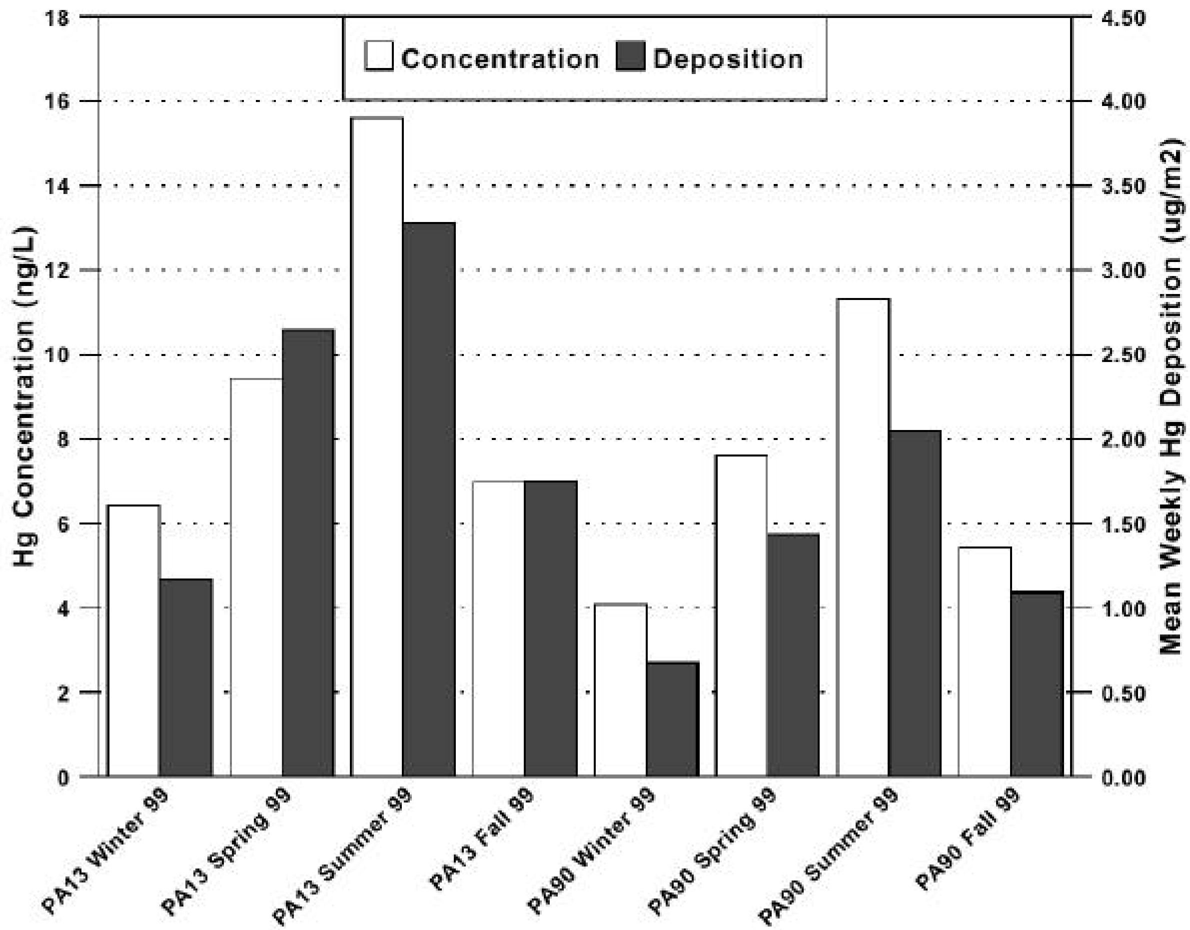

Figure 7. Seasonal variation of total mercury concentrations and wet depositions at the Cambria County (PA13) and the Tioga County (PA90) MDN sites in Pennsylvania during 1999.

network (Figure 6) are consistently higher than any other seasonal period and are more than double the concentrations observed during the winter (December-February) period. Mercury deposition is also much higher during the summer than any other season, with more than three times the amount of deposition occurring during the summer months than during the winter (Figure 6). Seasonal means for individual MDN sites are listed in Appendices II and III. Higher deposition of mercury in the summer months is a function of both higher concentrations of mercury in rainfall and higher summer rainfall volumes at most of the sites. Strong seasonal concentration patterns were also evident at the two Pennsylvania sites in 1999 (Figure 7). Seasonal concentration patterns at both the Tioga County (PA90) and Cambria County (PA13) sites are very similar, with Summer (June - August) concentrations and depositions two to three times as high as Fall and Winter concentrations. These seasonal patterns reflects to a great extent, seasonal differences in precipitation patterns and mercury concentrations. The differences in deposition between the two Pennsylvania are also caused by differences in precipitation volumes and to a lesser extent differences in mercury concentrations.

Summary

Annual wet deposition of total mercury at 39 MDN sites in the U.S. and eastern Canada in 1999 ranged from 3.9 µg/m^2 and 17.7 µg/m^2. The average annual deposition across all sites in the network was 10.7 µg/m^2. Wet mercury deposition in Pennsylvania in 1999 ranged from 9.10 µg/m^2 in Cambria County to 5.63 µg/m^2 in Tioga County. Wet mercury deposition in Tioga County in 1999 was the second lowest amount reported in the United States in 1999; the third lowest if the Canadian sites are included in the comparison. Volume-weighted mean annual concentrations of total mercury in precipitation in the U.S. in 1999 ranged from 4.5 ng/L to 17.0 ng/L. The volume-weighted average annual mercury concentration measured across the network in 1999 was 9.9 ng/L. The volume-weighted mean concentration of total mercury in Pennsylvania ranged from 7.0 ng/L in Tioga County to 9.3 ng/L in Cambria County. Mercury concentrations and wet deposition estimates in the U.S. in 1999 were similar to values reported since 1995. Although some differences are evident, most of these differences can be attributed to the addition of new MDN sites in 1999. Within most geographic regions (e.g., Northeast, Lake States), mercury concentrations and depositions were also similar. In general, mercury concentrations and wet depositions were lower in New England and Eastern Canada and higher in south Florida, around the Lake States and around the Gulf States. Mercury deposition in Pennsylvania falls in the middle of this range, except for observations in Tioga County which were lower in 1999 than most other sites. Mercury concentrations and wet deposition estimates in the U.S. are consistently highest in the summer months and lowest during the winter period. This seasonal pattern is also evident at the two Pennsylvania sites with complete annual records. Wet deposition of mercury depends on both the

mercury concentration in precipitation and the amount of precipitation. Both of these factors are higher during the summer months at many of the MDN sites, including the Pennsylvania sites, and have an impact on the amount of mercury deposited during the period. Mercury deposition monitoring will continue in Pennsylvania in 2000. The number of sites in the state will remain at seven.

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APPENDIX I

Weekly Total Mercury Concentrations and Depositions at Pennsylvania Mercury Deposition Network Sites

National Atmospheric Deposition Program/MDN
Weekly Mercury Concentrations and Depositions
Site Located in Cambria, County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA13	12/30/1997	01/06/1998	12.2	12.2	12.1	147.0	A	W	
PA13	01/06/1998	01/13/1998	32.5	32.5	9.6	311.1	A	W	
PA13	01/13/1998	01/20/1998	14.0	14.0	4.1	57.8	B	W	hm
PA13	01/20/1998	01/27/1998	25.7	25.7	2.9	75.5	A	W	
PA13	01/27/1998	02/03/1998	10.2	10.2	6.8	69.5	A	W	
PA13	02/03/1998	02/10/1998	21.6	21.6	6.3	136.8	A	W	
PA13	02/10/1998	02/17/1998	8.3	8.3	9.0	74.4	A	W	
PA13	02/17/1998	02/25/1998	60.7	60.7	3.3	203.3	A	W	
PA13	02/25/1998	03/03/1998	13.5	13.5	11.8	158.5	A	W	
PA13	03/03/1998	03/10/1998	21.6	21.6	6.9	150.0	A	W	
PA13	03/10/1998	03/17/1998	2.5	2.5	20.6	52.2	A	W	
PA13	03/17/1998	03/24/1998	38.1	38.1	8.4	319.5	B	W	d
PA13	03/24/1998	03/31/1998	0.0	0.0	--	0.0	A	D	
PA13	03/31/1998	04/07/1998	29.8	29.8	3.6	108.9	A	W	
PA13	04/07/1998	04/14/1998	36.6	36.6	7.0	254.9	B	W	d
PA13	04/14/1998	04/21/1998	54.6	54.6	9.1	495.7	B	W	d
PA13	04/21/1998	04/28/1998	50.8	50.8	14.2	723.3	B	W	d
PA13	04/28/1998	05/04/1998	24.6	24.6	5.6	137.0	B	W	d
PA13	05/04/1998	05/12/1998	77.7	77.7	5.0	389.8	B	W	d
PA13	05/12/1998	05/19/1998	5.8	5.8	31.0	181.1	B	W	d
PA13	05/19/1998	05/26/1998	4.1	4.1	7.8	31.6	A	W	
PA13	05/26/1998	06/02/1998	8.9	8.9	25.9	230.5	B	W	d
PA13	06/02/1998	06/09/1998	3.7	3.7	18.6	68.5	A	W	
PA13	06/09/1998	06/16/1998	61.5	61.5	11.6	713.8	B	W	d
PA13	06/16/1998	06/23/1998	18.8	18.8	16.7	314.8	B	W	d
PA13	06/23/1998	06/30/1998	12.7	12.7	19.2	244.0	A	W	
PA13	06/30/1998	07/07/1998	14.0	14.0	12.1	168.6	A	W	
PA13	07/07/1998	07/14/1998	33.2	33.2	10.1	335.9	B	W	d
PA13	07/14/1998	07/21/1998	15.2	15.2	18.8	286.8	A	W	
PA13	07/21/1998	07/28/1998	9.5	9.5	23.3	221.5	B	W	h
PA13	07/28/1998	08/04/1998	7.6	7.6	17.3	132.1	A	W	
PA13	08/04/1998	08/11/1998	13.8	13.8	14.9	205.6	B	W	d
PA13	08/11/1998	08/18/1998	33.0	33.0	9.6	317.0	A	W	
PA13	08/18/1998	08/25/1998	3.4	3.4	26.9	92.3	A	W	
PA13	08/25/1998	09/01/1998	14.5	14.5	20.4	295.2	A	W	
PA13	09/01/1998	09/08/1998	22.6	22.6	16.8	380.6	A	W	
PA13	09/08/1998	09/16/1998	4.8	4.8	12.0	57.8	A	W	

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Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA13	09/16/1998	09/22/1998	6.4	6.4	25.1	159.5	A	W	
PA13	09/22/1998	09/29/1998	7.2	7.2	28.2	204.4	A	W	
PA13	09/29/1998	10/06/1998	17.7	17.7	6.6	117.3	A	W	
PA13	10/06/1998	10/13/1998	48.3	48.3	9.2	443.6	A	W	
PA13	10/13/1998	10/20/1998	4.8	4.8	6.8	32.9	A	W	
PA13	10/20/1998	10/27/1998	0.5	--	9.2	4.6	B	T	i
PA13	10/27/1998	11/03/1998	1.3	1.3	50.6	64.2	A	W	
PA13	11/03/1998	11/10/1998	8.9	8.9	13.1	116.4	A	W	
PA13	11/10/1998	11/17/1998	6.4	6.4	8.4	53.6	A	W	
PA13	11/17/1998	11/24/1998	1.9	1.9	38.3	72.9	A	W	
PA13	11/24/1998	12/01/1998	3.8	3.8	12.3	46.7	A	W	
PA13	12/01/1998	12/08/1998	2.3	2.3	13.7	31.3	B	W	m
PA13	12/08/1998	12/15/1998	4.8	4.8	2.8	13.5	A	W	
PA13	12/15/1998	12/22/1998	22.2	22.2	11.4	254.3	A	W	
PA13	12/22/1998	12/29/1998	1.3	1.3	10.2	12.9	B	W	i
PA13	12/29/1998	01/06/1999	22.9	22.9	2.2	50.1	B	W	d
PA13	01/06/1999	01/12/1999	30.5	30.5	3.1	93.2	A	W	
PA13	01/12/1999	01/19/1999	34.0	34.0	5.7	193.9	B	W	d
PA13	01/19/1999	01/26/1999	34.3	34.3	7.4	253.5	B	W	dz
PA13	01/26/1999	02/02/1999	6.4	6.4	3.3	20.9	B	W	z
PA13	02/02/1999	02/09/1999	15.6	15.6	11.2	174.7	B	W	hm
PA13	02/09/1999	02/17/1999	3.8	3.8	--	--	C	W	vf
PA13	02/17/1999	02/23/1999	0.0	0.0	--	0.0	A	D	
PA13	02/23/1999	03/02/1999	16.3	16.3	5.1	82.7	B	W	d
PA13	03/02/1999	03/09/1999	49.5	49.5	7.2	355.2	B	W	dm
PA13	03/09/1999	03/16/1999	13.3	13.3	2.4	32.1	B	W	d
PA13	03/16/1999	03/23/1999	19.7	19.7	2.2	44.2	B	W	d
PA13	03/23/1999	03/30/1999	0.0	0.0	--	0.0	A	D	
PA13	03/30/1999	04/06/1999	34.3	34.3	10.5	358.5	B	W	d
PA13	04/06/1999	04/13/1999	49.5	49.5	15.4	762.8	B	W	d
PA13	04/13/1999	04/20/1999	21.8	21.8	7.4	161.8	B	W	d
PA13	04/20/1999	04/27/1999	24.6	24.6	11.8	289.9	B	W	d
PA13	04/27/1999	05/04/1999	0.0	0.0	--	0.0	B	T	d
PA13	05/04/1999	05/11/1999	6.4	6.4	10.9	69.5	B	W	d
PA13	05/11/1999	05/18/1999	14.0	14.0	22.2	310.4	B	W	d

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Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA13	05/18/1999	05/25/1999	31.3	--	5.7	179.7	B	W	dm
PA13	05/25/1999	06/01/1999	0.0	0.0	--	0.0	B	T	d
PA13	06/01/1999	06/08/1999	9.0	9.0	9.8	88.2	B	W	hd
PA13	06/08/1999	06/15/1999	2.0	2.0	18.3	37.2	A	W	
PA13	06/15/1999	06/22/1999	21.1	21.1	7.8	164.2	B	W	d
PA13	06/22/1999	06/29/1999	39.5	39.5	12.2	480.8	B	W	hd
PA13	06/29/1999	07/06/1999	4.4	4.4	25.9	115.1	B	W	d
PA13	07/06/1999	07/13/1999	25.5	25.5	21.9	558.2	B	W	d
PA13	07/13/1999	07/20/1999	0.5	0.5	55.4	28.1	B	T	i
PA13	07/20/1999	07/27/1999	21.8	21.8	19.6	427.1	B	W	d
PA13	07/27/1999	08/03/1999	18.7	18.7	23.1	431.3	B	W	d
PA13	08/03/1999	08/10/1999	4.1	4.1	17.8	72.2	B	W	d
PA13	08/10/1999	08/17/1999	57.0	57.0	13.1	747.9	B	W	d
PA13	08/17/1999	08/24/1999	6.4	6.4	19.8	127.1	B	W	d
PA13	08/24/1999	08/31/1999	35.6	35.6	7.8	276.5	B	W	d
PA13	08/31/1999	09/07/1999	39.3	39.3	4.9	191.3	B	W	d
PA13	09/07/1999	09/14/1999	3.7	3.7	19.7	72.5	B	W	d
PA13	09/14/1999	09/21/1999	33.8	33.8	9.0	302.5	B	W	d
PA13	09/21/1999	09/28/1999	2.5	2.5	34.6	87.9	B	W	d
PA13	09/28/1999	10/05/1999	38.4	38.4	4.4	168.7	A	W	
PA13	10/05/1999	10/12/1999	19.6	19.6	6.4	124.5	A	W	
PA13	10/12/1999	10/19/1999	11.0	11.0	14.7	161.0	B	W	d
PA13	10/19/1999	10/26/1999	6.4	6.4	12.4	78.7	B	W	d
PA13	10/26/1999	11/02/1999	0.9	0.9	27.3	24.3	B	W	ih
PA13	11/02/1999	11/09/1999	53.6	53.6	3.9	207.5	B	W	
PA13	11/09/1999	11/16/1999	0.0	0.0	--	0.0	B	T	
PA13	11/16/1999	11/23/1999	5.6	5.6	9.4	52.3	B	W	d
PA13	11/23/1999	11/30/1999	56.4	56.4	6.6	374.1	B	W	d
PA13	11/30/1999	12/07/1999	5.3	5.3	11.5	61.4	B	W	d
PA13	12/07/1999	12/14/1999	23.0	23.0	5.9	136.2	B	W	hd
PA13	12/14/1999	12/21/1999	7.7	--	2.9	22.2	B	W	dm
PA13	12/21/1999	12/28/1999	0.5	0.5	--	0.0	B	T	d
PA13	12/28/1999	01/04/2000	9.3	9.3	16.2	151.6	B	W	d
PA13	01/04/2000	01/11/2000	7.1	7.1	6.5	45.9	B	W	d
PA13	01/18/2000	01/25/2000	6.7	6.7	--	--	C	W	vd
PA13	01/11/2000	01/18/2000	3.6	3.6	8.5	30.4	B	W	d

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Site Located in Cambria, County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA13	01/25/2000	02/01/2000	6.9	6.9	--	--	C	W	vdh
PA13	02/01/2000	02/08/2000	5.8	5.8	25.4	148.4	B	W	di
PA13	02/08/2000	02/15/2000	36.1	36.1	5.4	194.9	B	W	d
PA13	02/15/2000	02/22/2000	21.0	21.0	7.1	149.8	B	W	d
PA13	02/22/2000	02/29/2000	19.3	19.3	10.1	195.7	B	W	d
PA13	02/29/2000	03/07/2000	7.0	7.0	8.3	58.3	B	W	d
PA13	03/07/2000	03/14/2000	15.2	15.2	12.5	191.1	B	W	d
PA13	03/14/2000	03/21/2000	38.9	38.9	4.7	182.7	B	W	d
PA13	03/21/2000	03/28/2000	4.1	4.1	12.1	49.1	B	W	d
PA13	03/28/2000	04/04/2000	26.0	26.0	8.4	217.8	B	W	d
PA13	04/04/2000	04/11/2000	15.1	15.1	7.8	117.2	B	W	d
PA13	04/11/2000	04/18/2000	45.0	45.0	7.0	314.5	B	W	dh
PA13	04/18/2000	04/25/2000	61.8	61.8	8.3	511.3	B	W	d
PA13	04/25/2000	05/02/2000	6.2	6.2	22.0	135.4	B	W	d
PA13	05/02/2000	05/09/2000	0.0	0.0	--	0.0	B	T	h
PA13	05/09/2000	05/16/2000	4.8	4.8	12.6	60.1	A	W	
PA13	05/16/2000	05/23/2000	51.3	51.3	10.7	548.0	A	W	
PA13	05/23/2000	05/30/2000	51.8	51.8	9.3	481.3	B	W	dh
PA13	05/30/2000	06/06/2000	26.3	26.3	9.9	261.5	A	W	
PA13	06/06/2000	06/13/2000	7.6	7.6	13.9	104.7	A	W	
PA13	06/13/2000	06/20/2000	22.1	22.1	10.5	231.5	B	W	d
PA13	06/20/2000	06/27/2000	0.0	0.0	--	0.0	B	D	

National Atmospheric Deposition Program/MDN

Weekly _Mercury Concentrations and Depositions
Site Located in Greene County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA37	05/27/1999	06/01/1999	0.0	--	46.2	15.7	B	T	isdm
PA37	06/01/1999	06/08/1999	16.3	--	7.6	123.2	B	W	dm
PA37	06/08/1999	06/15/1999	6.3	--	11.8	74.8	B	W	dm
PA37	06/15/1999	06/22/1999	0.0	0.0	--	0.0	B	D	d
PA37	06/22/1999	06/29/1999	8.9	8.9	8.7	76.9	B	W	d
PA37	06/29/1999	07/06/1999	34.3	34.3	7.1	244.6	B	W	d
PA37	07/06/1999	07/13/1999	14.9	14.9	22.5	336.4	B	W	d
PA37	07/13/1999	07/20/1999	6.5	6.5	29.3	190.0	A	W	__
PA37	07/20/1999	07/27/1999	5.8	5.8	14.2	82.1	A	W	__
PA37	07/27/1999	08/03/1999	25.9	25.9	22.1	573.3	B	W	d
PA37	08/03/1999	08/10/1999	9.9	9.9	13.8	136.9	B	W	d
PA37	08/10/1999	08/17/1999	11.6	11.6	11.9	138.0	B	W	d
PA37	08/17/1999	08/24/1999	0.0	0.0	--	0.0	A	T	__
PA37	08/24/1999	08/31/1999	40.0	40.0	20.8	830.5	B	W	d
PA37	08/31/1999	09/07/1999	20.2	20.2	7.9	160.3	B	W	d
PA37	09/07/1999	09/14/1999	8.3	8.3	23.9	197.2	B	W	d
PA37	09/14/1999	09/21/1999	21.3	21.3	5.2	111.5	B	W	d
PA37	09/21/1999	09/28/1999	4.2	4.2	16.6	69.5	A	W	__
PA37	09/28/1999	10/05/1999	57.9	57.9	9.0	523.3	B	W	h
PA37	10/05/1999	10/12/1999	25.4	25.4	5.9	150.1	B	W	h
PA37	10/12/1999	10/19/1999	11.4	11.4	13.6	155.0	B	W	d
PA37	10/19/1999	10/26/1999	2.3	2.3	10.1	23.2	B	W	d
PA37	10/26/1999	11/03/1999	33.1	33.1	9.5	314.2	B	W	d
PA37	11/03/1999	11/09/1999	0.0	--	--	0.0	B	D	m
PA37	11/09/1999	11/16/1999	0.3	--	39.3	10.2	B	T	id
PA37	11/16/1999	11/23/1999	3.7	3.7	2.3	8.4	B	W	d
PA37	11/23/1999	11/30/1999	59.3	59.3	4.2	249.9	B	W	d
PA37	11/30/1999	12/07/1999	6.3	6.3	9.4	59.1	B	W	d
PA37	12/07/1999	12/14/1999	52.8	52.8	6.0	316.1	A	W	__
PA37	12/14/1999	12/21/1999	6.5	6.5	2.2	14.1	B	W	d
PA37	12/21/1999	12/28/1999	0.0	0.0	--	0.0	B	T	h
PA37	12/28/1999	01/04/2000	8.3	8.3	18.5	152.3	B	W	dh
PA37	01/04/2000	01/11/2000	6.4	6.4	12.5	79.3	B	W	dh
PA37	01/11/2000	01/18/2000	0.4	--	36.9	13.7	B	T	hi
PA37	01/18/2000	01/25/2000	4.9	--	3.2	16.0	B	W	dm
PA37	01/25/2000	02/01/2000	4.4	4.4	4.9	21.4	B	W	d
PA37	02/01/2000	02/08/2000	1.9	1.9	7.4	14.0	B	W	dhi

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Weekly Mercury Concentrations and Depositions
Site Located in Greene County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA37	02/08/2000	02/15/2000	62.5	62.5	6.1	381.6	B	W	d
PA37	02/15/2000	02/22/2000	51.3	51.3	3.3	171.3	B	W	dh
PA37	02/22/2000	02/29/2000	5.1	5.1	9.6	49.0	B	W	d
PA37	02/29/2000	03/07/2000	1.7	1.7	29.3	48.4	A	W	__
PA37	03/07/2000	03/14/2000	17.7	17.7	8.8	155.2	B	W	d
PA37	03/14/2000	03/21/2000	45.5	45.5	7.4	336.4	B	W	d
PA37	03/21/2000	03/28/2000	4.5	4.5	11.8	53.4	A	W	__
PA37	03/28/2000	04/04/2000	39.8	39.8	6.3	251.6	B	W	d
PA37	04/04/2000	04/11/2000	13.5	13.5	9.1	122.5	B	W	dm
PA37	04/11/2000	04/18/2000	34.2	34.2	9.7	330.6	B	W	dm
PA37	04/18/2000	04/25/2000	11.4	11.4	62.6	715.3	B	W	h
PA37	04/25/2000	05/02/2000	18.5	18.5	15.1	279.4	B	W	d
PA37	05/02/2000	05/09/2000	2.0	2.0	20.0	40.6	B	W	dh
PA37	05/09/2000	05/16/2000	11.3	11.3	27.6	311.6	A	W	__
PA37	05/16/2000	05/24/2000	46.9	46.9	13.3	625.1	B	W	dh
PA37	05/24/2000	05/30/2000	15.0	15.0	15.7	236.0	B	W	d
PA37	05/30/2000	06/06/2000	8.1	8.1	18.3	148.4	B	W	h
PA37	06/06/2000	06/13/2000	6.4	6.4	22.7	143.8	A	W	__
PA37	06/13/2000	06/19/2000	42.4	42.4	16.3	689.6	B	W	d
PA37	06/20/2000	06/27/2000	13.6	13.6	13.1	177.5	B	W	d

National Atmospheric Deposition Program/MDN
Weekly Mercury Concentrations and Depositions
Site Located in Montgomery County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA60	11/23/1999	11/30/1999	38.6	38.6	8.2	315.7	B	W	d
PA60	11/30/1999	12/07/1999	17.0	17.0	6.2	105.6	B	W	hd
PA60	12/07/1999	12/13/1999	9.9	9.9	3.8	37.8	B	W	hd
PA60	12/13/1999	12/21/1999	42.6	--	9.3	397.7	B	W	dm
PA60	12/21/1999	12/28/1999	0.0	0.0	--	0.0	B	D	d
PA60	12/28/1999	01/04/2000	0.0	0.0	--	0.0	B	T	d
PA60	01/04/2000	01/11/2000	32.4	32.4	3.8	123.9	A	W	__
PA60	01/11/2000	01/18/2000	5.3	5.3	20.6	108.8	B	W	d
PA60	01/19/2000	01/26/2000	27.0	27.0	9.4	254.6	B	W	d
PA60	01/26/2000	02/01/2000	24.4	24.4	12.9	315.7	B	W	dh
PA60	02/01/2000	02/08/2000	3.5	--	8.7	30.6	B	W	dm
PA60	02/08/2000	02/15/2000	14.2	14.2	7.7	109.8	B	W	d
PA60	02/15/2000	02/22/2000	31.0	31.0	5.8	179.3	B	W	d
PA60	02/22/2000	02/29/2000	8.8	8.8	8.7	76.1	B	W	d
PA60	02/29/2000	03/07/2000	0.0	0.0	--	0.0	A	T	__
PA60	03/07/2000	03/14/2000	23.8	23.8	14.9	355.1	B	W	d
PA60	03/14/2000	03/21/2000	31.8	31.8	5.9	188.6	B	W	dh
PA60	03/21/2000	03/28/2000	105.2	105.2	5.3	555.6	B	W	d
PA60	03/28/2000	04/04/2000	12.6	12.6	10.7	134.7	B	W	d
PA60	04/04/2000	04/11/2000	16.4	16.4	16.5	271.3	B	W	d
PA60	04/11/2000	04/18/2000	34.5	34.5	17.0	587.1	B	W	dh
PA60	04/18/2000	04/25/2000	14.2	14.2	18.2	257.6	B	W	d
PA60	04/25/2000	05/02/2000	3.4	--	34.6	117.0	B	W	dm
PA60	05/02/2000	05/09/2000	0.0	0.0	--	0.0	B	T	d
PA60	05/09/2000	05/16/2000	27.2	27.2	18.5	503.9	B	W	d
PA60	05/16/2000	05/23/2000	44.3	44.3	15.5	686.7	B	W	d
PA60	05/23/2000	05/30/2000	23.9	23.9	14.7	351.4	A	W	__
PA60	05/30/2000	06/06/2000	12.1	12.1	3.7	44.7	B	W	d
PA60	06/06/2000	06/14/2000	43.3	43.3	11.5	497.1	A	W	__
PA60	06/14/2000	06/20/2000	29.5	29.5	9.2	271.0	B	W	d
PA60	06/20/2000	06/27/2000	35.1	35.1	10.3	362.2	B	W	d

National Atmospheric Deposition Program/MDN

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Site Located in Tioga, County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA90	12/29/1997	01/06/1998	33.8	33.8	3.6	121.9	B	W	h
PA90	01/06/1998	01/13/1998	35.8	35.8	7.0	251.2	A		W
PA90	01/13/1998	01/20/1998	15.6	15.6	1.7	27.3	A		W
PA90	01/20/1998	01/27/1998	13.5	13.5	4.7	63.9	A		W
PA90	01/27/1998	02/03/1998	1.5	1.5	11.1	17.0	B	W	hi
PA90	02/03/1998	02/10/1998	3.3	3.3	11.8	39.1	B	W	h
PA90	02/10/1998	02/17/1998	10.2	10.2	5.0	50.7	A	W	
PA90	02/17/1998	02/24/1998	51.1	51.1	4.9	249.9	A	W	
PA90	02/24/1998	03/03/1998	19.1	19.1	3.1	58.3	A	W	
PA90	03/03/1998	03/10/1998	22.6	22.6	3.4	77.2	A	W	
PA90	03/10/1998	03/17/1998	3.3	3.3	9.6	31.8	A	W	
PA90	03/17/1998	03/24/1998	34.3	34.3	6.4	218.2	B	W	h
PA90	03/24/1998	03/31/1998	1.0	1.0	25.1	25.5	B	W	i
PA90	03/31/1998	04/07/1998	12.2	12.2	6.0	73.3	B	W	d
PA90	04/07/1998	04/14/1998	42.2	42.2	4.4	185.1	B	W	d
PA90	04/14/1998	04/21/1998	46.5	46.5	--	– C	W	fv	
PA90	04/21/1998	04/28/1998	18.5	18.5	4.8	89.1	A	W	
PA90	04/28/1998	05/05/1998	14.7	14.7	10.3	151.7	B	W	d
PA90	05/05/1998	05/12/1998	67.1	67.1	5.5	370.9	B	W	d
PA90	05/12/1998	05/19/1998	18.3	18.3	35.3	645.0	B	W	d
PA90	05/19/1998	05/26/1998	4.6	4.6	11.2	51.1	A	W	
PA90	05/26/1998	06/01/1998	16.0	16.0	25.7	411.2	B	W	d
PA90	06/02/1998	06/09/1998	12.2	12.2	17.5	213.9	B	W	d
PA90	06/09/1998	06/16/1998	36.8	36.8	9.0	333.0	A	W	
PA90	06/16/1998	06/23/1998	3.8	3.8	14.0	53.5	B	W	h
PA90	06/23/1998	06/30/1998	42.7	42.7	15.3	654.6	B	W	dh
PA90	06/30/1998	07/07/1998	16.5	16.5	13.3	220.2	B	W	dh
PA90	07/07/1998	07/14/1998	14.0	14.0	21.9	306.4	B	W	h
PA90	07/14/1998	07/21/1998	11.7	11.7	11.1	129.8	A	W	
PA90	07/21/1998	07/28/1998	26.7	26.7	4.7	126.1	B	W	h
PA90	07/28/1998	08/04/1998	1.0	1.0	18.8	19.1	A	W	
PA90	08/04/1998	08/11/1998	7.6	7.6	19.7	149.8	B	W	d
PA90	08/11/1998	08/18/1998	2.3	2.3	23.7	54.1	B	W	d
PA90	08/18/1998	08/25/1998	4.4	4.4	28.9	128.6	A	W	
PA90	08/25/1998	09/01/1998	8.9	8.9	31.4	279.1	B	W	d
PA90	09/01/1998	09/08/1998	17.5	17.5	9.4	164.6	B	W	d
PA90	09/08/1998	09/15/1998	3.9	3.9	4.4	17.2	A	W	

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Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA90	09/15/1998	09/22/1998	3.3	3.3	15.6	51.4	B	W	h
PA90	09/22/1998	09/29/1998	9.9	9.9	16.0	158.1	A	W	
PA90	09/29/1998	10/06/1998	4.1	4.1	8.3	34.2	B	W	m
PA90	10/06/1998	10/13/1998	67.1	67.1	6.4	428.0	B	W	d
PA90	10/13/1998	10/20/1998	1.8	1.8	40.4	71.8	B	W	dhz
PA90	10/20/1998	10/27/1998	3.8	3.8	5.1	19.4	A	W	
PA90	10/27/1998	11/03/1998	2.4	2.4	0.8	1.9	A	W	
PA90	11/03/1998	11/10/1998	1.4	1.4	13.3	18.9	A	W	
PA90	11/10/1998	11/17/1998	10.0	10.0	7.0	70.5	A	W	
PA90	11/17/1998	11/24/1998	5.7	5.7	3.7	21.1	B	W	h
PA90	11/25/1998	12/02/1998	5.5	5.5	5.2	28.5	B	W	d
PA90	12/02/1998	12/08/1998	1.8	1.8	13.2	23.6	B	W	mi
PA90	12/10/1998	12/17/1998	2.0	2.0	3.9	8.0	A	W	
PA90	12/17/1998	12/22/1998	22.0	22.0	4.2	91.7	B	W	s
PA90	12/22/1998	12/29/1998	0.0	0.0	--	0.0	A	D	
PA90	12/29/1998	01/05/1999	22.4	22.4	1.8	40.6	B	W	h
PA90	01/05/1999	01/12/1999	13.0	13.0	--	--	C	W	vfz
PA90	01/12/1999	01/19/1999	54.1	54.1	3.7	201.7	A	W	
PA90	01/19/1999	01/26/1999	24.4	24.4	5.3	129.4	B	W	m
PA90	01/26/1999	02/02/1999	5.5	5.5	4.6	25.1	A	W	
PA90	02/02/1999	02/09/1999	8.9	8.9	--	-- C	W	vfz	
PA90	02/09/1999	02/16/1999	3.7	3.7	8.4	30.8	A	W	
PA90	02/16/1999	02/23/1999	1.8	1.8	--	-- C	W	ch	
PA90	02/23/1999	03/02/1999	5.3	5.3	6.7	35.7	B	W	hd
PA90	03/02/1999	03/09/1999	67.3	67.3	4.7	317.6	B	W	hd
PA90	03/09/1999	03/16/1999	1.8	1.8	--	-- C	W	vfh	
PA90	03/16/1999	03/23/1999	15.2	15.2	2.4	36.1	B	W	hd
PA90	03/23/1999	03/30/1999	0.0	0.0	--	0.0	B	D	d
PA90	03/30/1999	04/06/1999	14.0	14.0	6.0	83.6	B	W	d
PA90	04/06/1999	04/13/1999	28.4	28.4	9.3	263.9	B	W	d
PA90	04/13/1999	04/20/1999	12.3	12.3	7.6	93.6	B	W	d
PA90	04/20/1999	04/27/1999	18.9	18.9	9.0	170.6	B	W	hd
PA90	04/27/1999	05/04/1999	0.0	0.0	--	0.0	B	D	d
PA90	05/04/1999	05/11/1999	10.4	10.4	10.8	112.7	B	W	d
PA90	05/11/1999	05/18/1999	0.0	0.0	--	0.0	A	D	
PA90	05/18/1999	05/25/1999	15.0	15.0	20.6	310.4	B	W	d
PA90	05/25/1999	06/01/1999	0.0	0.0	--	0.0	B	T	hd

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Site Located in Tioga, County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA90	06/01/1999	06/08/1999	5.1	5.1	7.7	39.2	B	W	d
PA90	06/08/1999	06/15/1999	2.4	2.4	8.8	21.5	B	W	hd
PA90	06/15/1999	06/21/1999	11.8	11.8	10.7	126.1	B	W	d
PA90	06/21/1999	06/29/1999	62.5	62.5	7.3	452.8	B	W	d
PA90	06/29/1999	07/06/1999	18.1	18.1	6.1	110.3	B	W	hd
PA90	07/06/1999	07/13/1999	15.9	15.9	27.7	440.1	B	W	hd
PA90	07/13/1999	07/20/1999	3.5	3.5	6.0	20.8	A	W	
PA90	07/20/1999	07/27/1999	13.1	13.1	7.0	91.9	B	W	d
PA90	07/27/1999	08/03/1999	9.1	9.1	30.4	278.1	B	W	d
PA90	08/03/1999	08/10/1999	1.3	1.3	44.0	55.9	B	W	id
PA90	08/10/1999	08/17/1999	23.9	23.9	10.1	241.4	B	W	d
PA90	08/17/1999	08/24/1999	14.2	14.2	11.9	167.8	B	W	hd
PA90	08/24/1999	08/31/1999	17.1	17.1	4.3	73.5	B	W	d
PA90	08/31/1999	09/07/1999	54.0	54.0	3.8	207.5	B	W	d
PA90	09/07/1999	09/14/1999	2.8	2.8	20.0	56.0	B	W	hd
PA90	09/14/1999	09/21/1999	57.6	57.6	5.2	298.3	B	W	d
PA90	09/21/1999	09/28/1999	0.0	0.0	--	0.0	B	T	d
PA90	09/28/1999	10/05/1999	40.2	40.2	4.2	169.6	A	W	
PA90	10/05/1999	10/12/1999	4.1	4.1	8.9	36.6	A	W	
PA90	10/12/1999	10/19/1999	9.5	9.5	8.5	80.5	B	W	hd
PA90	10/19/1999	10/26/1999	4.2	4.2	14.5	60.8	B	W	hd
PA90	10/26/1999	11/02/1999	0.0	0.0	--	0.0	A	T	
PA90	11/02/1999	11/09/1999	9.5	9.5	5.6	53.8	B	W	hd
PA90	11/09/1999	11/16/1999	1.3	1.3	35.5	45.1	B	W	i
PA90	11/16/1999	11/23/1999	1.3	1.3	8.9	11.3	B	W	d
PA90	11/23/1999	11/30/1999	57.2	57.2	5.0	283.7	B	W	hd
PA90	11/30/1999	12/07/1999	3.5	3.5	5.1	17.8	B	W	hd
PA90	12/07/1999	12/15/1999	30.2	30.2	5.1	155.2	B	W	hd
PA90	12/15/1999	12/21/1999	4.2	4.2	1.7	7.2	B	W	d
PA90	12/21/1999	12/28/1999	0.0	0.0	--	0.0	B	T	d
PA90	12/28/1999	01/04/2000	11.7	11.7	12.3	144.2	B	W	d
PA90	01/04/2000	01/11/2000	10.7	10.7	3.1	32.6	B	W	d
PA90	01/11/2000	01/18/2000	10.3	10.3	--	-- C	W	vd	
PA90	01/18/2000	01/25/2000	6.1	6.1	--	-- C	W	fvp	
PA90	01/25/2000	02/01/2000	11.4	11.4	--	-- C	W	vh	
PA90	02/01/2000	02/08/2000	1.8	1.8	--	-- C	W	v	

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Site Located in Tioga, County, PA

Site	Date On	Date off	Subppt mm	Pptrec mm	HgConc ng/L	HgDep ng/m^2	QR	Sample Type	Notes
PA90	02/08/2000	02/15/2000	24.1	24.1	--	-- C	W	fv	
PA90	02/15/2000	02/22/2000	26.2	26.2	--	-- C	W	fv	
PA90	02/22/2000	02/29/2000	14.2	14.2	1.8	25.9	B	W	dm
PA90	02/29/2000	03/07/2000	2.9	2.9	6.7	19.0	B	W	d
PA90	03/07/2000	03/14/2000	18.2	18.2	19.6	355.1	B	W	dh
PA90	03/14/2000	03/21/2000	20.2	20.2	3.6	73.4	B	W	dh
PA90	03/21/2000	03/28/2000	21.6	21.6	11.1	240.2	B	W	h
PA90	03/28/2000	04/04/2000	44.5	44.5	3.0	133.8	A	W	
PA90	04/04/2000	04/11/2000	27.2	27.2	9.9	268.2	B	W	dh
PA90	04/11/2000	04/18/2000	17.1	17.1	5.2	89.4	B	W	d
PA90	04/18/2000	04/25/2000	36.1	36.1	4.2	150.0	B	W	d
PA90	04/25/2000	05/02/2000	6.0	6.0	16.7	99.8	B	W	h
PA90	05/02/2000	05/09/2000	2.0	2.0	--	-- C	W	fv	
PA90	05/09/2000	05/16/2000	7.4	7.4	4.2	31.3	B	W	dh
PA90	05/16/2000	05/23/2000	58.9	58.9	7.4	433.2	B	W	h
PA90	05/23/2000	05/30/2000	26.7	26.7	4.4	118.0	A	W	
PA90	05/30/2000	06/06/2000	21.3	21.3	--	-- C	W	fv	
PA90	06/06/2000	06/13/2000	19.1	19.1	--	-- C	W	f	
PA90	06/13/2000	06/20/2000	47.9	47.9	9.4	451.0	B	W	d
PA90	06/20/2000	06/27/2000	19.7	19.7	17.9	353.2	B	W	dh

EXPLANATION OF MDN DATA FIELDS

SITE CODE: Two-letter state or province designator plus SAROAD county code for U.S. sites or sequential numbers for Canada.

START DATE: Month/Day/Year (mm/dd/yy)

END DATE: Month/Day/Year (mm/dd/yy)

SUBPPT: Rain gauge precipitation amount in millimeters (mm) if available, otherwise precipitation amount in mm is calculated from the net precipitation volume caught in the sample bottle.

PPT: Precipitation amount in mm from the rain gauge, if blank, no rain gauge data available.

HG CONC: Total mercury concentration reported by the lab in nanograms/Liter (ng/L).

DEPOSITION: Product of SUBPPT and HG CONC. Units are ng/m^2.

QUALITY RATING (QR) CODE:

A = fully qualified with no problems
B = valid data with minor problems, used for summary statistics
C = invalid data not used for summary statistics
Bland = no sample submitted for the time period

SAMPLE TYPE:

W = Wet sample, measurable precipitation (> or = 0.03 inch) on the rain gauge (RG) or net bottle catch (BC) = or > 10.0 mL if RG data are missing. Concentration and deposition data are reported unless the QR code is C.

D = Dry sample, no indication of sampler openings on the RG or net BC < 1.5 mL if RG event recorder data are missing. No concentration data are reported. Ppt, subppt and deposition are set at zero.

T = Trace sample. RG showes openings or a trace of precipitation amount (<0.03inch). If the RG data are missing, a net BC between 1.5 mL and 10.0 mL (inclusive) will be coded as a trace (T) sample type. Concentration data may or may not be reported depending on whether the BC is 1.5 mL or higher. If the BC = 1.5 mL or higher, then ppt is left blank, subppt = BC, and deposition is based on the BC volume. If BC < 1.5 mL, then ppt, subppt, and deposition are all set to zero.

Q = Sampler was used for a Quality Assurance (QA) sample, no ambient sample submitted. No concentration values are reported (QA values will be published in the QA Report). Deposition is only reported where the value is zero (D or T samples with no measurable precipitation).

NOTES:		QR CODE	Valid for Symmary (Yes/NO)
s =	short sample time (< 6 days)	B	Y
e =	extended sample time (> 6 days)	B	Y
d =	debris present (previously marked with an x)	B	Y
m =	missing information (previously p or r for missing precipitation or missing event recorder data	B	Y
z =	site operations problems	B	Y
h =	sample handling problems (z and h include equipment and handling problems that don't seriously compromise the sample	B	Y
b =	sample handling problems (Codes z and h include equipment and handling problems that don't seriously compromise the sample)	B	Y
i =	low volume sample (1.49 mL < net BC < 10.0 mL) (Mercury concentration data are reported for i coded samples but they are less certain than those for samples with net BC of at least 10 mL)	B	Y
b =	bulk sample (wet side exposed entire sampling interval)	C	N
v =	RG indicates precipitation occurred but BC < 1 mL, or < 10% of indicated RG amount	C	N
u =	undefined sample (wet side bucket exposed during rain free periods	C	N
f =	serious problems with field operations that seriously compromise the sample integrity	C	N
l =	lab error	C	N
c =	sample compromised due to contamination	C	N
p =	no precipitation data from either RG and BC	C	N
n =	no sample submitted	–	N

Calculation of Deposition:

1. If a valid precipitation amount can be read from the rain gauge chart (RG ≥ 0.03 inch), the sample type is set to "W" (wet); and the value from the RG chart is used to calculate deposition (RG amount in mm times Hg concentration in ng/L). If the RG chart event recorder shows no sampler opening, sample type is set to "D" (dry) and precipitation amount and deposition are set to zero.

2. If the precipitation amount from the RG chart is not available, the net bottle catch (BC) will be used to calculate deposition as long as BC > 1.49 mL. If the BC is between 1.5 and 10.0 mL, the sample type will be set to "T" (trace) and the BC used to calculate deposition. These samples are also coded with an "i" in the Notes field and downgraded to a "B" Quality Rating to indicate

uncertainty due to low volume. If BC > 10 mL, the sample type will be set to "W" (wet) and the BC will be used to calculate deposition.

3. If the rain gauge indicates sampler openings, but the precipitation amount cannot be determined accurately from the RG chart (RG < 0.03 inch), the sample type will be coded "T" (trace) and the BC will be used to calculate deposition as long as the BC ≥ 1.5 mL. If the BC < 10 mL, samples will be coded for low volume as in 2. If the BC < 1.5 mL, no concentration will be reported and the ppt and subppt and deposition will be set to zero.

4. In cases where there is a valid precipitation amount from wither the RG or BC but invalid or missing concentration data, seasonal or annual summary deposition values will be calculated using the site-specific, seasonal, volume-weighted mean concentration. This deposition value will not be displayed for individual weeks in the WEB database, but will be used only for the calculation of seasonal and annual average concentrations and deposition estimates on maps and summary products.

APPENDIX II

Quarterly and Annual Total Mercury Concentrations and Wet Depositions
Mercury Deposition Network Sites 1997 through May 2000
(December - November Annual Period)

Appendix IIa. Seasonal and annual (Dec. to Nov.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 1997.

	Annual			Dec-Feb			Mar-May			Jun-Aug			Sep-Nov		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
FL05 1997	.	.	.	.	.	.	.	.	.	.	.	.	8.234	3.612	17.27
FL11 1997	14.197	24.372	67.59	8.328	0.688	3.25	12.256	4.483	14.40	16.003	15.298	37.63	12.500	3.905	12.30
FL34 1997	.	.	.	.	.	.	.	.	.	.	.	.	13.521	3.649	10.63
GA09 1997	.	.	.	.	.	.	.	.	.	.	.	.	11.673	3.066	10.34
ME02 1997	.	.	.	.	.	.	.	.	.	11.832	3.384	11.26	6.730	2.268	13.27
ME09 1997	5.562	5.838	41.32	2.869	0.845	11.60	5.082	1.288	9.97	8.930	2.207	9.73	5.225	1.329	10.01
ME98 1997	6.724	7.841	45.91	3.825	1.385	14.25	5.794	2.329	15.83	15.567	2.786	7.05	5.651	1.261	8.79
MN16 1997	10.595	7.754	28.81	4.578	0.428	3.68	8.554	1.111	5.12	13.147	4.235	12.68	11.427	2.129	7.33
MN18 1997	10.883	4.542	16.43	7.119	0.462	2.55	9.521	0.954	3.95	12.128	1.605	5.21	11.648	1.397	4.72
MN23 1997	10.819	6.962	25.33	2.655	0.288	4.28	9.930	1.036	4.11	15.389	4.166	10.66	10.064	1.609	6.30
MN27 1997	12.839	8.692	26.65	9.059	0.922	4.00	9.062	0.981	4.26	14.118	5.437	15.16	15.273	1.251	3.23
NB02 1997	6.768	6.083	35.39	3.751	1.260	13.23	6.547	1.761	10.59	16.474	1.810	4.32	6.430	1.183	7.24
NC08 1997	10.609	9.790	36.33	5.684	1.072	7.43	6.776	1.174	6.82	18.716	4.234	8.91	9.668	3.236	13.18
NC42 1997	9.829	9.707	38.88	5.969	1.423	9.39	8.346	1.708	8.06	15.552	4.666	11.81	7.540	1.843	9.63
NH05 1997	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NM10 1997	.	.	.	.	.	.	.	.	.	19.929	1.994	3.94	13.748	1.712	4.90
NS01 1997	5.910	7.739	51.55	3.287	1.513	18.13	4.446	1.711	15.15	13.911	1.996	5.65	7.913	2.538	12.63
ON03 1997	.	.	.	.	.	.	9.846	1.778	7.11	9.690	1.610	6.54	7.677	1.324	6.79
PA13 1997	.	.	.	.	.	.	12.591	3.838	12.00	11.564	3.560	12.12	3.841	1.524	15.62
PA90 1997	.	.	.	.	.	.	10.070	1.611	6.30	13.772	3.284	9.39	5.812	1.470	9.96
SC19 1997	11.013	12.717	45.46	9.672	2.081	8.47	9.508	2.034	8.42	13.582	5.788	16.78	9.364	2.805	11.79
TX21 1997	9.575	13.119	53.95	6.654	2.848	16.85	10.039	2.827	11.09	12.521	5.003	15.73	9.430	2.462	10.28
WA18 1997	17.737	21.130	46.90	13.131	5.940	17.81	28.321	9.140	12.71	21.351	2.799	5.16	11.389	3.246	11.22
WI08 1997	10.710	6.331	23.27	3.015	0.394	5.15	12.123	1.443	4.69	12.603	2.931	9.16	14.569	1.586	4.28
WI09 1997	9.218	5.760	24.60	3.089	0.395	5.03	9.765	1.237	4.99	12.337	2.214	7.07	10.025	1.915	7.52
WI36 1997	10.398	8.417	31.87	2.424	0.389	6.31	16.376	2.192	5.27	10.427	3.202	12.09	12.893	2.683	8.19
WI99 1997	.	.	.	.	.	.	11.081	1.850	6.57	15.803	3.855	9.61	7.308	1.208	6.51
Mean 1990	10.199	9.811	37.66	5.595	1.314	8.91	10.287	2.214	8.45	14.145	3.829	10.77	9.598	2.162	9.38

Appendix IIb. Seasonal and annual (Dec. to Nov.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 1998.

	Annual			Dec-Feb			Mar-May			Jun-Aug			Sep-Nov		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
CA97 1998	.	.	.	.	.	.	7.341	1.794	9.62	5.305	0.170	1.26	3.543	0.713	7.92
CO97 1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FL04 1998	.	.	.	.	.	.	8.944	1.647	7.25	20.462	9.022	17.36	12.331	6.618	21.13
FL05 1998	.	.	.	.	.	.	12.107	1.836	5.97	19.830	5.792	11.50	11.056	4.468	15.91
FL11 1998	11.746	21.493	72.04	6.813	3.011	17.40	10.109	1.535	5.98	16.254	11.897	28.82	10.019	5.049	19.84
FL34 1998	.	.	.	.	.	.	11.053	1.876	6.68	14.286	5.959	16.42	10.740	8.372	30.69
GA09 1998	11.641	18.100	61.22	8.915	4.853	21.43	9.982	2.482	9.79	15.525	7.130	18.08	12.011	3.635	11.91
LA05 1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA10 1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA28 1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ME02 1998	6.525	6.929	41.81	4.394	0.783	7.02	6.227	1.711	10.82	8.069	2.716	13.25	6.238	1.698	10.72
ME09 1998	6.034	7.074	46.15	2.528	0.656	10.22	4.789	1.400	11.51	9.526	3.639	15.04	5.413	1.290	9.38
ME96 1998	.	.	.	.	.	.	6.567	2.320	13.91	11.205	5.402	18.98	10.952	1.886	6.78
ME98 1998	5.871	9.156	61.39	3.186	1.877	23.20	6.579	2.609	15.61	10.430	2.743	10.36	6.278	1.950	12.23
MN16 1998	11.717	8.676	29.15	6.553	0.233	1.40	16.472	2.899	6.93	13.473	3.634	10.62	7.309	1.894	10.21
MN18 1998	14.241	8.892	24.58	20.452	0.560	1.08	16.719	2.207	5.20	14.090	2.973	8.31	12.499	3.175	10.00
MN23 1998	13.968	9.726	27.41	5.181	0.221	1.68	10.228	1.905	7.33	16.294	5.017	12.12	15.089	2.406	6.28
MN27 1998	12.535	7.407	23.26	7.906	0.215	1.07	11.869	1.730	5.74	12.873	3.226	9.86	13.293	2.225	6.59
NB02 1998	6.244	7.268	45.83	3.427	1.134	13.03	8.854	2.941	13.08	8.808	1.587	7.09	5.609	1.801	12.64
NC08 1998	11.858	18.851	62.59	6.360	3.219	19.92	12.476	3.751	11.84	15.180	7.218	18.72	15.166	4.664	12.11
NC42 1998	7.110	9.793	54.23	3.752	1.777	18.65	6.973	2.405	13.58	14.055	3.517	9.85	6.789	2.095	12.15
NH00 1998	.	.	.	.	.	.	.	.	.	7.073	3.209	17.86	8.871	1.724	7.65
NH05 1998	7.381	7.681	40.97	3.743	0.883	9.29	7.310	2.278	12.27	10.809	2.939	10.70	7.207	1.594	8.71
NM10 1998	20.730	3.861	7.33	10.615	0.244	0.90	14.223	0.310	0.86	28.542	2.309	3.18	16.537	1.002	2.39
NS01 1998	5.224	6.587	49.64	3.251	1.247	15.11	4.945	1.453	11.57	11.155	2.239	7.90	4.244	1.624	15.06
ON03 1998	11.432	7.160	24.66	4.526	0.684	5.95	9.153	1.548	6.66	15.511	2.388	6.06	16.704	2.540	5.99
PA13 1998	10.329	10.429	39.75	7.768	2.092	10.60	8.345	3.002	14.17	14.152	3.332	9.27	13.799	2.003	5.71
PA90 1998	9.034	7.696	33.54	5.483	1.162	8.35	7.669	2.334	11.98	14.310	2.801	7.71	9.550	1.336	5.51
PQ04 1998	.	.	.	.	.	.	.	.	.	10.037	3.527	13.83	10.043	1.902	7.46
PQ05 1998	.	.	.	.	.	.	.	.	.	9.263	2.497	10.61	3.054	0.994	12.81
SC19 1998	.	.	.	.	.	.	.	.	.	15.724	4.633	11.60	5.799	1.008	6.84
TX21 1998	.	.	.	8.345	3.313	15.63	.	.	6.12	17.968	2.581	5.66	7.851	4.177	20.95
WA18 1998	6.992	5.532	31.15	5.859	2.001	13.45	10.285	1.352	5.17	12.084	0.821	2.68	5.035	1.260	9.85
WI08 1998	12.207	8.988	28.99	6.037	0.399	2.60	10.267	2.344	8.99	16.245	3.935	9.54	10.508	2.099	7.86
WI09 1998	11.243	5.745	20.12	2.333	0.164	2.76	11.615	1.299	4.40	12.806	2.652	8.15	13.382	1.630	4.80
WI36 1998	11.625	7.470	25.30	2.534	0.217	3.37	13.888	1.773	5.03	12.382	3.488	11.09	13.495	1.992	5.81
WI99 1998	13.368	12.437	36.63	4.384	0.640	5.75	12.200	3.279	10.58	19.511	5.276	10.65	13.001	3.187	9.65
Mean 1998	10.394	9.433	38.60	6.014	1.316	9.58	9.900	2.072	8.92	13.734	3.947	11.34	9.801	2.546	10.71

Appendix IIc. Seasonal and annual (Dec. to Nov.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 1999.

	Annual			Dec-Feb			Mar-May			Jun-Aug			Sep-Nov		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
CA97 1999	.	.	.	3.239	1.611	19.58	3.952	0.961	9.58	.	.	.	.	.	.
CO97 1999	10.604	10.515	39.04	6.326	2.250	14.00	10.997	3.442	12.32	13.018	2.588	7.83	14.754	1.831	4.89
FL04 1999	12.436	18.129	57.39	12.702	1.526	4.73	17.686	3.049	6.79	14.912	8.451	22.31	8.648	5.176	23.56
FL05 1999	11.523	13.422	45.86	8.552	1.385	6.38	10.458	0.869	3.27	12.135	8.103	26.29	12.291	3.099	9.93
FL11 1999	11.600	17.738	60.20	10.830	1.257	4.57	17.097	1.228	2.83	14.332	9.360	25.71	8.576	5.902	27.09
FL34 1999	10.895	12.534	45.29	10.558	1.345	5.02	16.223	1.220	2.96	10.821	5.942	21.62	9.553	3.809	15.70
GA09 1999	11.718	11.961	40.19	7.437	1.404	7.43	18.702	1.161	2.44	14.494	7.647	20.77	7.116	1.724	9.54
IL11 1999	.	.	.	.	.	.	10.973	2.220	7.96	10.996	4.418	15.82	10.258	1.271	4.88
LA05 1999	12.705	13.065	40.49	6.124	1.778	11.43	13.927	2.384	6.74	14.728	6.706	17.93	17.585	1.962	4.39
LA10 1999	10.042	15.423	60.47	6.600	4.937	29.45	15.763	5.189	12.96	13.698	4.248	12.21	11.212	1.666	5.85
LA28 1999	13.437	12.435	36.43	13.413	2.384	7.00	13.046	2.406	7.26	15.444	5.087	12.97	11.031	2.580	9.21
ME02 1999	6.216	6.619	41.92	4.151	0.997	9.46	8.089	1.725	8.40	10.352	2.248	8.55	4.170	1.644	15.52
ME09 1999	5.578	6.751	47.65	3.256	0.745	9.01	5.199	1.199	9.08	9.870	2.918	11.64	4.024	1.833	17.93
ME96 1999	7.385	8.495	45.29	5.397	1.584	11.55	7.710	2.382	12.16	14.968	1.988	5.23	6.421	2.666	16.35
ME98 1999	6.376	7.631	47.12	3.516	1.111	12.45	6.177	1.636	10.43	13.946	1.647	4.65	6.307	3.139	19.59
MN16 1999	.	.	.	4.978	0.338	2.68	12.067	2.504	8.17	13.744	6.455	18.49	.	.	5.97
MN18 1999	11.235	8.186	28.68	6.039	0.351	2.29	13.456	1.430	4.18	12.177	4.257	13.76	8.951	1.921	8.45
MN23 1999	.	.	.	.	.	2.02	10.337	2.803	10.68	16.037	4.751	11.66	36.254	4.195	4.56
MN27 1999	15.305	6.711	17.26	9.690	0.213	0.87	13.719	2.319	6.66	15.356	3.156	8.09	23.196	0.971	1.65
NB02 1999	6.693	7.232	42.54	3.873	1.195	12.14	6.214	1.513	9.59	11.756	2.335	7.82	6.627	2.187	12.99
NC08 1999	7.762	17.964	91.11	6.256	2.196	13.82	6.953	2.520	14.27	12.034	3.986	13.04	7.287	9.253	49.99
NC42 1999	6.449	8.570	52.31	5.643	1.666	11.62	8.961	2.139	9.40	7.682	1.934	9.91	5.212	2.831	21.39
NH00 1999	.	.	.	4.431	0.975	8.67	8.427	1.433	6.69	10.798	2.269	8.27	.	.	.
NH05 1999	.	.	.	4.214	0.966	9.02	6.560	1.646	9.88	.	.	.	.	.	.
NM10 1999	.	.	.	.	.	.	.	.	.	21.944	3.869	6.94	23.031	2.108	3.60
NS01 1999	4.950	5.765	45.85	3.537	0.942	10.48	4.470	1.389	12.23	8.405	2.103	9.85	3.949	1.332	13.28
ON03 1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA13 1999	9.592	8.853	36.34	6.428	1.169	7.16	9.425	2.647	11.06	15.608	3.277	8.27	6.983	1.748	9.85
PA37 1999	.	.	.	.	.	.	.	.	.	14.158	1.992	5.54	11.197	2.542	8.94
PA90 1999	7.234	5.326	28.99	4.100	0.676	6.49	7.614	1.438	7.43	11.308	2.046	7.12	5.421	1.093	7.94
PQ04 1999	8.926	5.729	25.27	6.435	0.703	4.30	9.945	0.900	3.56	10.705	2.045	7.52	8.290	2.082	9.89
PQ05 1999	5.771	5.422	36.99	2.960	0.580	7.72	5.072	0.997	7.74	9.241	2.300	9.80	5.716	1.704	11.74
SC19 1999	9.248	8.387	35.71	6.202	1.190	7.55	12.377	2.087	6.64	11.181	3.424	12.06	7.139	1.715	9.46
TX21 1999	11.453	11.205	38.52	9.995	3.263	12.85	11.938	3.763	12.41	13.457	2.922	8.55	10.370	1.239	4.71
WA18 1999	7.743	7.721	39.26	4.577	1.891	16.27	8.996	1.979	8.66	19.305	2.089	4.26	6.888	1.762	10.07
WI08 1999	12.722	13.555	41.95	9.183	0.971	4.16	9.722	1.773	7.18	14.086	8.483	23.71	13.059	2.287	6.89
WI09 1999	13.798	9.110	25.99	4.719	0.312	2.60	9.968	1.505	5.94	15.666	5.755	14.46	20.298	1.538	2.98
WI36 1999	11.058	8.859	31.54	4.542	0.440	3.81	7.474	1.528	8.05	13.860	5.669	16.10	13.855	1.258	3.57
WI99 1999	10.521	9.191	34.39	6.176	0.843	5.38	13.180	3.783	11.30	11.514	3.569	12.20	7.561	1.059	5.52
Mean 1999	9.699	10.083	42.00	6.355	1.329	8.68	10.358	2.032	8.25	13.159	4.168	12.53	10.683	2.445	11.37

Appendix IId. Seasonal and annual (Dec. to Nov.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 2000.

	Annual			Dec-Feb			Mar-May			Jun-Aug			Sep-Nov		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
AB08 2000	.	.	.	.	.	.	12.632	0.331	1.03	.	.	.	.	.	.
AL03 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
BC06 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CA72 2000	.	.	.	.	.	.	11.962	1.262	4.16	.	.	.	.	.	.
CA97 2000	.	.	.	3.719	1.969	20.85	3.987	0.962	9.50	.	.	.	.	.	.
CO97 2000	.	.	.	.	.	18.66	7.367	2.352	12.57	.	.	.	.	.	.
FL04 2000	.	.	.	8.534	0.587	2.71	10.551	2.488	9.29	.	.	.	.	.	.
FL05 2000	.	.	.	7.682	0.835	4.28	11.207	0.512	1.80	.	.	.	.	.	.
FL11 2000	.	.	.	9.177	0.675	2.90	11.383	1.736	6.00	.	.	.	.	.	.
FL34 2000	.	.	.	10.140	0.599	2.32	6.065	1.117	7.25	.	.	.	.	.	.
GA09 2000	.	.	.	7.984	1.077	5.31	7.580	1.762	9.15	.	.	.	.	.	.
GA40 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IL11 2000	.	.	.	5.942	0.652	4.32	13.725	2.367	6.79	.	.	.	.	.	.
LA05 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA10 2000	.	.	.	6.469	1.086	6.61	13.940	6.567	18.55	.	.	.	.	.	.
LA12 2000	.	.	.	.	.	.	8.321	2.910	13.77	.	.	.	.	.	.
LA28 2000	.	.	.	8.646	1.966	8.95	11.939	2.637	8.70	.	.	.	.	.	.
ME02 2000	.	.	.	5.721	1.136	7.82	6.056	1.937	12.60	.	.	.	.	.	.
ME09 2000	.	.	.	2.871	0.679	9.31	4.302	1.649	15.09	.	.	.	.	.	.
ME96 2000	.	.	.	5.077	1.105	8.57	6.626	2.207	13.11	.	.	.	.	.	.
ME98 2000	.	.	.	5.305	1.946	14.44	7.554	3.165	16.49	.	.	.	.	.	.
MN16 2000	.	.	.	4.806	0.139	1.14	9.672	1.149	4.68	.	.	.	.	.	.
MN18 2000	.	.	.	.	.	1.49	14.300	2.010	5.53	.	.	.	.	.	.
MN23 2000	.	.	.	3.618	0.156	1.70	10.114	1.594	6.21	.	.	.	.	.	.
MN27 2000	.	.	.	4.892	0.089	0.72	16.328	3.073	7.41	.	.	.	.	.	.
MS22 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NB02 2000	.	.	.	5.388	1.694	12.38	7.171	2.229	12.24	.	.	.	.	.	.
NC08 2000	.	.	.	7.075	1.481	8.24	6.904	1.651	9.42	.	.	.	.	.	.
NC42 2000	.	.	.	6.483	1.125	6.83	7.025	1.883	10.55	.	.	.	.	.	.
NF09 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH00 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH05 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NM10 2000	.	.	.	7.312	0.063	0.34	21.037	1.062	1.99	.	.	.	.	.	.
NS01 2000	.	.	.	4.719	1.907	15.91	7.227	2.289	12.47	.	.	.	.	.	.
NY20 2000	.	.	.	4.196	0.856	8.04	7.985	3.434	16.93	.	.	.	.	.	.
ON07 2000	.	.	.	.	.	.	18.371	3.154	6.76	.	.	.	.	.	.
PA13 2000	.	.	.	7.503	1.421	7.45	8.764	2.582	11.60	.	.	.	.	.	.
PA30 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA37 2000	.	.	.	5.620	1.489	10.43	13.177	3.319	9.92	.	.	.	.	.	.
PA60 2000	.	.	.	8.049	1.980	9.68	11.593	3.733	12.68	.	.	.	.	.	.
PA90 2000	.	.	.	5.456	1.076	7.77	7.004	1.934	10.87	.	.	.	.	.	.
PQ04 2000	.	.	.	4.476	0.677	5.96	8.041	1.972	9.66	.	.	.	.	.	.
PQ05 2000	.	.	.	2.629	0.575	8.62	5.186	1.146	8.70	.	.	.	.	.	.
SC19 2000	.	.	.	.	.	.	10.793	1.875	6.84	.	.	.	.	.	.
TX21 2000	.	.	.	7.391	1.373	7.32	13.772	6.140	17.55	.	.	.	.	.	.
WA18 2000	.	.	.	6.056	1.768	11.49	11.768	2.164	7.24	.	.	.	.	.	.
WI08 2000	.	.	.	4.719	0.349	2.92	11.338	1.577	5.48	.	.	.	.	.	.
WI09 2000	.	.	.	4.343	0.365	3.31	10.432	1.560	5.89	.	.	.	.	.	.
WI36 2000	.	.	.	4.899	0.510	4.10	8.085	1.016	4.95	.	.	.	.	.	.
WI99 2000	.	.	.	14.991	1.498	3.94	14.450	4.491	12.24	.	.	.	.	.	.
Mean 2000	.	.	.	6.232	1.027	7.13	10.140	2.268	9.36	.	.	.	.	.	.

APPENDIX III

Quarterly and Annual Total Mercury Concentrations and Wet Depositions
Mercury Deposition Network Sites 1997 through June 2000
(January - December Calendar Year)

Appendix IIIa. Quarterly and annual (Jan. to Dec.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 1997.

	Annual (Jan-Dec)			Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
CA97 1997	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FL05 1997	.	.	.	.	.	.	.	.	.	20.886	5.450	10.27	8.138	4.708	22.78
FL11 1997	13.310	25.566	75.62	7.787	0.971	4.91	9.915	8.080	32.09	22.710	13.671	23.70	7.514	2.849	14.93
FL34 1997	.	.	.	.	.	.	.	.	.	.	.	.	9.281	2.099	8.91
GA09 1997	.	.	.	.	.	.	.	.	.	.	.	.	10.753	4.215	15.43
ME02 1997	.	.	.	.	.	.	.	.	.	9.308	3.128	13.23	6.244	1.596	10.06
ME09 1997	5.951	5.725	37.87	3.373	0.821	9.59	6.353	1.575	9.76	9.060	2.202	9.57	4.204	0.956	8.96
ME98 1997	6.787	7.505	43.54	3.831	1.383	14.21	7.555	2.536	13.22	13.660	2.428	7.00	4.062	0.941	9.12
MN16 1997	11.129	7.637	27.02	4.125	0.380	3.63	13.023	2.172	6.56	13.830	4.233	12.05	8.323	1.009	4.77
MN18 1997	10.991	4.344	15.56	7.312	0.561	3.02	11.283	1.141	3.98	13.581	1.546	4.48	9.141	0.946	4.08
MN23 1997	11.438	6.900	23.75	3.315	0.357	4.24	14.268	1.923	5.31	16.078	3.895	9.54	6.777	0.803	4.67
MN27 1997	12.966	8.349	25.35	9.433	0.936	3.91	13.696	1.586	4.56	13.976	5.467	15.40	7.471	0.282	1.49
NB02 1997	7.114	6.034	33.39	4.556	1.345	11.62	8.545	1.934	8.91	13.581	1.831	5.31	4.486	0.861	7.56
NC08 1997	10.562	9.978	37.19	6.000	1.267	8.31	10.149	2.106	8.17	20.037	4.529	8.90	6.856	2.057	11.81
NC42 1997	9.637	9.804	40.06	6.587	1.659	9.92	9.800	1.858	7.47	15.110	4.794	12.49	5.264	1.361	10.18
NH05 1997	.	.	.	.	.	.	.	.	.	.	.	.	5.602	0.930	6.53
NM10 1997	.	.	.	.	.	.	.	.	.	17.178	2.935	6.73	10.257	0.456	1.75
NS01 1997	6.306	7.623	47.59	3.516	1.520	17.03	6.471	1.770	10.77	12.672	3.061	9.51	4.702	1.228	10.28
ON03 1997	.	.	.	.	.	.	12.280	2.264	7.26	8.717	1.406	6.35	6.183	1.011	6.44
PA13 1997	9.226	10.707	45.69	12.487	2.161	6.81	13.312	4.311	12.75	8.876	2.293	10.17	4.792	1.943	15.96
PA90 1997	9.660	7.190	29.30	9.289	1.121	4.75	12.484	1.849	5.83	12.436	3.059	9.68	5.019	1.152	9.04
SC19 1997	11.048	13.362	47.62	9.393	2.358	9.88	10.851	2.655	9.63	14.426	5.015	13.69	9.064	3.318	14.41
TX21 1997	9.649	13.239	54.02	7.647	3.224	16.60	11.620	4.392	14.88	10.904	2.511	9.07	8.832	3.022	13.47
WA18 1997	15.687	17.409	43.69	13.346	6.180	18.23	27.539	6.107	8.73	19.951	2.610	5.15	8.529	2.509	11.58
WI08 1997	11.349	6.270	21.75	3.529	0.509	5.68	16.981	2.047	4.75	12.204	2.637	8.51	12.960	0.930	2.82
WI09 1997	9.546	5.586	23.04	2.939	0.331	4.44	12.243	1.869	6.01	12.028	2.623	8.59	7.499	0.763	4.01
WI36 1997	10.803	8.314	30.30	2.817	0.407	5.69	17.671	2.412	5.37	11.358	4.018	13.93	10.360	1.397	5.31
WI99 1997	10.929	7.668	27.62	6.631	0.883	5.24	12.912	3.268	9.96	12.865	2.858	8.75	6.135	0.572	3.67
Mean 1997	10.204	9.461	36.50	6.396	1.419	8.39	12.331	2.755	9.33	13.976	3.675	10.09	7.350	1.626	8.89

Appendix IIIb. Quarterly and annual (Jan. to Dec.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 1998.

	Annual (Jan-Dec)			Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
CA97 1998	.	.	.	3.916	3.563	35.82	4.857	0.851	6.90	.	.	-5.00	3.536	1.097	12.21
CO97 1998	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FL04 1998	13.637	19.469	56.21	8.440	2.855	13.32	11.049	1.424	5.07	17.970	11.691	25.61	11.373	3.525	12.20
FL05 1998	12.346	14.671	46.78	8.823	4.184	18.67	22.878	0.438	0.75	16.643	8.108	19.18	9.397	1.953	8.18
FL11 1998	12.492	20.448	64.45	8.466	2.977	13.85	8.291	1.628	7.73	15.653	12.661	31.85	11.364	3.182	11.02
FL34 1998	.	.	.	.	.	.	13.891	1.926	5.46	13.681	10.175	29.28	7.076	2.538	14.12
GA09 1998	11.839	16.828	55.96	9.526	5.093	21.05	8.469	1.147	5.33	14.749	8.133	21.71	12.268	2.452	7.87
LA05 1998	.	.	.	.	.	.	.	.	.	.	.	.	8.748	1.077	4.85
LA10 1998	.	.	.	.	.	.	.	.	.	.	.	.	6.193	2.462	15.65
LA28 1998	.	.	.	.	.	.	.	.	.	.	.	.	7.878	0.963	4.81
ME02 1998	6.475	7.009	42.62	4.152	1.132	10.74	6.931	2.622	14.89	11.235	1.588	5.56	5.559	1.613	11.42
ME09 1998	6.018	7.074	46.28	2.558	0.816	12.56	9.674	3.391	13.80	7.494	1.986	10.43	4.738	1.141	9.49
ME96 1998	8.765	11.295	50.73	4.021	1.491	14.60	11.118	5.258	18.62	10.596	2.853	10.60	8.899	1.564	6.92
ME98 1998	5.919	9.244	61.49	3.325	2.516	29.79	10.504	2.850	10.68	10.242	2.124	8.17	5.869	1.916	12.85
MN16 1998	11.402	8.787	30.34	6.651	0.361	2.14	14.034	3.661	10.27	13.277	3.039	9.01	7.554	1.712	8.93
MN18 1998	14.040	9.045	25.36	17.350	0.746	1.69	15.757	2.536	6.34	15.925	3.861	9.55	9.906	1.960	7.79
MN23 1998	13.882	9.856	27.95	6.027	0.403	2.63	14.962	4.738	12.47	15.363	2.487	6.37	13.451	2.214	6.48
MN27 1998	12.525	7.431	23.36	8.986	0.298	1.31	13.164	2.168	6.49	11.325	2.822	9.81	14.128	2.065	5.76
NB02 1998	6.194	7.247	46.06	4.661	2.118	17.89	8.764	2.175	9.77	8.709	1.258	5.69	4.830	1.560	12.71
NC08 1998	11.737	18.637	62.51	6.600	3.472	20.71	16.184	6.446	15.68	14.553	7.707	20.85	7.558	1.013	5.27
NC42 1998	7.008	9.666	54.30	3.879	2.037	20.67	10.541	3.691	13.78	8.564	2.870	13.20	6.305	1.064	6.65
NH00 1998	.	.	.	.	.	.	.	.	.	8.762	2.631	11.82	7.816	1.510	7.61
NH05 1998	7.429	7.614	40.35	4.295	1.496	13.72	9.434	3.211	13.40	14.641	1.754	4.72	6.300	1.363	8.52
NM10 1998	22.965	3.980	6.82	17.681	0.289	0.64	8.068	0.073	0.35	29.422	2.447	3.27	18.006	1.166	2.55
NS01 1998	5.220	6.415	48.39	2.779	1.373	19.45	10.428	1.448	5.47	10.345	2.223	8.46	3.522	1.342	15.01
ON03 1998	11.268	7.414	25.90	4.056	0.738	7.16	13.476	1.941	5.67	19.508	2.981	6.02	9.786	1.754	7.06
PA13 1998	10.121	9.917	38.57	6.788	1.914	11.10	9.683	3.650	14.84	15.181	2.897	7.51	11.194	1.456	5.12
PA90 1998	8.937	7.570	33.35	4.996	1.274	10.04	10.523	3.093	11.57	14.335	2.301	6.32	7.092	0.976	5.42
PQ04 1998	.	.	.	.	.	.	.	.	.	9.545	3.232	13.33	9.726	1.721	6.96
PQ05 1998	.	.	.	.	.	.	.	.	.	7.223	2.260	12.32	3.068	0.863	11.07
SC19 1998	.	.	.	.	.	.	.	.	.	10.775	4.317	15.77	7.000	0.413	2.32
TX21 1998	9.771	12.396	49.95	9.291	3.528	14.95	16.699	1.765	4.16	8.361	2.855	13.45	9.522	4.206	17.39
WA18 1998	6.296	5.434	33.98	5.951	2.028	13.42	13.039	1.384	4.18	10.828	0.350	1.27	4.280	1.642	15.11
WI08 1998	12.033	9.128	29.87	8.686	1.147	5.20	13.233	3.940	11.72	15.537	2.517	6.38	9.325	1.555	6.56
WI09 1998	11.358	5.817	20.16	5.138	0.457	3.50	11.672	1.733	5.84	13.665	1.963	5.66	12.696	1.664	5.16
WI36 1998	11.669	7.509	25.33	4.114	0.396	3.79	10.996	2.379	8.52	15.456	3.163	8.06	12.447	1.571	4.97
WI99 1998	13.334	12.401	36.61	5.195	0.822	6.23	13.773	4.387	12.54	20.807	5.275	9.98	9.294	1.856	7.86
Mean 1998	10.544	10.085	40.14	6.655	1.769	12.38	11.796	2.619	9.04	13.449	3.954	11.60	8.547	1.726	8.72

Appendix IIIc. Quarterly and annual (Jan. to Dec.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 1999.

	Annual (Jan-Dec)			Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
CA97 1999	.	.	.	3.634	1.947	21.10	2.657	0.255	3.77	60.712	0.341	0.22	.	.	.
CO97 1999	10.273	10.833	41.52	6.879	2.796	16.00	11.386	3.871	13.38	12.352	2.094	6.67	11.924	1.654	5.46
FL04 1999	12.488	18.111	57.10	14.057	1.386	3.88	14.237	5.423	15.00	15.689	9.705	24.35	4.324	1.523	13.87
FL05 1999	11.422	13.600	46.88	8.475	1.738	8.07	16.605	3.970	9.41	11.680	6.834	23.03	8.770	1.416	6.36
FL11 1999	11.585	17.673	60.06	11.017	1.121	4.01	13.741	3.972	11.38	14.935	10.510	27.71	4.829	2.081	16.97
FL34 1999	.	.	.	11.034	1.064	3.80	8.257	3.750	17.88	18.622	5.188	10.97	.	.	12.03
GA09 1999	11.593	12.193	41.41	8.925	1.889	8.34	10.176	1.684	6.52	16.353	7.278	17.52	5.777	1.326	9.04
IL11 1999	.	.	.	.	.	.	10.154	2.843	11.02	11.817	3.651	12.16	8.854	1.398	6.21
LA05 1999	12.325	13.441	42.94	8.025	2.716	13.32	15.389	4.225	10.81	15.420	4.690	11.98	9.644	1.673	6.83
LA10 1999	10.719	14.736	54.13	8.431	4.739	22.13	17.443	5.989	13.52	12.478	3.122	9.85	7.348	1.610	8.63
LA28 1999	13.088	12.829	38.59	12.786	2.937	9.04	18.336	3.080	6.61	15.995	5.374	13.23	6.067	1.496	9.70
ME02 1999	6.321	6.841	42.61	4.530	1.455	12.64	12.177	1.321	4.27	6.345	2.747	17.04	5.980	1.314	8.65
ME09 1999	5.453	6.905	49.85	3.003	1.003	13.15	10.045	2.004	7.86	6.000	2.378	15.60	4.100	1.379	13.25
ME96 1999	7.262	8.430	45.70	5.279	1.924	14.35	9.142	1.740	7.49	9.747	3.333	13.46	5.573	1.473	10.40
ME98 1999	6.135	8.035	51.56	3.764	1.510	15.79	10.908	1.637	5.91	11.004	2.491	8.91	4.456	2.371	20.95
MN16 1999	12.671	10.988	34.14	4.357	0.253	2.29	14.797	3.660	9.74	12.906	6.474	19.75	10.259	0.618	2.37
MN18 1999	11.385	8.122	28.09	14.858	0.830	2.20	14.195	2.228	6.18	10.349	3.829	14.57	8.607	1.124	5.14
MN23 1999	.	.	.	.	.	2.24	12.879	4.628	14.15	23.414	5.371	9.03	19.663	1.563	3.13
MN27 1999	.	.	.	.	.	0.84	13.223	2.838	8.45	17.205	2.974	6.80	20.159	0.602	1.18
NB02 1999	6.651	7.526	44.55	4.628	1.758	14.95	8.906	1.180	5.21	10.626	2.605	9.65	5.127	1.919	14.74
NC08 1999	7.800	17.935	90.53	7.628	2.629	13.57	7.057	3.095	17.27	9.278	10.002	42.44	4.907	2.150	17.25
NC42 1999	6.597	8.425	50.28	7.166	1.907	10.48	7.336	2.077	11.14	6.050	2.576	16.77	6.176	1.865	11.89
NH00 1999	.	.	.	3.981	0.994	9.83	12.691	1.225	3.80	6.852	3.020	17.35	.	.	.
NH05 1999	.	.	.	3.999	1.320	13.00	7.592	0.978	5.07	.	.	.	.	.	.
NM10 1999	.	.	.	.	.	.	.	.	.	22.951	5.698	9.77	13.838	0.193	0.55
NS01 1999	4.954	6.105	48.51	3.390	1.429	16.59	6.665	0.958	5.66	7.761	2.401	12.18	3.688	1.319	14.08
NY20 1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ON03 1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA13 1999	9.265	9.100	38.67	5.385	1.334	9.75	11.314	2.422	8.43	13.202	3.831	11.42	6.507	1.499	9.07
PA37 1999	.	.	.	.	.	.	.	.	.	14.832	3.078	8.17	7.190	1.886	10.33
PA60 1999	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA90 1999	7.041	5.633	31.50	4.129	0.922	8.79	10.310	1.222	4.66	8.510	2.494	11.54	5.579	0.921	6.50
PQ04 1999	8.792	5.745	25.73	7.854	0.743	3.73	9.906	0.833	3.31	10.329	2.703	10.30	6.875	1.465	8.39
PQ05 1999	5.543	5.419	38.49	3.662	0.795	8.55	10.004	1.420	5.59	6.756	1.771	10.32	4.178	1.489	14.03
SC19 1999	9.458	8.805	36.66	11.266	1.999	6.98	7.405	1.553	8.26	11.419	3.597	12.40	6.983	1.599	9.01
TX21 1999	11.402	10.726	37.04	11.372	3.083	10.67	13.151	3.574	10.70	13.613	2.618	7.57	7.098	1.459	8.09
WA18 1999	8.159	8.079	38.98	5.633	2.290	16.00	13.971	1.445	4.07	21.498	2.194	4.02	5.686	2.150	14.89
WI08 1999	12.781	13.481	41.53	10.537	0.880	3.29	13.463	4.801	14.04	12.238	6.463	20.79	15.261	1.321	3.41
WI09 1999	13.572	9.224	26.76	4.488	0.254	2.23	11.324	2.353	8.18	15.981	5.222	12.86	16.075	1.421	3.48
WI36 1999	10.768	8.849	32.35	4.308	0.418	3.82	9.865	2.542	10.15	13.586	5.164	14.96	8.488	0.738	3.43
WI99 1999	10.497	9.281	34.81	7.410	0.967	5.14	11.555	5.038	17.17	15.285	2.204	5.68	7.222	1.252	6.83
Mean 1999	9.517	10.244	43.14	7.148	1.607	9.44	11.341	2.662	9.06	14.157	4.217	13.54	8.153	1.449	9.03

Appendix IIId. Quarterly and annual (Jan. to Dec.) total mercury concentrations and wet depositions at National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in the U.S. and Canada in 2000.

	Annual (Jan-Dec)			Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec		
Site Year	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches	Conc ng/L	Dep æg/m2	Precip Inches
AB08 2000	.	.	.	.	.	.	12.827	0.655	2.01	.	.	.	.	.	.
AL03 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
BC06 2000	.	.	.	.	.	.	9.654	1.469	5.99	.	.	.	.	.	.
CA72 2000	.	.	.	.	.	.	16.164	0.456	1.11	.	.	.	.	.	.
CA97 2000	.	.	.	3.119	1.737	21.92	7.343	0.486	2.61	.	.	.	.	.	.
CO97 2000	.	.	.	.	.	21.24	9.626	2.603	10.64	.	.	.	.	.	.
FL04 2000	.	.	.	9.393	0.887	3.72	11.119	2.680	9.49	.	.	.	.	.	.
FL05 2000	.	.	.	8.295	0.627	2.98	12.022	1.660	5.44	.	.	.	.	.	.
FL11 2000	.	.	.	12.031	1.351	4.42	11.705	3.009	10.12	.	.	.	.	.	.
FL34 2000	.	.	.	6.870	0.924	5.30	.	.	5.48	.	.	.	.	.	.
GA09 2000	.	.	.	7.346	1.059	5.68	12.726	3.264	10.10	.	.	.	.	.	.
GA40 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IL11 2000	.	.	.	7.467	0.759	4.00	13.764	3.463	9.90	.	.	.	.	.	.
LA05 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA10 2000	.	.	.	9.596	1.830	7.51	15.435	7.155	18.25	.	.	.	.	.	.
LA12 2000	.	.	.	10.892	1.187	4.29	9.455	3.667	15.27	.	.	.	.	.	.
LA28 2000	.	.	.	10.427	2.301	8.69	13.166	2.795	8.36	.	.	.	.	.	.
ME02 2000	.	.	.	5.045	0.966	7.53	6.488	2.194	13.31	.	.	.	.	.	.
ME09 2000	.	.	.	2.780	0.563	7.98	5.204	1.802	13.63	.	.	.	.	.	.
ME96 2000	.	.	.	5.126	1.132	8.70	7.034	2.485	13.91	.	.	.	.	.	.
ME98 2000	.	.	.	6.159	1.672	10.69	8.435	3.519	16.42	.	.	.	.	.	.
MN16 2000	.	.	.	10.227	0.580	2.23	13.992	2.832	7.97	.	.	.	.	.	.
MN18 2000	.	.	.	12.064	0.615	2.01	12.131	2.536	8.23	.	.	.	.	.	.
MN23 2000	.	.	.	6.668	0.448	2.64	10.549	1.854	6.92	.	.	.	.	.	.
MN27 2000	.	.	.	8.787	0.463	2.07	17.392	3.701	8.38	.	.	.	.	.	.
MS22 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NB02 2000	.	.	.	5.942	1.605	10.64	7.902	2.249	11.21	.	.	.	.	.	.
NC08 2000	.	.	.	6.942	2.088	11.84	10.200	2.797	10.80	.	.	.	.	.	.
NC42 2000	.	.	.	5.544	1.265	8.98	11.041	3.605	12.86	.	.	.	.	.	.
NF09 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH00 2000	.	.	.	6.504	1.177	7.12	.	.	.	.	.	.	.	.	.
NH05 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NM10 2000	.	.	.	19.277	0.271	0.55	21.078	1.341	2.50	.	.	.	.	.	.
NS01 2000	.	.	.	4.771	1.907	15.73	8.495	2.233	10.35	.	.	.	.	.	.
NY20 2000	.	.	.	6.143	1.476	9.46	7.539	3.111	16.24	.	.	.	.	.	.
ON07 2000	.	.	.	.	.	.	.	.	10.74	.	.	.	.	.	.
PA13 2000	.	.	.	8.261	1.465	6.98	9.421	3.033	12.67	.	.	.	.	.	.
PA30 2000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PA37 2000	.	.	.	6.857	1.439	8.26	15.548	3.948	10.00	.	.	.	.	.	.
PA60 2000	.	.	.	8.621	1.743	7.96	11.673	4.278	14.43	.	.	.	.	.	.
PA90 2000	.	.	.	.	.	6.20	6.872	2.307	13.21	.	.	.	.	.	.
PQ04 2000	.	.	.	5.190	0.654	4.96	10.176	2.663	10.30	.	.	.	.	.	.
PQ05 2000	.	.	.	3.249	0.369	4.47	5.379	1.154	8.45	.	.	.	.	.	.
SC19 2000	.	.	.	.	.	.	10.132	2.304	8.95	.	.	.	.	.	.
TX21 2000	.	.	.	8.301	1.190	5.65	14.407	7.054	19.28	.	.	.	.	.	.
WA18 2000	.	.	.	9.539	2.532	10.45	10.041	1.223	4.80	.	.	.	.	.	.
WI08 2000	.	.	.	6.416	0.810	4.97	12.386	2.008	6.38	.	.	.	.	.	.
WI09 2000	.	.	.	7.108	0.673	3.73	10.917	1.639	5.91	.	.	.	.	.	.
WI36 2000	.	.	.	6.226	0.665	4.20	8.071	1.547	7.54	.	.	.	.	.	.
WI99 2000	.	.	.	16.573	1.680	3.99	14.857	6.979	18.49	.	.	.	.	.	.
Mean 2000	.	.	.	7.882	1.170	7.10	11.059	2.744	9.97	.	.	.	.	.	.