

The Quicksilver Caucus (QSC) is a coalition of State associations formed to address and resolve health and environmental problems resulting from the release of mercury to the environment. The membership of the QSC includes the Environmental Council of the States, The Association of State and Territorial Solid Waste Management Officials, The National Association of Clean Air Agencies, The Association of State and Interstate Water Pollution Control Administrators, The Association of State Drinking Water Administrators, and the National Pollution Prevention Roundtable.

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Mercury-Added Product White Paper

Executive Summary

This paper identifies several mercury-added product sectors on which state and federal agencies could focus to reduce the use of mercury through both voluntary and regulatory mechanisms. These sectors were selected by a workgroup of the Quicksilver Caucus (QSC) based on a set of selection criteria, with the most important criterion being the level of effort already underway in that sector.

The product sectors identified as equally meriting national attention are:

- Non-vehicle switches, relays, and flame sensors
- Thermometers
- Dental amalgam
- Thermostats
- Lamps

Each of these product sectors is characterized, and then recommendations for future actions are made. Common recommendations include pursuing multi-stakeholder partnerships, educating consumers and businesses, supporting labeling, expanding safe collection programs, and leveraging federal and state environmental laws and regulations to accelerate the reduction in the manufacture and sale of these mercury-added products.

Three additional sectors - switches in end-of-life vehicles, health care, and schools - are identified as having considerable action underway. Continued federal and state efforts in these areas are encouraged.

Background

Mercury-added products represent a sizable but diffuse source of potential releases to the environment. In May 2006, in response to interest expressed by US EPA in working with states on managing mercury-added products, the Quicksilver Caucus (QSC) launched discussions with supporting analysis to identify, recommend, and discuss a list of mercury-added products on which state and federal agencies could focus to reduce the use of mercury, through both voluntary and regulatory mechanisms. The analysis relies substantially on the research conducted for the *2005 Compendium of Mercury States' Activities* but also includes other identified sources important to the discussions. The QSC convened a group (workgroup) representing five states and the Interstate Mercury Education and Reduction Clearinghouse¹ (IMERC) staff. (Appendix A). The QSC group established criteria for targeting mercury products and sectors, selecting products and sectors based on these criteria, and recommending potential voluntary and regulatory actions for reducing and managing mercury-added products. This document, developed by the QSC, is intended to stimulate discussion between states and US EPA on this topic.

Criteria for Selecting Products

The workgroup initially discussed five major criteria for identifying priority products and sectors that should be targeted by additional federal efforts. The criteria included technical considerations, public health impacts, industry characteristics, current federal and state actions, and public interest. See Appendix B for a list of criteria considered. It was determined that the single most important factor in choosing products for action is the extent to which there is already considerable effort underway, largely by states but also as supported by federal and public efforts. This is based on the premise that states have applied technical and public health impact criteria to determine what products should be targeted and thus have generated considerable momentum already. These state focus areas could benefit substantially from complementary and supportive efforts on the part of US EPA.

The workgroup developed and reviewed an updated version of the table covering “State Action Related to Mercury in Products (Excluding Vehicle Switches)” from the *2005 Compendium of States' Mercury Activities* to evaluate where there was considerable state mercury reduction action. To update the table, the workgroup consulted a variety of state sources on mercury reduction legislation, added information on state vehicle switch programs, and added clarifying information on state laws and regulations that were not covered in the original table. See Appendix C for the updated table. After consulting the results of the updated table, the workgroup considered a number of other factors, including public health impacts, technical attributes, and industry characters.

¹ State members of IMERC are California, Connecticut, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, Vermont, and Washington.

Identification of State and Federal Actions for Priority Product Categories

Mercury reduction actions can occur at any and all levels of government, by private sector actions or public-private partnerships, or through coalitions that create public pressure for action. Actions may be voluntary, mandatory, or a combination of approaches directed at the use and proper collection and disposal of mercury. They can range from legislation on product notification and labeling and applying pollution prevention principles to product phase-outs or sales prohibitions to voluntary multi-stakeholder agreements or even unilateral action by a manufacturer to redesign mercury out of a product. Some approaches, particularly product bans, can be phased in to allow the manufacturer adequate time to innovate and develop non-mercury substitutes or alternative technologies and deplete existing inventories. Programs may include education and outreach as well as collection and proper management of mercury-added products. Some programs provide financial or in-kind incentives, such as bounties paid for the recovery of mercury vehicle switches at salvage yards, or offers of a digital thermometer in exchange for a mercury-in-glass fever thermometer. Actions can be undertaken at the local, state and/or federal level, or there may be third-party actions such as coalitions that create public pressure for action.

Recommended Product and Sector Categories

Based on the primary criterion of substantial state-initiated momentum, and the secondary criteria listed in Appendix B, the workgroup selected five product categories as meriting equal priority for developing recommendations on further federal, state, and local action: non-vehicle switches and relays, thermometers, dental amalgam, thermostats, and lamps. Also, for the purpose of encouraging continued state and federal efforts, the workgroup identified three additional sectors that already have considerable action underway. These sectors – mercury switches in end-of-life vehicles, health care, and schools - are described briefly at the end of this paper.

Non-vehicle Switches, Relays, and Flame Sensors

Non-vehicle switches are products or devices that open or close an electrical circuit or a liquid or gas control valve and include float switches, tilt switches, pressure switches, temperature switches, and flame sensors. Relays are products or devices that open or close electrical contacts to control the operation of other devices in the same or another electrical circuit. Relays are often used to turn on and off large current loads by supplying relatively small currents to a control circuit. Mercury-added relays include mercury displacement relays, mercury wetted reed relays, and mercury contact relays. Switches and relays are sold both individually or as a product component. The amount of mercury per switch or relay can vary from 50 milligrams to 67 grams of mercury. Older products may contain more. According to the data submitted to the IMERC-member states by manufacturers of mercury-added products for 2001, switch and relay

components sold in the United States used more than 52 tons of mercury. This is the largest mercury use for a product category for sale in the U.S. that has been identified by the data collected through IMERC.

There are at least eight states with legislation that either currently bans or phases out in the next one to three years the sale of mercury switches and relays and the products that contain these components. There are various state specific statutory exceptions in these laws, for example, when a mercury-added switch is required under federal law or federal contract specifications. Most of the states also provide a process for the manufacturers to apply for an exemption to the phase-outs. These and other states may also have mercury-added product notification and labeling requirements. On a national level, US EPA has launched a voluntary program, the National Partnership for Environmental Priorities (NPEP)-Mercury Challenge, which provides public recognition to companies that make a commitment to reduce mercury in the products it manufactures and purchases. Several mercury switch manufacturers are already participating in this program.

Recommendations

Given that the states with legislation that affect the sale of mercury-added switches and relays constitute a substantial proportion of commerce conducted in the United States, the workgroup anticipates a significant reduction in the prevalence of mercury in these product types. There is a major challenge with identifying such products and components, so that the state laws can be properly enforced. US EPA could assist in this by supporting the states in the identification of components and final products that have mercury-added switches and relays through targeted technical assistance, grants, and national outreach efforts. In light of state actions to limit the use of mercury-added switches, QSC calls on US EPA to work towards a national phase-out of unnecessary uses in these products over the next five years. A step in this direction would be for US EPA to meet with switch manufacturers and industry experts to try and gain a consensus on performance parameters for mercury switches and relays. Also, US EPA should strengthen the NPEP Mercury Challenge by calling upon manufacturers of mercury-added switches and relays to sign on to a national agreement to phase out the production and sale of these products, with the exception of those rare cases where use of mercury is essential and where there are no non-mercury alternatives available over the next five years.

US EPA should also assist the states in identifying the large number of products that contain mercury switches and relays that are currently in use that were sold prior to 2000 when the first group of state laws requiring product labeling began to take effect. It is expected that these products will be coming out of use over the next 10 – 20 years, since many of them have a relatively long life expectancy. The switches and relays in these products need to be properly managed at end of life. Companies that use these products need guidance on how to identify and properly handle them, and US EPA's support in identifying these products would assist hazardous waste generators in meeting their compliance responsibilities.

Thermometers

Thermometers are temperature-measuring devices that can use a variety of technologies, such as liquid in glass or a thermocouple. The mercury-in-glass thermometer most familiar to the

general public is the fever thermometer, but there are many other mercury thermometer applications in health care, laboratories, meteorology, education, and industry. Initially, state and local government actions in this sector focused on restricting the sale of mercury in the glass fever thermometers and supporting programs to collect and recycle those in use in households, health care, and schools. This was due to concerns about the public health impacts and environmental risk from spills not cleaned up properly and from improper disposal of broken fever thermometers resulting in mercury releases through incineration or land application of sludge.

Efforts have also been underway to address non-fever thermometers that are widely used in industrial, laboratory, or health-care settings. There are a few state laws that address the phase-out on the sale of these types of mercury thermometers, some of which allow manufacturers to apply for an exemption. In the course of reviewing these applications, the states have found that many uses of thermometers by industry and laboratories are integral to American Society of Testing and Materials (ASTM) standards, and therefore users that need to meet those standards are limited in their ability to use non-mercury alternatives. The states have begun to communicate with ASTM, the major international standard-setting body, regarding these standards and the need to re-evaluate them given widely available mercury-free alternatives.

Recommendations

An important barrier to phase-out is industry or government standards and test methods that specifically require laboratory and industrial mercury-in-glass thermometers. At the request of states and thermometer manufacturers, ASTM has recently begun evaluating all of its approximately 839 standards that require mercury-in-glass industrial and laboratory thermometers. The review, evaluation, and development of updated standards for these uses of mercury thermometers will require a significant number of knowledgeable volunteers. US EPA can assist the states with this effort by communicating its strong support for this re-evaluation; assisting ASTM with identifying and addressing barriers to updating these standards; and supporting state participation. Additionally, US EPA should request that all applicable federal agencies such as the Department of Energy and the National Institute of Standards and Technology review any standards that require a mercury-added device and, where feasible, re-write them to require non-mercury-added devices. Furthermore, the US EPA Laboratories have extensive experience with using mercury-in-glass thermometers and their alternatives, and the Agency could lend some of this expertise to this effort. The Agency could also support the states in their efforts to educate consumers, businesses, and institutions about acceptable alternatives. US EPA should also work towards an expeditious national phase-out of those uses where it is determined that feasible alternatives exist.

Dental Amalgam

Mercury comprises approximately half of the metals used in common mercury dental amalgam. The other metals are silver (35 percent), tin (9 percent), copper (6 percent), and zinc (1 percent). Mercury amalgam has been used in dentistry for over 100 years as a preferred tooth restorative material, since it is easy to work with and is durable. Dental amalgam capsules contain between 100 and 1,000 milligrams of mercury. According to the available data from the IMERC-member states, as reported by the dental amalgam capsule manufacturers, the amount of mercury in the dental amalgam sold in 2001 in the U.S. was more than 30 tons.

As many other sectors discharging mercury have implemented mercury pollution prevention (P2) measures, dentists have become one of the largest common sources of mercury entering Publicly Owned Treatment Works (POTWs). Several recent studies have determined that dental practices are now contributing between 40-50 percent of all mercury in wastewater influent. This matter poses particular concern since mercury entering POTWs usually settles out in the sewage sludge, which eventually is either incinerated, heat treated, and/or land applied as bio-solids. Another concern is improper waste amalgam disposal in "red bag" regulated medical waste containers, where this waste material is then either incinerated or autoclaved with the potential for mercury to become volatilized and enter the environment.

During the last decade, significant advances have taken place in the area of reducing mercury amalgam from dental facilities wastewater discharges. Nearly two dozen brands of amalgam separators are now available that can trap 95+ percent of the mercury amalgam. Many communities and states have enacted ordinances or promulgated rules requiring that dentists install and properly maintain amalgam separators. In areas that rely on septic tanks or where water quality effluent limits are especially stringent, this technology holds great promise toward helping dischargers meet the tighter mercury standards. Another emerging program is the effort of the American Dental Association (ADA) and state associations to establish Best Management Practices (BMPs) on the application and proper management of amalgam waste. More recently the BMPs outreach campaign has evolved to a joint effort of ADA and US EPA to encourage the adoption of a "Gray Bag" dental amalgam recycling program.

Recommendations

US EPA, dental associations, and state environmental agencies should continue their collaboration on development of US EPA and ADA's "Gray Bag" dental amalgam recycling program and assure this program is effectively implemented throughout the country. US EPA should continue to support research and information sharing about cost-effective mercury amalgam removal systems and in developing and promoting wider consumer understanding of mercury-free restorative materials.

US EPA, states, and municipalities should engage ADA on the establishment of a national agreement with the goal that within the next three to five years, all dental practices adopt best management practices in tooth restorative practices, which includes the installation of dental amalgam separators. To create incentives to adopt best management practices, the US EPA should further evaluate the potential adoption of a national mercury wastewater "ceiling" for dental practices that discharge mercury under the National Pollutant Discharge Elimination System (NPDES). In the meantime, municipalities should identify opportunities in their POTW programs to create their own incentives to accelerate the adoption of best management practices. With increasingly stringent effluent limits, the ADA will have an interest in promoting cost-effective solutions to meeting water permit requirements, and this could leverage its agreement to participate in a national mercury-added amalgam recovery program.

Dental insurance practices that favor reimbursement for mercury-added amalgam fillings serve as a disincentive for consumers to choose mercury-free restorative materials. Some states are examining their employee dental insurance policies to determine whether they should be amended to require parity on reimbursement for the costs of non-mercury restoration alternatives. Two states

increase consumer awareness by requiring dentists to provide information on the advantages of alternative restorative materials. US EPA could explore whether there are impediments to insurance practices that lead to a preference in mercury-added amalgam over effective alternatives. US EPA and the states can undertake consumer education to increase awareness of effective mercury-added amalgam alternatives.

Professional training at dental schools is critical to promoting best management practices into application of dental amalgam separators and the proper use of mercury-free restorative materials. US EPA should continue and strengthen its current outreach efforts to dental schools to promote these practices and techniques.

The long-run goal as technology and cost effectiveness permit should be a decline in the use of mercury-added amalgam as a restorative material.

Thermostats

Thermostats containing mercury switches are used in residential and commercial heating, ventilation, and air conditioning (HVAC) systems, and are a significant source of mercury use and exposure through solid waste processing. The major manufacturers of mercury thermostats reported to the IMERC member states that more than 14 tons of mercury was used in the thermostats they sold in the U.S. in 2001. For many uses of mercury thermostats there are widely available non-mercury alternatives, including programmable thermostats that the manufacturers promote as having important energy efficiency and convenience benefits.

There are currently three major and several minor manufacturers selling mercury switch thermostats in the U.S. The three major manufacturers - Honeywell, White-Rodgers, and General Electric - formed the Thermostat Recycling Corporation (TRC) in 1997-98 to collect end-of-life thermostats through a wholesaler-based reverse distribution system. This program has recently been expanded to rural and larger urban HVAC contractors; however, according to an October 18, 2004 report by the Product Stewardship Institute, it is estimated that in 2002-2003, the nationwide thermostat recovery under the TRC program was only two to three percent.

There have been several recent developments related to thermostats. Honeywell, which has an estimated 85 percent of the market, no longer manufactures mercury switches itself but is still using mercury switches manufactured by its suppliers. Most recently, Honeywell has been working with the Product Stewardship Institute (PSI), interest groups, and states on a comprehensive approach to management of mercury thermostats, including programmatic and legislated components such as sales bans, expansion of collection programs, and incentives for recovery of thermostats by contractors and homeowners.

A number of states have recently enacted laws or promulgated regulations that restrict the sale of mercury thermostats. For example, Maine has passed legislation that prohibits the sale of new mercury thermostats and provides for financial incentives to collect end-of-life thermostats. Collection pilot projects are currently underway in several states and localities under the auspices of the PSI Thermostat Dialogue. Incentive pilot projects are being conducted statewide in Oregon and

Indiana. Pilot projects for collection through Household Hazardous Waste (HHW) facilities are being conducted at about 50 local and regional HHW programs in Florida, Illinois, Minnesota, Washington, and Wisconsin.

Recommendations

A national thermostat initiative could incorporate the lessons learned from the PSI dialogue and the various collection pilots to apply to a national approach. The goal should be collection of 50 percent of end-of-life thermostats in five years and 90 percent within seven years. In light of the availability of cost-effective non-mercury alternatives, a more immediate goal should be a national agreement to phase out the sale of mercury-added thermostats. Such an agreement could include a grace period and a comprehensive collection, education, and outreach program. US EPA should use a model similar to the approach it applied in developing the National Vehicle Mercury Switch Recovery Program, working with the states to identify the stakeholders for a national agreement on thermostats and applying the data being collected by PSI and IMERC member states to develop a national mercury thermostat collection program.

Lamps

Mercury is used in a variety of light bulbs, from fluorescent tubes to car headlights to neon signage. Fluorescent and other mercury-added bulbs are generally more energy efficient and long-lasting than incandescent and other equivalent forms of lighting; for this reason, states and US EPA have aggressively promoted their use. At this time the technology is not available to make general purpose, energy-efficient light bulbs without mercury. As a result, the markets for mercury-added lamps are likely to continue to be strong and grow in the future. However, non-mercury bulbs have been recently developed for a few applications, such as vehicle high intensity discharge headlights, emergency lighting, and store display lighting.

Hazardous waste lamps, including mercury-added lamps, are covered by federal Resource Recovery and Conservation Act (RCRA) and state Universal Waste Rules. US EPA and the states encourage the recycling of any mercury-added lamp under the Universal Waste Rule. However, on the federal level, only lamps that fail the Toxicity Characteristic Leaching Procedure (TCLP) and are generated by large or small quantity generators must be managed as either Hazardous or Universal Waste. Lamps that pass TCLP and lamps generated by Conditionally Exempt Small Quantity Generators (CESQGs) and households are not regulated under RCRA and do not have to be recycled under the Universal Waste Rule. Some states have more stringent requirements and may prohibit disposal and require recycling of all business lamps or all business and household lamps, regardless of TCLP status.

An emerging lamp management issue revolves around the use of drum top bulb crushers used to reduce the volume of spent lamps prior to shipping. A study on drum top crushers released by US EPA in August 2006 concluded that operators at times are exposed to mercury levels above the Permissible Exposure Limits under the federal Occupational Safety of Health Act, raising employee safety and environmental concerns. In testing, mercury was found to be released during the crushing and drum packing process. A number of states either do not allow the use of drum top crushers or require the issuance of a RCRA Subtitle C Part B Treatment permit and/or air permit to facilities that propose to install the units.

Recommendations

As states require and promote the phase-out of mercury use in switches, relays, thermostats, and thermometers, mercury-added lamps are likely to gain prominence as a significant source of mercury in the solid waste streams. For now, continuing to promote proper recycling for lamps is a critical mercury reduction challenge for the US EPA and states. It is important that while the Agency promotes increased use of energy-efficient lighting under the “Change a Light, Change the World” campaign, it also provide a consistent message on the importance of lamp recycling. As simple a slogan as “buy, conserve, recycle” sends a clear message to consumers that would encourage the purchase of energy-efficient lights, but it also reminds them of their obligation to recycle these lamps at the end of their useful life.

US EPA should build on state efforts to promote universal labeling of all lamps and actively encourage standardized labeling for all mercury-added lamps on both the national and international levels, to encourage consumer awareness and proper handling and recycling.

US EPA has supported several lamp recycling projects through a target grant program in the recent past; however, the funds for this program are no longer available. Additional funding is still necessary to help promote increased consumer awareness and to continue to develop a lamp collection and recycling infrastructure. Ongoing funding for lamp recycling programs at the state and local level should be encouraged under any existing US EPA waste and waste reduction related grant programs, and from grant programs made available through US EPA program offices in the Great Lakes, Gulf of Mexico and Chesapeake Bay.

Some states have established partnerships with retailers that sell florescent lamps to offer free lamp recycling to households and small businesses. US EPA should work with retailers, utilities, and light manufacturers to aggressively promote this approach. US EPA can leverage the education and outreach capacity of state and local government, trade associations, and other interested organizations to help promote this approach.

US EPA should work with industry associations such as the National Electrical Manufacturers Association to ensure that private websites like www.lamprecycle.org provide current information on lamp recycling vendors and regulatory requirements. US EPA needs to work with the states on issuing guidance on the safe use of drum top crushers for mercury lamps. Based on this guidance, both US EPA and private industry and trade association websites should provide updated, easy-to-understand information on best management practices on handling and shipping lamps, particularly on the risks and acceptable standards for lamp crushing.

US EPA should also continue to engage the lamp manufacturers on the technical challenges associated with developing low mercury or mercury-free and energy efficient bulbs.

Vehicle Switches, Health Care, and Schools

There are substantial actions underway on the federal, state and local levels in addressing mercury in vehicles and in the health care and school sectors. A national agreement related to mercury switches in vehicles and a national Memorandum of Understanding in the health care sector provide voluntary frameworks for addressing mercury-added products in these sectors. Several states

have enacted legislation requiring the removal of mercury switches from end-of-life vehicles. Other states have active voluntary programs. States also have enacted legislation or adopted programs that contain sales bans, use bans, mercury product phase-outs, and product labeling affecting vehicle switches, health care, and mercury in schools. To support these efforts, many states have aggressive outreach and education programs and websites to promote mercury pollution reduction by the vehicle salvage yards, health care, and K-12 schools.

Recommendations

With the recent execution of the National Vehicle Mercury Switch Recovery Program agreement, US EPA should facilitate the necessary actions to ensure that all participating parties meet their responsibilities and obligations. Close monitoring and measurement will ensure the success of this voluntary effort. In health care, while significant progress is underway through the Hospitals for a Healthy Environment, US EPA and the states can broaden their focus to look at other promising health care-related facilities such as satellite clinics, veterinary facilities, nursing homes, hospices, and in-home health care providers. Within the Hospitals for a Healthy Environmental program, there should be a substantial effort directed at reducing the use of mercury-added sphygmomanometers. A recommended approach is to establish a national mercury-free sphygmomanometer pledge or similar program that could include the support of a multi-stakeholder group including health insurance companies.

With respect to K-12 schools, funding for programs that offer financial assistance to perform school clean out of hazardous chemicals including mercury, offered by US EPA and some states, should be accelerated and increased. Clean-out programs should be tied to the adoption of mercury-free purchasing policies so that mercury does not find its way back into the classroom. Due to the risks involved and the high price of spill remediation, it would make sense for Congress to consider national legislation mandating that K-12 schools not purchase, store, or use elemental mercury, mercury-added instruments, or mercury compounds.

Products for Future Actions: Manometers, Novelty Items, and Button Batteries

Several states and localities have taken legislative action to phase out the sale and use of other mercury-added products, including, for example, barometers, manometers, novelty items, sphygmomanometers/mercury blood pressure cuffs, dairy monometers, and button cell batteries. At least one state prohibits the sale, installation, and use of mercury manometers in the dairy industry, while other states and localities have banned the sale of certain types of toys, games, and novelty items containing mercury. Two Northeast states recently enacted a requirement that button batteries be free of intentionally added mercury by 2011. In the negotiations on this law, manufacturers committed to removal of intentionally added mercury in these products by this date.

Conclusions

The long-term goal is for phase-out of the sale of non-essential uses of mercury-added products, where there are non-mercury alternatives available. The QSC believes that there are several

mercury-added products whose use could be phased out within the next 3-5 years. The best opportunities for achieving this goal are to aggressively pursue multi-stakeholder partnerships, educate consumers and businesses, and leverage federal and state environmental laws and regulations to accelerate the reduction in the manufacture and sale of these mercury-added products. There also should be an expansion of safe collection programs as mercury-added products reach the end of their useful life.

In order to effectively implement this paper's recommendations, US EPA should develop action plans, working with QSC and other stakeholders, setting clear goals and objectives with timelines, and evaluating and reporting on program effectiveness. US EPA and states need to work together to track changes in the use of mercury-added products and to measure the sources and amount of mercury that is collected. This should be correlated with efforts underway to monitor the releases of mercury to air and water, and the associated environmental impact as measured by fish and wildlife studies. Most important is that in tandem with these efforts, US EPA must develop tangible plans for the long-term storage of the excess elemental mercury. These plans should ensure the mercury is not reused in products in the United States or abroad, and that it is not re-circulated back into the environment.

Appendix A—Mercury-Added Product White Paper Workgroup

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Appendix B—Criteria for Product Selection

Note these should be taken into consideration both in terms of choosing targets and in designing strategies for engaging the sources.

Technical attributes

- Readily identifiable product
- Easily separated component
- Availability of functionally equivalent (or adequate) cost effective substitute
- Essential versus non-essential,
- Product expectancy under normal use

Prevalence, exposure and disposition

- Mass
- Average length of commercial use (product life expectancy)
- Legacy vs. continued product
- Sensitivity of population group likely to be exposed
- Ease of collecting at end of life (recoverability)
- Potential for spill existing
- Infrastructure for collecting
- Point of release (air, water, waste)

Industry characteristics

- Readily identifiable manufacturers/producers
- Concentration ratio (few large businesses vs. many small businesses)
- Customer base (household versus industrial, concentrated versus diffuse)
- Product distribution channels (retail, wholesale, product reps)
- Trade association characteristics (readily identifiable, market share coverage)
- Extent of industry action underway (such as in health care, auto switches)

Federal and state actions

- Existing or impending federal rules or regulations
- Existing or impending state rules or regulations (Mercury Compendium)
- Expressed Congressional, state legislative or gubernatorial interest
- Potential for building on existing federal and state programs, partnerships, and agreements (Mercury Compendium, EPA Roadmap)
- Tribal concerns

Public interest

- Customer awareness and receptivity
- Interest and expertise of relevant trade associations
- Interest of NGOs
- Environmental justice

Appendix C – State Actions Related to Mercury in Products

State	Auto Switches	Ban Mercury in Schools	Button Cell Batteries	Dental Amalgam	Elemental Mercury	Formulated Products	Lamps Considered Universal Waste	Limits on Amount of Mercury in Products	Measuring devices (barometers, manometers, sphygmomanometers, etc.)	Novelty Items	Packaging	Relays	Switches (except auto switches)	Thermometers	Thermostats	Other Products
Alabama																
Alaska																
Arizona																
Arkansas	M															
California	M						U	S	S	S	S	S	S	S	S	
Colorado	V															
Connecticut	V		S	A	S	S	U	S	S	S	S	S	S	S	S	S
Delaware																
Florida							U				S					
Georgia											S					
Hawaii	V															
Idaho																
Illinois	V	S								S	S	S	S	S		
Indiana	M	S	S							S				S		
Iowa											S					
Kansas																
Kentucky																
Louisiana	M	S				S		S	S	S		S	S	S		
Maine	M	S	S	A	S		U		S		S	S	S	S	S	
Maryland		S									S			S		
Massachusetts	M	S		A			U		S	S		S	S	S	S	
Michigan	V	S												S		S
Minnesota	M								S	S	S			S		
Mississippi	V			V			U									
Missouri											S					

Key

- A = Amalgam Separators Required
- M = Mandatory Program
- S = Sales and/or Use Ban
- U = Universal Waste
- V = Voluntary Program

State	Auto Switches	Ban Mercury in Schools	Button Cell Batteries	Dental Amalgam	Elemental Mercury	Formulated Products	Lamps Considered Universal Waste	Limits on Amount of Mercury in Products	Measuring devices (barometers, manometers, sphygmomanometers, etc.)	Novelty Items	Packaging	Relays	Switches (except auto switches)	Thermometers	Thermostats	Other Products
Montana																
Nebraska													S			
Nevada																
New Hampshire	V	S		A	S					S	S		S			S
New Jersey	M										S		S			S
New Mexico																
New York	V	S		A	S	S	U	S	S	S	S	S	S	S	S	S
North Carolina	M	S														
North Dakota																
Ohio																
Oklahoma																
Oregon	M									S			S	S	S	S
Pennsylvania	V										S					
Rhode Island	M	S		A	S	S	U	S	S	S	S	S	S	S		
South Carolina	M															
South Dakota																
Tennessee																
Texas	V															
Utah	V															
Vermont	M	S		A	S		U	S	S	S	S	S	S	S	S	S
Virginia	M										S					S
Washington	V	S		A			U		S	S			S	S		
West Virginia																
Wisconsin	V										S					
Wyoming																

