

**Metropolitan Council Environmental Services
Voluntary Mercury Reduction Agreement**

**2000 ANNUAL REPORT
March 1, 2001**

1.0 Introduction and Background

The Metropolitan Council Environmental Services (MCES), a division of the Metropolitan Council, submitted a Voluntary Mercury Reduction Agreement (VMRA) to the Minnesota Pollution Control Agency on December 28, 2000. The VMRA summarizes the past actions and outlines the commitments under this agreement, according to topic area. This annual report describes the activities and accomplishments that occurred during the year 2000. These activities and accomplishments are arranged using the same major headings found in the VMRA.

2.0 Control of Discharges to the MDS

- In 1998, MCES lowered its Local Limit from 100 µg/l to 2 µg/l. During 2000, MCES continued to administer this limit for industries discharging to MCES. If mercury was found at significant levels in wastewater from industries, MCES worked with the industries to identify sources and requested that they minimize their mercury loadings. MCES wrote “case studies” describing the situation so that other staff could learn about sources of mercury and ways to minimize the discharge of mercury. Five such case studies were prepared in 2000. If an industry’s discharge levels were above the local limit, MCES issued a Notice of Violation (NOV), which required more formal investigation and reduction efforts by the industry. Two such NOVs were issued in 2000.
- A Dental Amalgam Removal Equipment Evaluation continued through 2000. See Attachment No. 1 to this Annual Report showing the monitoring of advanced amalgam removal equipment at local dental clinics. The attachment shows both the monitoring done in 1999 and in 2000. Data tabulation began in 2000 and is being completed as of the writing of this Annual Report.
- Method development to improve the reproducibility and recovery of sludge mercury analytical methods was completed in 2000 by MCES Laboratory Services staff. This effort was undertaken to improve data reliability. As a result of this method development, sample preparation procedures and analytical digestion procedures were modified.
- The Community-wide Dental Amalgam Removal Study, a cooperative study with the Minnesota Dental Association and the Cottage Grove and Hastings area dentists continued during 2000. For approximately a 3-month period, amalgam removal equipment was installed in all Hastings dental offices. This equipment was subsequently removed and will be installed in the Cottage Grove dental offices during 2001. Daily sludge samples are being collected at the Cottage Grove and Hastings Wastewater Treatment Plants and monitored for mercury concentrations. The sludge mercury concentrations will be evaluated during the course of this study

in order to determine if additional removal equipment results in a decrease of mercury at the treatment plants.

3.0 Policy-Related Actions

- MCES continued to participate in the Minnesota Mercury Contamination Reduction Initiative and Advisory Council.
- MCES is supporting the 2001 legislative program of the Minnesota Office of Environmental Assistance (MOEA) that seeks to phase out the use of mercury fever thermometers.
- The Metropolitan Council has taken action to change its dental insurance policies for its own employees to encourage the use of mercury-free posterior restorations (dental cavity fillings). Previous dental policies were negotiated to allow employees and dependents to select mercury-free composites, but would only cover up to the cost of a mercury amalgam filling. In 2000, the Council negotiated a new contract with its dental provider that removes the financial disincentive for employees and their dependents to select the mercury-free alternative. The additional coverage for approximately 8,000 employees and their dependents costs approximately \$8,000 per year.
- In 2000, MCES awarded \$1.7 million of the \$7.5 million in grant monies available (over a five-year period - 1999-2004) to reduce non-point source (NPS) runoff. Since mercury strongly associates with soil particles, reductions in NPS runoff will lead to reductions in mercury in runoff to surface waters.
- In 2000, MCES completed its \$1.375 million targeted grant program for Infiltration and Inflow (I/I) removal from local collection systems. Since mercury can be found in I/I, its removal will lead to a decrease in mercury to wastewater treatment plants.

4.0 External Pollution Prevention

- MCES worked with staff at the University of Minnesota (Environmental Health and Safety) to determine how to treat the wastewater discharged from the 370 operatories (chairs) used within the University Dental School. A new “air/water separator” tank was installed in 2000 that was designed with help from MCES. This tank includes new plumbing and electronic control features to accommodate installation of advanced filtration equipment. The filtration equipment is scheduled for installation in the second quarter of 2001.
- MCES has been an active participant in the Mercury Work Group of the Association of Metropolitan Sewerage Agencies (AMSA), a trade group of major

publicly owned treatment works (POTW). This group has been active in persuading the U.S. Environmental Protection Agency (EPA) to resume validation testing of EPA's mercury Method 245.7 and conducting follow-up sampling of EPA's 1994 study of Great Lakes POTWs. The AMSA work group has prepared a Domestic Waste Characterization Study that has been presented to EPA. MCES contributed to the study by characterizing mercury in domestic-only wastewater and in report preparation.

- In 2000, MCES set up a partnership with Park Nicollet Health Services (then called HealthSystem Minnesota) and the Minnesota Technical Assistance Program. PNHS operates Methodist Hospital and other medical clinics. As one example of this partnership, MCES is providing services for analysis of various hospital reagents and chemicals to determine mercury concentrations in frequently used materials, and PNHS will provide staff support and access to their facility. This work will complement PNHS' use of a MnTAP intern in 2000 to identify uses of mercury and alternative products.
- MCES has been an active participant in MOEA's Healthcare Industry Environmental Management Advisory Group, by attending meetings and making contributions to the group in 2000. MCES also spoke to the Twin Cities Healthcare Engineers' Association to inform them of our concerns regarding minimizing mercury discharges to the sanitary sewer.
- As part of a cooperative project, MCES contributed staff time in 2000 to help write a protocol to test advanced amalgam removal equipment in dental clinics. This protocol is being put together by NSF International for EPA as part of the "Environmental Technology Verification Program" or "ETV".

5.0 Internal Pollution Prevention

- In 2000, MCES reviewed its previously prepared inventory of mercury containing devices and has prioritized replacement with non-mercury containing items as appropriate. A total of ten pounds of liquid mercury, 4,229 mercury containing fluorescent light tubes, and twenty pounds of mercury-containing switches and other mercury-containing devices have been recycled.
- MCES staff that conduct demolition have been informed that all mercury-containing devices must be removed and recycled prior to demolition.
- A warning poster was designed by MCES to alert operations and maintenance personnel of buildings and areas that contain mercury-containing devices. The poster describes devices that contain mercury and the procedures to follow if the

device needs to be repaired, removed or a spill occurs. This poster has been placed throughout MCES facilities at appropriate locations.

- MCES experimented with contract language in capital projects that restricts the use of mercury-containing devices. For example, the South Washington County Wastewater Treatment Plant Request for Proposals (RFP) contained a prohibition on mercury-containing devices except for those with MCES approval. Types of devices that would be allowed include fluorescent and ultraviolet lamps because they can be recycled.
- MCES has eliminated the use of mercury-containing thermometers in the laboratory and in the wastewater sample refrigerators at the WWTPs. In addition, where possible, MCES has eliminated or reduced the frequency of use of some analytical methods because they contain mercury. For example, MCES has requested the elimination of NPDES permit requirements to analyze effluent samples for total Kjeldahl nitrogen, since the reagent contains mercury.
- In 2000, MCES conducted several mercury fever thermometer exchanges for its employees. For each mercury-containing thermometer that was brought in, employees were given a mercury-free digital thermometer at no cost to the employee. Each digital thermometer costs \$3.29. Approximately 288 mercury fever thermometers were collected for recycling through this program.
- MCES has continued its research and development activities utilizing a previously developed research analytical method to determine mercury ultra-trace concentrations on 40 sediment samples for the Lake St. Croix Sediments Study, in partnership with the Science Museum of Minnesota. This study is funded through a Metropolitan Council MetroEnvironment Partnership grant.
- Also during 2000, the MCES utilized its ultra-trace research analytical method to continue to determine mercury concentrations from nonpoint sources on the Minnesota River. A total of 240 water samples were analyzed for total mercury and 140 water samples were analyzed for methyl mercury.
- During 2000 MCES characterized mercury concentrations in drinking water of two metropolitan area cities and found mercury to be present in very low concentrations of 1 nanogram per liter or less in the eight sites that were surveyed.
- In May 2000, MCES completed construction of a new production-oriented laboratory facility that is designed with a clean room. The clean room is designed for low-level analytical methods to be conducted.

- An automated mercury analyzer was upgraded to include the gold amalgam trap necessary to perform low-level mercury analyses with EPA Method 1631. Method development work continued throughout 2000 in order to obtain the required minimum detection level (MDL) for subsequent certification by the Minnesota Department of Health.
- Procedures have been developed and implemented to use EPA Method 1669, for collection of low-level mercury samples at the Cottage Grove Wastewater Treatment Plant.

6.0 Technology-based Controls – Liquid Treatment Processes

- MCES evaluated the cost and effectiveness of technology-based controls for mercury removal from municipal wastewater effluents at the Cottage Grove/South Washington County Wastewater Treatment Plant (1999) and as part of the Rosemount Wastewater Treatment Plant Interim Improvements Project (2000). These evaluations found that it is not cost effective to provide technology-based controls for end of pipe removal of mercury from these types of effluents, particularly on a cost per pound removed basis.
- MCES is a MnGREAT! Award Recipient for 2000. The award recognizes the Metro Plant for innovations in energy recovery and wastewater handling technology. The energy savings prevent 173 tons of nitrous oxides, 512 tons of sulfur oxides, 58,500 tons of carbon dioxide and 1.04 pounds of mercury in air emissions per year.

Technology-based Controls – Air Emissions Processes

- The Council has initiated the Metro Solids Processing Improvements Project to replace the aging multiple hearth incinerators and air pollution control (APC) systems at the Metro Plant with new combustion technology (fluidized bed incinerators) and accompanying APC systems. The Council will provide in the new APC systems the capability to treat exhaust gases with carbon which is expected to achieve a goal of reducing mercury in air emissions by approximately 70% from current emission estimates (1997). Procurement of these new systems began in early 2000. The design build selection process began with the prequalification of five potential design build contractors. A total of two proposals were submitted to MCES in July 2000. Following review of the proposals and negotiations with each of the respective contractors, a Notice of Award was issued to VonRoll, Inc. in December 2000 for the design and construction of the fluidized bed incinerators and accompanying APC systems. Issuance of the notice to proceed is dependent on

the issuance of the air emissions permit amendment. Operation of the new facilities is scheduled to begin in 2005.

- The cost for the carbon injection technology and the enhanced particulate removal technology, which is integral to enhanced mercury removal, is approximately \$5.7 million.

7.0 Mercury Reductions Achieved

- Previous actions taken to control sources of mercury discharged to the collection system have resulted in a reduction of mercury concentrations in Metro Plant sewage sludge from approximately 3.0 milligrams per kilogram (mg/kg) in 1990 to 1.25 mg/kg in 2000.

8.0 VMRA Administration

- MCES agreed to provide an annual report of the progress made under the VMRA by March 1 of each year for the preceding calendar year. This report fulfills that commitment.

ATTACHMENT NO. 1

Overview of MCES 1999-2000 Monitoring of Dental Clinics Minneapolis – St. Paul Minnesota Metropolitan Area

<u>Baseline Monitoring:</u>		<u>Number of Weeks</u>
Dr. K:	August 16, 1999 – September 8, 2000	4
B.D. Clinic:	August 20, 1999 – September 13, 1999	3
Dr. L:	November 12, 1999 – January 6, 2000	8
Dr. Mc:	July 5, 2000 – August 23, 2000	7
Dr. Mdj:	July 12, 2000 – August 16, 2000	5
 <u>Asdex Filters (by Avprox, Inc.):</u>		
Dr. K:	July 22, 1999 – August 13, 1999	3
B.D. Clinic:	August 3, 1999 – August 20, 1999	3
Dr. L:	September 7, 1999 – October 1, 1999	4
 “Fraker Tank” (The Amalgam Collector, by R&D Services, Inc.)		
Dr. K:	September 8, 1999 – September 29, 1999 (1 st tank)	3
Dr. K:	September 29, 1999 – November 4, 1999 (2 nd tank)	5
B.D. Clinic:	September 13, 1999 – October 1, 1999 (1 st tank)	3
B.D. Clinic:	October 11, 1999 – November 8, 1999 (2 nd tank)	4
Dr. L:	October 4, 1999 – November 12, 1999 (1 st tank)	6
 <u>Durr Centrifuge:</u>		
Dr. Tyr:	June 21, 2000 – August 9, 2000	7
Dr. Mc:	August 23, 2000 – September 27, 2000	5
 Rebec Settling/Filtration System:		
Dr. Tm :	August 7, 2000 – September 28, 2000	8
Dr. Mdj:	August 16, 2000 - September 20, 2000	5
 <u>Metasys ECO II Settling System:</u>		
Dr. Mdj:	September 20, 2000 – October 25, 2000	5

The study of the above systems is being done under a partnership with the Minnesota Dental Association. A review panel has been established to review the testing protocol and the draft report, when it is completed.

The dates above are the dates that the equipment was in place at the clinics. Wastewater samples were collected for the vast majority of these time periods. Most, but not all, of the solids collected within the amalgam removal systems were analyzed.