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Removing Mercury Switches from Vehicles

A Pollution Prevention Opportunity for States

August 2005

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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 State and Territorial Air Pollution Program Administrators, The Association of Local Air Pollution Control Officials, The Association of State and Interstate Water Pollution Control Administrators, The Association of State Drinking Water Administrators, and the National Pollution Prevention Roundtable.

The Quicksilver Caucus members developed this document under Cooperative Agreement Number X5 83227101, awarded by the United States Environmental Protection Agency (US EPA).

Removing Mercury Switches from Vehicles

A Pollution Prevention Opportunity for States

Background

Methylmercury is a persistent, toxic contaminant that bioaccumulates in the tissues of fish. Relatively low concentrations of mercury in fish pose serious health risks to people and wildlife that consume them. Anthropogenic mercury emissions enter water bodies, either directly or through deposition from the air and, through biological processes, transform into methylmercury, which enters the aquatic food chain.

The population at the highest risk of mercury-related developmental problems is children of women who consumed large amounts of fish and seafood during pregnancy. The National Research Council's July 2000 report estimated that each year about 60,000 children could be born in this country with permanent, irreversible neurological problems due to mercury exposure. As a result, 45 States and the Food and Drug Administration have adopted public health advisories related to fish consumption throughout the country due to mercury contamination.

Pure mercury is a liquid metal that volatizes readily. It has traditionally been used in making products like thermometers, switches, and some light bulbs. (It is sometimes referred to as quicksilver.) Breaking mercury products and spilling mercury, as well as the improper treatment and disposal of products such as vehicle switches, and wastes containing mercury, can also release it into the environment.[1]

Mercury in Vehicles—The Problem

Prior to complete phase out at the end of model year 2003, domestic automobile manufacturers (Ford, GM, Chrysler) installed mercury-containing switches in vehicles for convenience lighting in the trunk, hood and other interior lighted areas, in anti-lock braking systems (ABS), and in other systems such as ride control. Other automobile manufacturers never used mercury in similar applications (Honda, Toyota), or stopped using it by the end of model year 1997 (Subaru) or earlier. Today, vehicles containing an estimated 150 million mercury convenience light and ABS switches (representing around 150 tons of mercury) remain on the road although this "snapshot" number is falling as the remaining vehicles with mercury switches are retired.[2] This is a snapshot in time.

Unless there are programs in place to collect the mercury switches before these vehicles are crushed, shredded and recycled, mercury can be released into the air, soil and water during crushing, shredding or more importantly from subsequent smelting of the steel hulks in electric arc furnaces (EAFs). It is estimated that between 10-to-12 million vehicles with mercury switches are annually shredded into scrap.[3] This shredded scrap is used primarily to produce steel in EAFs, and is used to a limited extent in iron and steel foundries. Steel scrap is also used in integrated steel mills but to a smaller extent.[4]

Automakers are not able to provide precise figures on the number of switches in existing or scrapped cars because the switches were installed as options in many cases, and they did not track the installations. However, reasonable estimates of mercury switches in salvaged vehicles can be derived for a particular state by first estimating the number of cars taken out of service annually in that state. To derive the number of switches, a conservative estimate of one switch per two scrapped cars is consistent with the lower end of recent state estimates.

New Federal Regulations On the Horizon— New Challenges for States

US EPA estimates that EAF mercury air emissions are 10 tons per year, making them the 4th largest source in the United States[5]. US EPA is writing a Clean Air Act area source rule for EAF hazardous air pollutants, including mercury, and hopes to propose it in late 2005. End-of-stack controls are unlikely because of technical issues and US EPA authority is limited to steel mills (i.e. US EPA cannot impose requirements on upstream suppliers, such as dismantlers).

The area source rule is expected to include "work practice" requirements for mercury source control (pollution prevention), such as mercury feed restrictions already imposed on iron and steel foundries. These "work practices" may include recognizing scrap generated in states with applicable statutes or voluntary programs that in some systematic, documented way reduce the amount of mercury in vehicle and other scrap—examples include statutorily mandated collection and recycling programs in Maine, New Jersey, and Arkansas, and the voluntary programs in Wisconsin, and Colorado. It should be noted that it is not yet clear which existing programs US EPA would consider sufficient for this purpose—it may depend upon the program's effectiveness.

States without such programs will need to develop or amend programs to make them stringent enough to satisfy the rules' requirements so that the scrap from their state's vehicle shredders and dismantlers can continue to be sold for steel production.

Looking For Solutions

Existing Vehicle Recycling Infrastructure

Dismantlers, those handling whole, uncrushed end of life vehicles (ELVs), are in the best and last position to recover mercury switches. However, they generally do not remove mercury switches since there is no market for them and there are added costs to do so (locating and removing switches can cost between $1.00 to $5.00 per convenience light switch depending on labor, disposal, record keeping, regulatory requirements, etc.). ABS switch removal requires more effort because of where they are located, so the labor cost of ABS switch removal is higher. There are approximately 14,000 vehicle dismantlers in the US. However, only a few States can identify their dismantlers since many are small operations that may not be subject to or may operate outside of environmental permitting or vehicle de-titling requirements. The largest dismantler trade association, the national Automotive Recyclers Association (ARA), includes, by its own estimate, only about 30% of all dismantlers. There are also state, regional, and local associations of dismantlers. Dismantlers are also known as salvage yards, and they sell parts from vehicles as well as the steel hulks. Dismantlers may crush vehicles on site or chose to sell to a mobile or stationary crushing firm for further processing.

Scrap Processors are a group of businesses that handle crushed or whole (uncrushed) vehicles. While most accept only crushed vehicles, those handling whole vehicles are similar to dismantlers—in the best and last position to recover mercury switches. The primary national trade association for scrap processors is the Institute of Scrap Recycling Industries, (ISRI). ISRI has nearly all scrap processors operating vehicle shredders and many of those that pre-process the ELVs as members.

Partnership for Mercury Free Vehicles. The coalition of dismantlers (ARA), scrap processors and shredders (Institute of Scrap Recycling Industries), steelmakers (American Iron and Steel Institute, Steel Manufacturers Association), environmental groups (Environmental Defense, Great Lakes United, Ecology Center, etc.), are working together to establish effective mercury switch and recovery programs that include outreach and education, financial incentives for dismantlers, and automaker responsibility.[6]

Other States

States (23 to date), US EPA, and Canada have taken steps to address this problem using either existing authorities or new legislative approaches. Table-1 summarizes the range of State approaches for removing mercury switches from vehicles as of June 2005. (Appendix A provides abstracts and web site links to more information about state programs. Appendix B summarizes the 2005 laws.)

States with existing programs as well as those considering new legislation *are all targeting their efforts on having dismantlers and scrap processors remove mercury-containing devices*

from end of life vehicles. They differ is in such areas as:

- Who pays for the program (e.g., automakers, steel mills, grants from US EPA, etc.).
- How comprehensive the program is in terms of membership and record-keeping, and data collection.
- Whether switch removal is mandatory.
- Whether someone provides in-kind or direct cash financial incentives (e.g., bounties) to dismantlers to remove the devices.
- Whether they include ABS switches.

Unlike some other environmental issues, there is virtual agreement among all parties that mercury switch removal at vehicle end of life is warranted to reduce mercury releases. The issues that have created the most controversy are who should finance the programs, and who should absorb the costs of switch removal and subsequent management.

Some states have enacted legislation requiring the automakers to create or finance parts or the entire program, including a financial incentive to the dismantlers.

- Arguments for taking this approach include imposing costs on those entities who installed the switches despite the availability of non-mercury alternatives used by other manufacturers at the time, and the limited funds available at state agencies or elsewhere to fund this non-federally supported initiative.
- Arguments against this approach include a reluctance to penalize automakers for using mercury switches that were legal at the time, and an acknowledgement that steelmakers should contribute at least in part because they benefit economically from not installing mercury stack controls if the switches are removed prior to smelting.

A separate but related issue is whether providing a financial incentive to dismantlers, sometimes called a bounty, is a necessary and desirable element of the program. States have taken different approaches based upon whether as an equity matter they seek to relieve salvage yards from some of the switch removal costs, and whether states believe a financial incentive is needed because of the challenges associated with a voluntary or enforcement-based approach for the salvage yard sector. In some cases, states have started without an incentive to test the results, but have indicated they may move to an incentive if the results do not meet expectations.

The decision on whether to include ABS switches depends upon balancing considerations of the higher time and expense associated with ABS switch removal versus the estimated 10-15% of the mercury in vehicles attributed to ABS systems.

Switch removal programs also generally have three common program components:

- Program administration to manage the program and evaluate its effectiveness
- Outreach to the dismantler community within their state
- A system that ensures safe handling, storage and proper management of the removed mercury devices

Wisconsin and New York have incorporated requirements in storm water permits for auto dismantlers.

Table 1 – Summary of State Approaches

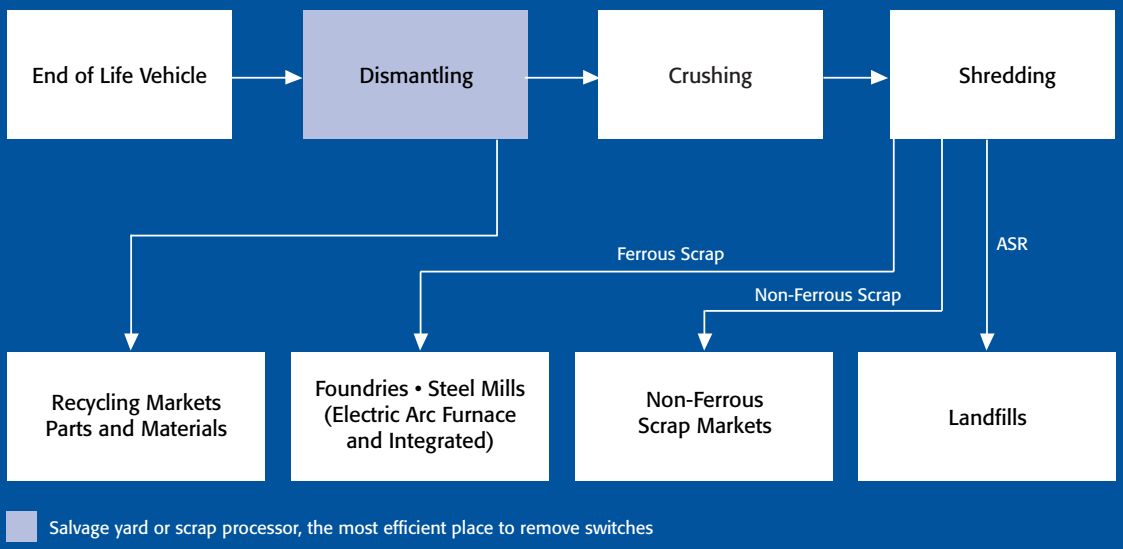
State	Use Existing Program Authorities	Special Legislation[12]
Arkansas		Enacted Legislation – "Mercury Switch Removal Act 2005" Signed March 7, 2005
California	Outreach, Pilot Program, Regulation	Proposed Legislation: AB 1240– "Mercury Switch Removal Act of 2005" This bill is currently a two year bill and is on inactive status.
Colorado	Voluntary ELV Removal Program	
Connecticut	Compliance Assistance Outreach Program	Proposed Legislation: SB 1187 – "An Act Concerning Mercury Switches and Devices In Motor Vehicles"
Florida	Compliance Assistance Pilot	
Illinois	Research "Report to the Governor and Legislature on Reducing and Recycling Mercury Switch Thermostats and Vehicle Components"	Proposed Legislation: HB 1628– "Mercury Free Vehicle Act of 2005"
Indiana	Compliance Assistance and Inspections Project	
Louisiana		Proposed Legislation: HB 600–
Maine		Enacted Legislation–Maine law on mercury components in motor vehicles, 38 MRSA §1665- Enacted Legislation "An Act To Amend the Law on Mercury-added Products" Signed May 20, 2005
Massachusetts		Proposed Legislation: H1293 "Mercury Free Vehicle Act of 2005" Proposed Legislation: H1296– "An Act To Eliminate The Emission Of Mercury From Vehicles"
Michigan	Voluntary ELV Removal Program Partnership	
Minnesota	Pilot Program Partnership	Enacted Legislation 1995 requiring "good faith effort" to remove switches prior to crushing. [Minn. Stat. 116.92 subd. 4(c)]

(continued on page 6)

Table 1 – Summary of State Approaches *(continued from page 5)*

State	Use Existing Program Authorities	Special Legislation[12]
New Jersey		Enacted Legislation – P.L. 2005, c.54 "Mercury Free Vehicle Act of 2005" Signed March 24, 2005
New York	Pilot Collection Program	Proposed Legislation: A03336 and S 04256– "Mercury-free Vehicle Act of 2005"
North Carolina		Proposed Legislation: SB 1014 and HB 1136 – "Mercury Switch Removal Act of 2005"
Ohio	Research "Mercury Contamination from Metal Scrap Processing Facilities – A Study by Ohio EPA"	
Oregon	Pilot Project Partnership OR DEQ Interim Policy Directive For Managing Mercury Switched (Issued in 2002)	
Pennsylvania	Voluntary ELV Removal Program Partnership	Proposed Legislation: SB 524 – "Mercury-Free Motor Vehicle Act"
Rhode Island	Outreach Factsheets	Enacted: 2005–H 5911 SUBSTITUTE A AS AMENDED – "Mercury Reduction and Education Act."
South Carolina		Proposed Legislation: H709 and H3922– "Mercury Switch Removal Act of 2005"
Texas		Enacted Legislation: HB 2793 – "Removal of Convenience Switches"
Vermont	Outreach	Proposed Legislation: S. 0084– "Comprehensive Management of Exposure to Mercury"
Virginia	Partnership Pilot	
Washington		Proposed Legislation: HB 1731 "An Act Relating to the Removal of Mercury-added Components in Motor Vehicles; amending RCW 70.95M.010 and 70.95M.080." Proposed Legislation: ESB 5710–An Act Relating to the Removal of Mercury-added Components in Motor Vehicles; adding a new chapter to Title 70 RCW; and prescribing penalties."
Wisconsin	Voluntary Partnership	

Figure 1
Existing Vehicle Recycling Infrastructure



Existing Vehicle Recycling Infrastructure– A Source and A Solution[7]

The vehicle-recycling infrastructure currently in place in the United States (and Canada) is shown in *Figure 1*. Approximately 94 percent of End of Life Vehicles (ELVs) enter this system, where parts are recovered for their re-use value and the ferrous and non-ferrous metals are recovered and re-used in the production of steel and other products.

Dismantling

ELVs enter the recycling infrastructure via a vehicle dismantling facility which sells parts, and/or a "scrap yard," which makes money solely on the value of the steel. (A scrap processor may take in whole vehicles or vehicles that have gone through salvage yards.) Once vehicle dismantlers remove all the parts with significant resale value from an end-of-life vehicle, the remaining hulk is prepared for crushing and/or shredding.

- The United States has an estimated 14,000 dismantlers, 20 percent of which use advanced technologies and target late model vehicles. The remaining dismantlers conduct more traditional auto salvage operations.
- High-value parts dismantlers tend to be high-volume operations that quickly process ELVs. This type of dismantler either sends the ELV hulks on to a shredder or to a scrap yard for further preparation prior to shredding.

- The vast majority of automotive dismantlers are low volume low technology operations that store the ELV to wait for a good metal price to sell the removed parts. Many of the low volume, low technology operations are small and may not be subject to environmental regulation.

The most effective and efficient removal of mercury switches occurs at the auto dismantler/recycler or the scrap-processing yard prior to crushing for shipment and shredding.[8]

Crushing

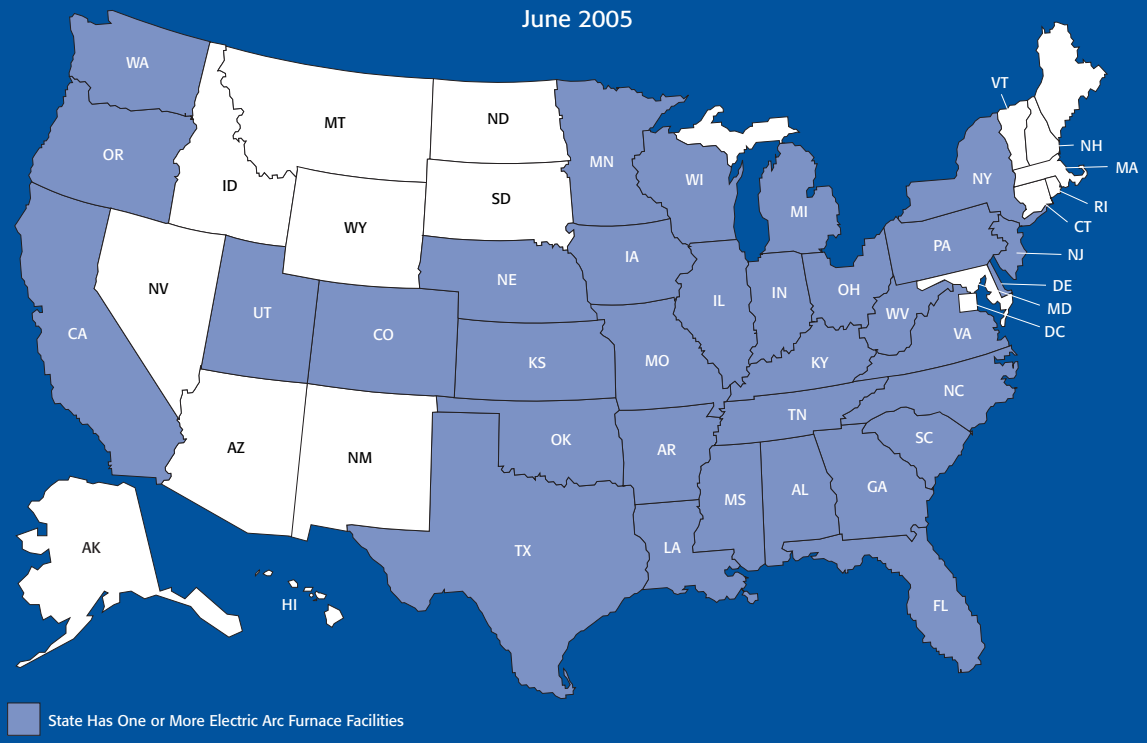
Mobile and stationary crushers are used to crush vehicles at auto or scrap recycling facilities prior to shredding. Crushers are rarely or never located at EAFs. The hulk is usually crushed or flattened for volume reduction before shipment to the shredder. While some components are removed prior to crushing, significant quantities of plastics (trim, cabling, etc.), glass and other non-recycled materials and contaminants remain in the vehicle. Shredded vehicle hulks provide a consistent affordable raw material for steel mills. Once a vehicle is crushed, the mercury switch (if not removed) may become inaccessible.

Shredding

Vehicles are typically crushed before shredding but don't have to be for ease of transport, handling, and efficiency. Vehicles may be shredded at freestanding shredders or shredders located at EAFs (rare). The shredding process separates the materials into three fractions: ferrous, nonferrous, and auto shredder residue (ASR). ASR includes lightweight materials such as foam, textiles, plastics, glass, metal fines that are not recovered, residual fluids, and dirt. The shredder uses hammermills to break down the hulk into fist-sized chunks. The ferrous metals are then recovered by magnetic separation. Nonferrous metals are recovered using other technologies such as eddy current separators. The shredder produces a high quality steel scrap product, which is sent to integrated and EAF steel mills and to iron and steel foundries, although, EAFs are the predominant nationwide consumer.

Though some states have made progress in recovering mercury switches, the bulk of the mercury switches remain with the shredded steel product. The mercury is contained in small steel 'bullets' which are readily attracted by a magnet in most switches.[9]

Figure 2
Location of Some Electric Arc Furnaces in the United States*
June 2005



*Based on data provided by Steel Manufacturers Association, QSC Members, and US EPA

Electric Arc Furnaces or Mini Mills (EAF)

EAFs use electrical energy to melt and refine scrap to make steel products. During melting, elements in the scrap — such as phosphorus, silicon, manganese, carbon, and other materials — are oxidized. Other documented byproducts of the EAF process include metal dusts, and **gaseous byproducts, including an estimated 10 tons of mercury air emissions.**[10]

Today there are about 100 EAF Mini Mills operating in the United States. The U.S. steel production from these mills for that year was approximately 45 million metric tons (50 million short tons). Approximately 37 percent of all domestic ferrous scrap processed by the steel industry is supplied from the automotive recycling sector, which also processes discarded appliances and other industrial scrap steel.[11] (See figure 2 for States with EAF Mills.)

Removing Switches from Vehicles– Cost Effective and Easy To Do

Most of the mercury in vehicles is found in convenience light switches. Vehicle trunk and hood light switches can contain mercury. A mercury switch is probably being used if the light goes on when the hood is partway up, or if the bulb housing is deliberately mounted at an angle to the hood, Most cars containing mercury switches are American makes and models. The second most significant use of mercury is in ABS sensors, which are typically in four-wheel drive vehicles. Other much less important uses (less than 1% historically) are switches to activate airbags, some seat belt systems and automatically adjusting suspension systems. Some agricultural equipment, military vehicles, mass transit vehicles, and fire hook and ladder equipment also contain mercury switches.

- A Michigan study found on average, it takes 48 seconds to remove a convenience light switch assembly and 95 seconds total to remove the pellet in addition to the assembly.[14] The study timed this activity from the point at which the switch was located and exclusive of recordkeeping and associated activities.
- New Jersey estimates it takes less than 1 minute to remove a mercury convenience lighting switch from an end of life vehicle.[15]
- The 1.3 million vehicles registered in Maine at the beginning of 2001 contained almost 2300 pounds of mercury in switches alone.[16]
- Since the inception of the voluntary Michigan Mercury Switch Sweep recovery program a total of 12,028 switches.[17]
- Minnesota has recovered over 46,000 vehicle switches since its programs began in 2001.[18]

Auto recycler removes mercury switch from under the car hood

How Dismantlers Remove Switches

Mercury switches are removed before the vehicle is junked or crushed. This is generally done at the same time as removal of vehicle fluids, batteries, refrigerants and non-deployed airbags. There are four basic steps dismantlers follow:

1. Cut the power supply wire attached to the base of the switch assembly.
2. Remove any fasteners in order to separate the entire assembly from the vehicle.
3. Carefully remove the mercury switch from the assembly. If the switch cannot easily be removed, put the entire assembly in the collection container. Removing the switch from the assembly will save storage space and may also save on disposal costs.
4. If the switch or the assembly looks damaged or corroded, place the switch or entire assembly in a separate plastic container, like a yogurt tub with a tight fitting lid, to prevent leakage.[13]

Appendix A
Programs for Reducing and Recycling Mercury Containing Vehicle Devices

Abstracts and Web Site Links as of June 2, 2005

State Actions and Approaches

ARKANSAS

Enacted Legislation—The "Mercury Switch Removal Act of 2005" establishes a program that requires mercury switches to be removed from end of life vehicles before they are crushed, or flattened, and shredded. *Automobile manufacturers are required to take responsibility—including financial*—for the safe removal of mercury-containing light switches from end-of-life vehicles, prior to being shredded and recycled into new products. Signed into law on March 7, 2005.

http://www.arkleg.state.ar.us/ftproot/bills/2005/ public/SB323.pdf and http://www.americanrecycler.com/0405mercury.shtml

CALIFORNIA

Outreach, Pilots, and Regulation—Developed variety of materials (including training manuals, fact sheets, a Best Management Practices (BMP) document, model recordkeeping forms, and accumulation labels) to assist auto dismantlers and repair facilities to identify, locate, remove, and properly manage mercury switches in vehicles. California is also currently conducting a pilot program in collaboration with the State of California Auto Dismantlers' Association (SCADA) to assist the association's member dismantlers in complying with the State's mercury switch removal requirement. In 2003, adopted regulations which required, effective January 1, 2005, that require removal of mercury convenience light switches from the trunks and hoods of end-of-life vehicles prior to crushing, bailing, shearing or shredding the vehicle.

http://www.dtsc.ca.gov/LawsRegulationsPolicies/Mercury/Oeara_regs_mercfinaltext.pdf and http://www.dtsc.ca.gov/HazardousWaste/Mercury/index.html

Proposed Legislation—AB 1240—"Mercury Switch Removal Act of 2005." Would require every manufacturer of vehicles sold in the state, individually or as part of a group of manufacturers, in consultation with the Department of Toxic Substances Control (Department), develop and submit a mercury switch removal plan to the Department for review and approval on or before July 1, 2006. The plan will provide for the financing of the removal, collection, and recovery system for mercury switches. These costs are to be borne by the manufacturers of vehicles sold in the state, and the manufacturers will develop a method that ensures the prompt payment to vehicle recyclers, scrap recycling facilities, and the department, for costs associated with mercury switch removal and disposal.

http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=ab_1240&sess=CUR&house=B&author=levine

Enacted Legislation—Senate Bill (SB) 633, the Mercury Reduction Act of 2001, required the Department of Toxic Substances Control to take certain actions to promote the removal and proper management of convenience lighting switches from vehicles: 1) provide technical assistance to businesses that dismantle or crush vehicles on the safe removal and proper disposal of mercury light switches, including information on makes and models that contain such switches and companies that recycle them; 2) encourage repair shops to offer replacement and recycling of mercury light switches; 3) inform the public how they can have mercury light switches replaced and recycled.

COLORADO

Voluntary ELV Removal Program—Participants in the program remove switches from ELVs, properly store and dispose of collected switches, maintain records and provide program input. With money from Supplemental Environmental Projects (SEPs) the Colorado Department of Public Health and Environment (CDPHE) provides training, technical support, and basic equipment to participants and provides resources to support a program administrator. The program administrator collects switches, complies with applicable regulations, ships switches to disposal/recycling site, pays cost of transport and disposal/recycling, records number of switches received, reports to CDPHE and automotive recyclers. Participants in the program are receiving some enforcement amnesty and are also eligible to receive Cross Media Compliance Assistance (CMCA). *Automobile manufacturers are not financially responsible* for the removal and collection of the switches.

http://www.cdphe.state.co.us/hm/mercury/switch.asp

CONNECTICUT

Compliance Assistance Outreach—Communicates about the issue in their *Auto Recycling Industry Compliance Guide* and through a fact sheet that describes best management practices for locating and removing switches in vehicles.

http://www.dep.state.ct.us/enf/autorecyclingguide.pdf

Proposed Legislation—*SB 1187*— Would prohibit the sale of motor vehicles containing mercury switches and headlamps and establish a program to recover such switches and headlamps when motor vehicles are recycled. Auto manufacturers would develop a program to remove mercury switches and mercury-containing headlamps from ELVs. *Costs born by auto manufacturers- incentive, transport, recycling— Min $1.00 per switch.* Would also require the phase-out mercury containing switches and headlamps by January 1, 2007. Dealers establish voluntary switch removal/ replacement for vehicles in commerce.

http://www.cga.ct.gov/2005/tob/s/2005SB-01187-R00-SB.htm

FLORIDA

Compliance Assistance Pilot—Provides free environmental training to salvage yards operators. An environmental compliance manual is provided to all participating yards, and those that have verifiable compliance with the requirements of the manual get certified as "Florida Green Yards." Mercury switches are one of the waste streams targeted under this program. The compliance manual

has information on the proper removal and management of mercury switches.

http://www.dep.state.fl.us/waste/categories/hazardous/pages/autocert.htm

ILLINOIS

Research—In February 2005, the Illinois Environmental Protection Agency issued a *Report to Governor and Legislature on Reducing and Recycling Mercury Switch Thermostats and Vehicle Components*. This report presents recommendations for improving efforts to reduce and recycle mercury components that are found in thermostats and motor vehicles. It recommends a statewide program be created to collect and manage mercury-containing switches when a vehicle reaches the end of its useful life. The framework for a mercury switch removal and management program can include the following components:

- Establish a goal that over 90 percent of reasonably accessible mercury switches will be removed from end-of-life vehicles. Operate the program for 10 years and ensure the collected switches are safely managed.
- Establish a mutually agreed-to system among automakers, steel mills and shredders to fund the costs associated with removal and management of mercury switches from end-of-life vehicles, including educational outreach and compliance. Provide a monetary incentive for auto recyclers/ dismantlers and others to remove and return the switches for collection to foster widespread and effective participation in the program.
- Create educational materials (e.g., guidance manual and instructional video) and deliver training workshops around the state to provide information on the environmental benefits and appropriate procedures for removing and managing mercury switches from end-of-life vehicles. (IEPA/OPP/04-026)

Proposed Legislation—HB 1628 is known as the "Mercury-Free Vehicle Act". Two amendments have been offered. One concerns the removal of mercury switches, while the other would prohibit the use of mercury-containing products in new vehicles.

http://www.ilga.gov/legislation/BillStatus.asp?DocNum=1628&GAID=8&DocTypeID=HB&LegID=16423&SessionID=50&GA=94

INDIANA

Compliance Assistance and Inspections—This long-term project takes a comprehensive, integrated approach to the auto salvage facility sector in Indiana. The project includes a compliance assistance manual that addresses mercury switch disposal and provides links where citizens may obtain more information. Workshops and inspections are also included in the project.

http://www.in.gov/idem/autosalvage/

LOUISIANA

Proposed Legislation—HB 600 "Mercury Switch Removal Act" states that manufacturers of vehicles sold within this state, individually or as part of a group, shall develop, in consultation with the Louisiana Department of Environmental Quality, a mercury minimization plan and submit the mercury minimization plan to the secretary for review and approval. A mercury minimization plan must provide for the financing of the removal,

collection, and recovery system for mercury switches installed in vehicles manufactured by the manufacturer and its predecessors and affiliates. These costs shall be borne by the manufacturers of vehicles sold in the state, ensuring that additional financial burdens are not placed on automobile dealers or businesses dealing with end-of-life vehicles. The manufacturers shall develop a method that ensures the prompt payment to vehicle recyclers, scrap recycling facilities, and the department for costs associated with mercury switch removal and disposal.

http://www.legis.state.la.us/billdata/streamdocument.asp?did=296675
http://www.legis.state.la.us/

MAINE

Enacted Legislation—As of January 1, 2003, state law in Maine requires mercury switches from convenience lighting and ABS g-sensors to be removed from motor vehicles before they are crushed and shredded. The law also requires automakers to establish a collection system to recycle the mercury switches and pay a bounty to auto recyclers for each switch collected. Salvage yards must deliver collected switches to one of two sites in state. *Costs born by auto manufacturers—incentive of $1.00 per switch, transport, recycling—. This legislation resulted from a stakeholder group process and report to the Legislature.*

http://janus.state.me.us/legis/ros/lom/LOM120th/5Pub651-700/Pub651-700-05.htm

Effective September 17, 2005, the bounty increases to $4 if automakers continue to require an associated VIN; if the VIN requirement is dropped, the minimum bounty is $3 per switch.

http://www.mainelegislature.org/legis/bills/chapters/PUBLIC148-1.asp

MASSACHUSETTS

Proposed Legislation—H 1293 is known as the "Mercury Free Vehicle Act of 2005" and would require manufacturers to set up a mercury switch recovery program with a goal to recovering 90% of the mercury switches. *Costs born by auto manufacturers—incentive, transport, recycling*—$3/switch for convenience lights and $15/switch for ABS.

Proposed Legislation—H 1296 is "An Act To Eliminate The Emission Of Mercury From Vehicles" and would require the removal of all mercury containing components from vehicles before they are crushed. Manufacturers would need to implement plans for the recovery of mercury components from discarded vehicles, including reimbursement for the cost of removal of these components.

http://www.mass.gov/legis/bills/house/ht01/ht01296.htm

MICHIGAN

Voluntary ELV Removal Program Partnership—The Michigan Department of Environmental Quality and the Alliance of Automobile Manufacturers (Alliance) have signed a Memorandum of Understanding that expires on September 30, 2006 to promote the voluntary removal and collection of mercury switches from ELVs. The Michigan Mercury Switch Sweep Program project managers work cooperatively to promote the removal and proper management of vehicle switches containing mercury. The Alliance contracts with a third party to operate the program. The Alliance provides funding for buckets,

labels, spill kits, educational materials and collection/transportation of the recovered switches. The Alliance has also developed a 5 minute instructional DVD that explains the program to dismantlers. Auto dismantlers, recyclers and crushers are not monetarily compensated for the time it takes to remove the switches. The project includes enlisting the help of auto shredders, the electric arc furnace, and integrated steel manufacturers.

http://www.deq.state.mi.us/documents/deq-ess-p2-mercury-switchsweepmou.pdf
http://www.michigan.gov/deq/0,1607,7-135-3308_3323-114288—M_2005_3,00.html

MINNESOTA

Enacted Legislation—Minnesota law requires auto recyclers, crushers and shredders to make a "good faith effort" to remove mercury lighting and ABS switches from ELVs prior to crushing (effective 8/1/95).

Other Programs—The Minnesota Pollution Control Agency Salvage Yard Program conducted training, developed a BMP manual, provided prepaid switch recycling containers, and enforced the switch removal law from 1995 to 2001. A six-month pilot program to collect both light and ABS switches was conducted in Ramsey County in 2002. A $1 bounty was given for each switch collected. Approximately 8,700 switches were collected from approximately 14,000 vehicles. [In legislative testimony, the auto industry characterized this as "100% recovery."] One steel mill in the state, North Star (now Gerdau Ameristeel), serves as a collection facility for switches and since 2000 has paid participating dismantlers and recyclers $40/pound for switches as an incentive to remove them. The state's Travel Management Division has removed mercury switches from vehicles leaving state service since November 2001. Non-mercury switches are installed where possible. The state vehicle bid specification has required disclosure of mercury content in vehicles since late 2001.

Pilot Program Partnership—Automobile manufacturers, through their trade association the Alliance of Automobile Manufacturers (Alliance), have an agreement with Minnesota Waste Wise (MWW), to operate a two-year switch outreach, collection, transportation, and recycling program. The program's intended users are salvage yards, scrap processors, vehicle crushers, and other businesses that may generate automotive mercury switches in the course of their business. The agreement was effective June 1, 2004 and the Alliance is providing $150,000 to fund the two-year program

The MWW is responsible for operation of the entire auto mercury switch outreach, collection, transportation, and recycling program. MWW is responsible for making regular program reports to the Alliance and Office of Environmental Assistance. There are no bounties or payments to the yards, just free and convenient recycling of whole switch assemblies, rather than pellets, to minimize the risk of release.

NEW JERSEY

Enacted Legislation—A2482 "Mercury Switch Removal Act of 2005" This law establishes a program for the removal of mercury-containing convenience light and anti-lock brake mercury switches from "end-of-life" vehicles before they are flattened, bailed, or shredded. *Automobile*

manufacturers are financially responsible for the removal and collection of the switches, their transportation to mercury retorters, and the recovery of the gram of mercury each switch contains. *Automobile Manufacturers are required to pay a minimum of $2/switch to dismantlers plus $0.25/switch to NJ DEP* for program administration. The New Jersey bill is based on a model developed by the Partnership for Mercury Free Vehicles (PMFV). New Jersey had a stakeholder process and conducted extensive research in preparation of this legislation.

http://www.njleg.state.nj.us/bills/BillView.asp

NEW YORK

Pilot—The New York State Department of Environmental Conservation developed a voluntary program that offers free collection containers and shipping for all New York auto recyclers. A portion of a U.S. EPA grant has been used to fund the program. Shipping and transportation costs were approximately $9 for 450 switches. Recycling costs were $45 per pound of mercury collected

http://www.dec.state.ny.us/website/ppu/p2autosw.html .

Proposed Legislation—A 03336 and S 04256,The "Mercury-free Vehicle Act of 2005"; requires automobile manufacturers to establish and implement plans to provide for the removal, replacement, collection and recovery of mercury-added components from motor vehicles currently on the road or about to be scrapped. *Automobile Manufacturers are required to pay* prevailing rate based on manufacturer-dealer warranty for transport and recycling.

http://assembly.state.ny.us/leg/?bn=A03336 and
http://assembly.state.ny.us/leg/?bn=S04256

NORTH CAROLINA

Proposed Legislation—Senate Bill 1014 and House Bill 1136—"Mercury Switch Removal Act"—Would require every manufacturer of vehicles sold within North Carolina to develop a mercury minimization plan and submit the plan to the Department for review and approval. Manufacturers of vehicles would be allowed to develop and submit a plan either individually or as part of a group of manufacturers. A manufacturer shall not be required to develop or implement a mercury minimization plan if the manufacturer demonstrates to the satisfaction of the Department that there is no significant risk of a release of mercury from any vehicle manufactured by the manufacturer. A mercury minimization plan must include *a method to finance the removal, collection, and recovery of mercury switches installed in vehicles manufactured by the manufacturer and its predecessors and affiliates*.

http://www.ncga.state.nc.us/Sessions/2005/Bills/House/HTML/H1136v4.html
http://www.ncga.state.nc.us/sessions/2005/bills/senate/html/s1014v1.html

OHIO

Research—"Mercury Contamination from Metal Scrap Processing"

Facilities—A Study by Ohio EPA"—The Ohio EPA initiated a study to investigate the potential for high mercury emissions from scrap processing facilities in Ohio. The study report indicates that mercury switches in cars and appliances are the main cause of mercury emissions from these facilities and recommends that a voluntary program be in place to remove mercury switches before shredding.

http://www.epa.state.oh.us/dapc/atu/mercpaper.pdf

OREGON

Pilot Project—The Mercury "Switch Out" project is a cooperative effort of the Oregon Environmental Council, AAA of Oregon and Idaho, the Northwest Automotive Trades Association, and the Oregon Department of Environmental Quality (OR DEQ). This project allows drivers to take their cars to participating auto repair shops to replace mercury-containing hood and trunk switches for free.

http://www.deq.state.or.us/programs/consumercorner/mercury/mercury5.htm

http://www.oeconline.org/kidshealth/hgreductionpartnerships/view?searchterm=mercury

Policy Directive—In 2002, the OR DEQ issued an interim policy for management of mercury switches. This policy allows facilities such as auto recyclers and vehicle repair facilities that remove mercury-containing switches to manage these switches as universal wastes.

http://www.deq.state.or.us/wmc/hw/policy/2002-po-002.pdf

PENNSYLVANIA

Voluntary ELV Removal Program Partnership—The Pennsylvania Department of Environmental Protection (DEP), AERC Recycling Solutions, Bethlehem Apparatus Co. Inc., Clean Air Council, Institute of Scrap Recycling Industries, Pennsylvania Automotive Recycling Trade Society and Steel Recycling Institute established a partnership program that invites vehicle recyclers to participate in Pennsylvania's Mercury Switch Removal Program that encourages the removal of mercury switches from vehicles. Program participants will remove the switches before the mercury is released to the environment. The DEP pays program costs that include training workshops, shipping containers and safety equipment (mercury spill kits, safety goggles, latex gloves, and plastic containment tub). It also includes an incentive payment paid to participants by the DEP for removing the mercury switches. The mercury recyclers are paying for the shipping and mercury recycling costs.

http://www.dep.state.pa.us/dep/deputate/pollprev/mercury/mercuryswitch.htm

Proposed Legislation—SB 524 is known as the "Mercury-Free Motor Vehicle Act" and requires manufacturers to develop and implement a plan for the removal of mercury switches from end-of-life vehicles. *Automobile Manufacturers would be required to pay a minimum of* $2/switch to dismantlers and $1/switch to DEP.

RHODE ISLAND

Outreach—The Department of Environmental Management (DEM) has developed factsheets to enable the identification of automotive lighting assemblies that contain mercury switches. These fact sheets include procedures for replacing them with non-mercury switches.

http://www.dem.ri.gov/programs/benviron/assist/abp2fact.htm

Enacted Legislation—2005—H 5911 Substitute **A** As Amended—"Mercury Reduction and Education Act." Creates a program for the recovery of mercury switches from end-of-life vehicles. Manufacturers are required to develop plans to capture 50% of the switches in 2006 and 70% in 2007 and each year thereafter. If the capture rates are not achieved in any calendar, the DEM shall

develop, issue, administer and enforce regulations compelling the manufacturers to undertake a collection program. All costs of the program would be borne by the manufacturers. They would be required to pay vehicle recyclers or scrap metal facilities a minimum of $3/switch removed. In addition, the manufacturers would be required to pay $1/switch to the DEM as partial compensation for costs of administering the program.

http://www.rilin.state.ri.us/Billtext/BillText05/HouseText05/H5911Aaa.pdf

SOUTH CAROLINA

Proposed Legislation—H709 and H3922—"Mercury Switch Removal Act of 2005"—Within ninety days after the effective date of this chapter, every manufacturer of vehicles sold within this State, individually or as part of a group, shall develop, in consultation with the Department of Health and Environmental Control, a mercury minimization plan prepared pursuant to this section and submit the mercury minimization plan to the Director of the Department of Health and Environmental Control for review and approval pursuant to Section 44-18-150. These *costs must be borne by the manufacturers of vehicles sold in the State*, ensuring that additional financial burdens are not placed on automobile dealers or businesses dealing with end-of-life vehicles. The manufacturers shall develop a method that ensures the prompt payment to vehicle recyclers, scrap recycling facilities, and the department for costs associated with mercury switch removal and disposal.

http://www.scstatehouse.net/sess116_2005-2006/bills/3922.htm

TEXAS

Enacted Legislation—HB 2793—"Removal of Convenience Switches" requires vehicle manufacturers to develop and implement a plan to remove and recycle mercury convenience switches. Manufacturers are required to provide educational materials for the recyclers. They are also required to provide packaging materials, shipping, recycling, and storage or disposal for the removed switches. Vehicle recyclers or scrap metal recycling facilities that remove convenience switches from eligible vehicles in accordance with educational materials received under this chapter shall be provided regulatory incentives by the commission under programs implemented pursuant to Section 5.755, Water Code, including on-site technical assistance and compliance history classification adjustments.

http://www.capitol.state.tx.us/

VERMONT

Outreach—Vermont conducts limited outreach to encourage voluntary removal and twice a year removes switches from State-owned vehicles. (Thomas Benoit 5-25-05)

Proposed Legislation—S. 0084 is known as "Comprehensive Management of Exposure to Mercury" and, among other items, requires the Agency of Natural Resources to conduct a study of methods to effectively and feasibly remove mercury-added components from vehicles, appliances, and other equipment at solid waste management facilities and metal salvaging businesses.

http://www.leg.state.vt.us/database/status/summary.cfm?Bill=S%2E0084&Session=2006

VIRGINIA

Partnership Pilot—The Virginia DEQ in partnership with the Virginia Automotive Recyclers Association is sponsoring and promoting removal of mercury-containing switches from junked cars. AERC Recycling Solutions in Ashland, Virginia provides a "Switch Collection / Shipping Kit" to any salvage operator that volunteers to remove the switches during disassembly. The kit will hold up to 450 mercury switches, and when full, is shipped to AERC's facility in Pennsylvania for recycling.

http://www.deq.virginia.gov/p2/mercury/automotiveswitches.html

WASHINGTON

Proposed Legislation—SB 5710 and HB 1731 "An Act Relating to the Removal of Mercury-added Components in Motor Vehicles; amending RCW 70.95M.010 and 70.95M.080." Vehicle manufacturers develop and implement a system to remove, collect, and recover mercury-added components from end-of-life vehicles.

http://www.leg.wa.gov/wsladm/billinfo1/dspBillSummary.cfm?billnumber=1731&year=2005 and http://www.leg.wa.gov/wsladm/billinfo1/dspBillSummary.cfm?billnumber=5710&year=2005

WISCONSIN

Voluntary Partnership—The Wisconsin Department of Natural Resources (WDNR), Concerned Auto Recyclers of Wisconsin, the Wisconsin Institute of Scrap Recycling Industries, the Storm Water Cooperative Compliance Programs and auto and scrap recyclers have formed a partnership to establish mercury switch recycling capability for end-of-life vehicles in Wisconsin. The WDNR worked with industry groups to establish collection sites and provided technical and policy guidance for removal and safe handling of switches and provides some supplies for the safe handling of removed. The partnership works cooperatively to promote the program. A US EPA grant provided funding through June 2005.

http://www.dnr.state.wi.us/org/caer/cea/assistance/scrap/switches/index.htm

Federal Actions

U.S. EPA

In August 2004, U.S. EPA convened a group of key stakeholders to develop a national voluntary switch removal program. The group's members included state governments, vehicle recyclers and dismantlers, shredders, auto manufacturers, environmental organizations, steel companies, steel recyclers, and mercury recyclers. The U.S. EPA's objective was to have a voluntary program in place by January 2005. To date, the workgroup members have not been able to reach consensus on how to establish or to equitably share costs for a voluntary program.

International Actions

CANADA

Voluntary Partnership—The Clean Air Foundation, which is a partnership of government, industry and non-profit organizations, works with auto recyclers in a voluntary program to collect mercury light switches from ELVs. Program costs include marketing materials, staff time, collection containers, transportation of containers and switch disposal. The federal government, two provinces and a utility company provided funding.

http://www.pollutionprobe.org/merc/switchout.htm.

Appendix B
Matrix of State Mercury Auto Switch Legislation Passed in 2005*

	ARKANSAS	NEW JERSEY	RHODE ISLAND	TEXAS
Type of mercury switches:	Convenience lighting and ABS	Convenience lighting and ABS	Convenience lighting	Convenience lighting
Switch removal is mandatory for vehicle recyclers or scrap metal recycling facilities?	Yes, 30 days after state approval of automakers mercury minimization plan	Yes, 30 days after state approval of automakers mercury minimization plan	Yes	No
Automakers required to submit mercury minimization plan to state for approval?	Yes, 90 days after effective date of law	Yes, 90 days after effective date of law	Yes, by September 1, 2005	No
Is the capture rate that the automakers plan must meet specified in legislation?	Yes, 90%	Yes, 90%	Yes, 50% for CY 2006 and 70% for CYs 2007-2017	N/A
Plan must explain how capture rate requirements are anticipated to be met through implementation of the plan?	N/A	N/A	Yes	N/A
Plan must include proposal for storage or disposal of the switches?	Yes	Yes	Yes	N/A
Plan must include proposal for packaging and shipping switches to authorized recycling, storage, or disposal facilities?	Yes	Yes	Yes	N/A
Plan must provide for storage of recovered switches if environmentally appropriate recycling or disposal technologies are not available?	Yes	Yes	No	N/A
Plan must include proposal for implementing and financing the system?	Yes	Yes	Yes	N/A
Plan must not place additional financial burden on automobile dealers or businesses dealing with end-of-life vehicles?	Yes	No	No	N/A
Program must utilize, to the extent practicable, existing infrastructure for recycling end-of-life vehicles?	Yes	Yes	Yes	Yes
Automakers must begin implementation of plan upon state approval?	Yes, within 30 days of state approval	Yes, within 30 days of state approval	By January 1, 2006	By January 1, 2006

	ARKANSAS	NEW JERSEY	RHODE ISLAND	TEXAS
Automakers must identify make, model and year of vehicles containing switches:	Yes, including anticipated future production models	Yes, including anticipated future production models	Contents of plan not specified in legislation	Yes
Automakers must provide description and location of switches:	Yes	Yes	Contents of plan not specified in legislation	Yes
Automakers must provide estimate of number of switches available, for purposes of computing capture rate?	No	No	No	Yes
Automakers to provide system to mark vehicles to be processed for shredding or crushing to indicate presence or absence of mercury switches:	Yes	No	Contents of plan not specified in legislation	No
Automakers to develop and distribute educational materials for vehicle recyclers and scrap metal recycling facilities:	Yes	Yes	Yes	Yes
Must include information on safe and environmentally sound methods for switch removal?	Yes	Yes	Contents of plan not specified in legislation	Yes
Must include information on mercury hazards and proper handling of mercury?	Yes	Yes	Contents of plan not specified in legislation	Yes
Automakers must make available to the public information concerning services to remove mercury switches in motor vehicles?	No	No	Yes	No
Automakers must provide technical assistance to vehicle recyclers, scrap metal recycling facilities and state?	No	No	Yes	No
Automakers provide financing for costs incurred by vehicle recyclers or scrap metal recycling facilities?	Minimum of: $5/switch to vehicle recyclers or scrap metal recycling facilities $1/switch to state	Minimum of: $2/switch to vehicle recyclers or scrap metal recycling facilities $0.25/switch to state	Only if capture rate not met in any one calendar year. Minimum of $3/switch to vehicle recyclers or scrap metal recycling facilities $1/switch to state	No
Automakers to provide reimbursement regardless of when switches were removed, if vehicle recyclers or scrap recycling facilities maintain records?	Yes	Yes	No	N/A

	ARKANSAS	NEW JERSEY	RHODE ISLAND	TEXAS
Automakers pay storage container costs?	Yes	Yes	Yes	Yes
Automakers pay packaging costs?	Yes	Yes	Yes	Yes
Automakers pay shipping costs?	Yes	Yes	Yes	Yes
Automakers pay recycling, storage or disposal costs?	Yes	Yes	Yes	Yes
Automakers to submit annual reports to state:	Yes	Yes	Yes, plus quarterly	Yes
Automakers must design vehicles and their components for recycling:	Yes	No	No	No
Automakers to indemnify, defend, and hold harmless vehicle recyclers and scrap metal recycling facilities for any liability arising from release of mercury from switches after the components are transferred to the manufacturer or its agent or contractor?	Yes	No	No	No
Regulatory incentives** to vehicle recyclers and scrap metal recycling facilities?	No	No	No	Yes
Time at which vehicle recyclers or scrap metal recycling facilities must begin removal and proper management of removed switches after state approval of automakers plan:	Within 30 days	Within 30 days	By January 1, 2006	N/A
Vehicle recycler or scrap metal recycling facility to presume switch is mercury switch if the manufacturer is uncertain about mercury content?	Yes	Yes	Contents of plan not specified in legislation	No
Vehicle recyclers or scrap metal recycling facilities exempt from removing switch if it is inaccessible due to significant damage of vehicle in area surround switch?	Yes	Yes	Contents of plan not specified in legislation	N/A
Vehicle recyclers and scrap metal recycling facilities required to maintain records on switches collected, number of end-of-life vehicles containing mercury switches, and number of end-of-life vehicles processed for recycling?	Yes plus vehicle make and model and number of switches collected from each make	Yes and VIN	Contents of plan not specified in legislation	Yes plus send annual report to TCEQ
State must approve, disapprove, or conditionally approve automakers switch removal plan?	Yes, within 120 days of receipt of original plan	Yes, within 120 days of receipt of original plan	Yes, timeframe not specified in legislation	N/A
If plan is denied by state, how many days do the automakers have to resubmit a plan?	30 days	30 days	Not specified in legislation	N/A

	ARKANSAS	NEW JERSEY	RHODE ISLAND	TEXAS
If portion of plan is approved do the automakers have to implement before rest of plan is approved by the state?	Yes, within 30 days of partial approval	Yes, within 30 days of partial approval	Not specified in legislation	N/A
State must review revised plan within how many days of receipt?	30 days	30 days	Not specified in legislation	N/A
If the original plan is neither approved nor disapproved by the state shall the plan be considered conditionally approved?	Yes, 120 days after receipt of original plan	Yes, 120 days after receipt of original plan	Not specified in legislation	N/A
State agency has authority to complete, on behalf of automakers, any portion of the mercury minimization plan that has not been approved by the state?	Yes, 240 days after effective date of legislation	Yes, 240 days after effective date of legislation	Not specified in legislation	N/A
State can review the approved plan at any time and make recommendations to the plan at any time upon finding that the approved plan is deficient or not accomplishing purposes of legislation?	Yes	Yes	No	N/A
Switches must be designated as Universal Waste by the state?	Yes	Yes	Yes	Yes
State required to develop, issue, and administer regulations to implement legislation?	No	No	Yes, if capture rate not met in any one calendar year.	N/A
State to provide training, packaging, shipping, public education and storage, disposal or recycling?	No	No	Yes, only if capture rate not met in any one calendar year.	No
Program End Date	Not in legislation	Not in legislation	2017	Does not apply to manufacturers on or after the10th anniversary of the date on which the manufacturer last installed a convenience switch in a vehicle sold in Texas or August 31, 2015, whichever date occurs first.

* Created by Becky Lockart, IL EPA Office of Pollution Prevention July 2005

** Regulatory incentive means: 1) confidential technical assistance for all facility operations from the state environmental protection agency. The state technical assistance provider cannot initiate enforcement actions and does not report to any state or federal enforcement personnel including those at the state environmental protection agency, the U.S. Environmental Protection Agency, or the U.S. Occupational Safety and Health Administration. 2) The state environmental protection agency may modify penalties to be paid in enforcement actions taken against the recycling facility based on facility's participation in the voluntary switch removal program.

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[2] US EPA Staff remarks to the Quicksilver Caucus on April 11, 2005

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[4] US EPA Website 1 (http://www.epa.gov/epaoswer/hazwaste/mercury/ntl-switch.htm)

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