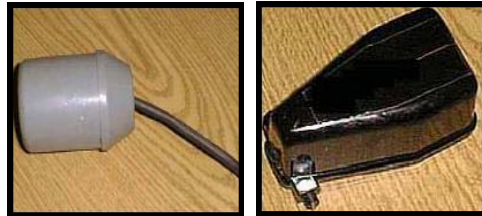


HOUSEHOLD APPLIANCE MERCURY SWITCH REMOVAL MANUAL



Chest Freezers



**Sump and Bilge Pump
Float Switches**

Gas Ranges



Washing Machines



**Maine Department
of Environmental Protection**

October 2004

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VERMONT'S HOUSEHOLD APPLIANCE MERCURY SWITCH REMOVAL MANUAL
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Any questions, comments, corrections or requests for additional copies should be directed to the:

Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

Attention: Mercury Products Program
Division of Solid Waste Management
Telephone: (207) 287-2651

This document is available on the Internet at: www.maine.gov/dep/mercury

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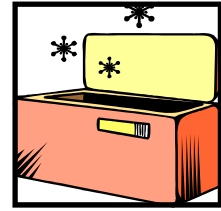
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1.0 INTRODUCTION

What is mercury?

Mercury is a naturally occurring metal. It is liquid at room temperature, binds easily with other metals and conducts electricity well. It is highly reliable for electrical switching in varied temperatures and moisture conditions. Because of these properties, mercury has been used in many household, medical and industrial products.



Why is mercury of concern?

In humans, mercury is a neurotoxin. This means it slows fetal and child development and impairs brain function. High exposure can cause tremors, numbness of fingers and toes, loss of muscle control, memory loss, and kidney disease. Mercury in our waterways changes through a natural chemical process to methylmercury, which is much more toxic than elemental mercury. Methylmercury is easily taken up in living tissue and builds up in fish and animals over time. Very small quantities of methylmercury can cause weight loss, reproductive problems and early death.



The most common way people are exposed to mercury is by eating mercury-contaminated fish. Maine is one of 48 states that have fish consumption advisories due to unhealthy concentrations of mercury in some species of fish. The fish consumption advisories recommend that people, especially women and children, limit the amount of certain types of fish they eat. Maine's advisories have been in place since 1994 and remain in effect today because mercury levels in fish have not decreased. The advisories are aimed at minimizing potential human health risks from mercury, but do nothing to remove the threat mercury poses to Maine's fish and wildlife.

How does mercury get into Maine's environment?

Most mercury in the environment comes from human activities. Mercury enters the air in the emissions from coal burning power plants and waste incinerators. Uncontained mercury, such as mercury that is released when a mercury switch or thermostat is crushed or broken, turns into a gas and also enters the air. Once in the air, mercury can fall to the ground with rain and snow, contaminating soils and water bodies. Improper disposal of household products that contain mercury and wastewater discharges add additional mercury to our lakes, streams and rivers. Mercury levels in Maine fish, loons, and eagles are among the highest in North America.



When white goods are recycled for scrap metal, mercury may be released to the environment during the shredding or crushing process. It can also be released either through smokestack emissions at smelters, incinerators or through landfill leachate from intact products or ash from their incineration. By removing mercury-added products from appliances prior to metal reclamation, we all can help manage mercury wastes properly and keep mercury out of the environment.

The appliance sales and service industry and solid waste facilities must help keep mercury out of Maine's environment.

Maine law requires appliance sales and service industry to remove, or assure the removal of mercury components prior to the disposal of a household appliance. Appliances of concern are often referred to as "white goods" and include chest freezers, washing machines, gas ranges, gas hot water heaters, and sump and bilge pumps. Many of these appliances contain mercury lamps, switches and thermocouples.

The Law

38 MRSA

Section 1663. Disposal ban

After July 15, 2002, a person may not knowingly place a mercury-added product in solid waste for disposal in a solid waste facility. This section may not be construed to affect existing laws, rules or regulations governing disposal of mercury-added products prior to July 15, 2002.

Section 1664. Source separation

1. Removal from service; products containing mercury. When a mercury-added product is removed from service, the mercury in the item must be reused, recycled or otherwise managed to ensure compliance with section 1663.

A person who is in the business of replacing or repairing a mercury-added product in households shall ensure, or deliver the item to a facility that shall ensure, that the mercury contained in the item that is replaced or repaired is reused, recycled or otherwise managed in compliance with section 1663.

Since we are constantly discovering additional products with mercury-added components, this manual remains a work in progress. Please let us know of any additional products that you feel should be added to this manual.

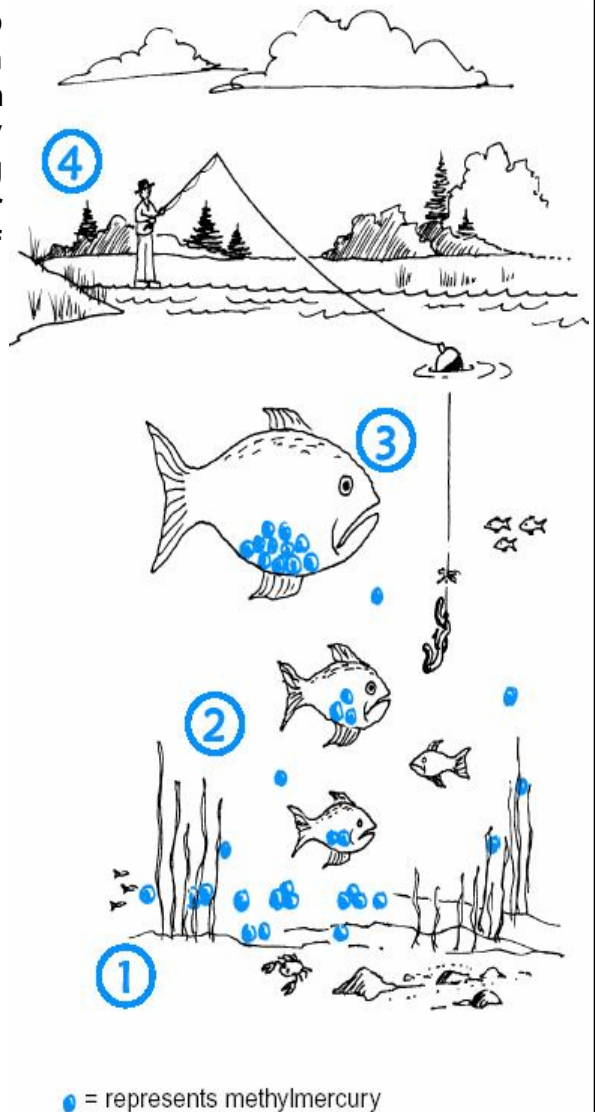
DEP Mercury Products Program
(207) 287-2651

How Does Mercury Get Into Fish?

Once in a lake or river, mercury is converted to methylmercury by bacteria and other processes. Fish absorb methylmercury from their food and from water as it passes over their gills. Mercury is tightly bound to proteins in all fish tissue, including muscle. **There is no method of cooking or cleaning fish that will reduce the amount of mercury in a meal.**

Methylmercury accumulates as you move up the food chain:

1. Methylmercury in the sediment and water is taken up by tiny animals and plants known as plankton.
2. Over time small fish eat large quantities of plankton.
3. Large predatory fish consume many smaller fish, accumulating methylmercury in their tissues. The older and larger the fish, the greater the potential for high mercury levels in their bodies.
4. Fish are caught and eaten by humans and animals, causing methylmercury to accumulate in their tissues.



The State of Maine Surface Water Ambient Toxics Monitoring Program has been monitoring the levels of mercury in fish tissue since 1994. More than 90% of the fish tissue samples exceeded the levels requiring fish consumption advisories across the state. The highest amounts of mercury are generally found in older fish. The Maine Bureau of Health has issued a fish consumption advisory which recommends that fewer meals be consumed of species with greater than average mercury levels. The advisory is also more protective of pregnant and nursing women, women who may become pregnant and children under age 8.

For more information on fish consumption advisories call the Bureau of Health toll-free at
1-866-292-3474

or on the web at
<http://www.maine.gov/dhs/ehu/fish/>

2.0 General Instructions

Safety Note: Proper personal protective equipment should be used at all times (i.e., safety glasses and gloves). In addition, spill equipment and storage material should be on-hand prior to any mercury-added device removal.

All appliances should be unplugged from an electrical outlet prior to any mercury switch removal. Appliances that have had these devices removed should be disabled to prevent future use (i.e., cut the electrical cord, or disable the gas feed line). All appliances that have had their mercury switches removed should be marked to note the removal of the mercury, similar to marking for CFC removal (once the mercury component is removed, the appliance is unsafe for reuse). All other hazardous components must also be properly removed and disposed of, including but not limited to chlorofluorocarbons (CFCs) and polychlorinated biphenyls (PCBs), prior to recycling the appliance as scrap metal.

In case a switch breaks during the removal process, please follow the mercury spill clean-up instructions on page 18.

Note: Once these mercury-added products are removed, proper handling, storage and disposal are described in Section 3.

2.1 Chest Freezers

Some chest freezers are made with a mercury switch inside the freezer cover light socket. The mercury engages two contact points when the lid is opened thus completing the electrical circuit and turning on the light. All freezer manufacturers have stopped using mercury as a switching mechanism and begun using a mechanical switch by January 1, 2000. If there is no visible



The following procedure should be used for removal of the mercury tilt switch.

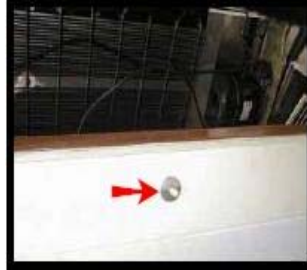
CHEST FREEZER MERCURY SWITCH REMOVAL

ESTIMATED REMOVAL
TIME: 1-5 MINUTES



STEP 1.

Open the freezer lid and look for a manual switch, similar to the one shown to the right. If it has a manual switch, the appliance can be handled as scrap metal (after removal of CFCs).



STEP 2.

Locate the light socket on the underside of the lid (on some freezers you may have to remove a plastic light cover).



If there is no manual switch, proceed to **STEP 2.**

STEP 3.

Remove the light bulb and properly discard.



STEP 4.

Remove the plastic housing (either by unscrewing it or breaking it off).



STEP 5.

Gently pull the light socket out of its mounting bracket (due to some lights having an in-line mercury switch see Reference Photo 2 below).



STEP 6.

Cut or remove the attached wires.



STEP 7.

Remove and properly dispose of the entire light socket.



REFERENCE PHOTO 1.

Assorted mercury freezer switches for disposal.



REFERENCE PHOTO 2.

Chest freezer light with an in-line mercury switch (glass ampule).



2.2 Washing Machines

Mercury switches were used in a small number of washing machines manufactured prior to 1972 because of their ability to reliably function in a high-moisture environment. Most washing machines with mercury switches will pass through the recycling system by 2010. Mercury switches were used for two different applications in washing machines, both of these uses were for consumer protection.

One application of the mercury switch was used to detect a lid opening and engage a brake to quickly stop the washer drum from moving. This feature is particularly important when the washer is in a spin cycle because it reduces the risk of a consumer being injured by reaching into a spinning basket. This switch is located between the washer tub and the cover for the tub area of the washer and is activated when the lid of the washer is lifted.

Another use for mercury switches was in the dynamic stabilizing system to prevent a severe out-of-balance condition. This switch worked by breaking the circuit when the machine was severely out of balance. It is located on the back of certain washing machine models.

These switches can be identified and removed using the following procedures.

WASHING MACHINE MERCURY SWITCH REMOVAL

ESTIMATED REMOVAL TIME:
5-10 MINUTES



STEP 1.

Open the lid on the washer and look for a non-mercury mechanical switch. These switches come in various sizes, shapes and locations. You should also be able to hear an audible “click” when a mechanical switch engages and disengages (with the opening and closing of the lid). If there is no mechanical switch continue to STEP 2. Photos A and B are examples of non-mercury mechanical switches.

Non-mercury mechanical switch examples:



A) back tab switch



B) front tab switch.

Once you have determined that there is no mechanical switch, the following procedure can be used to remove the mercury switch.

STEP 2.

Pry off the top of the washing machine as shown in figure A. or remove any fasteners from the lid as shown in figure B.



STEP 3.

On the underside of the lid, attached to the lid mounting rod, is an encapsulated mercury switch.

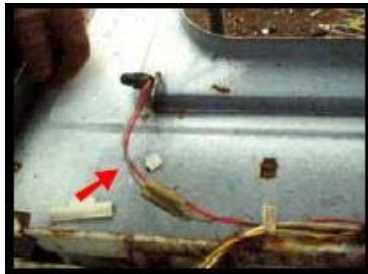


STEP 4

Remove the switch from the bracket.

STEP 5.

Cut or remove any attached wires.



STEP 6.

Properly store the mercury switch for future recycling.

SEVERE OUT-OF-BALANCE SWITCH REMOVAL

ESTIMATED REMOVAL TIME: 5-10 MINUTES



Another use for mercury switches in washing machines was in the dynamic stabilizing system to prevent a severe out-of-balance condition (only on certain models). Only through removal can you distinguish between a manual switch and a mercury switch. The mercury will be visible.

STEP 1

Locate the dynamic stabilizing switch on the back of the washing machine.



STEP 2

Remove the fastening bolts.



STEP 3

Disconnect the attached wires and properly dispose of the switch.



2.3 Gas Ranges

There are three types of gas ranges on the market:

- 1.) The old fashion type with a standing pilot light on the stove top for the burners and a standing pilot light in the lower part of the oven for lighting the oven;
- 2.) The ranges that contain a glow bar in the oven and use a hot surface igniter glow plug for surface burner lighting and;
- 3.) The ranges usually referred to as electronic spark ignition pilot lights that do not have either a glow bar in the oven or standing pilot lights in either the oven or the range top.

Those gas stoves with the old fashion standing pilot lights (1 above) **always** have mercury temperature sensing probes and switches. Pilot-light ranges require a mechanical safety device to detect whether the pilot-light is on. The safety device will shut off the supply of gas to the burner when the pilot-light has gone out. Otherwise, the potential exists for a dangerous quantity of gas to build up in the oven.

Gas ranges that have a hot surface igniter and a glow bar, (2 above) **do not** have mercury temperature sensing probes and switches.

Gas ranges that are ignited using an electronic spark ignition system (3 above) **may or may not** contain mercury temperature sensing probes and switches.

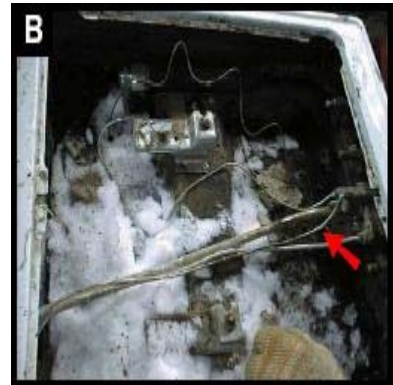
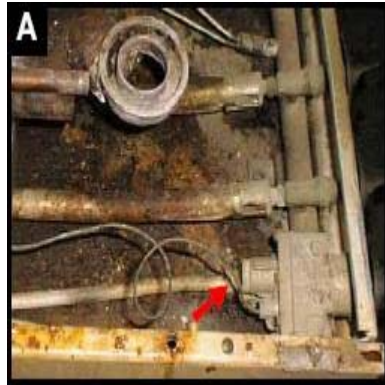
The following pages depict the mercury and non-mercury control devices in gas ranges. *(Note: Appliances sold after January 1, 2002 may be labeled if they incorporate a mercury-containing device.)* The procedures show how to distinguish the non-mercury probes and switches from the mercury switches (many times within the same appliance). Many of the stainless steel safety valve capillary tubes and sensor bulbs are mercury-containing devices while copper safety valve capillary tubes and sensor bulbs are non-mercury containing devices. **As a general rule, magnetic metals are mercury-containing probes while non-magnetic metals are non-mercury containing probes.** This may be difficult to distinguish if there is baked on food on the assembly. What may appear copper may be stainless steel coated with baked on food. Removal of any baked on food may be necessary prior to determining metal type.

Temperature capillary tubes and bulbs found within ovens or below upper burners are usually copper probes. A copper probe is a good indication of a non-mercury containing device. These capillary tubes and bulbs are instead filled with an oil or sodium-potassium mixture. Photos A thru D on the following page show some examples of non-mercury probes.

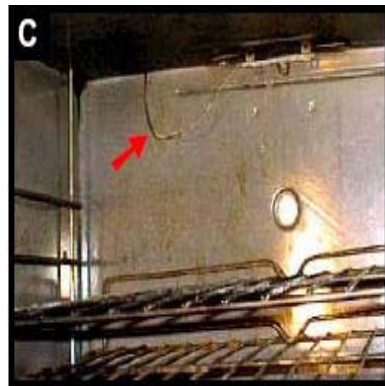
In addition, many ranges have fluorescent backlighting and PCB containing lighting ballasts. Under Maine law these are also considered universal waste and must be removed prior to the recycling of the range. The fluorescent lamp and PCB ballast should be managed as universal waste as detailed in Appendix A.

NON-MERCURY TEMPERATURE PROBES

These photos are examples of non-mercury temperature probes in a gas range and oven. Photos A and B show the top view of a gas range after the burner surface has been removed. **Note that these capillary tubes and bulbs start at the temperature control knob.**

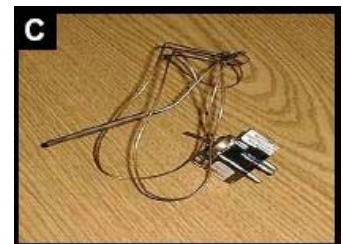


Photos C and D show the oven control temperature capillary tubes and bulbs (top of the oven cavity) which continue from the oven control knob into the oven cavity.



EXAMPLES OF SOME MERCURY GAS SAFETY VALVE CONTROLS, CAPILLARIES AND BULBS

Photos A & B show complete mercury gas safety valve control, capillary and bulb. Photo C shows a gas auto pilot probe.



Once you have determined that the gas oven capillary tubes and bulbs are mercury containing, the following procedure can be used to identify and remove the mercury gas safety valve control assembly.

GAS RANGE MERCURY GAS SAFETY VALVE CONTROL ASSEMBLY REMOVAL PROCEDURE

ESTIMATED REMOVAL TIME:
15-20 MINUTES



STEP 1.

Remove the broiler pan drawer.



STEP 2.

Once the drawer is removed you can view the burner assembly inside.



STEP 3.

When viewing the burner assembly, the small capillary tube (as pointed out) is indicative of a mercury sensor switch.



STEP 3A.

Burner assemblies without a capillary tube but instead with an electronic pilot flame sensor (identified by the two wires) are **non-mercury**.



STEP 3B.

For gas ranges with a bracket covering the pilot, simply bend the bracket out of the way to view the wires indicating an electronic pilot sensor (non-mercury sensor).



Ranges without a capillary tube can be sent to scrap metal after making sure there is no fluorescent backlighting (see STEP 16) or PCBs.

For ranges with a capillary tube, **proceed to STEP 4.**

STEP 4.

If you have a capillary tube (like the one in the photo), you will now have to remove the burner assembly, valve and all attached gas fittings.



STEP 5.

Start by removing the key (sometimes a screw or a pressure fit) holding the burner assembly in.



STEP 6.

With the burner assembly loose, **proceed to STEP 7.**



STEP 7.

Disconnect the gas feed line by loosening the fitting or cutting the gas line.



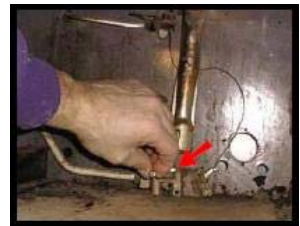
STEP 8.

Disconnect the pilot gas feed line by loosening or cutting (there may sometimes be two feed lines).



STEP 9.

Remove the two screws holding the gas safety valve control in place.



STEP 10.

The entire burner assembly and valve are now ready to be removed. Note there is no screw or pin holding the oven burner unit, this is an example of a pressure fitting oven burner unit.



STEP 11.

Gas range with the oven burner unit and gas safety valve control removed.



STEP 12.

The removed oven burner unit and gas safety valve control.



STEP 13.

Remove the screw holding the gas safety valve control and gas safety valve capillary tube and bulb to the oven pilot assembly.



STEP 14.

Carefully pull the gas safety valve capillary tube and safety valve sensor bulb back through the bracket.



STEP 15.

The entire gas safety valve control, gas safety valve capillary tube and safety valve sensor bulb are now ready for proper storage. **Proceed to STEP 16.**



GAS RANGE FLUORESCENT BACKLIGHTING REMOVAL

ESTIMATED REMOVAL TIME: 1-2 MINUTES



STEP 16.

Prior to disposal, all stoves should be inspected to make sure that there is no fluorescent backlighting or PCBs. Some backlighting contains fluorescents and PCBs that come in various shapes and sizes (in addition to the one shown in the photos) and should be carefully removed and disposed of properly.



2.4 Gas Hot Water Heaters

Although all the current literature states that mercury was not used in residential hot-water heaters, the following procedure has been included to help prevent any mercury-added thermocouples from entering the waste stream and eventually the environment. Use the following procedure to properly identify and remove any mercury-containing thermocouples (usually commercial hot-water heaters of 100 gallons or more).

NON-MERCURY TEMPERATURE PROBE

PHOTO A.

A non-mercury temperature probe. Notice that this probe is copper; which is a good indication of a non-mercury containing device.



GAS HOT WATER HEATER MERCURY THERMOCOUPLER REMOVAL

ESTIMATED REMOVAL TIME:
5-10 MINUTES



STEP 1.

Locate the temperature control unit.



STEP 2.

Determine if there is an electronic flame sensor (determine by the presence of wires) or if there is a mercury thermocouple.



STEP 3.

Use a magnet to determine if it is indeed a mercury probe (non-magnetic probes are non-mercury).



STEP 4

If the probe is mercury, simply remove the bottom of the heater and loosen the nut attaching the probe. Then properly remove and store the mercury thermocouple.



2.5 Pumps With Float Switches

Switches with mercury are commonly found in sump, bilge, trash and sewage lifting pumps. The mercury switch, which functions very reliably in the high moisture environment, turns on and off based on the corresponding water level. As the water level rises, so does the float ball and wire (a wire attached to the float is a good indication of a mercury sump pump) which would then tilt the mercury switch, completing the electrical circuit that turns on the pump. As the water level recedes the electrical circuit is broken and the pump turns off.

SUMP PUMP MERCURY REMOVAL

ESTIMATED REMOVAL TIME:
1-2 MINUTES



A mercury-free sump pump. Notice the metal guide and no attached wires.

The sump pump on the left is an example of a mechanical sump pump. This pump works on the same principle that as the float ball rises up with the water it would turn on the pump (mechanical switch) and when the water recedes it would sink down with the water and shut the pump off. As can be seen in the photo on the left, a metal guide is used instead of a wire. This is a good indication of a non-mercury sump pump.



Sump pump float containing mercury.

Once you have determined it is a mercury sump pump, the wire attaching the float can simply be cut and the whole float properly stored for recycling (see photo at right).

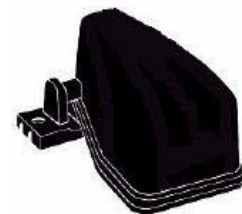
BILGE PUMP MERCURY REMOVAL

ESTIMATED REMOVAL TIME: 1-2 MINUTES



Automatic mercury containing float switch from a bilge pump

Bilge pumps work on the same principle as a sump pump. By rotating on a stationary point (see drawing on right) with the fluctuations in water level either up or down, the bilge pump would turn on or off. Several of the newer models use this method with a rolling steel ball instead of mercury to complete the electrical circuit. This can be determined by simply shaking the float switch. A steel ball bearing will be easily discerned from liquid mercury.



Automatic float switch

Once you have determined it is a mercury containing bilge pump, you can simply remove the entire float switch and properly store for recycling.

3.0 MERCURY-ADDED PRODUCTS HANDLING, STORAGE, TRANSPORTATION AND DISPOSAL

Once mercury switches, relays, devices, and lamps are removed, they should be properly handled, stored and recycled. Handling, storage and disposal requirements for these products are summarized below. Included for your convenience in **Appendix A** are the forms needed to comply with the regulatory requirements.

3.1 Handling

Removal of a mercury switch, relay, lamp or device can take place at the owner's residence, if you are repairing the appliance. If you are taking the appliance from the home you may remove the mercury component back at your place of business or, with prior agreement, have it removed by someone else through a written agreement with that solid waste facility.

A mercury switch, relay, lamp or device should always be handled in a way that will prevent breakage. Most can be stored in a 5 gallon plastic bucket with a locking lid that has a gasket. These buckets are usually available through the company that will pick up your universal wastes for recycling, or through many equipment supply companies. All storage buckets must be labeled as noted in Section 3.2 below.



When removing mercury or mercury-added components from a product, do so only over or in a containment device that will collect and contain any mercury released in the event of an accident. Be sure to keep spill clean-up kits and equipment readily available and always ensure that there is adequate ventilation. (See Section 4.0 of this manual for instructions to clean up a mercury spill.) Anyone handling mercury or mercury-added products should use proper personal protective equipment and be thoroughly familiar with proper mercury handling and emergency procedures.

3.2 Storage

If you remove mercury components or PCB ballasts, you will need to follow the storage requirements below.

All mercury switches, relays, lamps or devices and PCB ballasts must be stored in containers that will prevent any breakage or leakage. These items are considered universal wastes and must be stored in compliance with the requirements for the storage of universal waste in accordance with Chapter 850, Section 3A(13) of the rules, which are summarized below:

1. Universal waste must be stored in a secured area, which can be **locked** when not in use.
2. Universal waste storage areas must be designated by a clearly marked sign that states, "Universal Hazardous Waste Storage" **or** the type of waste being stored there, i.e. "Waste Lamp Storage", "Waste Mercury Device Storage", etc.

3. Store all universal waste in containers.
 - a. The containers must not show evidence of leakage, spillage or damage that could cause leakage under reasonably foreseeable conditions.
 - b. The containers **must be closed when not being added to**, structurally sound and compatible with the waste.
4. Each container must be labeled with the date you first put universal waste in it. (This date is called the accumulation start date) **and** the date the container becomes full. (If you wish to store universal wastes for more than 365 days, see #6 below.)
5. Universal waste containers should be marked with the type of waste they contain, i.e. "Waste Lamps", "Waste Mercury Devices", "Waste PCB Ballasts", etc.
6. A generator **cannot** store universal waste for more than **365** days from the date the waste is **first placed** in the container. There is an exception that allows additional storage time where it is needed to fill a container of waste no larger than the following container sizes and the container is shipped **no more than 90 days** from the date the container is filled:
 - a. Lamps: A container designed for no more than 190 lamps.
 - b. Mercury Devices: A container no larger than 55 gallons.
 - c. PCB Ballasts: A container no larger than 30 gallons.
7. Universal wastes must be stored so they **are not exposed** to the weather. To meet this requirement, universal wastes should be stored inside a structure that can be locked.
8. Universal wastes must be packed in containers with packing materials adequate to prevent breakage during storage, handling and transportation. The type and amount of packing materials should be adequate to prevent breakage during normal handling and shipping. Certain universal wastes are more fragile than others and will require more care in this regard.
9. Full universal waste containers must be sealed securely. Any universal waste container must immediately be **sealed** if incidental breakage occurs. This is an extremely important provision to prevent any broken items from escaping the container, exposing the workers and contaminating the storage area and transportation vehicle.
10. Universal waste containers must not be stacked more than 5 feet high. This prevents crushing or tipping of items.

11. Universal waste storage areas must be inspected **weekly** and the inspection documented in a **written inspection log**. The log must include the following items:
 - a. Name of the inspector.
 - b. Date of the inspection.
 - c. Condition of all waste containers.
 - d. Description of any problem noted during the inspection and action taken to fix it.
 - e. Number and type of universal wastes on site.

A copy of the log form is provided in Appendix A, pages 3 and 4. If you store 200 or less universal waste items on site, then you only need to keep track of the number and type of universal waste on site.

12. Universal waste containers must be stored to facilitate inspection of the container. The inspector must be able to determine the accumulation start date, container full date, and the container's condition.
13. All releases of waste and residues resulting from spills or leaks of universal waste must immediately be contained and transferred into a container that meets the requirements of the Maine Hazardous Waste Management Rules.

Spills must be handled as hazardous waste in accordance with Chapter 850, Section 3A(13)(e)(viii). Incidental breakage should however be a rare occasion. If frequent breakage is occurring, the generator, facility and transporter should review their handling procedures and packing materials to ensure that they are adequate for the job.
14. Your company must notify the Maine Department of Environmental Protection of the handling of universal waste and must obtain a Maine or EPA Identification Number. This requirement is intended as a registration provision and does not make other sections of the Hazardous Waste Management Rules applicable unless they are otherwise applicable. A notification form can be found in Appendix A, page 1.

A Maine or EPA Identification Number may be obtained by submitting the Universal Waste Notification Form to:

**Maine Department of Environmental Protection
Bureau of Remediation and Waste Management
Division of Oil and Hazardous Waste Facilities Regulation
17 State House Station
Augusta, Maine 04333-0017**

The form can also be downloaded From page 20 of the ***Universal Waste Handbook*** at the Department's website:

<http://www.maine.gov/dep/rwm/hazardouswaste/uwhandbook2004.pdf>

3.3 Transportation requirements

When transporting universal wastes from the owner's residence to your place of business, you must meet certain requirements. You should read the requirements included in **Appendix A**; a summary of key provisions is given below.

- The transporter shall carry a spill plan in the vehicle. (A spill plan is provided. See Appendix C for a copy.)
- The transporter shall have training to implement the spill plan. (See Section 3.4 below). Training shall be documented and the documentation shall be retained on file for 3 years or length of employment, whichever is longer.
- The transporter shall have at least \$1,000,000 annual aggregate liability insurance coverage.
- The transporter shall not transport foodstuffs for human or animal consumption that could come in contact with the universal wastes.
- The transporter may only take universal waste to a facility authorized by the State to handle universal or hazardous waste.
- The transporter shall comply with state and federal transportation requirements regarding the use of a manifest, bill of lading, or an applicable log form. (A copy of an applicable log form is provided in Appendix A, page 3.)

3.4 Training requirements

All employees and contractors who handle or have responsibility for managing mercury components as universal waste must be trained on proper handling and emergency procedures. Training may be provided by any qualified individual within the business or by the State DEP or a private consultant.

Documentation of the training must be maintained at the facility for a minimum of three years from the date the facility first receives or ships universal waste, or for the length of employment, whichever is longer. This documentation must include the name of the person receiving training, the date of the training and the information covered during the training.

3.5 Disposal

Properly contained and labeled mercury-added products can be taken for recycling in one of three ways. These are:

- through a local Solid Waste District of the municipality where your business is located (always call first to make sure they will accept universal wastes brought in by a business);
- through a universal waste transporter or consolidation facility. (see list in Appendix C); or
- through direct transport of the universal waste to a mercury recycler.

3.6 Closure

If your business brings appliances back to the business site for the removal and storage of the mercury components, it becomes a **central accumulation facility**. A central accumulation facility, in this case, is a facility where less than 200 mercury components are collected prior to shipment to a recycler or consolidation facility.

When it no longer handles mercury components, a **central accumulation facility** must go through closure in accordance with Chapter 851, Section 11 of the Department's Hazardous Waste Rules. The intent of this provision is to ensure that the site is free of mercury contamination.

4.0 MERCURY SPILL CLEAN-UP

CAUTION! Special Precautions for Mercury Spills:

Due to the need for specialized equipment and testing of the contaminated area, it is recommended that a professional environmental contractor be hired for any liquid mercury spill.

For All Mercury-Containing Spills: When a mercury spill occurs, the immediate area should be blocked off to prevent any accidental tracking of the mercury. If possible, the heat should be reduced and ventilation increased in the spill area. There are spill kits on the market that can be purchased or you may also put your own kit together. (See Appendix B for a list of what should be in your clean up kit.)

- **Avoid skin contact with mercury or surfaces that have been contaminated with mercury and make sure to remove all jewelry that may come in contact with the mercury.**
- **Do not use a vacuum to clean up mercury spills.** The use of a vacuum on a mercury spill will cause mercury to be dispersed into the air and some liquid mercury to stick to the metal parts in the vacuum motor. This will cause mercury to be discharged every time the vacuum is used. This poses a serious health problem and should be avoided. In addition, the vacuum will have to be decontaminated or discarded due to mercury contamination. Special vacuums that may be used on a mercury spill are available from environmental contractors.
- Always wear safety glasses and disposable rubber gloves when cleaning universal waste spills. All items except safety glasses (i.e. brooms, shovels, scoops, tape, gloves, sponges, rags, etc.) used to clean up mercury spills should be considered contaminated and must be disposed of as hazardous waste.

- Place the broken mercury component(s) in an appropriate container i.e. sealable plastic bag and then in a sealable plastic or metal container.
- Wipe the spill area thoroughly with a wet sponge. Place other clean-up materials (sponge, tape, rags, gloves etc.) in the container.
- Seal the container(s), date and label as 'Hazardous Waste Mercury Spill Materials' and store as hazardous waste for disposal.
- If the spill occurred on a carpet or other permeable surface it may be necessary to remove the flooring to prevent continued exposure to mercury.
- Thoroughly wash your hands and face after cleaning up any mercury spill. Clothing worn during spill cleanup should be washed immediately without other clothes in the washing machine.

Reporting Requirements:

All spills/discharges from mercury devices and PCB ballasts must be reported to the DEP immediately. Report any mercury spill to the Department's spill hotline at:

1-800-452-4664.

REFERENCES

Discussion Paper: Management of Hard to Handle Wastes in Vermont. Vermont Agency of Natural Resources. May 1998.

Managing Problem Materials Generated by Discarded Appliances and Vehicles. Report to Northeast Waste Management Officials' Association. Prepared by DPRA Incorporated. September 1994.

Fact Sheet: Mercury Applications in Major Appliances and Heating/Cooling Systems. Minnesota Office of Environmental Compliance. April 13, 1998.

Household Appliance Mercury Switch Removal Manual. Vermont Agency of Natural Resources. Spring 2002.

Universal Waste Handbook. Maine Department of Environmental Protection. January 2004.

Appendix A

Regulatory Forms and Instructions

- **Universal Waste Notification Form**
- **Certificate of Recycling and Record Retention Instructions**
- **Universal Waste Log—Parts 1 and 2**

Universal Waste Notification Form

Maine Department of Environmental Protection
Bureau of Remediation and Waste Management, Division of OHWFR, 17 State House, Augusta, Maine 04333-0017

Type of Facility:

- Large Universal Waste Generator (but less than 5000 kg accumulation)
 Generator Owned Central Accumulation Facility
 Small Service Central Accumulation Facility (less than 200 items)

Municipal/Regional: Recycling Center; Transfer Station

A. Facility Name:

B. Facility Location:

Street

City/Town

State

Zip Code

C. Facility Mailing Address: ___ Same as above.

Street

City/Town

State

Zip Code

D. Contact Person:

Name

Job Title

Phone

E. Facility Owner: ___ Same as Above

Name

Phone

Street

City

State

Zip Code

F. Waste Type: (check all that apply): (CR) Cathode Ray Tube; (PC) PCB Ballasts;
 (BT) Batteries; (H) Lamps; (TH) Mercury Thermostats; (MD) Mercury De-
vices (includes thermometers); (MS) Motor Vehicle Mercury Switches

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that I handle less than 5000kg of universal waste at any one time. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Official Title (Type or Print): _____

Signed: _____ Date: _____

CERTIFICATE OF RECYCLING for UNIVERSAL WASTES

Generators should receive a **Certificate of Recycling** from the recycling facility for each shipment of universal wastes except as noted below*.

The **Certificate of Recycling** shall be dated and signed by the recycling facility confirming that all hazardous waste components of the universal waste have been recycled, used, reused or reclaimed within thirty-five (35) days of receipt.

The **certificate** shall contain at least the following information:

- Name, address and phone number of the generator and the recycling facility;
- Date the universal waste was received at the recycling facility;
- Date the universal waste was recycled;
- Quantity of universal waste recycled;
- The tracking number of the document used to ship the universal waste to the recycling facility and;
- The following statement:
“I certify that all parts of the hazardous material referenced in the above shipping document including the mercury and lead have been recycled, i.e. used, reused or reclaimed as defined in Chapter 856 Section 11A(5).”

RECORDS RETENTION

Generators, owners or operators of any central accumulation facility must retain the following documents and paperwork at the facility:

- a. **Inspection logs** must be kept for **one (1) year** from the date of shipment or receipt of universal waste. Generators that accumulate 200 or less universal waste items at a time or in any given month (“small universal waste generators”) do not need to complete inspection logs.
- b. **Training documentation** must be kept for at least **three (3) years** from the date of shipment, receipt of universal waste or length of employment whichever is longer.* Small universal waste generators may be self-trained.
- c. **Bill of lading or manifest** must be kept for at least **three (3) years** from the date of shipment or receipt of universal waste.
- d. **Certificate of Recycling** must be kept for at least **three (3) years** from the date of shipment of the universal waste except for shipments of ballasts or residues from mercury spill kits.*

***In-state small universal waste generators and in-state central accumulation facilities** may have records (b) and (d) above maintained by the **in-state** consolidator provided the **in-state** consolidator meets the above requirements.

Universal Waste Log Form

Part 1

Maine or EPA ID _____

Generator/Central Accumulation Facility Name:

Generator/ Central Accumulation Facility Location:

Street

Street (cont.)

City/Town

State

Zip Code

Generating/ Central Accumulation Facility Mailing Address: ___ Same as above.

Street

Street (cont.)

City/Town

State

Zip Code

Contact Person:

Name

Job Title

Generator/Central Accumulation Facility Owner: ___ Same as Above

Name

Street

City

State

Zip Code

Universal Waste Log Form

Part 2

Generator/Central Accumulation Facility Name: _____

Waste Type Code ¹	Lamp Size (2',4',8') or type (U tube)	Battery Type ³	CRT Type ⁴	# of UW Items ²	Date Received	Comments
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

1. Waste Type Codes:

Battery = **BT**

Cathode Ray Tubes = **CR**

Lamps = **H**

Mercury-containing Thermostat = **TH**

PCB Ballast = **PC**

Mercury Devices (including mercury switches & flamesensors) = **MD**

Motor Vehicle Mercury Switches = **MS**

3. Battery Type:

Lithium = Li; Mercuric Oxide = HgO;

Nickel Cadmium = NiCd;

Nickel Metal Hydride = NiMH;

Silver Oxide = AgO

4. CRT Type:

Computer or Television

2. # of Universal Waste Items:

Total individual number of items, i.e.: individual switches, lamps, CRTs; ,thermostats, batteries, PCB ballasts.

Attach to Part 1.

Appendix B

Mercury Spill Clean-up Plan
and
Spill Kit List

MERCURY SPILL CLEAN-UP PLAN

CAUTION! Special Precautions for Mercury Spills

Due to the need for specialized equipment and testing of the contaminated area, it is recommended that a professional environmental contractor be hired for any liquid mercury spill.

For All Mercury-Containing Spills: When a mercury spill occurs, the immediate area should be blocked off to prevent any accidental tracking of the mercury. If possible, the heat should be reduced and ventilation increased in the spill area. There are spill kits on the market that can be purchased or you may also put your own kit together. (See next page for a list of what should be in your clean up kit.)

- **Avoid skin contact with mercury or surfaces that have been contaminated with mercury, and make sure to remove all jewelry that may come in contact with the mercury.**
- **Do not use a vacuum to clean up mercury spills.** The use of a vacuum on a mercury spill will cause mercury to be dispersed into the air and some liquid mercury to stick to the metal parts in the vacuum motor. This will cause mercury to be discharged every time the vacuum is used. This poses a serious health problem and should be avoided. In addition, the vacuum will have to be decontaminated or discarded due to mercury contamination. Special vacuums are available from environmental contractors that may be used on a mercury spill.
- Always wear safety glasses and disposable rubber gloves when cleaning a mercury spill. All items except safety glasses (i.e. brooms, shovels, scoops, tape, gloves, sponges, rags, etc.) used to clean up mercury spills should be considered contaminated and must be disposed of as hazardous waste.
- Place the broken mercury component(s) in an appropriate container i.e. sealable plastic bag, and then in a sealable plastic or metal container.
- Wipe the spill area thoroughly with a wet sponge. Place other clean-up materials (sponge, tape, rags, gloves etc.) in the container.
- Seal the container(s), date and label as 'Hazardous Waste Mercury Spill Materials' and store as hazardous waste for disposal.
- If the spill occurred on a carpet or other permeable surface it may be necessary to remove the flooring to prevent continued exposure to mercury.
- Thoroughly wash your hands and face after cleaning up any mercury spill. Clothing worn during spill cleanup should be washed immediately without other clothes in the washing machine.

Reporting Requirements: All spills/discharges from mercury devices and PCB ballasts must be reported to the DEP immediately. Report any mercury spill to the Department's spill hotline at:

1-800-452-4664.

Mercury Spill Kit

What you will need to make up your own spill kit:

1. Eye protection such as safety goggles
2. Flashlight
3. Sponges
4. Steel wool pad
5. Latex dish washing gloves
6. Thinner gloves that come in a box of 100 (cheap!)
7. Roll of masking tape
8. Two stiff pieces of paper, about 5 ½" x 8"
9. An eyedropper
10. A whisk broom – the smaller the better
11. A one gallon size container with a lockable lid
12. A smaller container with a good sealable lid
13. A magic marker or pen
14. A Universal Waste label
15. A copy of the one page spill clean-up plan

Nice to have but not necessary: Indicator powder

Containers and indicator powder can be ordered from an industrial supply catalog such as Lab Safety – 1-800-356-0783. Other companies can be found on the web.

Appendix C

Mercury Switch Transporters & Recyclers for Maine Page 1 of 2

Complete Recycling Solutions

#1 Father DeValles Blvd.
Fall River, MA 02723
(508) 402-7700 or (866) 277-9797

End Of Life Electronics

125 John Roberts Rd.
South Portland, ME 04106
(207) 775-1551

Environmental Management, Inc.

51 River Road
Brunswick, ME 04011
(207) 729-7549

Environmental Projects Inc.

155-F Lewiston Rd.
Gray, ME 04039
(207) 657-2400 or (877) 846-0447

Healthcare Compliance Service

P. O. Box 72557
Thorndale, PA 19372
(610) 518-5299 fax: (610) 518-2995

Lamp Environmental Industries, Inc.

46257 Morris Road
Hammond, LA 70401
(985) 345-4147 or (800)309-9908

Lighting Resources

498 Park 800 Drive
Greenwood, IN 46143
(317) 888-3889 fax: (317) 888-3890

Mercury Waste Solutions

21211 Durand Avenue
Union Grove, WI 53182
(800) 741-3343 fax: (262) 878-2699

Maine Labpack, Inc.

Mercury Switch Transporters & Recyclers for Maine
Page 2 of 2

248 Preble Street
South Portland, ME 04106
(207) 767-1933

Onyx Environmental Services

398 Cedar Hill Street
Marlborough, MA 07152
(800) 354-2382

Recycle First

100 Maine St Suite 222
Dover, NH 03820
(603) 516-3717

Safety Kleen Corporation

86 US Hwy 202
Leeds, ME 04263
(207) 933-4496

United Industrial Services, aka Total Waste Mgmt. Corp.

142 River Road
Newington, NH 03801
(800) 345-4525

UniWaste Services Corp.

125 Aviation Avenue
Pease International Tradeport
Portsmouth, NH 03801
(866) 522-7711 or (603) 422-7711 cell: (603) 944-6458

Wesco Distribution

80 Farm Road
Bangor, ME 04401
(207) 942-6713 or (800) 432-7969

Wuf Technologies

7 South State Street
Concord, NH 03301
(603) 224-7959 fax: (603) 229-1960

**For an up-to-date list of transporters & recyclers registered to do business in
Maine, go to www.maine.gov/dep/hazardouswaste/pdf/uwrecyclingcompanies.pdf**