

# **SWITCH OUT**

## **Auto Dismantlers' Guide**



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## Collection Project for Automotive Mercury Switches

*Goal:* To implement the first mercury switch collection programme in Canada, with a supportive business model involving all key players, including government, auto manufacturers, dismantlers, and the steel industry, and to ensure the collected mercury is disposed of properly through either closed-loop recycling or retirement.

### Mercury: It's Use and Its Impact

Mercury is a metal, and a highly toxic substance — only one gram (the amount in one automotive mercury switch) can contaminate a 20-acre lake for one year to the point where the fish cannot be eaten. High mercury levels are indicated in 99% of all inland fish advisories in Ontario.

Despite the availability of viable alternatives, mercury is used in several applications in the automotive industry, including: underhood and trunk lighting switches, anti-lock brake systems, high intensity discharge lamps, and active ride control. When the vehicle is scrapped and the hulks melted to make new steel, 100% of this mercury is released to the environments. In the estimated 500,000 cars scrapped every year in Ontario there are more than 200,000 lighting switches, equal to 200kg of mercury, going through the auto recycling process.

### The Switch Out

Modeled after successful programmes in the United States, Pollution Probe's Mercury Elimination and Reduction Challenge (MERC) is leading Canada's first *Switch Out*, a mercury switch removal

and collection programme. Working with partners from government and industry we have developed infrastructure to make mercury switch removal and recycling as easy, cost-efficient, and effective as possible. As the programme expands across Canada, we will continue to work to develop the best method for switch collection, and the creation of a business model to support it.

Pollution Probe recognizes that auto dismantlers are only one stage in a vehicle's life cycle. We are therefore addressing this problem from all angles, gaining support from the auto manufacturers and the steel manufacturers to make the programme sustainable in the long-term.

Pollution Probe is also working towards the elimination of mercury use in vehicle manufacturing.

### Contact

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[www.pollutionprobe.org/mercury.htm](http://www.pollutionprobe.org/mercury.htm)

## How to Remove, Store and Transport a Mercury Switch

Mercury switches must be removed before the vehicle is crushed or shredded. Removal of the hood and trunk lighting apparatus takes only a few seconds, and can be done at the same time as the removal of other fluids and wastes. The mercury is contained in a sealed metal switch within the lighting apparatus, so there is little danger of switch breakage during removal procedures. NOTE: Old Volvo's may use glass switches — extra care must be taken when removing these lighting assemblies.

### Step 1 — Remove Convenience Lighting Assembly from Vehicle

- Locate the small lighting fixture on the inner side of the vehicle trunk or hood.
- Cut the power supply attached to the base of the light fixture.
- Remove any fasteners in order to separate the entire fixture from the vehicle.
- Place entire fixture in a large bin of heavy plastic with a lid, for temporary storage.
- Repeat this process for all mercury containing lighting fixture in the vehicle. When in doubt, assume that a fixture contains a mercury switch.

*Entire process: Approximately 30 seconds.*

### Step 2 — Breakdown Assemblies to Recover Switch

As required, break down collected lighting assemblies to isolate the mercury switch, and place the switch in a small plastic container with lid for transportation. A 1L container will hold approximately 800 mercury switches.

- Identify and remove/open the snap, latch, clip, etc. that holds the assembly together, using hand tools. Small, flathead screwdrivers and small wire cutters are all that are often required. When the assembly is open identify the mercury switch, a small, metal device resembling a bullet.
- Remove the mercury switch. A small, flat-head screwdriver may be used for this purpose.
- Place the mercury bullet into the proper storage container prior to disposing of any excess metal or plastic parts — the lighting fixtures can be disposed of with regular waste.

*Recycling of 1500 vehicles per year will require approximately 3 hours of labour time per year to remove switches from housings.*

### Step 3 — Storage

Mercury switches and lighting fixtures should be collected in well-sealed, leak-proof, heavy plastic containers in an area where there is little risk of fire or breakage. Do not use tin or aluminum containers as mercury can combine with these metals and also leak through any seams. Do not store the mercury on the bare ground, and do not dispose of the bullets with the regular waste.

Storage of used mercury switches should comply with all provincial and national laws governing hazardous wastes. Many provinces allow for up to 5kg of accumulated waste without requiring a storage permit. At 3g/switch, this is equal to 1600 switches that can be stored on site at any one time. Provincial regulations

should be consulted for more detailed information.

#### **Step 4 — Transportation**

Mercury is considered a hazardous waste, and as such, the generation, transportation and disposal of mercury containing waste are governed by both provincial and federal regulations. Federal regulations allow for the transport of less than 5kg of hazardous waste (1600 switches) without a requirement for the shipment to be manifested. The generator, however, must be registered with provincial regulators as a “generator” (auto dismantlers are likely already registered, due to handling of other hazardous wastes), and the material must be transported using an approved hazardous waste hauler. Consult provincial regulations for more detailed information. A summary of relevant federal and Ontario regulations is located at the back of this booklet.

*It is the responsibility of the individual facility to ensure that they are operating within Provincial and Federal regulations.*

#### **Mercury Spill Guidelines**

Though the potential for a mercury spill to occur when collecting switches is remote, precautions should be noted when handling any potentially dangerous material. Mercury is a hazardous substance that is harmful if inhaled, ingested, or handled. All mercury spills should be cleaned up immediately and properly disposed of. There are some simple guidelines which should be followed should a mercury spill occur.

1. Small mercury spills on a hard, non-porous surface can be contained by wiping up the mercury and sealing the cloth or towel in a double plastic bag. This bag must then be disposed of properly, or removed by a hazardous waste handler.
2. Mercury spill kits are available at laboratory safety supply stores.
3. Never use a vacuum to clean up a mercury spill. Mercury readily becomes a vapour, and a vacuum will disperse mercury into the air where it can be inhaled.
4. Never use a broom to sweep up the mercury. This will create even smaller beads of mercury, which will be more difficult to collect.

#### **First Aid Measures**

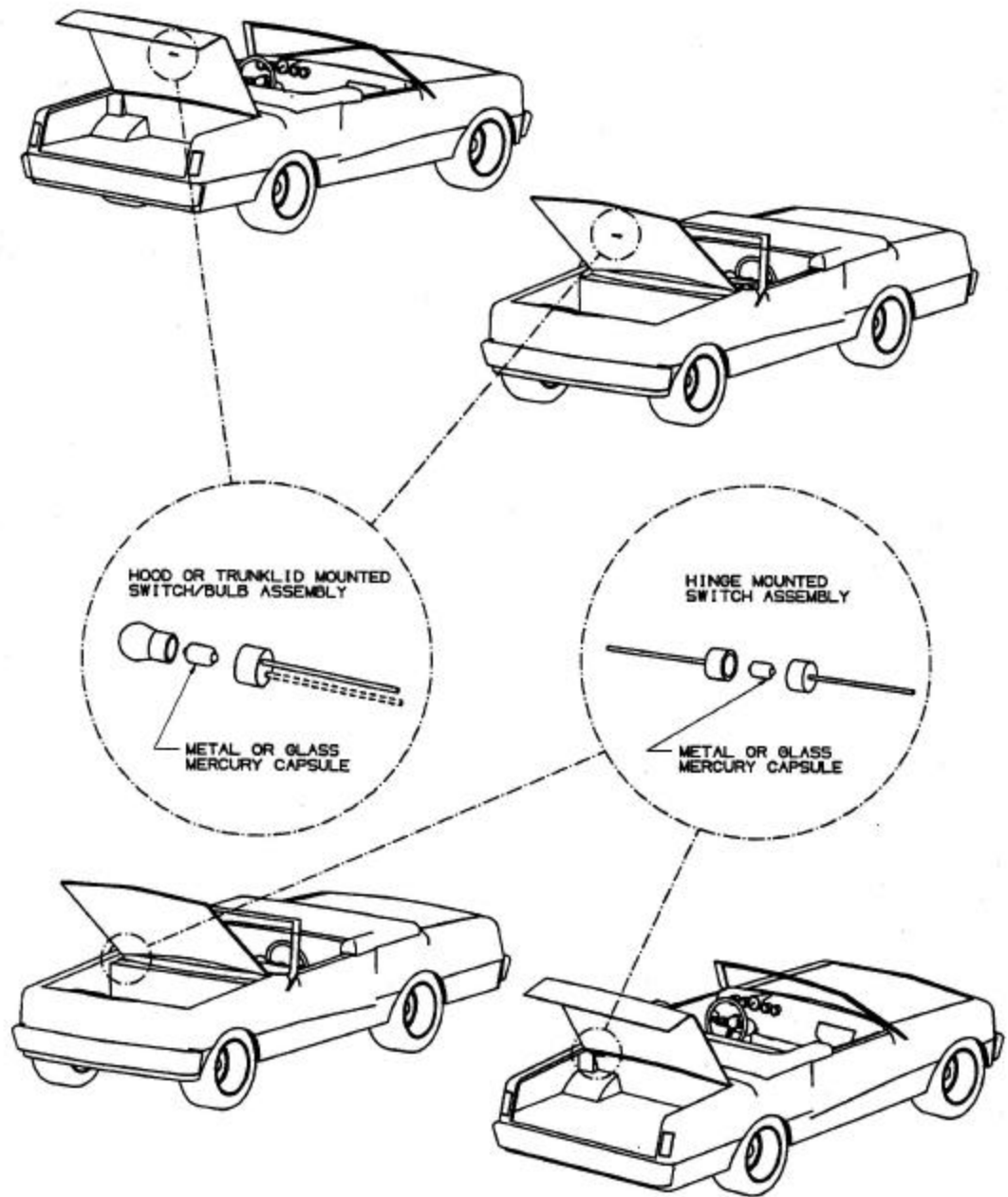
Should a mercury spill occur and individuals exposed to the mercury, there are a few simple procedures that should be followed.

1. *Skin contact*— remove any clothing that has absorbed the mercury, seal in a plastic bag and dispose of properly. Wash the area with soap and water and seek medical attention promptly.
2. *Eye contact*— flush eyes with room temperature water for at least 15 minutes. Lift upper and lower lids to rinse beneath them as well. Seek medical attention promptly.
3. *Inhalation* — move the person to an area where they can get fresh air. Seek medical attention as soon as possible.
4. *Ingestion* — Seek medical attention immediately.

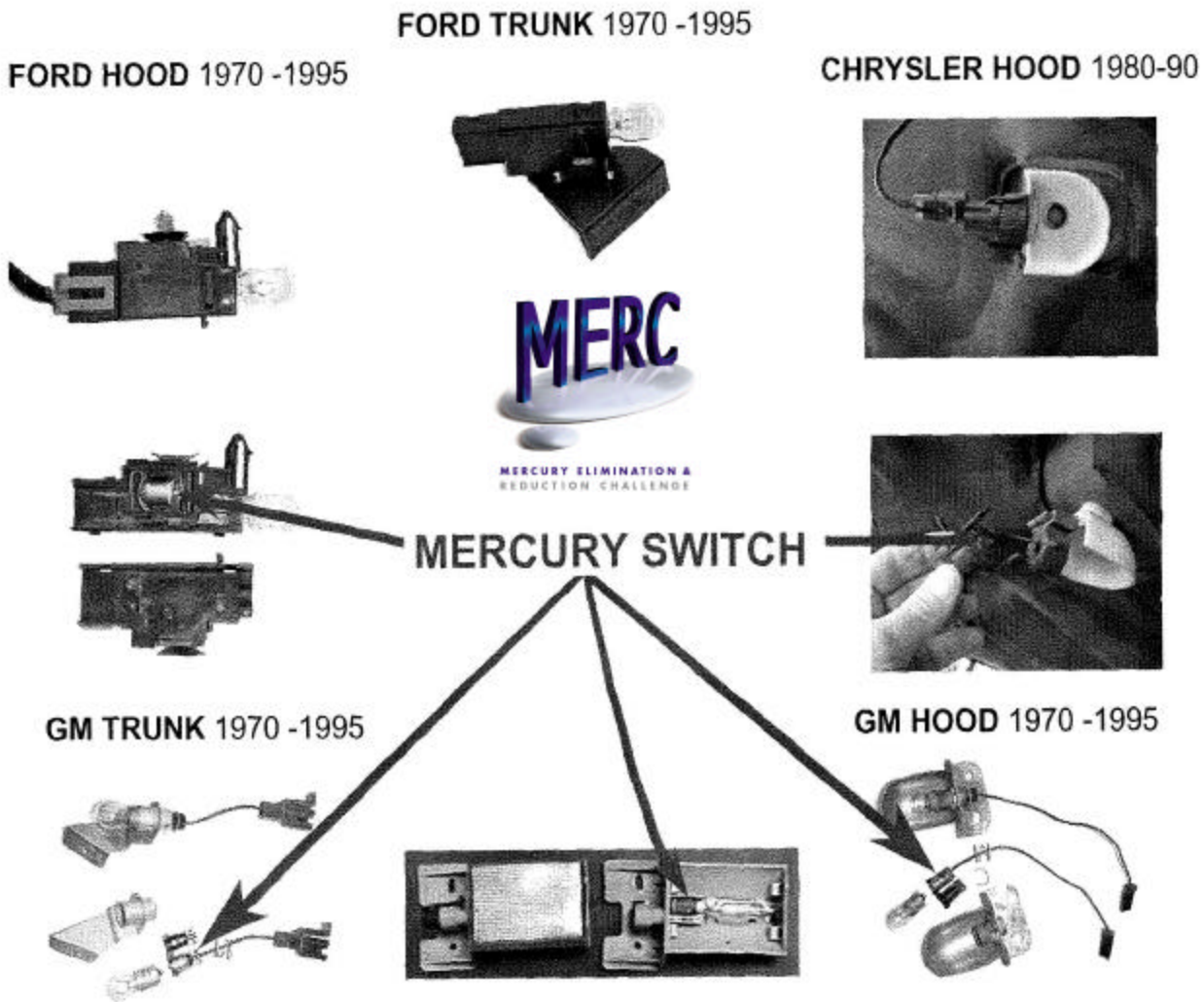
*Source: SAE Report J2456 “Mercury Switch Removal Process,” May 1998.*

## Location of Mercury Switches in Automobile Convenience Lighting

Procedures for Mercury Switch Removal and Replacement from Automobiles



# Convenience Lighting Assemblies Containing Mercury Switches



Source: New York State Department of Environmental Conservation





## Automotive Mercury Switches and Mercury Lighting, 2000–2001 Model Years

| MANUFACTURER            | VEHICLE                          | COMPONENT  |
|-------------------------|----------------------------------|--|
| <b>Daimler Chrysler</b> | 2000, 2001 4-Wheel Drive Jeeps   | ABS Switch   |
| <b>Ford</b>             | 2000 Grand Marquis/Mustang/E-350 | Instrument Panel Light Bulb  |
|                         | 2000 F-series Truck (F150-550)   | Convenience Lighting Switches  |
|                         | 2000 Crown Victoria              | Convenience Lighting Switches  |
|                         | 2000 Expedition                  | Convenience Lighting Switches  |
|                         | 2000 Navigator                   | Convenience Lighting Switches  |
|                         | 2000 Excursion                   | Convenience Lighting Switches  |
|                         | 2000 Explorer                    | Convenience Lighting Switches & ABS Sensor                           |
|                         | 2000 Mountaineer                 | Convenience Lighting Switches & ABS Sensor                           |
|                         | 2000 Ranger                      | ABS Sensor   |
|                         | 2000 Continental                 | Back-Lit Instruments (CCFT)  |
|                         | 2000 Windstar                    | Family Entertainment System  |
|                         | 2000 Villager                    | Family Entertainment System  |
|                         | 2001 F150 Supercrew              | Convenience Lighting Switches & Optional Family Entertainment System |
|                         | 2001 Expedition                  | Convenience Lighting Switches  |
|                         | 2001 Excursion                   | Optional Family Entertainment System                                 |
|                         | 2001 Econoline                   | Optional Family Entertainment System                                 |
|                         | 2001 Navigator                   | Convenience Lighting Switches  |
|                         | 2001 Continental                 | Back Lit Instruments (CCFT)  |
|                         | 2001 Windstar                    | Optional Family Entertainment System                                 |
|                         | 2001 Villager                    | Optional Family Entertainment System                                 |
| <b>American Honda</b>   | Honda Odyssey 2HKRL1             | Navigational Display   |
|                         | Honda S2000 JHMAP1               | HID Headlamp   |
|                         | Acura 3.5 RL JH4KA9              | Navigational Display & HID Headlamp                                  |
|                         | Acura 3.2 TL 19UUA5              | Navigational Display & HID Headlamp                                  |
|                         | Acura 3.2 CL 19UYA4              | HID Headlamp   |
|                         | Acura new model (unnamed MD)     | Navigational Display & HID Headlamp                                  |

| MANUFACTURER  | VEHICLE   | COMPONENT   |
|---|---|---|
| <b>General Motors</b>                                     | Cadillac Deville  | I/P Cluster Fluorescent Lighting, Night Vision Display & Navigational Display – options |
|   | Cadillac Seville  | I/P Cluster Fluorescent Lighting & Navigational Display – options                       |
|   | Cadillac Escalade   | Hood Light Switch   |
|   | Chevrolet Cavalier  | Hood Light Switch   |
|   | Chevrolet Corvette  | I/P Cluster Fluorescent Lighting  |
|   | Chevrolet Express   | Hood Light Switch   |
|   | Chevrolet Blazer  | Hood Light Switch   |
|   | GMC Denali  | Hood Light Switch   |
|   | GMC Envoy   | Hood Light Switch & HID Headlamps   |
|   | GMC Jimmy   | Hood Light Switch   |
|   | GMC Savanna   | Hood Light Switch   |
|   | Pontiac Sunfire   | Hood Light Switch   |
|   | Oldsmobile Bravada  | Hood Light Switch   |
| <b>Jaguar</b>   | No mercury at this time.  | Considering HID Headlamps   |
| <b>Mazda North America</b>                                | 2000 B-Series Pick-up Truck (B2500, B3000, B4000) *2001 B-Series No longer uses any switches containing mercury | ABS Sensor  |
|   | 2001 Millenia   | Back-Lit Instruments  |
|   | 2001 Tribute/MPV  | Optional Video Display Unit   |
| <b>Mercedes Benz</b><br>(Parent company Daimler Chrysler) | All Mercedes models   | Navigational Display & HID Headlamps – optional on all models                           |
|   | Mercedes S-Class  | Navigational Display, Back Lit Instruments & HID Headlamps                              |
|   | Mercedes CL-Class   | Navigational Display, Back Lit Instruments & HID Headlamps                              |
|   | Mercedes CLK Class  | Navigational Display & HID Headlamps – optional   |
|   | Mercedes E-Class  | Navigational Display & HID Headlamps – optional on all models                           |
|   | Mercedes M-Class  | Navigational Display & HID Headlamps – optional on all models                           |
| <b>Mitsubishi Motors Corporation</b>                      | 2000, 2001, 2002 Mitsubishi Diamante  | Combination Meter   |

| <b>MANUFACTURER</b>               | <b>VEHICLE</b>  | <b>COMPONENT</b>   |
|-----------------------------------|---|--|
| <b>Nissan</b>                     | Infiniti I30  | Xenon Headlamp, Cluster Meter Backlight & Display Assy-AV      |
|                                   | Infiniti Q45  | Xenon Headlamp, Cluster Meter Backlight & Display Assy-AV      |
|                                   | Infiniti QX4  | Xenon Headlamp, Cluster Meter Backlight & Display Assy-AV      |
| <b>Porsche Cars North America</b> | 911   | HID Headlamps & Navigational Display                           |
|                                   | Boxster   | HID Headlamps & Navigational Display                           |
| <b>Rover Group</b>                | Range Rover and Discovery   | No Mercury   |
| <b>Saab Cars USA</b>              | All 1999–2001 Saab Models   | No Mercury   |
| <b>Subaru of America</b>          | All 1998–2000 Subaru Models   | No Mercury   |
| <b>Toyota</b>                     | 2000, 2001, 2001 Lexus ES 300   | HID Headlamps & Optitron Instrumentation (speedometer and tac) |
|                                   | 2000, 2001, 2002 Lexus GS 300   | HID Headlamps, Optitron Instrumentation & Navigational Display |
|                                   | 2000 Lexus GS 400   | HID Headlamps, Optitron Instrumentation & Navigational Display |
|                                   | 2001, 2002 Lexus GS 430   | HID Headlamps, Optitron Instrumentation & Navigational Display |
|                                   | 2001 Lexus IS 300   | HID Headlamps  |
|                                   | 2002 Lexus IS 300   | HID Headlamps & Navigational Display                           |
|                                   | 2000 Lexus LS 400   | HID Headlamps, Optitron Instrumentation & Navigational Display |
|                                   | 2001, 2002 Lexus LS 430   | HID Headlamps & Navigational Display                           |
|                                   | 2000 Lexus LX 470   | Optitron Instrumentation                                       |
|                                   | 2001, 2002 Lexus LX 470   | Optitron Instrumentation & Navigational Display                |
| 2000 Lexus RX 300                 | Optitron Instrumentation & Information Display  |  |
| 2001, 2002 Lexus RX 300           | Optitron Instrumentation, Information Display & Navigational Display (this option replaces information display) |  |

| <b>MANUFACTURER</b>          | <b>VEHICLE</b>                     | <b>COMPONENT</b>   |
|------------------------------|------------------------------------|--|
| <b>Toyota</b>                | 2000 Lexus SC 300                  | Optitron Instrumentation                                   |
|                              | 2002 Lexus SC 300                  | HID Headlamps & Navigational Display                       |
|                              | 2000 Lexus SC 400                  | Optitron Instrumentation                                   |
|                              | 2002 Lexus SC 430                  | HID Headlamps & Navigational Display                       |
|                              | 2000, 2001, 2002 Toyota Avalon XLS | Information Display  |
|                              | 2002 Toyota Camry XLE/SE           | Navigation Display   |
|                              | 2001 Toyota Land Cruiser           | Navigation Display   |
|                              | 2001 Toyota Prius                  | Navigation Display   |
|                              | 2002 Toyota Prius                  | Navigation Display & Information Display                   |
|                              | 2001, 2002 Toyota Sienna           | Vehicle Entertainment System (VES) Display                 |
| <b>Volvo</b>                 | 2000 Volvo S80                     | Navigational Display                                       |
|                              | 2001 Volvo S60, V70, S80           | Optional Navigational Display                              |
| <b>Volkswagen of America</b> | VW (New) Beetle                    | HID Headlamps – option                                     |
|                              | Audi A4                            | HID Headlamps & Navigational Display – options             |
|                              | Audi S4                            | HID Headlamps & Navigational Display – option              |
|                              | Audi A6                            | HID Headlamps & Navigational Display – options             |
|                              | Audi A8                            | HID Headlamps & Navigational Display – options             |
|                              | Audi TT                            | HID Headlamps – option                                     |
|                              | Bentley Arnage                     | Display in Head Restraint & Navigational Display – options |
|                              | Bentley Azure                      | Display in Head Restraint & Navigational Display – options |
|                              | Bentley Continental R              | Display in Head Restraint & Navigational Display – options |
|                              | Bentley Continental SC             | Display in Head Restraint & Navigational Display – options |
|                              | Bentley Continental T              | Display in Head Restraint & Navigational Display – options |
|                              | Rolls-Royce Silver Seraph          | Display in Head Restraint & Navigational Display – options |

## Automotive Mercury Switches in Convenience Lighting, Pre-1995 Vehicles

| VEHICLE MAKE | VEHICLE YEAR(S) | VEHICLE MODEL   |
|--------------|-----------------|---|
| Ford         | 1974–1994       | Tempo<br>Escort<br>LTD<br>F250<br>Ranger<br>Taurus<br>Crown Victoria<br>Thunderbird<br>Topaz<br>Bronco II<br>Cougar |
| Buick        | 1977–1990       | LeSabre<br>Regal<br>Park Avenue<br>Celebrity<br>Skyhawk<br>Skylark<br>Century<br>Firenza                            |
| Pontiac      | 1984–1990       | Sunbird<br>Bonneville<br>Grand Am   |
| Oldsmobile   | 1977–1990       | Cutlass Ciera<br>Cutlass Supreme<br>Calais<br>Toronado<br>Regency<br>Delta  |

## SWITCHOUT: Auto Dismantlers' Guide

| Vehicle Make | Vehicle Year(s) | Vehicle Model   |
|--------------|-----------------|---|
| Chevrolet    | 1981–1990       | Beretta<br>Caprice<br>Lumina  |
| Chrysler     | 1975–1994       | New Yorker<br>Le Baron<br>Shadow<br>Cordoba<br>Laser<br>Reliant<br>Sundance<br>Ades |
| Cadillac     | 1979            | DeVille<br>Cimarron   |
| Audi         | 1984            | Make Not Available  |

Note: American-made vehicles from 1995 to date still contain mercury switches to actuate hood and trunk convenience lighting. Some exceptions are 1997 and newer Jeeps, and Chrysler product Mini-vans 1997 and newer.

Source: Association of International Automobile Manufacturers, June 1995. *Automobile Shredder Residue Report*.

## Mercury Switch Collection: Summary of Pertinent Hazardous Waste Regulations for Ontario

Mercury is a “Hazardous Waste Chemical”, under Schedule 2(B) of Ontario’s Regulation 347 (General-Waste Management), of the Ontario Environmental Protection Act (EPA). The generation, transportation and disposal of mercury containing waste in Ontario is governed by Part V (Waste Management) of the EPA, and subject to the following general requirements:

- Mercury waste generators must be a registered “hazardous waste generator” with the Regional Director of the Ontario Ministry of Environment prior to transferring the waste off-site. Generators are required to notify the Director if the waste mercury is retained at the generating site for more than three months unless the site has a Certificate of Approval. (Reg.347, Section 18). *Most auto dismantlers will already have a generator number, as a result of handling other hazardous wastes, so no further notification to regulators would be required.*
- Generators of mercury must use hazardous waste haulers approved under Part V of the Act, and that operate under a Certificate of Approval issued by the Ministry of Environment. A manifest, indicating the origin and destination of the mercury, must accompany the shipment. (Reg.347.19.1.(a)).
- The onus is on both the originator and transporter of the material to ensure that the mercury is transported to a registered hazardous waste landfill site or a mercury recycler/refiner operating under a Certificate of Approval.

### Regulatory Exception 1: Small Quantity Generator

If a site does not accumulate more than 5kg of mercury switches (1600 switches) in a one-month period, or accumulate more than 5kg over any period, the site qualifies as a “small quantities generator” under Regulation 347 and is **exempt from registration as a generator**. The 5kg limit applies to the entire unit, including packaging, not just the mercury contained in the switches.

As a small quantities generator **manifesting is not required**, however mercury switches must be transported by an approved hazardous waste hauler under Part V of the Act.

### Regulatory Exception 2: Generator Exemption

**Registration as a generator is not required** provided the waste hauler has as part of the conditions of their Certificate of Approval an exemption that would override this requirement. Fluorescent Lamp Recyclers Inc., the waste hauler chosen for the *Switch Out pilot*, has such an exemption. **All facilities involved in the Switch Out programme should fall under this exemption.** Wastes must still be manifested for shipment, unless they fall under the 5kg small quantity generator limit.

It is the responsibility of each site to ensure the provincial and federal regulations are complied with.

Ministry  
of the  
Environment  
135 St. Clair Avenue West  
Toronto ON M4V 1P5

Ministère  
de  
l'Environnement  
135, avenue St. Clair ouest  
Toronto ON M4V 1P5

April 23, 2001

Pollution Probe  
625 Church Street  
Suite 402  
Toronto, Ontario  
M4Y 201

Dear Ms. L. Hagreen:

**Re: Collection and Recycling System for Mercury Vehicle Switches**  
**"Switch the Switch" Project**

The Ministry of the Environment supports the efforts of Pollution Probe and partners in developing a program to collect mercury switches from end-of-life vehicles in Ontario. Such a program recognizes the importance of curtailing the emissions of mercury to the environment.

The automobile recyclers that are participating in this program by removing mercury switches from the end-of-life vehicles will be required to comply with the generator registration and manifesting requirements of Regulation 347. The waste generated from these activities would need to be released to a hazardous waste management company approved under Part V of the EPA to haul such waste off-site.

Small quantity exemptions (SQE) are included in Regulation 347 for some waste types under hazardous waste. The SQE would apply to the waste collected through this program provided the generators do not generate more than 5 kg. of this waste in a one month period or accumulate more than 5 kg. over any period. It is the responsibility of the generator to determine if the waste meets the SQE. The 5 kg. quantity applies to the entire unit (mercury switch) and not just the contaminants within the switch. If the SQE does not apply, registration and manifesting may not be required provided Fluorescent Lamp Recyclers (FLR) has as part of the conditions of their Certificate of Approval, a condition that would override these requirements.

Should you have any further questions or comments regarding the above, please do not hesitate to contact me at (416) 314-4186.

Sincerely,

Debra Hurst  
Senior Environmental Policy/Program Officer  
Hazardous Waste Policy Section  
Waste Management Policy Branch

cc: G. Rocoski, Manager, WMPB  
I. Smith, Technology Standards Branch  
R. McKenzie, Partnerships and Outreach Section, MOE



## Important Contacts

For questions related to the *Switch Out* Programme:

**Pollution Probe**

Leah Hagreen, *Switch Out* Manager

416-922-9038 ext. 25

[lhagreen@pollutionprobe.org](mailto:lhagreen@pollutionprobe.org)

[www.pollutionprobe.org/mercury.htm](http://www.pollutionprobe.org/mercury.htm)

For pick-up of mercury switches:

**Fluorescent Lamp Recyclers Inc.**

519-651-2606

For questions related to transportation regulations:

**Ontario Ministry of the Environment**

Debra Hurst, Waste Management Policy Branch

416-314-4186

For information on an Anti Lock Brake System Mercury Removal & Recycling programme:

**Clean Car Campaign**

[www.cleancarcampaign.org/pdfs/abs\\_removal.pdf](http://www.cleancarcampaign.org/pdfs/abs_removal.pdf)