



*Providing environmental and energy information and solutions to
Nevada's businesses and communities*

Managing Batteries

Batteries: We all have them, we all need them; what do we do with them?

In our hectic work day, we rely more and more on portable products to help us meet the demands placed on us. From cell phones to power drill to flashlights and radios, batteries keep our production levels at an optimum. But just like we need a vacation to recharge our system, batteries should also be *rechargeable* to keep our tools running.



The basic rules of pollution prevention are applicable to batteries in the workplace.

REDUCE

- Try to avoid using batteries. Avoid purchasing items that require batteries.. Use AC power whenever possible when using battery powered equipment
- Purchase rechargeable batteries or batteries that have long-life.

RECHARGE

- Consider buying rechargeable batteries whenever possible.
- When purchasing appliances containing rechargeable batteries, consider ones which offer easily removable rechargeable batteries. Remember that you can't replace or recycle it if you can't get to it.
- Look for the RBRC's Battery Recycling Seals when buying rechargeable batteries or battery-powered products. The Battery Recycling Seal signifies that the manufacturer is participating in the *Charge Up to Recycle!* program and supporting the environment.

RECYCLE

- Manage hazardous batteries as Universal Wastes. Implement an in house collection program to properly manage prior to recycling or disposal of the batteries.
- Visit www.rbrc.org/call2recycle/dropoff/index.php to find places to recycle rechargeable batteries and cell phones.
- By recycling your batteries properly you will be keeping in compliance with current environmental regulations, managing your waste stream properly and limiting your exposure to liability...and setting a good example for everyone to keep our environment healthy.

These three basic principles of pollution prevention can positively impact the budget of a business. Reducing the number of batteries that are purchased also reduces the number of batteries that are disposed of either as general waste or hazardous waste. Using rechargeable batteries may cost more initially, but they can reduce disposal costs/volume.

Environmental savings

According to a study by [Uniross](#) carried out in 2007, the production of rechargeable batteries has the following advantages over disposables (comparing serviceable life):

- 23 times less potential impact on non-renewable natural resources
- 28 times less potential impact on global warming
- 30 times less potential impact on air pollution (ozone pollution)
- 9 times less potential impact on air acidification
- 2 times less potential impact on water pollution

Best Practices:

A management practice to consider with batteries is *proper storage*. Batteries require some care to ensure proper and safe storage for efficient life. The following suggestions are offered:

- Batteries require cool, well ventilated, dry storage areas.
- Temperatures should not exceed 130 degrees Fahrenheit.
- Protect batteries against being damaged, crushed, punctured, or short-circuited.
- Do not smoke or eat in battery storage areas.
- Store batteries separately from other hazardous material.

Practice proper battery storage by keeping batteries in a cool, dry place at normal room temperature. It is not necessary to store batteries in a refrigerator. If they are placed in a refrigerator they should be placed in a sealed plastic bag or other closed container.

Hazardous Waste Regulations

Batteries are not subject to full hazardous waste regulations if the batteries are:

- Spent lead-acid batteries that are being reclaimed;
- Batteries from which precious metals are reclaimed (silver, under the Precious Metals Program);
- Batteries returned to the manufacturer for regeneration; or
- Batteries managed as universal waste.

A solid waste is a hazardous waste if it exhibits the characteristic of toxicity using the Toxicity Characteristic Leaching Procedure (TCLP). If the extract from a representative sample of the waste contains any of the contaminants equal to or greater than the concentrations listed below:



Contaminant	Concentration (milligrams per liter)	EPA Hazardous Waste Number
Cadmium	1.0 mg/L	D006
Chromium	5.0 mg/L	D007
Lead	5.0 mg/L	D008
Mercury	0.2 mg/L	D009
Silver	5.0 mg/L	D011

Note: Only the contaminants of interest in batteries are listed in the above table.

Currently, all kinds/types of batteries are eligible to be managed under the universal waste regulations which were developed to streamline management requirements of materials which would otherwise require management as hazardous wastes. It is recommended that hazardous batteries be managed as universal wastes unless they are lead-acid batteries which are exempt from regulation if reclaimed (Title 40 CFR Part 266, Subpart G, Spent Lead-Acid Batteries Being Reclaimed.) Additional information on the Universal Waste Rule is found at:

<http://www.epa.gov/epaoswer/hazwaste/id/univwast/battery.htm> or at <http://www.p2pays.org/ref%5C07/06013.htm>

Disposal Options:

Alkaline Batteries: Alkaline batteries are not considered a RCRA-regulated hazardous waste. Therefore, it is legal to dispose of these batteries in the trash. However we strongly recommend recycling these batteries. The electrolyte of an alkaline battery does not meet the definition of an aqueous solution or free liquid; therefore, they are not, by definition, a corrosive waste. However, the electrolyte used in alkaline batteries is either potassium hydroxide or sodium hydroxide. Both are strong alkalis. If alkaline batteries are damaged or mishandled, the alkali electrolyte may leak out of the battery cell. Severe chemical burns can result if the electrolyte comes into contact with the skin or eyes.



A service for alkaline (and rechargeable) battery recycling is [Big Green Box](http://www.biggreenbox.com). They are a mail in recycling service. You can purchase a box and when it is full you take it to a UPS facility and it is sent to the recycler for proper recycling of the batteries. For more information, visit their website: <http://www.biggreenbox.com/index.php>

Locations of battery recycling services can be found on the following websites:

<http://nevadarecycles.gov/main/recyclables.htm>

<http://earth911.org/> Use their search service at the top of the page.

DOT Hazardous Materials Regulations (HMR, 49 CFR Parts 171-180)

All batteries must be packaged for transportation in a manner that prevents short circuiting and damage to the battery or its terminals.

To prevent short circuiting the US DOT has identified the following as acceptable methods:

1. Packaging each battery or each battery-powered device when practicable, in fully enclosed inner packaging's made of non-conductive material;
2. Separating or packaging batteries and battery-powered devices in a manner to prevent contact with other batteries, devices or conductive materials (e.g., metal) in the packaging's; or
3. Ensuring exposed terminals are protected with non-conductive caps, non-conductive tape, or by other appropriate means. Proper insulation includes taping the terminals of the batteries or packaging in individual plastic bags. Clear tape is preferred so that battery identification is still possible. Other forms of insulation may also be used.

To prevent damage to terminals the US DOT has identified the following as acceptable methods:

1. Securely attaching covers of sufficient strength to protect the terminals;
2. Packaging the battery in a rigid plastic packaging; or
3. Constructing the battery with terminals that are recessed

More detailed information on the requirements governing the shipment of batteries and additional guidance are available on DOT's Hazmat Safety web site: <http://www.phmsa.dot.gov/hazmat>

Primary Batteries (Non-rechargeable)			
Type	Description	Examples of Use	Proper Disposal
Alkaline (Available in non-rechargeable and rechargeable)	Hazardous-only if purchased before 1993.	Flashlights, toys, radios, calculators, remote controls, electronic games, garage door openers, lanterns, and fire and smoke detectors and other products.	Purchased after 1993*: Ok to place in the trash. Recycle if possible. *Alkaline batteries have been produced in the U.S., Europe, and Japan without the addition of mercury since at least 1993.
Carbon Zinc (Non-rechargeable)	Non-hazardous-labeled "general purpose," heavy duty, or classic.	Flashlights, radios, calculators, remote controls, electronic games, garage door openers, lanterns, and fire and smoke detectors and other products. Used in many of the same applications as alkaline batteries, except that there are no carbon zinc button batteries.	OK to place in trash, recycle if possible.
Lithium (Non-rechargeable)	Hazardous-some may be reactive. * Link to EPA faxback 11033	Cameras, computer memory back up, watches, remote controls, hand-held games.	Place each battery in a separate plastic bag or place non-conductive tape over the battery terminals. Take to battery collection site.
Mercuric Oxide (Non-rechargeable)	Hazardous-Button cells no longer available for purchase in the U.S. Larger batteries are still available.	Hearing aids, watches, medical devices.	Take to a battery collection site.
Silver Oxide (Non-rechargeable)	Hazardous-usually button shaped with no markings.	Hearing aids, watches, calculators, cameras, toys, musical greeting cards.	Take to battery collection site.
Zinc Air (Non-rechargeable)	Non-hazardous-usually button shaped with a pin hole on one side.	Hearing aids, medical devices.	Take to battery collection site. Also ok to place in trash.

Please call (800) 882-3233 to provide updated information or visit <http://unrbep.org/publications/fact-sheets/> to obtain other fact sheets

Rechargeable Batteries			
Nickel Cadmium (Rechargeable)	Hazardous-labeled Ni-Cd.	Portable tools and appliances, cellular phones, cordless phones, camcorders, 2-way radios. Used as alternatives to alkaline batteries.	Take to battery collection site, or contact Rechargeable Battery Recycling Corporation at 800-8-BATTERY.
Lithium Ion (Rechargeable)	Non-hazardous-labeled Li-ion.	Laptop computers, cellular phones, camcorders and portable electronic equipment.	Place each battery in a separate plastic bag or place non-conductive tape over the battery terminals. Take to battery collection site, or contact Rechargeable Battery Recycling Corporation at 800-8-BATTERY
Small Sealed Lead Acid or Gel Cell (Non-automotive and Rechargeable)	Hazardous-labeled Lead.	Video cameras, security systems, weed trimmers, wheelchairs.	Take to battery collection site, or contact Rechargeable Battery Recycling Corporation at 800-8-BATTERY
Nickel Metal Hydride (Rechargeable)	Non-hazardous-labeled Ni-MH.	Video cameras, cellular phones, cordless phones, laptop computers. Used in some applications as an alternative to alkaline batteries.	Take to a battery collection site, or contact Rechargeable Battery Recycling Corporation at 800-8-BATTERY
Other			
Lead Acid (Automotive)	Hazardous	Cars, boats, snowmobiles, golf carts, motorcycles, all-terrain vehicles, and wheelchairs.	Take to HHW facility, or return to retailer. By law, auto battery retailers must accept up to five automotive batteries from consumers free of charge.

The Business Environmental Program (BEP) is a partner in the Business Services Group
College of Business of the University of Nevada, Reno.

DISCLAIMER: This guidance document is intended as general information and is not provided nor intended to act as a substitute for legal advice or other professional services. BEP advises the regulated community to read all applicable regulations set forth in both US Code of Federal Regulations (Title 40 C.F.R. Parts 260-279) and the Nevada Hazardous Waste Regulations and to keep informed of all subsequent revisions or amendments to these regulations. This guidance document was developed by BEP with funding support provided by the Nevada Division of Environmental Protection (NDEP).

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