

# ADVISORY COMMITTEE ON MERCURY POLLUTION



## 2005 ANNUAL REPORT

to the Governor, General Assembly  
and Citizens of the State of Vermont  
January, 2005

### Committee Members:

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## EXECUTIVE SUMMARY

This is the seventh annual legislative report of the Advisory Committee on Mercury Pollution, which was established in 1998 by the Vermont Legislature to report on mercury contamination in the environment, health risks posed, and to review programs and methods to reduce contamination and health risk.

This report reviews: (1) the status of mercury education and reduction efforts and work of the Committee; (2) status of mercury monitoring and research and monitoring needs; (3) Committee recommendations on reducing mercury contamination and exposure risk; and (4) Committee work plan for 2005.

### SUMMARY OF COMMITTEE RECOMMENDATIONS

- **Mercury Product Legislation** - The Advisory Committee on Mercury Pollution strongly recommends that mercury product legislation be passed by the Legislature this session. Vermont was one of the first states to pass mercury product legislation in regard to product labeling and voluntary mercury education and reduction. However, since the Northeast states developed “model” mercury product legislation, Vermont has lagged behind most New England states in adopting controls on mercury products. Vermont has been the leader in the nation in implementing mercury product labeling since the law was passed in 1998. However, there are many additional legislative actions that will reduce human health risk to mercury as outlined in the report.
- **Monitoring and Research Needs** - The Committee recommends that Departments of Environmental Conservation, Fish and Wildlife, and Health develop a long-term plan for environmental monitoring of mercury to better understand and predict fish tissue mercury levels for protection of public health and aquatic resources in Vermont.
- **Mercury Dairy Manometers** - The Committee strongly feels that adequate funding should be provided through the Agency of Agriculture, Food and Markets, in cooperation with Vermont Department of Environmental Conservation, to remove and/or replace the remainder of mercury-containing dairy manometers on active and inactive Vermont farms. These devices typically contain one-half pound or more of mercury. More than 80 mercury dairy manometers have been replaced; however, the task was never completed due to a lack of funding. Dairy manometer replacement is a cost-effective means to remove mercury that may be a high risk of future environmental release.
- **Work of the Committee in 2005** – The Committee has identified the following priorities in 2005: (1) continue to monitor the efforts in state government to provide outreach to the public, particularly sensitive populations, on fish consumption advisories; (2) continue to evaluate and assess environmental monitoring and mercury release inventory data to better understand potential impacts and trends and further steps that can be taken to reduce the risk of mercury exposure; (3) continue to monitor mercury use and release reduction in medical and dental facilities and outreach to patients; (4) continue to evaluate and monitor ongoing mercury education and reduction programs in the Departments of Environmental Conservation and Health.

## **INTRODUCTION**

This is the seventh annual report of the Advisory Committee on Mercury Pollution, which was established by the 1998 Vermont Legislature to address and report on mercury contamination in the environment, health risks posed, and to review programs and methods to reduce contamination and health risk of mercury.

The Committee met 10 times in 2004. Since 1998 the Committee has met 58 times.

This report is divided into the following sections:

- I. Overview of the Mercury Problem: Health Risks, Sources, and Emissions
- II. Recent Mercury Education/Reduction Efforts in Vermont
- III. Mercury in the Environment – Monitoring Year in Review
- IV. Committee Recommendations
- V. Committee Work Plan for 2005

## **I. OVERVIEW OF THE MERCURY PROBLEM – HEALTH RISKS, SOURCES, EMISSIONS**

### **Human Health and Wildlife Impacts of Mercury Exposure**

While there are several exposure routes of concern, human exposure to methylmercury is a primary exposure route for the general population and results mainly from the consumption of fish and shellfish. Chronic low-dose methylmercury exposure from maternal consumption of fish is common and has been associated with neurodevelopmental effects in children. Infants may also ingest methylmercury from breast milk; children, whose nervous systems continue to develop until about age 14, are exposed through their diet. Additionally, there is evidence that exposure to methylmercury can adversely affect the developing and adult cardiovascular system and may contribute to heart disease in adults. Methylmercury contamination of fish is so pervasive in the U.S. that health departments in 45 states have issued fish consumption advisories and the FDA and EPA issued a more stringent advisory last year warning pregnant women and children to limit consumption of all fish to 12 ounces per week, and to not eat more than 6 ounces of canned white albacore tuna per week. Limitations on fish intake pose public health impacts of their own, in light of the beneficial role of fish intake in a healthy diet.

Various government and international health agencies have developed health standards for methylmercury exposure. There is substantial agreement among these agencies on the level of methylmercury exposure that causes adverse effects. To the extent that the standards diverge, it is largely a consequence of scientific debate as to how to quantify uncertainties. A national survey conducted by the Centers for Disease Control and Prevention found that 1 in 6, or 16 percent of American women of childbearing age had amounts of mercury in their blood above levels that EPA considers safe.

Studies of the environmental effects of mercury have focused almost exclusively on wildlife impacts. Although the studies do not generally signal the decline of entire species, they do illustrate the adverse impacts on wildlife of mercury contamination in different regions of the U.S. For example, loon chick production in Wisconsin has shown a decline on lakes where the methylmercury content of chick blood

was elevated. Southeastern New Hampshire and the Rangeley Lakes area of Maine show the greatest concentration of mercury in loons in the nation, and loon studies in Vermont found that 20 percent of the loons tested are at high risk from methylmercury exposure. Recent modeling analyses indicate that there exists sufficient mercury contamination in New Hampshire lakes to reduce the overall growth of the New Hampshire loon population. In mammals, mercury has been found in the highest concentrations in fish-eating mink and otter. There is also evidence of reduced survivorship in otters in areas where mercury deposition levels are high. Some studies have also shown reproductive effects in fish.

### **Mercury Emissions and Deposition in the U.S.**

Mercury in the global inventory continuously cycles – it is mobilized, deposited on land and re-mobilized. Of the total mercury releases worldwide (4,840 tons), about 60 percent is from anthropogenic sources and the remainder is from natural sources that cannot be controlled. In the U.S., coal-fired power plant emissions are the largest single source of anthropogenic emissions at over 40 percent of the total anthropogenic load. Mercury occurs as a natural component of fossil fuels, particularly coal and to a lesser extent in oil. Other combustion sources such as municipal and medical waste incinerators, residential and industrial boilers, mercury cell chloralkali plants (that manufacture chlorine and other chemicals), and motor vehicle exhaust also contribute significantly to anthropogenic releases. Regionally, waste combustion sources have been significantly curtailed. Other anthropogenic releases of mercury are derived from mercury used intentionally in products (such as fluorescent lighting, thermostats, dental amalgam, measuring devices, electrical switches, and relays), and released during manufacturing or product use or disposal. Nationally, mercury deposition is highest in the Northeast and parts of the Midwest and Southeast.

### **Mercury Reduction Policy**

Reducing domestic supply and demand and sources of mercury emissions is key to reducing mercury contamination within the U.S., particularly in freshwater fish populations. Recent scientific studies suggest that reducing mercury emissions can result in measurable decreases in mercury deposition and subsequent reductions in freshwater fish mercury concentrations in a relatively short period of time (several years). This observation is encouraging to policy makers, suggesting that real mercury risk reduction can be realized soon after reduction measures are taken.

In 1998, the New England Governors and Eastern Canadian Premiers (NEG/ECP) adopted a regional Mercury Action Plan that established a science-based, integrated regional strategy intended to reduce in-region mercury emissions by: 50% in 2003, 75% in 2010; and virtually eliminate anthropogenic releases over the long term. As of 2003, the region has achieved a 55% reduction in mercury emissions. The interim goal of 50% was reached largely through controlling mercury emissions from municipal waste combustors and other industrial sources. Achieving the next goal of 75% will require aggressive controls on power plants, which are now the largest source of mercury in the region. Several states in the region have already taken regulatory steps to enact stringent mercury emissions controls. However, since about one-third of mercury deposition in the Northeast is attributable to out-of-region sources, primarily power plants, a strong national and international standard on mercury emissions is critical to reducing mercury exposure and risk within Vermont.

The EPA released new draft regulations in 2004 on control of mercury emissions from coal-fired power plants. These rules call for a two-step implementation, with essentially no new controls required until 2010, and a total emissions cap of 15 tons/year by the year 2018. One of the most controversial elements of this new regulation is the implementation of “pollution trading.” Under this scenario, mercury emitters that reduce emissions below their target levels can market excess emission credits to others, who then can use these credits to continue to emit mercury above their own target levels. While this approach is

amenable to certain air pollutants, the Advisory Committee views this as inappropriate for mercury. Power plants that purchase pollution credits that are available, instead of reducing their emissions, may contribute to regional or localized hotspots of mercury contamination.

EPA received over 680,000 individual comments on the proposed regulation. The majority of these are apparently against the proposed use of pollution trading to control mercury. Many of the comments also indicate that the regulations do not go far enough in controlling mercury from coal-fired utility boilers. Two sets of comments were filed that are significant from Vermont's perspective. First, Vermont's Attorney General filed joint comments with several other state attorneys general challenging the legality of pollution trading to control mercury. Secondly, the Hubbard Brook Research Foundation filed a science-based comment paper representing the joint views of over 30 of the top mercury scientists in the United States. EPA is continuing to accept comment on the mercury rule, which is due to be finalized in March 2005.

In a related matter, the State of New Jersey released new mercury emissions limits in 2004 on the ten coal-fired power plants in that jurisdiction. These New Jersey power facilities will be required to meet a 90% reduction in mercury emissions by 2007.

## **II. RECENT MERCURY EDUCATION AND REDUCTION EFFORTS IN VERMONT**

The following are summaries of recent mercury education and reduction efforts in Vermont that the Committee has reviewed or with which Committee members have been directly involved. The Vermont Department of Environmental Conservation (DEC) and Vermont Department of Health (VDH) have been the two state government agencies involved in these efforts.

### **Outreach to Sensitive Populations Grant Project**

EPA provided grant funding for two years to DEC to continue the outreach efforts to sensitive populations regarding mercury exposure through fish consumption. Outreach materials have been distributed to hospitals, OB/GYN, pediatric, other physicians, nurses, as well as childbirth educators, including midwives, doulas and Lamaze programs. To date over 18,000 brochures and posters have been distributed since October 2004. Town Health Officers placed posters in various town locations and information was sent to all libraries across the state as well as school nurses. WIC clinics and other Vermont Department of Health programs were given supplies of brochures and posters for distribution. A targeted mailing was sent to over 3,000 newly married couples. An additional mailing to parents of newborns is scheduled for January 2005, which will include a survey to measure awareness of the fish advisories and a digital thermometer as an incentive for completing the survey.

### **Web Site Redevelopment**

The "www.mercvt.org" DEC mercury website was completely redesigned to include new navigation and additional topic areas. The website now includes disposal information for various mercury-containing products as well as general information on mercury. Specific topic areas for dental, mercury in fish, environmental concerns, and a resource section were added to the site. Counters that tabulate visits to various areas such as the manufacturer labeling and mercury-in-fish areas were added to determine use.

### **School Presentations**

As a result of interest expressed by schools in presentations by DEC on mercury issues, a mercury video will be developed through EPA grant funding received. DEC plans to partner with Champlain College to

develop a video and a web based video game targeted toward 5<sup>th</sup> to 8<sup>th</sup> grade students. This project should be completed in 2005.

### **Fluorescent Lamp Recycling Outreach**

DEC received a three-year EPA grant in 2003 to provide outreach to businesses and institutions to encourage recycling of mercury-containing fluorescent lighting rather than improper trash disposal. The goal of the project is to at least double the current rate of lamp recycling in the next two years. Outreach has included mass mailings of lamp recycling brochures to businesses and electrical contractors, newspaper inserts of brochures, and media campaigns (radio, TV, and newspaper). DEC has partnered in this project with the Vermont Small Business Development Center and the Association of Vermont Recyclers. The Association of Vermont Recyclers is also a recipient of funding from the National Electrical Manufacturers Association (NEMA) to educate the general public and businesses about product labels on fluorescent and other mercury-containing lighting. This outreach and education will consist of media campaigns, newsletter articles, and direct mailings. This funding was required as a condition of DEC's approval of a labeling plan in which these lamps are labeled with the "Hg" symbol (mercury's scientific designation on the periodic table of elements). AVR is also providing outreach and assistance to schools to encourage lamp recycling. Initial indications are that the outreach campaign is resulting in significant increases in lamp recycling thus far.

### **Hospital/Health Care Mercury Reduction**

DEC has completed a voluntary mercury reduction project with Vermont's 15 hospitals, in which the hospitals have pledged to reduce mercury use and develop voluntary reduction plans. Many of Vermont's hospitals are reducing mercury-containing devices such as thermometers and blood pressure measuring devices and replacing these with mercury-free alternatives. It is anticipated that Vermont hospitals will reduce mercury use by over 90 % from baseline mercury use in the 1990s. DEC has also received EPA grant funding to provide outreach to physician's offices and clinics to inform and educate Vermont physicians about mercury reduction opportunities. Surveys are being conducted at approximately 350 physician offices to better understand their awareness of mercury issues. A mailing of mercury informational material to physician offices has been developed. It is anticipated that outreach and assistance provided by DEC will lead to mercury reduction efforts similar to hospitals. As a result of the project, more of these offices will also display patient informational materials on reducing mercury exposure though fish consumption.

### **Dental**

DEC completed a pilot project to evaluate dental amalgam separator performance and operational issues in 19 dental clinics across the state. Dental amalgam separators effectively remove mercury-containing amalgam filling particles from dental wastewater discharges. A final project report has been sent to all dental clinics in the state to better inform the Vermont dental community of their options and considerations for amalgam separators to remove mercury from wastewater. DEC worked in collaboration with the Vermont State Dental Society to organize and implement the pilot project as a means to provide the dental community with first-hand knowledge and experience with the technology and to verify vendor claims on unit performance. Six types of amalgam separators were provided by vendors, installed in the summer of 2003, and were monitored by DEC through mid- 2004.

The pilot demonstrated that there are several commercially available amalgam separators that can reliably perform with minimal maintenance. In general, these separators did not interfere with vacuum or suction when properly installed, maintained, and operated. Annualized costs (over three years) for the various

amalgam separators tested ranged from about \$500-\$1500 per year. Amalgam separators will assure that upwards of 95-99 percent of mercury is eliminated from dental discharges.

The Advisory Committee reviewed the educational materials developed by the State of Maine and by the American Dental Association to inform dental patients of amalgam fillings and the health and environmental concerns as well as the alternative filling materials that are available. The Vermont Department of Health was asked to review these educational materials and provided comment. The Advisory Committee will continue to review dental patient notification as a part of its work plan in the coming year.

**Municipal Collection of Mercury –Containing Wastes**

The table below shows the amount of mercury collected through municipal household hazardous waste programs over the last four calendar years from households and businesses. Wastes typically collected include thermometers, thermostats, mercury-containing switches and mercury spill clean-up debris. Due to recent outreach to encourage fluorescent lamp recycling, it is anticipated that lamp collection will continue to increase. Municipal solid waste districts and other municipal entities continue to play a significant role in the proper management of mercury-containing wastes.

Mercury Collection in Municipal Programs					
Type of Mercury Waste	2000	2001	2002	2003	2004
Mercury Products/Debris* (thermometers, measuring devices, switches)	972 lbs	1675 lbs	1740 lbs	1740 lbs	2049 lbs
Elemental Mercury **	25 lbs	161 lbs	168 lbs	204 lbs	234 lbs
Mercury-added Lamps ** (fluorescent and HID)	0.8 lbs (141,000 linear ft)	1.4 lbs (248,200 linear ft)	1.9 lbs (339,000 linear ft)	2.1 lbs (378,000 linear ft)	2.3 lbs (411,711 linear ft)

\* Includes the weight of mercury and non-mercury containing components

\*\* Represents actual weight of mercury collected

**III. MERCURY IN THE ENVIRONMENT – Monitoring Year in Review**

A number of recent Vermont, regional and national studies are summarized below.

**Mercury Emissions Inventory**

DEC has recently completed revisions to the statewide mercury emissions inventory. These revisions include estimates of mobile sources (e.g. automobiles, trucks), a previously unquantified emissions source, and revisions to the estimated mercury emissions from residential heating (See Appendix A) Vermont’s mercury emissions from quantifiable sources remain the lowest of all New England states. In addition to the Vermont emissions inventory updates, a revised New England-wide mercury emissions inventory has recently been released. This new inventory shows significant declines in mercury emissions, largely attributable to controls placed on municipal and medial waste combustors during the period 1998-2002.

## **Lake Champlain**

The Lake Champlain mercury modeling team (St. Lawrence University, US Geological Survey, Vermont DEC, University of Michigan) is publishing an initial version of an operational model describing mercury transport to and through Lake Champlain. In addition, the project team has secured new funding through the National Oceanic and Atmospheric Administration to augment the existing model by predicting biological mercury concentrations (fish and other aquatic biota). Preliminary fieldwork was undertaken in fall of 2004, and a full field program is scheduled to begin in June of 2005. The model derived from this project will permit stakeholders to determine the influence of changes in atmospheric deposition rates and wastewater discharges on the concentrations of mercury in the lake's waters and biota.

## **United States Geological Survey**

The USGS continues to actively monitor mercury in selected Vermont watersheds. The newest research findings corroborate that upland areas of small streams are important areas for the methylation (toxification) of mercury. During 2004, USGS will continue its monitoring activities and continue participating in the Lake Champlain project.

## **Vermont Institute of Natural Sciences**

VINS continues to build on their database of mercury in the blood of the threatened Bicknell's thrush and other insectivorous woodland birds. Results of this work build on prior year's findings: mercury in these birds is elevated in some Vermont sites (particularly on Stratton Mountain); and, the birds' blood continues to increase in mercury as the birds age. The purpose of this work is to establish an upland indicator of mercury contamination that can serve as a sentinel of changes in mercury impacts to high elevation sites over time.

## **Underhill Monitoring Station**

Information and data on mercury deposition are once again flowing from the Underhill mercury monitoring station. Vermont will benefit from the continued participation of Dr. Jerry Keeler from University of Michigan in operation of the site. Dr. Eric Miller also began working with the Vermont Monitoring Cooperative in mid-2004 to implement new monitoring approaches at Underhill, Vermont's only air monitoring site. As has previously been recommended, a second mercury deposition-monitoring site should be established in southern Vermont.

## **Northeast States Research Consortium**

The NSRC mercury workgroup is finishing a three-year assessment of mercury contamination across northeastern North America. The goal of that effort has been to catalogue as much existing mercury monitoring data as practical, from projects across northeast North America. These data have been synthesized to create a comprehensive picture of mercury contamination for the study region, and the results of these analyses comprise 23 peer-reviewed manuscripts that are "in press" in the journal *Ecotoxicology* as of this writing. Selected investigators who coordinated and participated in this project are participating in a February, 2005 briefing for congressional members and staff, federal agency science advisors, and the environmental advocacy community in Washington D.C.

The NSRC mercury group also completed the first year of a three-year project designed to determine what increase in fish mercury levels may be attributable to water level management in reservoirs with managed water levels. Findings from this project will yield important information to assist in minimizing the

environmental impact of operations attributable to flood control and hydroelectric facilities that operate within the State of Vermont.

## **METALICUS**

The Mercury Experiment to Assess Loadings in Canada and the US Project is a very high profile international experiment. A lake in the “Experimental Lakes Area” of Manitoba was chosen and dosed with “stable isotopes” of mercury. Stable isotopes are essentially chemical tracers, and METALLICUS researchers dosed distinct mercury isotopes for each of three distinct sections of the lake watershed (terrestrial, wetland, lake surface). Researchers are tracking the movement of mercury from the parts of the system where the mercury was dosed to its ultimate repository in water, sediment, or biota. The Project has concluded that newly deposited mercury is what is most readily methylated and therefore most readily available to biota. This is a very important finding that directly relates to the arguments surrounding mercury emission controls (see below). Specifically, if newly deposited mercury is most likely methylated, then emissions controls are more likely to be successful at reducing fish mercury in the short term after implementation.

### **Water Quality Criterion for Fish Tissue Mercury**

In 2001, EPA promulgated a new fish tissue criterion under §304(a) of the Clean Water Act. States are required by this section of the Act to either adopt the EPA recommended criteria, or to propose criteria that are more stringent, to be adopted into the state’s Water Quality Standards. There has been no further action on this in Vermont. Revision and new promulgation to the Vermont Water Quality Standards are now the purview of the Natural Resources Board.

### **Wildlife Criterion Value for Mercury**

The State of Maine is actively developing a wildlife criterion value (WCV) to protect wildlife from mercury consumed through the food web. A WCV is essentially a water-column mercury concentration above which fish are expected to bioaccumulate mercury to levels above those considered safe for wildlife that consume the fish. Maine’s proposed WCV is approximately one-tenth Vermont’s current most conservative criterion. Vermont should keep apprised of the work being done in Maine, as it may provide a suitable and simple approach to managing mercury in Vermont waters.

### **EPA Mercury Modeling Project**

During 2003, the EPA initiated a project with several partners to develop a comprehensive model predicting mercury reduction based on emission reduction strategies. This effort is still in its early stages, but should provide useful estimates of watershed recovery given a range of mercury emission control scenarios. This emissions inventory and modeling initiative will provide critical information for deriving mercury control plans that are required by § 303(d) of the Clean Water Act.

#### **IV. COMMITTEE RECOMMENDATIONS**

The Advisory Committee's recommendations for reducing mercury risk and exposure are divided into the following three categories:

- Mercury Education and Reduction Initiatives
- Legislation – Mercury Products
- Legislation – Dairy Manometers

##### **Mercury Education and Reduction Initiatives**

- Several mercury education and reduction outreach initiatives are underway and are critical to continued success in reducing mercury risk in Vermont. These include providing outreach to sensitive populations and health care providers on the fish consumption advisories; outreach to the general public on fluorescent lamp recycling; outreach to dental offices to provide consumer information on mercury-containing dental amalgam and alternatives; and outreach to health care facilities and dental offices on mercury reduction and best management practices. Adequate state resources should be provided to continue these efforts.
- The Committee recommends that educational materials be developed and disseminated to inform dental patients of the health and environmental concerns of mercury fillings and the alternatives available. This can be accomplished through the cooperation of the Committee with the Vermont Department of Health and the Vermont State Dental Society.

##### **Legislation – Mercury Products**

The Advisory Committee on Mercury Pollution strongly recommends that comprehensive mercury product legislation be passed by the Legislature this session. Vermont was one of the first states to pass mercury product legislation. However, since the Northeast states developed “model” mercury product legislation, Vermont has lagged behind most New England states in adopting controls on mercury products. (See Appendix B for a comparison of mercury product legislative provisions adopted in other states.) Vermont has been the leader in the nation in implementing mercury product labeling since the law was passed in 1998. However, there are many additional actions that will reduce human health risk to mercury in products. All of the recommended legislative provisions have already been adopted by other states.

In order to satisfactorily implement these legislative provisions outlined below, DEC staff have indicated that additional resources are needed or a reduction must be made in current efforts.

**Multi-State Clearinghouse** – Recommend that the Legislature authorize Vermont DEC to participate in the Interstate Mercury Education and Reduction Clearinghouse (IMERC), which coordinates the multi-state review of mercury-added product manufacturer notification, labeling, and exemption requests from product sale restrictions. Vermont's participation in the clearinghouse will reduce the level of effort in administering new provisions and assure greater consistency from state-to-state in manufacturer compliance issues. This provision has been adopted by several states.

**Manufacturer Notification** – Recommend that manufacturers of mercury-added products that are sold or distributed in Vermont be required to file a notification with the Department that provides information on the types of products and amounts of mercury they contain. This information is necessary to determine

those manufacturers subject to the provisions of the law, such as product labeling and restrictions on product sale. This same notification provision already exists in several states.

**Restrictions on Sale and Use of Certain Mercury-Added Products** – There are certain categories of mercury-added products and certain uses of mercury that should be banned or restricted because their use poses unnecessary health risk and/or there are viable mercury-free alternatives. These restrictions have been adopted by other states.

- *Ban the sale of mercury-added novelty items or toys* (with a few exceptions, such as those containing replaceable mercury-added button cell batteries or a mercury-added lamp as the only mercury-added component).
- *Ban the sale of mercury fever thermometers and mercury thermostats.* There are viable mercury-free alternatives in common usage.
- *Ban the sale of mercury-added dairy manometers.* There are viable mercury-free alternatives that will reduce the risk of mercury release from these devices, which can contain a half-pound of mercury.
- *Restrict the use of elemental mercury.* Liquid elemental mercury should be restricted to use only for medical, research or manufacturing purposes.
- *Restrict the sale of the mercury-added measuring devices such as barometers, hydrometers, blood pressure sphygmomanometers, and flow meters unless an exemption is granted.* Feasible mercury-free alternatives exist for most of these devices that represent a significant percentage of mercury usage in products.
- *Restrict the sale of mercury-added switches and relays unless an exemption is granted.* Feasible mercury-free alternatives exist for most of these switches and relays. These devices represent the largest percentage of mercury use in products today.
- *Exemptions from sales restriction.* Exemptions should be issued for measuring devices, switches, and relays only if there is no feasible mercury-free alternative, or the mercury-added product provides a net benefit to the environment, public health or public safety; and a collection, transportation, and processing system exists for the public to properly manage end-of-life products.

**Labeling of Mercury-Added Products** –Vermont’s mercury-added product labeling provisions passed in 1998 and Vermont has led the nation in efforts to have mercury-added products and components labeled, so that proper management of end-of-life products can be facilitated. Since 1998, however, several other states have adopted product-labeling laws similar to northeast states mercury product model legislation developed several years ago. The current labeling law provisions should be modified to make the labeling provisions more consistent with other states that have adopted the model language. This will simplify the implementation of the law in Vermont. Greater consistency will make it easier for mercury-added product manufacturers to comply with multiple state labeling laws.

**Discarded Mercury-Added Products** – The following provisions on discarded mercury-added products will minimize environmental release from historical use of mercury:

- Require that mercury-added products be separated from discarded solid waste and mandate that no person knowingly disposes of mercury-added products as solid waste. Current law only bans the disposal of labeled mercury-added products. This would assure that the large amounts of mercury in products manufactured before labeling provisions were effective are properly managed at end-of-life.
- In order to facilitate the collection and proper recycling of mercury switches and gauges, the Committee supports a DEC study with recommendations to the Legislature on mercury removal and collection systems, with their associated costs and funding mechanisms, that could be

established at solid waste management facilities and salvage businesses. Mechanical and electrical switches and relays and measuring gauges are prevalent in automobiles, appliances and other equipment and represent the largest mercury waste source from product disposal. Other states, notably Maine and New Jersey, require removal of mercury-added automobile switches prior to vehicle crushing and processing at auto salvage operations. Automobile manufacturers are responsible for collection systems for the switches and payment for removal costs.

**Mercury in Schools** - Ban the purchase and use of elemental mercury, chemicals containing mercury, and mercury-added measuring devices in primary and secondary schools. Most Vermont schools have already taken steps to eliminate mercury use in classroom laboratories. Use of mercury in schools poses an unnecessary risk of release and exposure.

**Mercury-Added Products in Dental Procedures** - Require dental offices and vocational dental programs to use best management practices established by DEC to properly manage mercury-containing dental amalgam wastes. Require dental offices that place or remove amalgam to install dental amalgam separators to capture amalgam particles in wastewater discharges. This technically and economically feasible technology can remove more than 95% of mercury from wastewater discharges. Dental offices contribute a significant proportion of mercury that is discharged to wastewater.

**Hospital Mercury Reduction Plans** - Require hospitals to develop mercury reduction plans to minimize mercury use in medical equipment and devices and formulated chemical products. Historically, hospitals have used many mercury-containing products (thermometers, blood pressure measuring devices, histology fixative and stains) for which there are now viable mercury-free alternatives. Many hospitals have already developed mercury reduction plans.

**Public Education and Outreach** - Continue to provide mercury outreach and assistance programs through the Departments of Environmental Conservation (DEC) and Health (VDH) to the general public, municipal entities, businesses, and institutions. The focus of outreach and assistance should be on reducing mercury releases to the environment and reducing risks of mercury exposure by increasing public awareness of the fish consumption advisories issued by the Department of Health. Public education has been effective to date in raising awareness about mercury in the environment, reducing the use of mercury-containing products, increasing the use of mercury-free alternatives, increasing proper management of mercury wastes, and increasing awareness of fish consumption advisories. Clearly there is more work to be done in outreach and education to continue to reduce risks further.

**Advisory Committee on Mercury Pollution** - The Advisory Committee on Mercury Pollution has been an effective means of advising the Departments of Health and Environmental Conservation since 1998. It is recommended that two new members be added to the Committee, a representative of the Department of Fish and Wildlife and a representative of a municipal solid waste district.

**Environmental Research on Mercury Contamination in Fish** - It is recommended that the Departments of Health, Fish and Wildlife, and Environmental Conservation develop a research plan and associated cost estimates, to better monitor and report on fish contamination levels and long-term trends in Vermont water bodies. This plan should be submitted as a report to the Legislature by next year. Such information is important in protecting Vermonters from the most common route of exposure to mercury.

### **Legislation – Dairy Manometers**

The Committee strongly supports legislation that would assure adequate funding through the Agency of Agriculture, Food and Markets to remove and/or replace the remainder of mercury-containing dairy manometers on Vermont farms that are both active and inactive. These devices typically contain one-half

pound or more of mercury. With funding through the Lake Champlain Basin Program, over 80 dairy manometers were removed from active farms in the Lake Champlain basin several years ago and replaced with mercury-free manometers in a highly successful project. Other states have initiated projects based on the Vermont experience. However, statewide removal in Vermont was never completed on active and inactive farms. Dollar-for-dollar, dairy manometer replacement is a cost-effective means to remove mercury that may be a high risk of future environmental release.

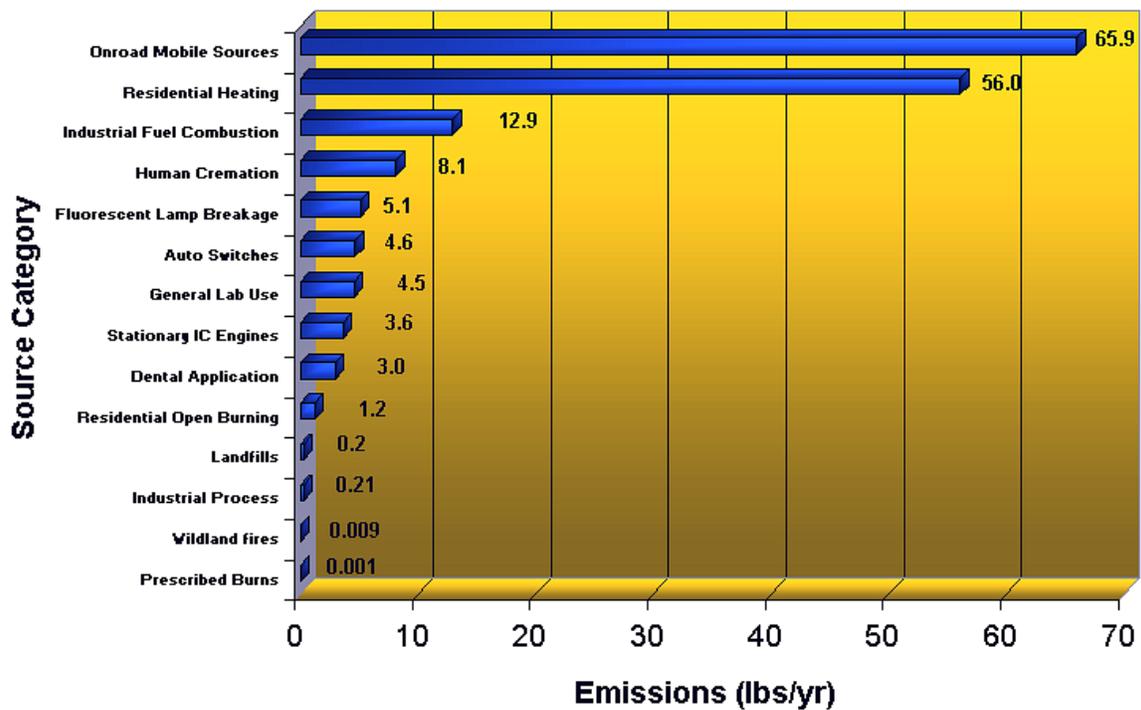
## V. COMMITTEE WORKPLAN FOR 2005

The Advisory Committee has identified the following priority areas of work in the coming year:

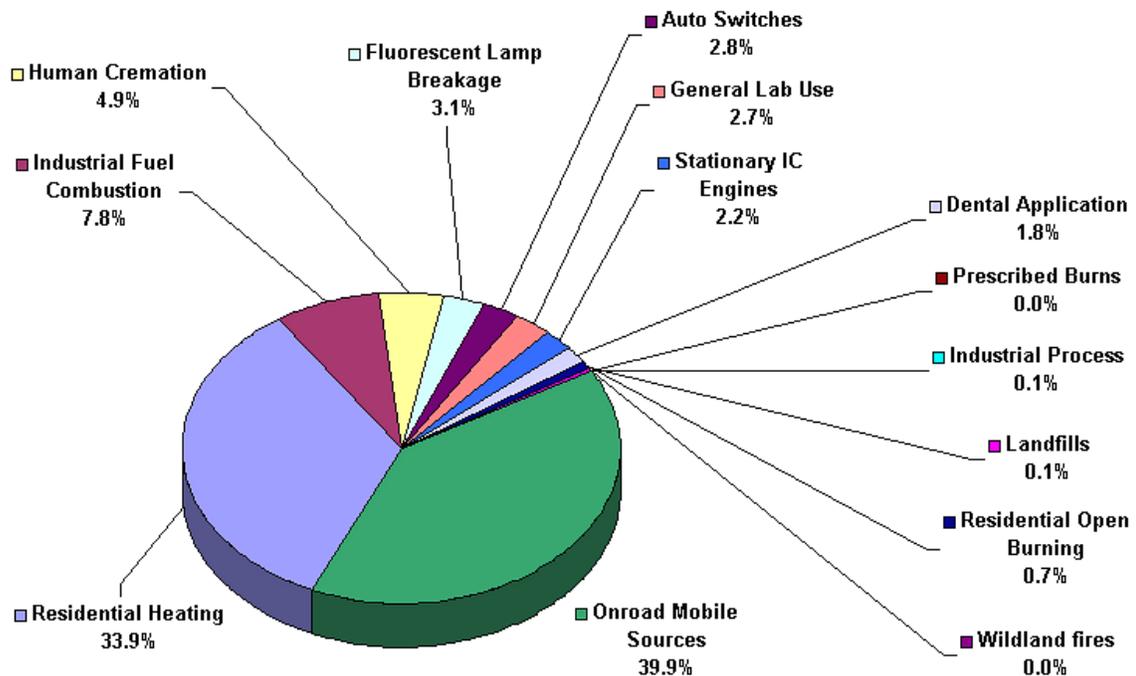
- **Outreach to Sensitive Populations** – The Committee has identified this area as a high priority. The greatest mercury exposure to the general population is through fish consumption. The level of public awareness is still relatively low but is increasing. The Committee will continue to review efforts by DEC and VDH to inform the general public and those populations most sensitive to mercury exposure about limiting their exposure by following the state’s fish consumption advisories.
- **Mercury in the Environment** – The Committee will continue to evaluate and assess environmental monitoring and mercury inventory data to better understand potential impacts and trends and further steps that can be taken to reduce the risk of mercury exposure.
- **Mercury Use and Release in Health Care** – The Committee will continue to monitor mercury use and release reduction in medical and dental facilities and outreach to patients on the fish advisories. The Committee will further explore the dissemination of information to dental patients on the potential advantages and disadvantages of using dental amalgam and other restorative materials.
- **Mercury Education and Reduction Efforts** – The Committee will continue to evaluate and monitor ongoing mercury education and reduction programs in the Departments of Environmental Conservation and Health such as mercury reduction in health care applications and fluorescent lamp recycling.

## APPENDIX A - Vermont Mercury Air Emissions by Source (lbs. and %)

(Total = 165.3 lbs)



### 2002 Mercury Source Contribution



Vermont mercury emissions data as generated by the Vermont Department of Environmental Conservation, Air Pollution Control Division

## APPENDIX B

### Status of Mercury Education & Reduction Legislation in the IMERC-Member States October 2004

Requirement	CT	IL	ME	MA	NH	NJ	NY	RI	VT	WA
Mercury-added Product Notification	☉	✓	☉	✓	☉			☉	✓	
Interstate Clearinghouse	☉	☉	☉	✓	☉		☉	☉	✓	
Bans on Certain Hg-Added Products	☉	☉	☉	✓	☉	✓	☉	☉	✓	☉
Novelty ban	☉	☉		✓	☉		☉	☉	✓	☉
Thermometer ban	☉	☉	☉	☉	☉	✓	☉	☉	✓	☉
School ban		☉	☉	✓	☉		☉	☉	✓	☉
Manometer ban	☉		☉	✓	✓			☉	✓	☉
Phase-Out & Exemptions	☉	☉	☉	✓	✓			☉	✓	
Labeling	☉		☉	✓	✓		☉	☉	☉	☉
Disposal Ban	☉		☉	✓	✓		☉	☉	☉	
Collection System Plans	☉	✓		✓	✓			☉		
Disclosure			☉	✓				☉		
Control on Sale of Elemental Mercury	☉	☉	☉	✓	☉		☉	☉	✓	☉
Public Education and Outreach	☉		☉	✓	☉	☉	☉	☉	☉	☉
Universal Waste Rule	*	*	*	*	*	*	*	☉	☉	
State Procurement			*	✓	✓			☉	*	
Education on Dental Amalgam			☉	✓	☉					
Dental Amalgam Separators Required	*		☉	✓	☉					
Dental Amalgam Recycling							☉			
Mercury Auto Switch Phase-out & Removal		✓	☉		✓	✓		✓		

☉= Provisions that have been passed this or previous years

✓= Provisions proposed in 2002, 2003, or 2004

\*= Authority exists to implement under existing laws or policies

Status of Mercury Legislation developed by the Northeast Waste Management Officials Association (NEWMOA). IMERC is the Interstate Mercury Education and Reduction Clearinghouse

By the Advisory Committee on Mercury Pollution:

Richard Phillips

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Chair of Advisory Committee on Mercury Pollution

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Date

On behalf of the members:

Michael Bender

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William Bress

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State Toxicologist, Chief Toxicology and Risk Assessment Program,  
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Vermont Senator, Senate Natural Resources and Energy Committee

Representative Philip C. Winters

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Advisory Committee on Mercury Pollution 2005 Report