

Environmental Guideline for Waste Batteries



Department of Environment
Government of Nunavut

GUIDELINE: WASTE BATTERIES

Original: January 2002

Revised: January 2011

This Guideline has been prepared by the Department of Environment's Environmental Protection Division and approved by the Minister of Environment under the authority of Section 2.2 of the *Environmental Protection Act*.

This Guideline is not an official statement of the law and is provided for guidance only. Its intent is to increase the awareness and understanding of the risks, hazards and best management practices associated with waste batteries. This Guideline does not replace the need for the owner or person in charge, management or control of the waste to comply with all applicable legislation and to consult with Nunavut's Department of Environment, other regulatory authorities and qualified persons with expertise in the management of waste batteries.

Copies of this Guideline are available upon request from:

Department of Environment
Government of Nunavut

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Electronic version of the Guideline is available at <http://env.gov.nu.ca/programareas/environmentprotection>

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Introduction

Batteries come in many different shapes, sizes and voltages. There are two basic categories of batteries in use: *non-rechargeable*, which are designed to be used once and discarded, and *rechargeable*, which can be recharged and used many times. Non-rechargeable batteries, such as the common alkaline battery, use a *dry cell* where the electrolyte is immobilized as a paste. This enables the battery to be operated in a random position. These batteries are commonly used in household items such as flashlights, calculators, toys, cameras and remote control devices. Rechargeable batteries use either a *dry cell* or *wet cell*. Wet cell rechargeable batteries have a liquid electrolyte and are commonly used by consumers in automobiles, ATVs and snowmobiles, and by industry in large uninterruptable power supplies and for telecommunications standby power. Dry cell rechargeable batteries can be used in many of the same consumer products as non-rechargeable batteries.

Approximately 671 million, or 95%, of the 707 million consumer and industrial batteries sold in Canada in 2007 were non-rechargeable. Of this total, 418 million were alkaline, 188 million were carbon-zinc and 65 million were button cell batteries. Sales of rechargeable batteries were approximately 37 million. Of this total, 16.5 million were nickel-cadmium, 6.4 million were nickel-metal-hydride, 2.8 million were lithium ion and 10.6 million were lead-acid batteries (EC, 2009).

The *Environmental Guideline for Waste Batteries* (the Guideline) provides information on the types, uses and potential environmental and human health effects of waste batteries and guidance on their proper storage, transportation and disposal. It is not an official statement of the law. For further information and guidance, the owner or person in charge, management or control of waste batteries is encouraged to review all applicable legislation and consult the Department of Environment, other regulatory agencies or qualified persons with expertise in the management of waste batteries.

The *Environmental Protection Act* enables the Government of Nunavut to implement measures to preserve, protect and enhance the quality of the natural environment. Section 2.2 of the *Act* provides the Minister with authority to develop, coordinate, and administer the Guideline.

1.1 Definitions

<i>Battery</i>	One or more electrochemical cells capable of storing and transforming chemical energy into electrical energy.
<i>Commissioner's Land</i>	Lands that have been transferred by Order-in-Council to the Government of Nunavut. This includes roadways and land subject to block land transfers. Most Commissioner's Land is located within municipalities.
<i>Contaminant</i>	Any noise, heat, vibration or substance and includes such other substance as the Minister may prescribe that, where discharged into the environment, (a) endangers the health, safety or welfare of persons, (b) interferes or is likely to interfere with normal enjoyment of life or property, (c) endangers the health of animal life, or (d) causes or is likely to cause damage to plant life or to property.

<i>Dangerous Good</i>	Any product, substance or organism included by its nature or by the <i>Transportation of Dangerous Goods Regulations</i> in any of the classes listed in the schedule provided in the <i>Transportation of Dangerous Goods Act</i> .
<i>Electrolyte</i>	A gel or liquid that is capable of conducting electricity.
<i>Environment</i>	The components of the Earth and includes (a) air, land and water, (b) all layers of the atmosphere, (c) all organic and inorganic matter and living organisms, and (d) the interacting natural systems that include components referred to in paragraphs (a) to (c) above.
<i>Minister</i>	The Minister of Environment of the Government of Nunavut.
<i>Qualified Person</i>	A person who has an appropriate level of knowledge and experience in all relevant aspects of waste management.
<i>Responsible Party</i>	The owner or person in charge, management or control of the waste.
<i>Transport Authority</i>	The statute and regulations controlling the management of hazardous waste under that mode of transport. These include (a) Road and Rail - <i>Transportation of Dangerous Goods Act (Canada) and Regulations; Interprovincial Movement of Hazardous Waste Regulations and Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations</i> . (b) Air – <i>International Air Transport Association (IATA) Dangerous Goods Regulations and International Civil Aviation Organization (ICAO) Technical Instructions</i> ; and (c) Marine – <i>International Maritime Dangerous Goods Code (IMDG)</i> .
<i>Waste Battery</i>	A battery that is no longer wanted or is unusable for its intended purpose and is intended for storage, recycling or disposal.

1.2 Roles and Responsibilities

1.2.1 Department of Environment

The Environmental Protection Division is the key environmental agency responsible for ensuring parties properly manage waste batteries and will provide advice and guidance on their management. Authority is derived from the *Environmental Protection Act*, which prohibits the discharge of contaminants to the environment and enables the Minister to undertake actions to ensure appropriate management measures are in place. Although programs and services are applied primarily to activities taking place on Commissioner's and municipal lands and to Government of Nunavut undertakings, the *Environmental Protection Act* may be applied to the whole of the territory where other controlling legislation, standards and guidelines do not exist. A complete listing of relevant legislation and guidelines can be obtained by contacting the Department of Environment or by visiting the web site at <http://env.gov.nu.ca/programareas/environmentprotection>.

1.2.2 Generators of Waste Batteries

The owner or person in charge, management or control of waste batteries is known as the responsible party. In general, the responsible party must ensure batteries are properly and safely managed from the time they are manufactured to their final disposal. This is referred to as managing the waste from cradle-to-grave. Information on the general management of hazardous waste in Nunavut, including generator, carrier and receiver responsibilities, can be obtained by referring to the *Environmental Guideline for the General Management of Hazardous Waste*.

Contractors may manage unwanted or waste batteries on behalf of the responsible party. However, the responsible party remains liable for ensuring the method of management complies with all applicable statutes, regulations, standards, guidelines and local by-laws. If the contractor does not comply with the requirements of the *Environmental Protection Act* and is charged with a violation while managing the waste, the responsible party may also be charged.

1.2.3 Other Regulatory Agencies

Other regulatory agencies may have to be consulted regarding the management of waste batteries as there may be other environmental or public and worker health and safety issues to consider.

Workers' Safety and Compensation Commission

The Workers' Safety and Compensation Commission is responsible for promoting and regulating worker and workplace health and safety in Nunavut. The Commission derives its authority from the *Workers' Compensation Act* and *Safety Act* which require an employer to maintain a safe workplace and ensure the safety and well being of workers.

Department of Community and Government Services

The Department of Community and Government Services is responsible under the *Commissioners' Lands Act* for the issuance of land leases, reserves, licenses and permits on Commissioner's Lands. The Department, in cooperation with communities, is also responsible for the planning and funding of municipal solid waste and sewage disposal facilities in most Nunavut communities.

Department of Health and Social Services

Activities related to the handling and management of waste batteries may have an impact on public health. The Office of the Chief Medical Officer of Health and Regional Environmental Health Officers should be consulted regarding legislated requirements under the *Public Health Act*.

Department of Economic Development and Transportation

The Motor Vehicles Division of the Department of Economic Development and Transportation is responsible for the safe transport of hazardous waste and other dangerous goods by road through administration of the *Transportation of Dangerous Goods Act*. The Department is also responsible under the *Motor Vehicles Act* for driver licensing and various other vehicle and road safety matters.

Environment Canada

Environment Canada is responsible for administering the *Canadian Environmental Protection Act* (CEPA) and for regulating the interprovincial and international movement of hazardous waste under the *Interprovincial Movement of Hazardous Waste Regulations* and *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. Environment Canada is also responsible for administering the pollution prevention provisions of the federal *Fisheries Act* and owns the EcoLogo initiative, which is designed to help consumers and industry make more environmentally conscious purchasing decisions.

Indian and Northern Affairs Canada

Indian and Northern Affairs Canada is responsible under the *Territorial Lands Act* and *Nunavut Waters and Nunavut Surface Rights Tribunal Act* for the management of federal lands and waters, including the impact waste batteries may have on the quality of these lands and waters.

Local Municipal Governments

The role of municipal governments is important in the proper local management of waste batteries. Under the Nunavut Land Claims Agreement, municipalities are entitled to control their own municipal disposal sites. Unwanted waste may be deposited into municipal landfill sites and sewage lagoons only with the consent of the local government. The local fire department may also be called upon if a fire or other public safety issue involving batteries is identified.

Co-management Boards and Agencies

Co-management boards and agencies established under the Nunavut Land Claims Agreement have broad authority for land use planning, impact assessment and the administration of land and water. Activities involving the management and disposal of waste batteries may be controlled through the setting of terms and conditions in plans, permits and licenses issued by the Nunavut Water Board and other co-management boards and agencies.

Types, Uses and Potential Effects of Batteries

2.1 Types and Uses

Batteries are classified into two broad categories: *non-rechargeable* and *rechargeable*.

Non-rechargeable batteries, also known as primary batteries, can produce electrical current immediately upon being inserted into a device and are intended to be used and discarded. They are commonly used in portable devices that have a low current drain, are used only intermittently or are used well away from an alternative electrical power source (i.e. a wall plug-in or portable generator). Non-rechargeable batteries cannot be safely recharged since the active materials may not return to their original form and the chemical reactions may not be easily reversible. Common types of non-rechargeable batteries include alkaline, carbon-zinc and button cell. All non-rechargeable batteries are dry cell batteries.



Figure 1 – Common Consumer Batteries
Source: Public Domain

Rechargeable batteries, also known as secondary batteries, are sold in a discharged state and must be charged prior to use. These batteries are designed to be repeatedly charged by applying an electric current, which reverses the chemical reactions that occur during use. The oldest type of rechargeable wet cell battery is the common lead-acid battery used to start cars, trucks, snowmobiles and ATVs. These batteries are heavy because they contain large quantities of lead and can provide significant peak electrical current. A semi-solid electrolyte has replaced sulphuric acid in newer lead-acid batteries to prevent spillage. Other rechargeable batteries include several portable dry cell types including nickel-cadmium, nickel-metal-hydride and lithium-ion. Nickel-cadmium batteries currently have the largest share of the dry cell rechargeable market although nickel-metal-hydride and lithium-ion batteries have begun to replace them in many applications because of their higher capacity.

Table 1 describes the most common batteries in use and their applications.

2.2 Potential Effects on Environment and Human Health

Modern batteries contain a variety of corrosive and poisonous materials (i.e. electrolytes and heavy metals including lead, cadmium and nickel). Some older batteries also contain mercury, although in the 1990s manufacturers started to eliminate or reduce the amount of mercury found in their batteries. These contaminants can leach into water and soil from batteries that have been disposed of in landfills or abandoned on the land. Contact with the corrosive electrolytes can cause chemical burns to eyes and skin while heavy metals can bioaccumulate¹ and biomagnify² in living organisms, affecting these organisms and those that prey upon them.

¹ The accumulation over time of metals and other persistent substances within an organism from both biotic (i.e. other organisms) or abiotic (i.e. land, air and water) sources.

Table 1. Common Batteries and Their Applications

Battery Type	Description	Common Applications
Non-rechargeable (Primary)		
Alkaline	Sizes: AAA, AA, C, D, 6V and 9V. Alkaline batteries contain zinc and manganese with an electrolyte of potassium hydroxide or sodium hydroxide. Both electrolytes are strongly alkaline.	Flashlights, clocks, calculators, toys, smoke detectors, remote controls
Carbon-Zinc	Sizes: AAA, AA, C, D, 6V and 9V. Carbon-zinc batteries contain zinc and manganese with an electrolyte solution of ammonium chloride and zinc chloride. Ammonium chloride is a severe eye irritant and zinc chloride is corrosive.	Flashlights, clocks, calculators, toys, smoke detectors, remote controls, garage door openers
Button Cell – Silver-Oxide, Lithium, Alkaline, Zinc-Air	Various sizes. Button cell batteries are single cells shaped like a squat cylinder. Numerous types of button cells exist and may contain zinc, lithium, manganese, silver and other metals. Mercuric-oxide button cells are no longer available due to the toxicity and environmental hazards associated with mercury.	Watches, hearings aids, toys, cameras, pagers, remote controls, greeting cards
Rechargeable (Secondary)		
Vehicle Lead-Acid	Sizes: 6V and 12V. Lead-acid batteries contain lead and a sulphuric acid electrolyte. The battery can contain between 60 and 75% lead, by weight. Sulphuric acid is a strong oxidizing agent and can cause severe skin burns or irritation upon contact.	Cars, trucks, motorcycles, snowmobiles
Sealed Lead-Acid	Sizes: 2V, 6V and 12V. Commonly referred to as the 'maintenance-free battery', sealed lead-acid batteries are similar to the vehicle lead-acid battery except the case is sealed. Safety valves allow venting of gas during charge and discharge.	Video cameras, power tools, wheelchairs, ATVs, computer power backup systems
Nickel-Cadmium (NiCd)	Sizes: AAA, AA, C, D, 6V and 9V. Nickel-cadmium batteries contain cadmium and nickel oxyhydroxide with a potassium hydroxide electrolyte. The electrolyte is strongly alkaline.	Flashlights, toys, cellular phones, handheld power tools
Nickel-Metal-Hydride (NiMH)	Sizes: AAA, AA, C, D, 6V and 9V. Nickel-metal-hydride batteries are similar to nickel-cadmium batteries except the cadmium has been replaced with a hydrogen-absorbing metal alloy. NiMH batteries have 2-3 times the capacity of an equivalently sized NiCd battery.	Flashlights, toys, cellular phones, power tools, computer packs
Lithium-Ion	Various sizes. Conventional lithium-ion batteries contain graphite and one of several different lithium metal oxides. The electrolyte is a lithium salt in an organic solvent. Pure lithium reacts vigorously with water to release gases.	Calculators, cameras, laptop computers, computer memory back-up systems

² The progressive buildup of metals or other persistent substances through successive trophic levels – meaning that it relates to the concentration ratio in the tissue of a predator as compared to that in its prey.

Charging a battery produces a small amount of hydrogen and oxygen. Overcharging can result in these gases being generated faster than they can escape from within the walls of the battery, resulting in an explosion. This process is known as 'gassing'. Explosions can also occur through the misuse or malfunction of a battery including attempting to charge a non-rechargeable battery or short-circuiting a high output lead-acid battery.

Small button batteries have also been known to be swallowed by children. Although the likelihood of the battery becoming lodged in the throat depends upon the child's age and size of the battery, caution should still be exercised around very young children. While in the digestive tract a battery's electrical discharge could burn the surrounding tissues.

Waste Management

*Minimizing or avoiding the creation of pollutants and wastes can be more effective in protecting the environment than treating or cleaning them up after they have been created.*³

3.1 Pollution Prevention

Pollution prevention is a term used to describe methods and practices that minimize or eliminate the generation of waste. Pollution prevention strategies for waste batteries include the following:

- Reduce*
- Check to see if you already have the right batteries on hand before purchasing more.
 - Consider replacing non-rechargeable batteries with rechargeable batteries.
 - Look for batteries that have less heavy metals and mercury by reading the label and choosing Ecologo certified products. A complete listing of environmentally-preferable products is available for downloading at <http://www.ecologo.org/en/index.asp>.
 - Avoid accidental discharge by preventing the battery terminals from contacting conductive (i.e. metal) materials. This includes removing the batteries from equipment when the equipment will not be used for extended periods of time.
 - Keep batteries cool and dry when not in use. Battery life can be extended further by storage at low temperature (i.e. in a refrigerator) as this slows the chemical reactions. Batteries must be returned to room temperature to achieve their maximum voltage.
 - Rechargeable lithium and nickel-cadmium batteries should be stored at 40% state-of-charge while nickel-metal-hydride can be stored at any state to extend their operational life. Lead-acid batteries should always be stored at full charge.
- Reuse*
- Service lead-acid batteries regularly (i.e. electrolyte levels).
 - Charge rechargeable batteries using a charger specifically designed for the size and type of battery.
 - Donate unused batteries to others including local theatres, schools, clubs, churches or Hunters and Trappers Associations.
 - Make an agreement with your supplier to return un-opened or unused batteries.
- Recycle*
- Send unwanted or spent batteries to registered recyclers. The Rechargeable Battery Recycling Corporation (RBRC) voluntary recycling program accepts nickel-cadmium, nickel-metal-hydride, lithium-ion and small sealed lead batteries at participating retailers across Canada. Check RBRC's web site at <http://www.rbrc.org> for the nearest drop-off location. The names of commercial and industrial battery recyclers can be obtained by contacting the waste exchanges and associations listed in Appendix 10 of the *Environmental Guideline for the General Management of Hazardous Waste*.

The *Workplace Hazardous Materials Information System* (WHMIS) is Canada's national hazard communication standard and is administered by the Workers' Safety and Compensation Commission. Key elements of WHMIS are the provision of material safety data sheets (MSDS), labeling instructions and worker education and training programs. MSDS are available from battery manufacturers and contain information on the properties of batteries, along with instructions on safe use and handling.

³ Source – Canadian Council of Ministers of the Environment.

3.2 Storage

Storage refers to the maintenance of waste batteries while awaiting recycling, transport or disposal. Storage is not acceptable for the long-term management of waste batteries except under extraordinary circumstances and should be considered as a temporary measure only.

Unwanted or waste batteries should be stored in the following manner:

- Large quantities of unwanted wet cell (i.e. vehicle lead-acid, sealed lead acid) batteries should be placed on strong wooden pallets to keep the batteries off the ground and to make relocation with a forklift easier. Batteries should be stacked no more than 3 high and shrink-wrapped with plastic to stabilize the pallet. When stacking batteries, the battery terminals should be protected from short circuit by separating each layer using a non-conductive material, such as a sheet of plywood. When wet-cell batteries are individually stored and packaged for transport, the container must meet the requirements of the Canadian General Standards Board standard CGSB-43.150 (TC, 2010).
- Large quantities of unwanted dry cell batteries should be stored in sound and sealable containers. The containers should be located so as to be protected from sun, weather and physical damage.
- Each container must be clearly labeled to identify its contents. If waste batteries are being stored in an institutional, commercial or industrial location or if the batteries are being stored for transport, the containers must be labeled in accordance with the *Workplace Hazardous Materials Information System* (WHMIS) and relevant Transport Authority.
- Place all labeled containers in a secure and clearly marked area which is separate from other waste to prevent its disposal with normal garbage.
- Workers should be trained in the safe use, handling and shipping of waste batteries, have access to material safety data sheets and be provided with personal protective equipment. Only trained personnel should have access to the designated storage area.
- All types of batteries should be stored out of reach of small children and pets. Children and other family members should be made aware of the hazards associated with batteries.



Figure 2 – The Proper and Improper Storage of Lead-Acid Batteries
Source: Transport Canada

If a commercial facility is used to store hazardous waste for periods of 180 days or more or the quantity of waste batteries and other waste on-site at any one time exceeds the criteria set out in the *Environmental Guideline for the General Management of Hazardous Waste*⁴, the facility must be registered with the Department of Environment as a hazardous waste management facility. Copies of registration forms are available at <http://env.gov.nu.ca/programareas/environmentprotection/forms-applications> or by contacting Nunavut's Department of Environment. Refer to the *Environmental Guideline for the General Management of Hazardous Waste* for additional information on the registration process.

3.3 Transportation

Not all types of waste batteries are subject to the *Transportation of Dangerous Goods Act*. For example, sealed lead-acid and vehicle lead-acid batteries that contain sulphuric acid electrolyte are classified as a dangerous good while household alkaline, nickel-cadmium, nickel-metal-hydride, silver-zinc and some small lithium batteries are not. If in doubt, contact the manufacturer or consignor to determine whether the battery is a dangerous good or simply assume it is and manage it accordingly. Section 3.3 *Transportation* applies only to batteries that are classified as being a dangerous good.

Waste batteries that are classified as being a dangerous good may also be a hazardous waste for the purpose of transportation, depending upon the quantity being transported. Under the federal *Interprovincial Movement of Hazardous Waste Regulations* and *Export and Import of Hazardous Waste and Recyclable Material Regulations*, no person may transport hazardous waste in Canada or internationally for purposes of disposal or recycling in a quantity greater than five litres or five kilograms unless it is accompanied by a completed manifest. Manifest forms are available from Nunavut's Department of Environment and completion instructions are included on the reverse side of each manifest. Further information on manifesting can be obtained by referring to the *Environmental Guideline for the General Management of Hazardous Waste* or Environment Canada's *User's Guide for the Hazardous Waste Manifest*.

When transporting waste batteries as a hazardous waste, the documentation, packaging, labeling and placarding must conform to the federal and territorial *Transportation of Dangerous Goods Act* and *Regulations*. Schedule I of the *Regulations* classifies waste batteries as follows:

Shipping Name: WASTE Batteries, Wet, Filled with Acid
Classification: 8
Product Identification Number: UN2794
Packing Group: III

Shipping Name: WASTE Batteries, Wet, Filled with Alkali
Classification: 8
Product Identification Number: UN2795
Packing Group: III

⁴ The criterion for Class 4.3 Water Reactive Waste is 500 litres or kilograms, for Class 8 Corrosives and Class 9 Miscellaneous Waste is 1000 litres or kilograms and the total aggregate quantity is 5000 litres or kilograms.

Shipping Name:	WASTE Batteries, Wet, Non-Spillable Classification: 8 Product Identification Number: UN2800 Packing Group: III Special Provision: 39
Shipping Name:	WASTE Batteries, Dry, Containing Potassium Hydroxide Solid Classification: 8 Product Identification Number: UN3028 Packing Group: III
Shipping Name:	WASTE Lithium Batteries Classification: 9 Product Identification Number: UN3090 Packing Group: II Special Provision: 34
Shipping Name:	WASTE Batteries Containing Sodium or WASTE Cells Containing Sodium Classification: 4.3 Product Identification Number: UN3292 Packing Group: II

The transport of waste batteries in Canada or internationally by aircraft must conform to the *International Air Transport Association (IATA) Dangerous Goods Regulations* and *International Civil Aviation Organization (ICAO) Technical Instructions*, while transport by marine vessel must conform to the *International Marine Dangerous Goods (IMDG) Code*. Further information on transporting waste batteries by aircraft or marine vessel can be obtained by contacting Transport Canada or by referring to the appropriate Transport Authority.

Hazardous waste generators, carriers and receivers must be registered with the Nunavut Department of Environment. A unique registration number is assigned to each registrant through the registration process, which enables completion of the manifest document. Copies of registration forms are available at <http://env.gov.nu.ca/programareas/environmentprotection/forms-applications> or by contacting Nunavut's Department of Environment. Refer to the *Environmental Guideline for the General Management of Hazardous Waste* for additional information on the registration process.

A listing of hazardous waste generators, carriers, receivers and management facilities registered to operate in Nunavut is available by contacting Nunavut's Department of Environment.

3.4 Disposal

Unwanted or waste batteries must be properly recycled or disposed of. Heavy metals found in some types of batteries (i.e. nickel-cadmium, nickel-metal-hydride and lead-acid batteries) are toxic to wildlife and can contaminate food and water supplies. Sulphuric acid electrolyte spilled from lead-acid batteries is corrosive to skin, affects plant survival and leaches metals from other landfilled garbage. Other types of batteries (i.e. household alkaline and carbon zinc batteries) don't have a recycling method and can be disposed of in a landfill along with other household garbage. Table 2 describes disposal methods for common batteries.

Waste batteries that are generated in large quantities by commercial, industrial, institutional or government operations should be safely stored until they can be transported to a commercial recycler or registered hazardous waste receiver. Names of Canadian recyclers and disposal companies are available by contacting the waste management exchanges and associations listed in Appendix 10 of the *Environmental Guideline for the General Management of Hazardous Waste*.

Table 2. Disposal Methods for Common Batteries

Battery Type	Sizes Available	Disposal Method ⁵
Alkaline	AAA, AA, C, D, 6V and 9V.	Dispose along with household garbage.
Carbon-Zinc	AAA, AA, C, D, 6V and 9V.	Dispose along with household garbage.
Button Cell – Silver-Oxide, Lithium, Alkaline, Zinc-Air	Various sizes.	Alkaline – Dispose along with household garbage. All other types – return to a licensed recycler.
Vehicle Lead-Acid	6V and 12V.	Return to a licensed recycler.
Sealed Lead-Acid	2V, 6V and 12V.	Return to a licensed recycler.
Nickel-Cadmium (NiCd)	AAA, AA, C, D, 6V and 9V.	Return to a licensed recycler.
Nickel-Metal-Hydrate (NiMH)	AAA, AA, C, D, 6V and 9V.	Return to a licensed recycler.
Lithium-Ion	Various sizes.	Return to a licensed recycler.

Some municipalities in Nunavut are implementing programs aimed at collecting and safely storing household hazardous waste as part of their garbage collection programs. Residents wishing to locally dispose of waste batteries should contact their municipality for other disposal options.

Consideration will be given by Nunavut’s Department of Environment to management methods that differ from instructions provided in the Guideline where it can be demonstrated that the proposal would result in an equivalent level of environmental protection.

⁵ The Rechargeable Battery Recycling Corporation (RBRC) will accept nickel-cadmium, nickel-metal-hydrate, lithium-ion and small sealed lead (up to 2 lbs or 1 kilogram each) batteries only. Check RBRC’s web site at <http://www.rbrc.org> for the nearest drop-off location.

Conclusion

Batteries are classified into two broad categories: *non-rechargeable* and *rechargeable* and come in many different shapes, sizes and voltages. Non-rechargeable batteries use a *dry cell* where the electrolyte is immobilized as a paste and are commonly used in small household items such as flashlights, calculators, toys, cameras and remote control devices. Rechargeable batteries use either a *wet cell* or *dry cell*. Unlike dry cell batteries, wet cell rechargeable batteries have a liquid electrolyte and are commonly used where greater electrical current is required such as in automobiles, ATVs and snowmobiles and for large industrial uninterruptable power supplies. Rechargeable batteries can be used for many of the same applications as non-rechargeable batteries.

More than 700 million consumer and industrial batteries are sold each year in Canada. With current recycling rates estimated to be between 5 and 10%, more than 630 million spent or unwanted batteries are stored or disposed of each year in Canada alone. The *Environmental Guideline for Waste Batteries* is an introduction to the management of these wastes. It provides information on the characteristics of batteries, possible effects on the environment and human health and guidance on proper storage, transportation and disposal.

Familiarity with the Guideline does not replace the need for the owner or person in charge, management or control of waste batteries to comply with all applicable federal and territorial legislation and municipal by-laws. The management of batteries may also be controlled through permits and licenses issued by Nunavut's co-management boards, Indian and Northern Affairs Canada and other regulatory agencies. These permits and licenses must be complied with at all times.

For additional information on the management of waste batteries, or to obtain a listing of available guidelines, go to the Department of Environment web site or contact the Department at:

Environmental Protection Division
Department of Environment
Government of Nunavut
Inuksugait Plaza, P.O. Box 1000, Station 1360
Iqaluit, Nunavut X0A 0H0

Telephone: (867) 975-7729

Fax: (867) 975-7739

Email: EnvironmentalProtection@gov.nu.ca

Website: <http://env.gov.nu.ca/programareas/environmentprotection>

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<http://env.gov.nu.ca/node/82#Guideline Documents>

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Rechargeable Battery Recycling Corporation (RBRC) Webpage.

<http://www.rbrc.org>

Transport Canada. Bulletin RDIMS #5872093 – Transporting Batteries, (2010).

<http://www.tc.gc.ca/eng/tdg/publications-bulletins-transportingbatteries-1099.htm>

APPENDICES

APPENDIX 1 - ENVIRONMENTAL PROTECTION ACT

The following are excerpts from the *Environmental Protection Act*

1. "Contaminant" means any noise, heat, vibration or substance and includes such other substance as the Minister may prescribe that, where discharged into the environment,
 - (a) endangers the health, safety or welfare of persons,
 - (b) interferes or is likely to interfere with normal enjoyment of life or property,
 - (c) endangers the health of animal life, or
 - (d) causes or is likely to cause damage to plant life or to property;

"Discharge" includes, but not so as to limit the meaning, any pumping, pouring, throwing, dumping, emitting, burning, spraying, spreading, leaking, spilling, or escaping;

"Environment" means the components of the Earth and includes

- (a) air, land and water,
- (b) all layers of the atmosphere,
- (c) all organic and inorganic matter and living organisms, and
- (d) the interacting natural systems that include components referred to in paragraphs (a) to (c).

"Inspector" means a person appointed under subsection 3(2) and includes the Chief Environmental Protection Officer.

- 2.2 The Minister may
 - (a) establish, operate and maintain stations to monitor the quality of the environment in the Territories;
 - (b) conduct research studies, conferences and training programs relating to contaminants and to the preservation, protection or enhancement of the environment;
 - (c) develop, co-ordinate and administer policies, standards, guidelines and codes of practice relating to the preservation, protection or enhancement of the environment;
 - (d) collect, publish and distribute information relating to contaminants and to the preservation, protection or enhancement of the environment:
3.
 - (1) The Minister shall appoint a Chief Environmental Protection Officer who shall administer and enforce this Act and the regulations.
 - (2) The Chief Environmental Protection Officer may appoint inspectors and shall specify in the appointment the powers that may be exercised and the duties that may be performed by the inspector under this Act and regulations.
5.
 - (1) Subject to subsection (3), no person shall discharge or permit the discharge of a contaminant into the environment.
 - (3) Subsection (1) does not apply where the person who discharged the contaminant or permitted the discharge of the contaminant establishes that
 - (a) the discharge is authorized by this Act or the regulations or by an order issued under this Act or the regulations;
 - (b) the contaminant has been used solely for domestic purposes and was discharged from within a dwelling house;
 - (c) the contaminant was discharged from the exhaust system of a vehicle;

- (d) the discharge of the contaminant resulted from the burning of leaves, foliage, wood, crops or stubble for domestic or agricultural purposes;
- (e) the discharge of the contaminant resulted from burning for land clearing or land grading;
- (f) the discharge of the contaminant resulted from a fire set by a public official for habitat management of silviculture purposes;
- (g) the contaminant was discharged for the purposes of combating a forest fire;
- (h) the contaminant is a soil particle or grit discharged in the course of agriculture or horticulture; or
- (i) the contaminant is a pesticide classified and labelled as "domestic" under the *Pest Control Products Regulations* (Canada).

(4) The exceptions set out in subsection (3) do not apply where a person discharges a contaminant that the inspector has reasonable grounds to believe is not usually associated with a discharge from the excepted activity.

- 5.1. Where a discharge of a contaminant into the environment in contravention of this Act or the regulations or the provisions of a permit or license issued under this Act or the regulations occurs or a reasonable likelihood of such a discharge exists, every person causing or contributing to the discharge or increasing the likelihood of such a discharge, and the owner or the person in charge, management or control of the contaminant before its discharge or likely discharge, shall immediately:
- (a) subject to any regulations, report the discharge or likely discharge to the person or office designated by the regulations;
 - (b) take all reasonable measures consistent with public safety to stop the discharge, repair any damage caused by the discharge and prevent or eliminate any danger to life, health, property or the environment that results or may be reasonably expected to result from the discharge or likely discharge; and
 - (c) make a reasonable effort to notify every member of the public who may be adversely affected by the discharge or likely discharge.
6. (1) Where an inspector believes on reasonable grounds that a discharge of a contaminant in contravention of this Act or the regulations or a provision of a permit or license issued under this Act or the regulations has occurred or is occurring, the inspector may issue an order requiring any person causing or contributing to the discharge or the owner or the person in charge, management or control of the contaminant to stop the discharge by the date named in the order.
7. (1) Notwithstanding section 6, where a person discharges or permits the discharge of a contaminant into the environment, an inspector may order that person to repair or remedy any injury or damage to the environment that results from the discharge.
- (2) Where a person fails or neglects to repair or remedy any injury or damage to the environment in accordance with an order made under subsection (1) or where immediate remedial measures are required to protect the environment, the Chief Environmental Protection Officer may cause to be carried out the measures that he or she considers necessary to repair or remedy an injury or damage to the environment that results from any discharge.

APPENDIX 2 – GOVERNMENT AND INDUSTRY CONTACTS

Government of Nunavut

Environmental Protection Division
Department of Environment
Inuksugait Plaza
P.O. Box 1000, Station 1360
Iqaluit, Nunavut X0A 0H0
Telephone: (867) 975-7729 Fax: (867) 975-7739

Motor Vehicles Division
Department of Economic Development and
Transportation
P.O. Box 10
Gjoa Haven, Nunavut X0B 1J0
Telephone: (867) 360-4615 Fax: (867) 360-4619

Workers' Safety and Compensation Commission
P.O. Box 669
Baron Building/1091
Iqaluit, Nunavut X0A 0H0
Telephone: 1-877-404-4407 (toll free)
Fax: 1-866-979-8501

Department of Community and Government
Services (all Divisions)
P.O. Box 1000, Station 700
4th Floor, W.G. Brown Building
Iqaluit, Nunavut X0A 0H0
Telephone: (867) 975-5400 Fax: (867) 975-5305

Office of Chief Medical Health Officer of Health
Department of Health and Social Services
P.O. Box 1000, Station 1000
Iqaluit, Nunavut X0A 0H0
Telephone: (867) 975-5774 Fax: (867) 975-5755

Government of Canada

Indian and Northern Affairs – Nunavut Region
P.O. Box 2200
Iqaluit, Nunavut X0A 0H0
Telephone: (867) 975-4500 Fax: (867) 975-4560

Environment Canada (NWT and Nunavut)
5019 52nd Street
Yellowknife, Northwest Territories X1A 1T5
Telephone: (867) 669-4730 Fax: (867) 873-8185

Department of Transport – Road, Rail, Marine, Air
P.O. Box 8550
344 Edmonton Street
Winnipeg, Manitoba R3C 1P6
Telephone: 1-888-463-0521 (toll free)
Fax: (204) 983-8992 Road, Rail and Marine
Fax: (204) 983-1734 Air

Industry

Rechargeable Battery Recycling Corporation
P.O. Box 236, Station E
Toronto, ON M6H 4E2
Telephone: (416) 535-9210
www.rbrc.org