



Managing Dry-cell Batteries

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Background

Each year, businesses in the United States purchase over a billion dry-cell batteries to power such devices as flashlights, cordless power tools and appliances, a wide variety of measuring and monitoring devices, emergency lighting, calculators, cellular and cordless phones, lap-top computers, camcorders, smoke detectors and many more. When hazardous batteries are disposed of in a landfill or incinerator, the mercury, lead, cadmium, or silver can contaminate air, surface water, and ground water. Hazardous batteries must be recycled or managed as hazardous waste.

Types of Batteries

There are many different types of batteries, each with its own chemistry and characteristics:

- alkaline,
- carbon zinc,
- nickel-cadmium,
- nickel metal hydride,
- sealed lead-acid,
- mercury or mercuric oxide,
- silver or silver oxide,
- lithium ion,
- lithium, and
- zinc air.

Since proper management of a battery depends on the battery type, you will want to pay special attention to the types of batteries you buy and use. The battery type may be found on the battery label, package or is available from your battery supplier.

Sizes of Batteries

Most battery types come in several different shapes and sizes, including A, AA, AAA, C, D, 6V, 9V, coin or button shaped, and battery packs (a series of battery cells connected together and usually encased in plastic).

Characteristics of Batteries

Some batteries are hazardous to the environment because of the amount of mercury, lead, cadmium, or silver they contain; others are not hazardous because they do not contain any of these toxic metals, or they contain such tiny amounts that they do not pose a significant environmental concern. Some batteries are single use, while others are rechargeable and can be used many times; some batteries can be recycled, some can not. Table 1 compares different kinds of batteries.

Managing Nonhazardous Batteries

The types of batteries identified as *nonhazardous* in Table 1 may generally be disposed of as an industrial solid waste or recycled. In order to divert metals from local solid waste combustion or composting facilities, some county programs require businesses to manage these nonhazardous batteries differently. Check with your county environmental program to determine the proper disposal method for nonhazardous batteries in your area.

Managing Hazardous Batteries

Batteries identified as *hazardous* in Table 1 (page 3) must be managed as Universal Waste or hazardous waste.



Rechargeable Nickel-Cadmium and Sealed Lead-Acid Batteries

Minnesota law prohibits the placement of nickel-cadmium and lead-acid batteries in the garbage or solid waste stream. Minnesota law also requires the manufacturers of these kinds of batteries to establish a statewide system to collect rechargeable batteries, rechargeable battery packs and products with nonremovable rechargeable batteries from households and businesses.

These batteries may be managed as a Universal Waste or as a hazardous waste. Universal waste allows for the ease of collection and management to facilitate recycling.

Nickel-Cadmium, Nickel Metal Hydride, Small Sealed Lead-Acid (SSLA), and Lithium Ion Batteries

Rechargeable Battery Recycling Corporation (RBRC) is a non-profit organization created by the rechargeable power industry and dedicated to the recycling of rechargeable batteries – nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH), lithium ion (Li-ion), and small sealed lead (Pb).

RBRC has arranged for a national battery recycling program where a thermal recovery process reclaims the metals from the batteries and prepares them for use in new products.

Businesses that generate these four types of rechargeable batteries may ship their batteries to one of RBRC's battery reclamation facilities at no cost to the generator (except transportation). For more information about the rechargeable battery recycling program, contact RBRC at (320) 963-2232, (678) 419-9990 or 1-(800)-8-BATTERY, or visit <http://www.rbrc.org>

Sealed Lead-Acid (SLA) Batteries – 2 lbs or greater

Contact your battery supplier to inquire about collection or exchange information. Ship your SLA batteries to a secondary lead smelter or other recycling outlet. Since the composition of SLA batteries is similar to motor vehicle batteries, many motor vehicle battery outlets and haulers may accept your spent SLA batteries. For a list of motor vehicle battery recycling outlets and haulers, request MPCA hazardous waste fact sheet #6.06. Also, see *Transportation Requirements*.

Mercury and silver batteries are typically button-or coin-shaped, although businesses may sometimes use larger mercury and silver batteries. Minnesota law prohibits the placement of silver and mercury batteries in the garbage or solid waste stream. Although Minnesota law has prohibited the sale of mercury batteries since February 1, 1992, mercury batteries may still be in use.

Minnesota law requires manufacturers of mercury and silver batteries to provide for the collection of silver and mercury batteries from businesses that use their batteries. Businesses that have used mercury or silver batteries have two options:

1. Contact your battery supplier or the battery/product manufacturer to inquire into available mercury and silver battery collection programs; or,
2. Ship your mercury and silver batteries to a hazardous waste disposal or battery reclamation facility. See *Transportation Requirements*.

Large Lithium Batteries (nonrechargeable, more than 9 volts)

A used lithium battery of more than 9 volts is considered a hazardous waste unless test results show the battery to be nonhazardous. Lithium batteries are not toxic but may react violently with water, making them potentially hazardous for the characteristic of reactivity. During battery discharge, the reactive lithium is transformed into a non-reactive substance. Therefore, the more you discharge your lithium batteries, the less likely the batteries will exhibit reactivity.

Businesses that generate hazardous lithium batteries must ship these batteries to a hazardous waste facility or a lithium battery discharging facility in accordance with applicable transportation requirements. See *Transportation Requirements*.

Businesses that have tested their lithium batteries and shown them to be nonhazardous may dispose of them as an industrial solid waste or recycle them. In order to divert batteries from local solid waste combustion or composting facilities, some county programs may require you to send these batteries to a solid or industrial waste landfill. Check with your county environmental programs to determine the proper disposal method for nonhazardous lithium batteries in your area.

Mercuric Oxide and Silver Oxide Batteries

Managing Dry-cell Batteries



MPCA staff strongly recommends that whenever possible, businesses completely use up lithium batteries prior to discard. This practice will reduce the number of

batteries used and may also render the batteries nonhazardous, resulting in reduced disposal costs.

Table 1: Battery Hazards and Characteristics

Batteries identified as hazardous in this table must be managed as Universal Waste or hazardous waste.

Type of Battery	Hazardous or Nonhazardous ¹	Recyclable or Nonrecyclable	Rechargeable or Nonrechargeable	Notes:
Alkaline	Nonhazardous	Nonrecyclable/ limited recyclable	Nonrechargeable and rechargeable	Most commonly used and recognized battery
Carbon Zinc	Nonhazardous	Nonrecyclable/ limited recyclable	Nonrechargeable	Often labeled <i>General Purpose</i> , <i>Heavy Duty</i> or <i>Classic</i>
Nickel-Cadmium	Hazardous for cadmium (<i>Cd</i>), waste code: <i>D006</i>	Recyclable	Rechargeable	Labeled <i>Ni-Cd</i> ;
Nickel Metal Hydride	Nonhazardous	Recyclable	Rechargeable	Labeled NiMH
Sealed Lead-Acid	Hazardous for lead (<i>Pb</i>), waste code: <i>D008</i>	Recyclable	Rechargeable	Pb-acid
Mercuric Oxide	Hazardous for mercury (<i>Hg</i>), waste code: <i>D009</i>	Recyclable	Nonrechargeable	Marked with ⊕ symbol
Silver Oxide	Hazardous for silver (<i>Ag</i>), waste code: <i>D011</i>	Recyclable	Nonrechargeable	
Lithium ion	Nonhazardous	Recyclable	Rechargeable	Labeled Li-ion
Lithium, small	Nonhazardous ²	Recyclable	Nonrechargeable	Small = 9 volts or less; often button, often labeled Li or CR
Lithium, large	Potentially hazardous for reactivity ³	Recyclable	Nonrechargeable	Large = more than 9 volts; if hazardous, waste code: <i>D003</i>
Zinc Air	Nonhazardous	Nonrecyclable	Nonrechargeable	Usually button size

¹ Based solely on Toxicity Characteristic Leaching Procedure test results.

² Applies to discharged lithium batteries of no more than 9 volts.

³ The MPCA considers a lithium battery of more than 9 volts to be a hazardous waste unless the generator's evaluation (test results) shows the battery to be nonhazardous.



Storage Requirements

Store batteries in a cool location in a vented, nonmetal container. A plastic bucket or sturdy cardboard box may serve the purpose. Do not place an airtight lid on the container, because gases that normally vent from batteries may be trapped, creating a potentially dangerous situation. Batteries may have a residual charge. To prevent batteries from short-circuiting, place batteries in separate plastic bags or place tape over the terminals.

The federal universal waste rules limit the time period during which one may accumulate hazardous batteries to one year unless additional time is needed to facilitate proper management. If hazardous batteries accumulate for a period longer than one year, the handler must document the length of time that the batteries have been accumulating and be able to demonstrate why more than a one-year time period is necessary.

Mark battery storage containers with the words *Batteries for Recycling* or *Hazardous Waste Batteries*.

Inspect battery containers regularly to ensure they are not leaking or broken; recontainerize batteries when leaking or broken containers are discovered. Documentation of battery container inspections is not required.

Transportation Requirements

Minnesota's requirements for transporting hazardous batteries reflect the federal Universal Waste rules. A hazardous waste manifest and licensed hazardous waste transporter are not required for any hazardous waste battery shipments. However, a transporter must meet any Minnesota Department of Transportation (MnDOT) requirements applicable to the specific hazard class of a battery shipment (e.g. reactive material).

When shipping within the State of Minnesota use a waste-tracking invoice containing the following information:

- date of shipment;
- location from which batteries were shipped;
- destination location; and,
- number or pounds of batteries shipped.

When shipping out of Minnesota to another state you may use a waste-tracking invoice containing the

information outlined above *unless* the shipment is passing through a state that requires a hazardous waste manifest. If any state requires a hazardous waste manifest, you must use a manifest and a hazardous waste transporter. If using a hazardous waste manifest, use the waste codes from Table 1. No states require hazardous waste manifests or hazardous waste transporters to ship NiCd or SSLA batteries. You can always ship these wastes using a waste-tracking invoice.

When shipping to Minnesota from another state, you may use a waste-tracking invoice containing the information outlined above *unless* you are shipping through a state that requires a hazardous waste manifest; then you must use a hazardous waste manifest and hazardous waste transporter. If using a hazardous waste manifest, use the waste codes from the table. No states require hazardous waste manifests or hazardous waste transporters to ship NiCd or SSLA batteries. You can always ship these wastes using a waste-tracking invoice.

Record Keeping Requirements

Keep on site for a minimum of three (3) years a copy of each waste-tracking invoice or manifest used for shipments of batteries. If you do not need a waste-tracking invoice or manifest, MPCA staff recommends that you keep a receipt or other records showing:

- date of shipment;
- location from which batteries were shipped;
- destination location; and,
- number or pounds of batteries shipped.

Notification Requirements

Businesses are not required to report or obtain a hazardous waste license for their own used dry-cell batteries; however, batteries must still be managed properly as described above. Businesses collecting batteries from other businesses (*consolidation sites*) and Large Quantity Universal Waste Generators (*LUWG*) of universal hazardous waste, such as dry cell batteries, are required to notify the EPA of this activity. LUWGs are businesses that accumulate more than 5000 kilograms or more of universal waste, collectively, at any time, at their site. Complete and return the Hazardous Waste Generator Notification form to satisfy the notification requirement.



Tips

- Avoid the use of batteries whenever possible by purchasing tools and equipment that does not require batteries.
- Avoid buying products with non-removable batteries.
- Use rechargeable batteries whenever possible.
- While batteries are normally safe to handle, batteries can contain caustic materials that may leak. If a battery appears to be dirty or have a white, film-like substance around the terminals, use caution when handling the battery. **Do not touch the dirty area.** Wear protective gloves; wash your hands with soap and water after handling batteries.

Dry-cell Battery Collectors

The Minnesota Pollution Control Agency (MPCA) maintains the following list of dry-cell battery collectors solely as a service to Minnesota generators of dry-cell batteries. Information was voluntarily supplied by the companies and is not necessarily a complete list of available services. The list does not endorse specific service providers. The MPCA, by providing the list, does not imply that the companies are in compliance with applicable laws. The MPCA cautions generators to personally evaluate the services and compliance status of any company they use to manage waste. The list that follows is alphabetical by company name. The MPCA periodically updates this list. (Partial update: 8/02)

Companies that collect the following:

- 1 = Button batteries
- 2 = Ni-cd rechargeable batteries
- 3 = Small sealed lead batteries
- 4 = Other dry-cell batteries

A1 Battery Source

940 Highway 10
Elk River, MN 55330
(763) 241-8877
(1,2,3,4) drop off

A1 Wireless & Batteries

14123 Commerce Avenue NE
Prior Lake, MN 55372
(952) 226-3999
(1,2,3,4) drop off

A-Battery City, Inc.

58 Ninth Avenue NE
Minneapolis, MN 55413-1812
Contact: Bruce Rosenberg
Phone: (612) 379-7735
(3) drop off & pick up

Bauerly Brothers Company, Inc.

Shadow Wood Drive NE, Hwy 23 NE
Sauk Rapids, MN 56379
Contact: Michael Oaks
Phone: (320) 251-3378
(3) drop off

Como Lube & Supplies, Inc.

1108 Port Terminal Road
Duluth, MN 55802
Contact: Laura Lott
Phone: (218) 722-2920/(800) 692-5417
(1,2,3,4) pick up

Como Lube & Supplies, Inc.

13575 Fenway Blvd. North
Hugo, MN 55038
Contact: Dave Schwinghammer
Phone: (651) 646-0830/(800) 254-2705
(1,2,3,4) pick up

Enviro-Chem, Inc.

21821 Industrial Blvd.
Rogers, MN 55374
Contact: Todd Meyer
Phone: (763) 428-4002
(1) silver oxide only; pick up or drop off

Gopher Resource Corporation

3385 So. Highway 149
Eagan, MN 55121
Phone: (651) 454-3310
(2,3,4) drop off



Green Lights Recycling

10040 Davenport Street
Blaine, MN 55449
Contact: John Crudo
Phone: (763) 785-0456
(1,2,3,4) pick up or drop off

Inmetco

245 Portersville Road
Ellwood City, PA 16117
Contact: Tim Cimperman
Phone: (724) 758-2800
(1,2,3,4) ship to

Kinsbursky Brothers

1314 N Lemon Street
Anaheim, CA 92801
Contact: Paul Johnson or Todd Coy
Phone: (714) 738-8516
(1,2,3,4) send to

Lighting Retrofit Recycling, Inc.

3855 Highway 14 W
Owatonna, MN 55060
Contact: Eric Kylo
Phone: (800) 274-1309
(1,2,3,4) pick up or drop off

Lighting Unlimited

PO Box 942
Bemidji, MN 56619
Contact: Terry Schmidt
Phone: (218) 751-2751
(1,2,3)

Maguire-Strickland Refining Corporation

1290 81st Avenue NE
Minneapolis, MN 55432
Contact: John Maguire
Phone: (763) 786-2858
(1) silver oxide or mercury only, drop off

Mercury Refining

26 Railroad Avenue
Albany, NY 12205
Contact: Leo Cohen
Phone: (800) 833-3505
(1) silver oxide and mercury only, ship to

Mercury Waste Solutions

2007 W County Rd C2
Roseville, MN 55113
Contact: Dennis McNaughton
Phone: (877) 636-6514
(1,2,3,4) pick up or drop off

Onyx Environmental Services

3230 101st Ave. NE
Blaine, MN 55449
Phone: (763) 786-3660
(1,2,3,4) pick up

OSI Environmental, Inc.

300 Fayal Road
Eveleth, MN 55734
Contact: Patrick Tracey
Phone: (218) 744-3064
(1,2,3,4) pick up

OSI Environmental, Inc.

20401 County Rd. 81
Rogers, MN 55374
Contact: Brian Delmore
Phone: (763) 428-8775
(1,2,3,4) pick up

OSI Environmental, Inc.

PO Box 3155
Bemidji, MN 56619
Contact: Tom Hallberg
Phone: (218) 751-2026
(1,2,3,4) pick up

Raw Materials Company

17 Invertose Drive, PO Box 6
Port Colborne, Ontario, Canada L3K 5V7
Contact: James Ewles
Phone: (905) 835-1203
(1,2,3,4) pick up, drop off, or ship to us

Safety Kleen (BDT), Inc.

4255 Research Parkway
Clarence, NY 14031
Contact: Nancy Beebe
Phone: (716) 759-2868
(1,2,3,4) pick up



Safety Kleen Corporation

1302 18th Street
Cloquet, MN 55720
Contact: Larry Zeadow
Phone: (218) 879-2164
(1,2,3,4) pick up

Safety Kleen Corporation

9261 Isanti Street NE
Blaine, MN 55449
Contact: Dan Chamberlin
Phone: (763) 780-1332
(1,2,3,4) pick up

Safety Kleen Corporation

3459 Washington Drive, Suite 202
Eagan, MN 55122
Contact: Lanco Kulberg
Phone: (651) 688-9918
(1,2,3,4) pick up

Safety Kleen Corporation

3227 Terminal Drive
Eagan, MN 55121-1610
Contact: Joe Eichten
Phone: (651) 688-6975
(1,2,3,4) pick up

Scrap Metal Processors, Inc.

150 Girard Avenue No.
Minneapolis, MN 55405-1817
Contact: Pete Stanger
Phone: (612) 377-6663
(3) drop off

Van Waters & Rogers Subsidiary

845 Terrace Court
St. Paul, MN 55101-4237
Contact: William Cain
Phone: (651) 774-9400
(1,2,3,4) pick up