# MERCURY SWITCH REMOVAL from MOTOR VEHICLES in MAINE

A report to the Mercury Products Advisory Committee

Prepared by the Maine Department of Environmental Protection
January 2004

## I. Introduction

This is the first annual report on the effectiveness of the source separation program under Title 38, section 1665-A, of the Maine Revised Statutes Annotated [38 MRSA § 1665-A]. Beginning January 1, 2003, this law requires the removal of mercury switches and mercury headlamps from motor vehicles before they are crushed and shredded for the scrap metals market. The purpose of this source separation effort is to reduce mercury emissions from iron and steel mills that use automobile scrap.

According to a 1995 auto industry white paper,[1] over 99% of the mercury in motor vehicles is found in switches. Automakers ended their use of mercury switches in new vehicles beginning with model year 2003, but mercury switches in older U.S. motor vehicles currently are a significant source of mercury emissions to the environment and will remain so unless the switches are removed and recycled when the vehicles are scrapped.

Under the Maine law, responsibility for removal and recycling of the switches is shared as follows:

- Automobile dismantlers, junkyard operators and others who handle end-of-life vehicles (ELVs) are required to remove mercury switches and headlamps before the vehicles are crushed and transport them to a consolidation facility[2];
- Automakers are required to establish consolidation facilities, pay $1 for each mercury switch delivered to the facilities, and ship the switches to a recycling facility; and
- The Department of Environmental Protection (DEP) is required to provide information and training to facilitate the removal and recycling of the mercury components.

The DEP also is required to file this annual status report with the Maine Mercury Products Advisory Committee.[3] The report is due January 1 each year beginning in 2004 and must address the following:

- Whether the $1 switch bounty should be adjusted to increase the number of switches brought to consolidation facilities;
- Whether other motor vehicle components should be included in the program; and
- Whether the program should be terminated and, if so, when.

[1] Nachtman, Jim and Hill, Doris, "Mercury in Automotive Systems - A White Paper", *SAE Technical Paper #906409* (August 15, 1995), p. 3.

[2] The term "consolidation facility," as used in the Maine Hazardous Waste Management Rules, means a facility where mercury switches or other "universal wastes" are collected and temporarily stored while awaiting shipment to a recycling, treatment or disposal facility. See rules of the Department of Environmental Protection, chapter 850(3)(A)(13)(a).

[3] See 38 MRSA § 1665-A, sub-§ 9 and § 1670. The 13-member Mercury Products Advisory Committee advises the DEP and Legislature on actions to prevent and reduce environmental releases of mercury from consumer products.

## II. Legislative background

In May 1997, in response to increasing evidence of mercury contamination, the Maine Legislature passed a *Resolve, to Direct the Land and Water Resources Council to Develop a Report and Proposed Actions to Control Mercury Emissions and Discharges*.[4] The resolve directed the Land and Water Resources Council[5] to develop a long-range strategy to reduce the levels and sources of mercury contamination affecting Maine's environment. The resolve further directed that the strategy include recommendations for regulatory, legislative, pollution prevention or technical assistance actions to reduce mercury contamination.

In January 1998, the Council published its mercury reduction strategy in a report titled *Initial Evaluation & Recommendations on Mercury in Maine*. The report documented the presence of unhealthy levels of mercury in the Maine environment, identified the major sources of mercury emissions, and recommended specific actions to reduce future emissions.

In response to the Council's recommendations, the Legislature's Committee on Natural Resources initiated legislation to reduce mercury releases from the largest in-state sources of mercury emissions—a chlorine production facility in Orrington that has since closed and the state's four municipal solid waste incinerators. This legislation as enacted in April 1998 places limits on mercury in wastewater discharges and in air emissions.[6] In addition, section 5 of the bill required the Council to report on the following:

- Establishment of a collection system by which mercury-added products can be returned to the manufacturer for recycling; and
- Labeling of mercury-added products to inform the user that the product contains mercury and that the manufacturer is required to recycle the product.

This report requirement was added to the bill at the request of the Mid-Maine Waste Action Corporation (MWAC), operator of a solid waste incinerator in Auburn. MWAC representatives argued that the State should not rely solely on end-of-pipe emission controls at solid waste incinerators to capture mercury in the waste stream, but rather should give preference to strategies that remove mercury-added products from the waste stream.

In January 1999, the Council submitted its report on *Labeling and Collection of Mercury-Added Products* to the Natural Resources Committee. The report concludes that:

- Maine should take steps to divert mercury-added products from the solid waste stream;
- Manufacturers of mercury-added products appear to be in the best position to ensure that appropriate, practical and cost-effective systems are available for end-of-life management of their products;
- Maine should consider adopting legislation that extends manufacturer responsibility for mercury-added products to the waste management stage; and

[4] Resolves 1997, c. 41.

[5] The Land and Water Resources Council is established under 5 MRSA §3331 to coordinate State activities regarding natural resource and land use management. The council is comprised of the Director of State Planning and the commissioners of eight other state agencies including the DEP.

[6] See *An Act to Reduce Mercury Use and Emissions*, PL 1997, c. 722.

- All mercury-added products should be labeled to inform users that the product contains mercury.

Significantly, this report also identified tilt switches in automobile convenience lights as a source of mercury emissions to the environment.

In May 2000, the Maine Legislature passed *An Act to Reduce the Release of Mercury into the Environment from Consumer Products* [PL 1999, c. 779]. This bill, among other things, enacted the Council recommendation on labeling of mercury-added products.[7] The bill also requires persons who remove mercury-added products from service to ensure that the mercury in the item is reused or recycled.[8] However, the applicability of these requirements to mercury components in automobiles was delayed by six months in response to concerns raised by the Alliance of Automobile Manufacturers (AAM) and the Maine Auto Recyclers Association (MARA).[9] The purpose of the delay was to give the DEP time to develop a labeling and source separation plan tailored to mercury-added auto parts.

In September 2000, the DEP convened an Advisory Group on Mercury-Added Auto Parts[10] to help develop the required source separation plan. The group included members from AAM, MARA and environmental groups. The group met six times through November 2001 to identify and discuss options for removing mercury switches before vehicles are crushed and shredded.

In January 2001, the DEP submitted *A Plan to Reduce Mercury Releases from Motor Vehicles in Maine* to the Legislature's Natural Resources Committee. The plan called for the following actions:

- A ban on the sale of new motor vehicles that contain mercury switches;
- Removal of mercury switches from scrapped motor vehicles before they are crushed;
- Removal of mercury light switches by car dealers before selling a used motor vehicle; and

[7] The labeling requirement is codified at 38 MRSA § 1662(1). Under this provision, a mercury-added product may not be sold in Maine after January 1, 2002 unless the item is labeled in accordance with rules adopted by the Board of Environmental Protection. The board adopted labeling rules in January 2001. See DEP rules, chapter 870, effective March 4, 2001, revised January 28, 2003.

[8] See 38 MRSA § 1664.

[9] See 38 MRSA § 1665, as enacted by PL 1999, c. 779, § 2, and repealed by PL 2001, c. 620, § 2. This section read:

> [The labeling and source separation requirements under sections 1662 and 1664] do not apply to mercury-added products, including mercury-added lamps, that are components in automobiles until July 15, 2002. A plan for compliance with these sections as they relate to automobile components must be developed pursuant to this section.
>
> By January 1, 2001, automobile manufacturers that sell automobiles at retail in this State or to a retailer in this State shall submit proposed alternative compliance plans to the department. By January 1, 2002, the department shall submit to the joint standing committee of the Legislature having jurisdiction over natural resources matters a plan for the labeling and source separation of automobile component parts to meet the requirements in sections 1662 and 1664. The department shall develop the plan in consultation with automobile manufacturers, automobile dismantlers, automobile recyclers and other interested parties. The plan may provide for alternative compliance plans for labeling and must provide for the safe removal and management of mercury-added parts prior to the shredding of vehicles. The department shall also develop, in consultation with the interested parties, an assessment of whether and how mercury switches or other electrical devices in automobile components should be added to the universal waste rules adopted by the board and submit the assessment with the plan.

[10] See Appendix B of this report for the current membership of the Advisory Group.

- Establishment of an automaker funded system to collect and recycle the mercury switches from those responsible for removing them.

Most of these recommendations subsequently were enacted into law in April 2002 with passage of *An Act to Prevent Mercury Emissions when Recycling and Disposing of Motor Vehicles.*[11] The final version of the bill, however, did not require removal of mercury switches by used car dealers. The Natural Resources Committee, at the urging of the Maine Auto Dealers Association, removed this provision. One argument advanced in support of its elimination was that many used car dealers do not have on-site mechanics and thus are ill-equipped to remove mercury switch light assemblies.

The final bill also included a provision requiring automakers to pay a $1 bounty for each mercury switch as "partial compensation" to those responsible for removing them.[12] A bounty was not part of the original bill because it was presumed used car dealers could recover their switch removal costs in the car purchase price. However, the Committee was urged to include a bounty when it became apparent that the switch removal requirement for used cars would be dropped from the bill, leaving the task of switch removal to fall entirely to auto dismantlers, salvage yard operators and others in the ELV industry.

MARA members called for a bounty on the premise that ELV handlers have limited ability to pass the costs of removing mercury switches to auto parts customers because the switches have no resale or salvage value. The DEP supported a bounty as a way to maximize the switch capture rate by providing an inducement to an industry that has many financially marginal facilities with an uneven history of environmental compliance. The DEP and others also argued that automakers should bear the responsibility for paying the bounty because they chose to place the mercury switches in commerce, and continued to make that choice long after the environmental implications were known and even though affordable and effective non-mercury switches were available.

## III. Implementation of source separation requirements

This section describes the actions that have been taken by the DEP, automakers and ELV handlers to implement the requirements of *An Act to Prevent Mercury Emissions when Recycling and Disposing of Motor Vehicles*, as codified under 38 MRSA § 1665-A.[13]

### A. Implementation by the DEP

As soon as the bill was signed into law on April 20, 2002, the DEP began taking steps to identify Maine's ELV handlers and develop training materials for them in anticipation of the January 1, 2003 effective date of the switch removal requirement. Ultimately, a list of over 700 municipally licensed ELV facilities was compiled and each licensee was invited to one of four regional training workshops held in October and November 2002. Total attendance at the four workshops exceeded 200. In preparation for the workshops, the DEP:

[11] See PL 2001, c. 656, repealing 38 MRSA § 1665 and enacting § 1665-A in its place.
[12] See 38 MRSA § 1665-A, sub-§ 5, ¶ B.
[13] The full text of § 1665-A appears in Appendix A of this report.

- Arranged for the production of an instructional video on removal of the mercury switches;
- Wrote an "Auto Dismantlers Guide to Recycling Mercury Switches and Mercury Lamps"; and
- Prepared laminated switch removal illustrations for use in the shop.

Each workshop attendee received a set of these training materials. They also were given log sheets, storage buckets and warning signs to facilitate compliance with the Maine Hazardous Waste Management Rules, which were revised effective November 2, 2002 to establish streamlined "universal waste" requirements that make it easy to remove, store, transport and recycle mercury switches from automobiles.

The DEP continues to advertise the availability of the training materials through a newsletter and other mailings, and has delivered the materials to many ELV handlers who did not attend the training workshops. DEP staff also has visited numerous ELV facilities to provide on-site compliance assistance.

B. Implementation by automakers

By September 30, 2002, automakers were required to provide the DEP with a plan stating how they intend to comply with their responsibilities under the law. Compliance plans were received from and are being implemented by AAM, Subaru of America, the Recreation Vehicle Industry Association and the Truck Manufacturers Association.

Most of the motor vehicle fleet is covered by the AAM plan. Automakers participating in the AAM plan include DaimlerChrysler, Ford, General Motors, Mazda, Mercedes-Benz, Mitsubishi, Nissan, Porsche and Volkswagen.

Under the AAM plan, a company called Wesco Distribution collects mercury switches and ships them for recycling. ELV handlers can take the switches to Wesco facilities in either Bangor or Portland. Wesco will accept delivery of switches during regular business hours, process the switches for recycling, and provide the person delivering the switches with a voucher indicating the number of switches accepted.

Each bucket of automotive mercury switches delivered to Wesco must be accompanied by a log sheet showing the Vehicle Identification Number (VIN) for each vehicle from which switches were removed. The party delivering switches also must sign a statement certifying that the switches are from vehicles dismantled in Maine. Wesco then forwards the signed log sheets to the participating automakers who use the VIN to identify the vehicle make and apportion costs. Once this is done, Wesco is instructed to issue a check to the ELV handler in the amount of one dollar for each mercury switch from a vehicle made by a participating manufacturer.

C. Implementation by ELV handlers

The DEP staff has attempted to identify the highest volume ELV handlers and provide on-site compliance assistance. Over 50 facilities have been visited to date. All of the facility operators were at least aware of the new source separation law, and most had attended either the DEP training workshops or received the DEP training materials.

Initial figures on the numbers of switches collected are sketchy. Most of the ELV handlers we visited had removed some switches, though many fewer than expected at a couple of facilities that recently crushed large numbers of vehicles. Based on a 2002 mercury switch removal study, ELV handlers can expect to recover at least one mercury switch for every two vehicles.[14] However, an ELV facility in Windham that crushed over 800 cars recovered no mercury switches and a facility in Orrington that crushed about 400 cars recovered just three.

The number of switches recovered will depend on the make, model and year of the vehicles crushed. For example, a facility that handled only Toyotas would not expect to recover any mercury switches because Toyota never used them in its vehicles. On the other hand, a facility that processes 1980 and later GM vehicles could expect to average 1.5 or more switches per vehicle. In the case of the Windham facility mentioned above, all the vehicles were reported to date from the 1940s and 50s. The fact that no mercury switches were found suggests they were not used in automobiles of that era.

AAM reports that, as of October 28, 2003, Wesco had received a total of 1,613 mercury switches in four deliveries since the program began in January. White & Bradstreet, a truck parts business in Augusta that is consolidating mercury switches for members of the Truck Manufacturers Association, has collected another 25 mercury switches from semis and other large trucks. Neither the Recreation Vehicle Industry Association nor Subaru report

[14] Michigan Department of Environmental Quality, et al., *Michigan Mercury Switch Study,* December 19, 2002. The study found 801 mercury switches in the convenience light assemblies of 1474 vehicles for an average of 0.54 switches per vehicle.

AAM, a partner in the Michigan study, notes that the Michigan fleet is dominated by vehicles made by Chrysler, Ford and GM, and suggests the number of switches per vehicle likely will be lower in Maine where imported autos are more prevalent. Based on 2001 vehicle registrations, imported autos account for 21% of the vehicle fleet in Michigan and 54% in Maine. See letter dated from Greg Dana of AAM to John James of the DEP, December 26, 2003.

The Ecology Center, also a partner in the Michigan study, suggests that the study finding of 0.54 switches per vehicle would be higher if the study had included a more representative sample of older vehicles, which generally have more switches. See Ecology Center press release, *Automotive Mercury Switch Study Released*, December 19, 2002. The Ecology Center is an environmental organization based in Ann Arbor, Michigan and author of the report *Toxics in Vehicles: Mercury* (January 2001).

The Michigan study also would have yielded a higher number of switches per vehicle if the study had included mercury switches in anti-lock braking systems (ABS). Maine ELV handlers are required to remove all mercury switches, including those found in ABS g-force sensors. This latter application accounts for about 12% of all automotive mercury switches. Nachtman and Hill, *supra* n 1. The Michigan study was limited to removal of mercury switches in hood and trunk lid convenience lights because this application accounts for over 85% of the mercury switches in motor vehicles and because the switches in these light assemblies are easier to remove than the ABS g-force sensors.

In a 2001 pilot project, the DEP removed 79 mercury switches from convenience light assemblies in 120 state-owned surplus vehicles, a rate of 0.65 switches per vehicle. Most of the vehicles were 1994 or later Chrysler, Ford or GM models.

collecting any mercury switches to date, but this is not unexpected given the limited extent to which Subaru used mercury switches and the rarity with which RVs appear to end up at ELV facilities.

## IV. Program effectiveness

### A. Number of switches collected

The goal of the auto switch collection program, as stated under 38 MRSA § 1665-A(5), is to "collect and recycle at least 90 pounds of mercury per year." Assuming each switch contains 0.8 grams of mercury, about 51,000 switches must be removed and recycled to achieve this goal. If each switch has 1.2 grams of mercury, just over 34,000 switches are needed.[15] Under either assumption, the 1,600 switches delivered to Wesco represent less than 5% of the statutory target.

This is a disappointing result given the DEP's aggressive education and training effort and the relative ease of removing the switches. However, we believe it is premature, at least for the purpose of this initial status report, to judge the program's effectiveness solely on the number of mercury switches delivered to Wesco so far.

Our site visits indicate that most ELV handlers have begun removing mercury switches but have not accumulated sufficient numbers to warrant driving to Bangor or Portland to turn them in. The DEP Hazardous Waste Management Rules allow ELV handlers to keep the switches at their places of business for up to three years before they must transport them to Wesco.[16] Moreover, the 5-gallon collection pails provided by the DEP can hold thousands of the switches if they are removed from their assemblies.

It is therefore likely that the number of switches removed to date well exceeds the number delivered to Wesco at this early stage of the program. Wesco's switch numbers will be a more reliable indicator in the second and third years of the program. In the meantime, we find it encouraging that Wesco already has received over 1,600 switches from just four ELV facilities. We have yet to hear from the vast majority of ELV handlers.

### B. Performance goal

AAM questions whether the 90-pound mercury collection goal is achievable. This goal is based on the following assumptions:

- A vehicle fleet of 1.3 million cars (2002 data);
- A vehicle scrap rate of 10% per year (avg. vehicle life = 10 yrs.);
- 0.65 mercury switches per vehicle;

[15] In their 1995 white paper, Nachtman and Hill, *supra* note 1, estimate that each automotive mercury switch contains 0.8 grams of mercury. However, in a subsequent analysis of mercury in GM vehicles, author Hill assumes "all switches have 1.2 grams of mercury." See email correspondence from Doris L. Hill to Terry A. Cullum, General Motors Corporation, May 15, 2001.

[16] DEP rules, Chapter 850, section 3(A)(13)(e)(xxvi)(f).

- 0.8 grams of mercury per switch; and
- A switch capture rate of 60%.

AAM argues the goal is overstated and does not reflect the expected annual decline in mercury amounts as older vehicles containing more mercury disappear from the fleet. According to AAM, a more realistic goal for 2003 is 28 pounds based on the following assumptions:

- A vehicle fleet of 1.024 million cars (2000 data);
- A vehicle scrap rate of 6.6% per year (avg. vehicle life = 15 years);
- Mercury switches are found only in vehicles made by Chrysler, Ford and GM;
- Chrysler, Ford and GM products account for 65% of the vehicles scrapped in Maine;
- 0.6 mercury switches per vehicle;
- 0.8 grams of mercury per switch; and
- A switch capture rate of 60%.

AAM emphasizes that its calculation is an approximation for 2003 only and that the amount of mercury recovered should decline in each subsequent year to reflect the retirement of cars made in the late 80s and early 90s, the peak years of mercury switch use. Instead of trying to calibrate the performance goal to this downward trend, AAM recommends the current weight-based goal be replaced with one based on the percentage of ELV handlers participating in the program. Several environmental groups, while not specifically objecting to a restatement of the performance goal, urge that the goal should be to capture at least 90% of the mercury in ELVs.[17]

The DEP agrees the goal should be to capture as many mercury switches as feasible. However, the issue of whether to revise the current 90-pound performance goal is academic because there are no regulatory consequences if the goal is not attained. We see no compelling need to change it.

C. Enforcement

AAM has commended the DEP's promotional initiatives, but believes the program could be made more effective by enforcing that part of the law that requires dismantlers to remove switches. Specifically, AAM recommends that the DEP make frequent yard visits to reinforce the importance of switch collection. Yard visits are critical, according to AAM, because they demonstrate that the program is a priority for the DEP and they also may carry with them some fear of enforcement.[18]

As a first step, AAM recommends that the DEP refine its list of municipally licensed junkyards to remove those entities that are not true ELV handlers.[19] AAM also urges the

[17] Letter from Charles Griffith, *et al.*, to John James, November 15, 2003; see also letter from Jon Hinck of the Natural Resources Council of Maine to John James, November 17, 2003.
[18] Letter from Gregory J. Dana of the Alliance of Automobile Manufacturers to John James, October 28, 2003.
[19] Maine law on Junkyards and Automobile Graveyards, 30-A MRSA § 3751 *et seq.*, potentially requires a person to obtain a municipal license just to store as few as three unregistered or uninspected vehicles. The law, however, includes

DEP to do spot enforcement to scare the ELV industry into compliance. Automakers believe that a strong enforcement posture on the part of the DEP could eliminate the need for a bounty as an incentive for removal of the switches. In the automakers' view, the desire to avoid fines could provide all the incentive needed if the ELV industry knew the DEP was serious about enforcement.

The DEP agrees that site visits are important and has visited over 50 ELV facilities since the switch removal requirement became effective on January 1, 2003. Our focus to date has been on compliance assistance. We also have used these visits to refine the DEP master list of ELV facilities and will continue to refine the list through phone contacts and mailings.

The DEP also recognizes the need to move beyond compliance assistance and take enforcement action when appropriate. It has been suggested, for example, that the monitoring of car crushing operations may provide a convenient and efficient opportunity to inspect for compliance with the switch removal requirement. We agree and will seek to work with the handful of crusher operators that currently serve the Maine ELV industry. We already have held an evening training session for crusher operators. The session covered best management practices including mercury switch removal.

We do not agree, however, with the implication that Maine should choose between the carrot of the bounty and the stick of enforcement. Both tools are appropriate. It is unrealistic to expect the DEP to strictly police the switch removal efforts of the 600 to 700 municipally-licensed automobile recyclers and junkyards in Maine. "AAM would remove the carrot even though we should already know that a stick alone would not work."[20]

## V. Issue: Should the $1 switch bounty be adjusted?

To help ensure the success of the mercury switch recovery effort, automakers currently are required to pay ELV handlers $1 per switch "as partial compensation for the removal, storage and transport of the switches."[21] In deciding to set the bounty amount at $1, the Legislature's Natural Resources Committee presumably was reacting to information from the DEP and others regarding the relative ease of removing mercury switches from ELVs. The DEP suggested at the time that most switches could be removed in one minute or less,[22] and calculated the removal costs as ranging from 38¢ to $l.71 depending on labor rates. The Michigan switch removal study completed last year supports the DEP time estimate. That study found it takes 95 seconds on average to remove a mercury switch light assembly from an ELV and remove the mercury switch from the assembly.[23]

In estimating the time needed for switch removal, neither the DEP nor the authors of the Michigan study contemplated that it would be necessary for ELV handlers to copy down the VIN

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a number of exceptions such that, in practical effect, most licenses are issued to persons in the business of dismantling, salvaging or recycling motor vehicles.

[20] Hinck, *supra* n. 17.

[21] 38 MRSA § 1665-A, sub-§ 5, ¶ B.

[22] Maine Department of Environmental Protection, *A Plan to Reduce Mercury Releases from Motor Vehicles in Maine*, January 2002, p. 12.

[23] Michigan DEQ, s*upra* n. 14 at p. 5.

of each vehicle. AAM, however, maintains the VIN is needed to allocate the costs of the program among its member manufacturers and ensure they pay only for switches from their vehicles. AAM has been unwilling or unable to allocate program costs using a simpler mechanism such as market share and remains adamant that if "manufacturers are required to pay a bounty, they must be able to audit these charges."[24]

AAM's insistence on the VIN may as much as double the time required to remove and recycle the mercury switches, thereby undermining the value of the bounty as a financial incentive for ELV handlers to participate in the source separation program. ELV handlers surveyed to date are unanimous in concluding that the exercise of recording the VIN is the most onerous part of the switch removal program.[25] In fact, this initial report on the program status would not have been due until January 1, 2005 but for the VIN requirement. When the requirement became known in December 2002, legislation to accelerate the initial report date by one year was introduced at MARA's request.[26] The specific purpose of this change was to provide an early opportunity for policymakers to reconsider the adequacy of the bounty in light of automaker insistence on the recording the VIN.

At an Advisory Group[27] meeting in September 2003 and in follow-up correspondence, AAM representatives indicated they would be willing to drop the VIN requirement if automakers are relieved of the requirement to pay a bounty. Specifically, if the bounty is eliminated, AAM will to do the following:

- Drop the VIN requirement;
- Arrange for the switches to be picked up from ELV handlers and shipped to a mercury recycling facility; and
- Assume some of the program education activities now being undertaken by the DEP, including informational mailings and distribution of the instructional video on switch removal.

At the meeting where this offer was made, four auto dismantlers representing MARA indicated they would be willing to forego the bounty if it means they no longer have to record VINs. MARA has about 35 members in all, most of who dismantle late model cars for parts. It is roughly estimated that MARA members account for about 10 to 15% of the ELVs processed in Maine each year. Their facilities tend to be operated in compliance with environmental best management practices. In fact, most MARA members reportedly have already instituted switch removal as a normal business practice, and would have done so whether or not a bounty is paid.

Automakers view the MARA reaction as evidence that ELV handlers would be amenable to a bounty-less program if they incur no costs other than the time required to remove the switches

[24] Dana, *supra* n. 18.
[25] A few ELV facilities have computerized inventory systems that lessen the burden of recording the VIN. For most ELV handlers, recording the VIN means accurately transcribing a 17-digit number from the vehicle registration if they have it or, if not, from the driver side doorpost or dashboard of the vehicle. See meeting notes of the DEP Advisory Committee on Mercury-Added Auto Parts, September 25, 2003; see also Hinck, *supra* n. 17.
[26] LD 385, 121st Maine Legislature, 1st Regular Session, subsequently signed into law on May 18, 2003 as PL 2003, c. 6.
[27] The DEP Advisory Group on Mercury-Added Auto Parts, *supra* n. 10.

and put them in a bucket.[28] In AAM's view, Maine's program falls short because it requires ELV handlers to deliver the switches to consolidation facilities.

AAM points to a switch removal program in New Hampshire as a model for Maine to emulate. According to a New Hampshire official familiar with the program, 60 mercury switch collection buckets were distributed in June to attendees of auto recycling workshops jointly sponsored by the New Hampshire Department of Environmental Services and the New Hampshire Auto and Truck Recyclers Association. Under the program as currently structured, participating auto salvagers absorb the cost of delivering the switches to any of five consolidation locations set up by the state and must pay a small fee to cover the state's cost to recycle the switches. AAM has offered to pay these recycling costs and would do so in Maine if it adopted New Hampshire's bounty free approach.[29]

While AAM's offer deserves consideration, the DEP believes it is premature to abandon the bounty. We agree with the observation by one advisory group member that there is no reason to believe the additional convenience of AAM proposal would offset the negative effect of eliminating the bounty and the incentive it provides for participation in the program by the non-MARA sector of the ELV industry.[30] The tentative support for the AAM proposal expressed by MARA members is indicative of how onerous they find the VIN requirement. But even while some MARA members would like to be rid of this task and would forego the bounty to that end, it must be noted that MARA supported the enactment of the bounty requirement and still believes a bounty is needed.[31] In MARA's view, the bounty is critical to gaining the participation of the hundreds of junkyard operators who are not members of MARA and who collectively account for more than 80% of the ELVs handled in Maine. Many of these facilities lack the quality control systems and best management practices that ensure the switches are removed as part of their normal business operations, and the bounty could provide the driving factor for their participation in the program.

At this point, we do not know the extent to which removal of the mercury switches is driven by the prohibition on scrapping mercury switches, by ELV handlers' desire to be good environmental stewards, or by the bounty. The DEP has hired a company called Market Decisions to conduct a mail survey of all ELV handlers on the DEP mail list. A copy of the survey appears in Appendix C. This survey may shed some light on the importance of the bounty to participation in the switch removal effort but the survey responses have yet to be tabulated and analyzed. In the meantime, we believe the bounty makes switch removal less onerous for ELV handlers and increases their buy-in by distributing some of the removal costs to the automakers who chose to install the switches. Elimination of the bounty, even in exchange for elimination of the VIN requirement, could reduce participation.

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[28] Dana, *supra*, n. 18.

[29] Because the New Hampshire program is voluntary and includes no recordkeeping requirements, state officials have no idea how many of the state's estimated 200 auto recycling facilities are actually participating in the program and to what extent. Fewer than 400 switches had been turned in to the state for recycling as of the date of this report. Source: Paul Lockwood, New Hampshire Department of Environmental Services.

[30] Hinck, *supra* n. 17.

[31] Meeting notes of the DEP Advisory Committee on Mercury-Added Auto Parts, September 25, 2003. The accuracy of these notes with respect to MARA's view on the ongoing need for a bounty was confirmed by telephone interview with MARA member Bob Miville on December 9, 2003.

We also think it is premature to increase the amount of the bounty. At least two members of the Advisory Group suggest that the bounty should be increased to $3 per switch. In their view, the current $1 bounty is an insufficient financial incentive given that ELV handlers must locate the VIN, record it on a log sheet, remove the switch, place the switch in the container and transport the switch to the consolidation facility.

It seems self-evident that raising the bounty would increase the number of switches captured. A higher bounty also would help cover the unanticipated cost of the VIN requirement. If raised high enough, a bounty could even make it worthwhile for someone to go from junkyard to junkyard to collect and redeem the switches much like those who collect bottles and cans to recover the deposit.[32]

Nevertheless, we think it is too early in the program to conclude that the $1 bounty provides an insufficient incentive. We do not have enough data, mainly because ELV handlers are not required to turn the switches in for recycling for three years. And we are not unmindful that raising the bounty could lead automakers to take a harder line on the VIN requirement by insisting a bounty is owed only for switches associated with a validated VIN.

For example, the first ELV handler to deliver switches to Wesco was Littlefield's Garage in Corinna. Littlefield's turned in 179 switches from 132 vehicles. AAM reports that only 86 of the 132 VINs on Littlefield's log sheets could be verified, meaning they correspond number for number with a VIN issued by automakers. In most cases, however, the invalid VINs contained enough coding to determine the vehicle make. Automakers ultimately paid the $1 bounty on all 179 switches, but have said "they will become less charitable about paying for switches associated with improperly recorded VINs" if the program were to become more onerous for manufacturers.[33]

**VI. Issue: Should other motor vehicle components be included in the program?**

In a May 23, 2003 letter to Lynn Rubenstein of the Northeast Recycling Council, Casimer Andary of AAM addresses the use of mercury-added automobile components other than switches. These components include HID headlamps, which are already included in Maine's source separation program, and the flat panel displays used in entertainment and navigation systems. Mr. Andary projects that mercury use in these components could approach 13 kilograms (about 29 pounds) per year by 2010 for the portion of the U.S. auto fleet manufactured by AAM members. Maine's prorated share would be 2 ounces based on year 2000 U.S. population data.

The DEP does not recommend adding flat panel displays to the source separation program for mercury-added auto components, and has received no call to do so. The DEP has not determined it is safe to release the mercury in these components to the environment. Rather, the small amount of mercury collectively embedded in the displays does not appear to warrant a targeted collection effort.

[32] Prosser, Alan, in email correspondence to Enid Mitnik of the Maine DEP, September 24, 2003.
[33] Dana, *supra* n. 18.

## VII. Issue: Should the mercury switch removal program be terminated?

In requiring the DEP to report annually on whether the mercury switch removal program should be terminated, the Legislature recognized that automakers stopped using mercury switches altogether beginning with model year 2003 vehicles.[34] The program therefore can be expected to yield diminishing numbers of mercury switches over time as older vehicles disappear from the fleet. Eventually, the number of switches recovered will no longer warrant a statewide collection effort and the program should be terminated. However, it would be premature to do so now given the prevalence of mercury switches in motor vehicle made before 2003.

Mercury switches appear to have been heavily used by the auto industry at least through 1995, although the number of the switches used annually had begun decline by that date and continued to decline steadily through the late 90s. GM estimates that automobiles assembled in 1995 had switches that collectively contained over 10 tons of mercury.[35] Most of these vehicles—and millions of vehicles from prior years when the use of mercury switches was even more pervasive—presumably are still on the road. It could be several more years before these mercury-laden vehicles are scrapped. AAM reports that the national scrap rate is 6.6%, which would suggest an average vehicle life of 15 years. If so, 1995 vehicles will not arrive at the crusher until the year 2010.

## VIII. Conclusion

In summary, the DEP concludes:

- Education and outreach efforts have been successful in that most ELV handlers appear to be aware of the mercury switch removal requirement.
- Automakers have met their obligation to establish switch consolidation facilities and pay a $1 bounty on each switch delivered to the facilities. As a condition of paying the bounty, automakers require ELV handlers to submit the Vehicle Identification Number (VIN) of each source vehicle.
- The Legislature established the bounty to compensate ELV handlers for the costs of removing the switches and transporting them to consolidation facilities. In setting the bounty amount at $1 per switch, the Maine Legislature did not contemplate that it would be necessary for ELV handlers to record VINs. Recording the VIN increases switch removal and handling costs.
- The extent to which ELV handlers are complying with the switch removal requirement is unknown. Approximately 1600 mercury switches have been delivered to consolidation facilities to date, far less than the number needed to achieve the statutory goal of capturing 90

[34] To ensure this practice ends, the Legislature specifically banned the use of mercury switches in new motor vehicles sold in Maine after January 1, 2003 unless an exemption is obtained from the Commissioner of Environmental Protection. See 38 MRSA § 1665-A, sub-§ 1. One such exemption has been granted. In a decision dated August 19, 2003, the commissioner granted an exemption allowing motor home manufacturers to install gas ovens that use mercury flame sensors to shut off gas flow when the oven pilot light is out.

[35] Hill, *supra* n. 15.

pounds of mercury per year. These low numbers may be due largely to DEP rules that allow ELV handlers to accumulate the switches for up to three years before they must be delivered to a consolidation facility. Accordingly, it is premature to make judgments about the program effectiveness or the need to raise the switch bounty.

- Beginning with model year 2003, automakers no longer are putting mercury switches in new cars. However, thousands of vehicles that have these switches are still on the road and the mercury will be released to the environment unless the switches are removed when the vehicles are scrapped.

Based on these conclusions, the DEP does not recommend changes to the source separation program under 38 MRSA § 1665-A and strongly recommends the program be continued.

# APPENDIX A

# MERCURY COMPONENTS IN MOTOR VEHICLES
## Maine Revised Statutes Annotated
## Title 38, chapter 16-B, section 1665-A

### §1665-A. Motor vehicle components

Notwithstanding sections 1663 and 1664, this section applies to a mercury-added product that is motor vehicle component.

**1. Prohibition on sale of a new motor vehicle with mercury switches.** A person may not sell a motor vehicle manufactured on or after January 1, 2003 if it contains a mercury switch. A motor vehicle manufacturer may apply to the commissioner for an exemption from this prohibition. The commissioner may grant an exemption upon finding that:

**A.** The manufacturer has provided assurance that a system exists for the proper removal and recycling of the mercury switch; and

**B.** Either of the following applies:

(1) Use of the mercury switch is necessary to protect public health or safety; or

(2) There are no technically feasible alternatives to the mercury switch at comparable cost.

**2. Prohibition on replacement mercury light switches.** Effective January 1, 2003, a person may not sell or distribute a mercury light switch for installation in a motor vehicle.

**3. Removal of certain mercury components when vehicle use ends.** Effective January 1, 2003, a person may not send a motor vehicle to a scrap recycling facility without first removing any mercury switch or mercury headlamp that is a component of the motor vehicle, except that a scrap recycling facility may agree to accept a motor vehicle that has not been flattened, crushed or baled, knowing it contains a mercury switch or a mercury headlamp, in which case the scrap recycling facility is responsible for removing that component. Upon removal, the components must be collected, stored, transported and otherwise handled in accordance with the universal waste rules adopted by the board under subsection 8.

**4. Voluntary removal of mercury light switches prior to end of vehicle use.** A motor vehicle dealer or any person engaged in motor vehicle repair or maintenance may participate in the mercury light switch removal and collection effort pursuant to subsection 5, as long as the person notifies the department before commencing removal and receives such training as may be required by the department. Any person who removes a mercury light switch from a motor vehicle before the motor vehicle is removed from service shall affix an official sticker to the motor vehicle to indicate that the switch has been removed.

The stickers may be obtained from the department and must be affixed to the doorpost or other location specified by the department. A person may not install a mercury light switch into a motor vehicle to which the sticker is affixed.

**5. Motor vehicle manufacturer responsibility.** Manufacturers of motor vehicles sold in this State that contain mercury switches or mercury headlamps shall, individually or collectively, do the following:

**A.** By January 1, 2003, establish and maintain consolidation facilities geographically located to serve all areas of the State to which mercury switches removed pursuant to this section may be transported by the persons performing the removal. A consolidation facility may not be a facility that is licensed in the State as a new or used automobile dealership;

**B.** Pay a minimum of $1 for each mercury switch brought to the consolidation facilities as partial compensation for the removal, storage and transport of the switches;

**C.** Ensure that mercury switches redeemed at the consolidation centers are managed in accordance with the universal waste rules adopted by the board under subsection 8; and

**D.** Provide the department and persons who remove motor vehicle components under this section with information, training and other technical assistance required to facilitate removal and recycling of the components in accordance with the universal waste rules adopted by the board under subsection 8, including, but not limited to, information identifying the motor vehicle models that contain or may contain mercury switches or mercury headlamps.

The goal of this collection and recycling effort is to collect and recycle at least 90 pounds of mercury per year from mercury switches removed from motor vehicles. By September 30, 2002, motor vehicle manufacturers shall provide the department with a plan as to how they intend to comply with the requirements of this subsection.

In complying with the requirements of this subsection, manufacturers of motor vehicles shall establish a system that does not require a person who removes a mercury switch to segregate switches separately according to each manufacturer of motor vehicles from which the switches are removed.

**6. Department responsibility.** The department shall:

**A.** Assist those subject to the source separation requirements of this section by providing training on the universal waste rules adopted by the board under subsection 8 and by taking other steps as deemed appropriate to provide for the safe removal and proper handling of motor vehicle components;

**B.** Design and distribute stickers required under subsection 4; and

**C.** Make available to the public information concerning services to remove mercury light switches in motor vehicles.

**7. Labeling.** Effective July 15, 2002, the labeling requirements of section 1662 apply to motor vehicles components. In approving an alternative compliance plan for labeling motor vehicles under section 1662, the commissioner shall require a motor vehicle manufacturer to apply a doorpost label listing the mercury added products that may be components in the motor vehicle. The commissioner may not require a manufacturer to affix a label to each mercury-added component.

**8. Rulemaking.** The board shall revise the universal waste rules adopted pursuant to section 1319-O, subsection 1, paragraph F as necessary to establish standards by which mercury switches in motor vehicles may be handled as universal waste.

**9. Reporting.** Before January 1, 2003, and annually thereafter, motor vehicle manufacturers doing business in the State shall report to the joint standing committee of the Legislature having jurisdiction over natural resource matters on any fee or other charge collected on the sale of new motor vehicles for the purpose of paying the cost of carrying out the manufacturer responsibilities under subsection 5. The report must specify the amount of the fee or charge collected and how it was determined. Before July 1, 2004 and annually thereafter, motor vehicle manufacturers shall report in writing to the department on the results of the source separation required under this section. The report must include, at a minimum, the number of mercury switches removed and recycled from motor vehicles during the previous calendar year; the estimated total amount of mercury contained in the components; and any recommendations to improve the future collection and recycling of motor vehicle components. Before January 1, 2004, and annually thereafter, the department shall report to the Mercury Products Advisory Committee on the effectiveness of the source separation required under this section, whether the partial reimbursement payment under subsection 5, paragraph B should be adjusted to increase the number of switches brought to consolidation facilities, whether other motor vehicle components should be added to the source separation efforts and whether the program should be terminated and, if so, when.

# APPENDIX B

# ADVISORY GROUP on MERCURY-ADDED AUTO PARTS

**Acknowledgement**

In preparation for filing this report, the DEP convened a meeting of the Advisory Group on Mercury-Added Auto Parts. We thank the members for their input and comments.

Automaker representatives

Dan Adsit, *Ford Motor Company*
Julie Becker, *Alliance of Automobile Manufacturers*
Rich Bell, *Ford Motor Company*
John Cabaniss, *Association of International Automobile Manufacturers*
Greg Dana, *Alliance of Automobile Manufacturers*
LeAnn Diehl, *Public Affairs Group* (representing the Alliance)
Ross Good, *Daimler Chrysler*
Jim Kiley, *Alliance of Automobile Manufacturers*
Jay Landers, *Recreation Vehicle Industry Association*
John Rugge, *Subaru of America*
William Schaefer, *Truck Manufacturers Association*
Jodi Theut, *General Motors*

Automobile dismantlers and recyclers

Ron Baron, *Silver's Auto Parts*
Jeff Bazinet, *M&P Auto*
John Dickinson, *Scarboro Used Auto Parts*
Kerby Littlefield, *Littlefield's Garage*
Bob Miville, *Aable Auto Parts*
Alan Prosser, *Alan Auto Body*
Jim Wakefield, *Maine Automotive Councils*

Scrap metal handlers

Dave Murphy, *Maine Metal Recycling*
Jeanne Schmeichel, *Prolerized New England Company*
Michael Zaitlin, *New England Metal Recycling*

Automobile dealers

Richard Blais, *RJB & Son*
Tom Brown, *Maine Auto Dealers Association*
Ginger Davis, *counsel for Maine Auto Dealers Association*

Environmental organizations

Michael Belliveau, *Environmental Health Strategy Center*
Steve Gurney, *Environmental Health Strategy Center*
Jon Hinck, *Natural Resources Council of Maine*
Karen Thomas, *Environmental Defense*

# APPENDIX C

# MERCURY SWITCH REMOVAL PROGRAM SURVEY

# Maine Department of Environmental Protection
## Mercury Switch Removal Program Survey

Instructions: Please complete the survey by marking the appropriate box or filling in your answer in the space provided.

1. Do you currently dismantle, scrap or store obsolete or non-working vehicles?

| | | |
|---|---|---|
| ☐ | YES | Please continue |
| ☐ | NO | **Thank you, this survey is for those who dismantle, scrap or store obsolete or non-working vehicles. We would still appreciate it if you would return this survey in the enclosed business reply envelope so that we do not send you additional surveys or reminders.** |

2. How would you describe your primary business?

| | |
|---|---|
| ☐ | Automobile dismantling and recycling |
| ☐ | Automobile grave yard ("u-pull-it") |
| ☐ | Scrap metal junkyard |
| ☐ | Vehicle service |
| ☐ | Auto body shop |
| ☐ | Auto rebuilder |
| ☐ | Other (please specify) _____ |

3. On average, how many cars do you keep on site at any one time? _____

4. Have you heard of a program sponsored by the Maine Department of Environmental Protection (DEP) to assist businesses in removing mercury switches from scrapped motor vehicles?

| | | |
|---|---|---|
| ☐ | YES | Please continue to question 5 |
| ☐ | NO | **Please skip to Page 4 and question 12 – do not answer questions 5 through 11** |

5. Do you currently participate in the Department of Environmental Protection's program to remove mercury switches and recycle them?

| | |
|---|---|
| ☐ | YES |
| ☐ | NO |

***Continued on next page***

6. How did you hear of this program? *Mark all that apply.*

| | |
|---|---|
| ☐ | I attended a DEP workshop |
| ☐ | I read about it in a DEP newsletter |
| ☐ | I heard about it from another business owner |
| ☐ | I heard about it from DEP staff |
| ☐ | I read about it in a newspaper or other (non-DEP) publication. Which one?_____ |
| ☐ | Other (please specify)_____ |

7. The Department of Environmental Protection provides free materials to assist in the removal of mercury switches. For each of the following, please indicate whether or not you are aware of its availability.

| | Aware | Not Aware |
|---|---|---|
| a. Instructional Video | ☐ | ☐ |
| b. Printed instructional manual ("Auto Dismantlers Guide") | ☐ | ☐ |
| c. Laminated switch removal instructions for use by mechanics | ☐ | ☐ |
| d. Secure Storage Pail for mercury switches | ☐ | ☐ |
| e. Log Sheets for recording VIN numbers | ☐ | ☐ |

8. The Department of Environmental Protection would like to know how useful you find the free materials it provides to assist in the removal of mercury switches. For each of the following, please indicate whether you have not received it, or if you have received it, whether you find it very useful, somewhat useful, not very useful or not at all useful.

| | I have not received it | I have received it and find it…. | | | |
|---|---|---|---|---|---|
| | | Very Useful | Somewhat Useful | Not very Useful | Not at all Useful |
| a. Instructional Video | ☐ | ☐ | ☐ | ☐ | ☐ |
| b. Printed instructional manual ("Auto Dismantlers Guide") | ☐ | ☐ | ☐ | ☐ | ☐ |
| c. Laminated switch removal instructions for use by mechanics | ☐ | ☐ | ☐ | ☐ | ☐ |
| d. Secure Storage Pail for mercury switches | ☐ | ☐ | ☐ | ☐ | ☐ |
| e. Log Sheets for recording VIN numbers | ☐ | ☐ | ☐ | ☐ | ☐ |

Continued on next page

***9. Do you have any comments or suggestions on these materials?***

_____

_____

10. Please tell us how each of the following effects your participation in the mercury switch recycling program.

| | It encourages my participation | It has no effect on my participation | It discourages my participation |
|---|---|---|---|
| a. The $1 bounty for each returned switch | ☐ | ☐ | ☐ |
| b. DEP assistance including manuals, training, laminated cards and buckets | ☐ | ☐ | ☐ |
| c. The Wesco switch drop off locations in Bangor or Portland | ☐ | ☐ | ☐ |
| d. The time required to remove switches | ☐ | ☐ | ☐ |
| e. The need to provide a VIN (Vehicle Identification Number) to receive the bounty for each switch | ☐ | ☐ | ☐ |
| f. My personal interest in protecting rivers and streams from mercury pollution | ☐ | ☐ | ☐ |
| g. Support from the Maine Auto Recyclers Association | ☐ | ☐ | ☐ |

11. Do you have any comments or suggestions on the program?

_____

_____

***These are all the questions we have for you. Please do not answer questions 12 & 13. Thank you for taking the time to complete this survey. Please return the survey in the envelope provided.***

If you would like to receive information or free materials on the program, please complete the order form on Page 4.

## ***Only if you answered NO to question 4, answer questions 12 and 13 below.***

12. The Department of Environmental Protection conducts a program to assist auto recyclers in meeting requirements for recycling mercury switches from automobiles. Switches may eventually release the dangerous mercury inside and affect the water quality in lakes, rivers and streams. Removal of a switch takes a few minutes and helps protect our fish and wildlife. For each returned switch, a bounty of $1 is paid. The DEP provides a video describing how to remove switches, a written instruction manual, laminated instruction cards to keep in the shop and a bucket to hold and store switches.

How interested are you in receiving compliance assistance from the DEP?

| | | | |
|---|---|---|---|
| ☐ | Very Interested | ☐ | Not Very Interested |
| ☐ | Somewhat Interested | ☐ | Not at all Interested |

13. Why do you say that?

_____

_____

***Thank you for taking the time to complete this survey. Please return the survey and order from in the envelope provided and mail to: Market Decisions, P.O. Box 2890, South Portland, ME 04116***

If you would like to receive information or free materials on the program, please complete the order form below.

---

Order Form – Complete this form for Free Materials and Information

| | |
|---|---|
| ☐ | Send me more information on how the program works |
| ☐ | Have someone from the DEP contact me |

**Send me the following materials:**

| | | | |
|---|---|---|---|
| ☐ | Instructional video | ☐ | Secure mercury switch storage bucket |
| ☐ | Written instructional manual | ☐ | Universal waste label for the storage bucket |
| ☐ | Laminated instruction cards for use by shop mechanics | ☐ | VIN log sheet |

Name: _____

Company: _____

Address: _____

City: _____ Zip Code: _____