

Guideline for the Management of Waste Lead and Lead Paint

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1 Introduction

Waste products that contain lead are considered contaminants under the Northwest Territories' *Environmental Protection Act* (EPA) and must be managed as a hazardous waste. This guideline presents a brief introduction into the management of waste lead and lead containing products. It is intended as a source of basic information and does not replace the existing legislation, which is referenced throughout.

Historically, lead was used in many commercial products including: paint, gasoline, insecticides and batteries, to name a few. We now know that products and structures painted with leaded paint are a source of health and environmental contaminants. Lead in gasoline and household paints is now restricted by federal legislation, as are lead pellet shotgun shells used for hunting migratory birds.

Lead is toxic to living organisms and if released into the environment can bioaccumulate and enter the food chain. Products that contain lead in excess of 600 parts per million (0.06% by weight) are considered hazardous waste and shall be managed in accordance with this guideline.

This document should be read in conjunction with the Guideline for the General Management of Hazardous Waste In The NWT (referred to as the General Guideline), and, the Guideline for the Management of Waste Institutional/Commercial and Industrial Chemicals. Management of lead acid batteries is addressed under the Guideline for the Management of Waste Batteries.

Section 2.2 of the EPA gives the Minister of Resources, Wildlife and Economic Development the authority to develop, coordinate and administer these guidelines. Other Acts and Regulations are also in place to protect workers and the public from the effects of lead exposure. Please contact the appropriate agency before proceeding on projects involving waste lead and lead paint.

1.1 Definitions

Controlled product Any product, material or substance specified under paragraph 15(1)(a) of *the Hazardous Products Act* (Canada) and its regulations.

<i>Fume</i>	The smoke-like vapour given off from heated metals.						
<i>Generator</i>	The owner or person in charge, management or control of a hazardous waste at the time it was generated, or a facility that generates hazardous waste.						
<i>Lead amended paint</i>	Structural coatings containing greater than 600 parts per million (0.06% by weight) lead.						
<i>Metallic lead</i>	The solid metal form of lead, bluish-white or silvery-gray in colour. By weight, it is heavy and is also soft, which makes it ductile and malleable. Other desirable properties are that it is a poor conductor of electricity, it has a low melting point and it is resistant to corrosion. Uses include: ammunition, electrical storage batteries (lead acid batteries), lead solder, pipes, sheaths for electrical cable and radiation shields.						
<i>Organic lead</i>	In general, lead combined with a chemical compound containing carbon. These chemical compounds are usually in powder, crystal, paste or liquid form, depending on the compound. Uses include tetraethyl lead (used as an anti-knock agent in gasoline), tetramethyl lead, lead naphthanate, stearate and oleate.						
<i>Inorganic lead</i>	In general, lead substances that <u>do not</u> contain compounds of carbon, hydrocarbons or derivatives. These chemical compounds are usually found in powder or crystal form, but some are liquid. Uses include: frits, glasses, insecticides, wood preservatives, specific paints, pigments, plastics and rubber compounds.						
<i>Transport authority</i>	The regulations controlling the management of hazardous waste under specified modes of transport. They include: <table> <tr> <td><u>Road and rail</u></td> <td><i>Transportation of Dangerous Goods Act (TDGA) and Regulations (TDGR)</i></td> </tr> <tr> <td><u>Air</u></td> <td><i>International Civil Aviation Organization (ICAO) Technical Instructions</i></td> </tr> <tr> <td><u>Marine</u></td> <td><i>International Maritime Dangerous Goods Code (IMDG)</i></td> </tr> </table>	<u>Road and rail</u>	<i>Transportation of Dangerous Goods Act (TDGA) and Regulations (TDGR)</i>	<u>Air</u>	<i>International Civil Aviation Organization (ICAO) Technical Instructions</i>	<u>Marine</u>	<i>International Maritime Dangerous Goods Code (IMDG)</i>
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1.2 Potential Effects

Metallic lead

Fumes – Lead fumes inhaled during melting operations pose an acute health risk to people. They can also be an accumulative poison and if exposure continues, chronic health symptoms and disability occur. The major areas affected are the nervous system, blood system and kidneys.

Dust – Metallic lead can also enter the body through breathing dust from activities such as sandblasting of lead paint. If inhaled, lead particles smaller than 10 microns (one-millionth meter) can move directly into the bloodstream through the lungs.

Another source of occupational lead exposure is by accidental ingestion as workers handle cigarettes or food when their hands are contaminated with lead dust.

Contact with Water – Metallic lead is not water soluble between the pH range of 5 and 12. If prevented from contacting water or water vapor, it will not leach into the environment.

Organic lead

These chemical compounds are generally toxic by inhalation, ingestion and skin absorption. With skin absorption being the primary route of exposure, it readily penetrates the skin directly or is dissolved in oils, which can penetrate the skin. Many organic lead compounds are also flammable or carcinogenic. Ingestion of leaded paint dust and chips has been shown to retard mental and physical growth in children.

Inorganic lead

These chemical compounds are generally toxic by inhalation or ingestion. Skin absorption is generally insignificant for both metallic and inorganic lead.

Hazardous Effect Ratings

	inhalation	ingestion	skin absorption
Metallic lead	High (extreme when heated)	Medium	Low
Organic lead	Medium	High	High
Inorganic lead	Low	High	Low

1.3 Common Sources of Lead

Metallic lead

Automotive industry:	wheel weights, bearings, friction additive in clutch facings and brakes, storage batteries
Construction industry:	flashing, pipe, sheeting, counterweights, paint additives
Electronic industry:	cathode-ray tubes, radiation shielding, solder
Resource industry:	fishing sinkers, rifle bullets, backstops at rifle and pistol ranges
Printing industry:	letter blocks

Organic lead

Miscellaneous:	paint, insecticides, fungicides, chemical reagents, gasoline additives, pigments, dyes
Automotive industry:	spent glycol solution removed from cooling systems with heat exchangers made from alloys containing lead as an adhesive

Inorganic lead

Oil field construction:	joining compound (pipe dope)
Automotive industry:	ceramic products, paints, rubbers, dyes, corrosion inhibiting pigment in paints and primers
Miscellaneous:	manufacture of explosives, blasting caps, matches and pyrotechnics, chemical reagents, pigments, dyes

2 Roles and Responsibilities

2.1 Environmental Protection

The **Environmental Protection Service (EPS)** is part of the Government of the Northwest Territories' (GNWT) Department of Resources, Wildlife and Economic Development. EPS is the agency responsible for control of how contaminants are discharged and their impact on the natural environment. It is responsible for ensuring environmentally acceptable management procedures, emission levels and disposal methods are maintained in the NWT.

EPS programs are applied primarily to Commissioner's Land, municipal lands or lands involving GNWT activities. Legislative authority is provided by the *Environmental Protection Act* (EPA) and *Pesticide Act*. Contact EPS for a listing of relevant regulations and guidelines or visit the web site at www.gov.nt.ca/RWED/eps/leg.htm.

2.2 Occupational Health and Safety

The **Prevention Services Division of the Workers' Compensation Board** regulates worker protection from air-borne lead and other toxic materials. The *General Safety Regulations*, under the *Northwest Territories Safety Act*, require that employee exposure to hazardous air-borne dust be maintained below specified levels. The specified exposure levels correspond to the type of materials in use and are listed in the Schedule to the regulations.

Contact the Prevention Services Division for regulations and procedures to prevent worker exposure to toxic materials. This includes lead abatement projects (leaded paint removal), handling products containing lead or the grinding, cutting or welding of products coated in leaded paint. Also included are worker protection measures for use during clean up of backstops at rifle and pistol ranges.

2.3 Public Health and Safety

The **Department of Health and Social Services** has the authority for public health and safety. The *General Sanitation Regulations*, under the authority of the *Public Health Act*, is the legislation used to protect the public from materials or activities that are injurious to public health. As an example, lead abatement projects, which use sand or abrasive blasting to remove leaded paint from steel structures, have the potential to adversely impact on public health. Responsible management of such projects means consulting with an Environmental Health Officer.

2.4 Generators

The responsibility for proper waste management rests with the generator and should be considered part of the “cost of doing business”.

Identification of lead in organic and inorganic lead-based chemicals is accomplished by review of the Material Safety Data Sheets (MSDS), which must accompany all controlled products distributed in Canada. Manufacturers or their product distributors are required to provide an MSDS with their products.

Alternate resources may be required to identify older products suspected of containing lead. Analysis by an accredited laboratory is one option. Laboratories can be contacted through their associations listed in the General Guideline, Appendix II.

Management options for lead-containing chemicals (organic or inorganic) are addressed in the Guideline for the Management of Waste Institutional - Commercial and Industrial Chemicals. The General Guideline should also be consulted for generator responsibilities.

Wastes Further Addressed

For the purpose of this guideline, only the following wastes containing lead and their management are further addressed:

- lead amended paint
- sand or soils used as backstops at rifle and pistol ranges
- soils containing lead at steel structure manufacturing/construction or repair yards

It is the owner's responsibility to identify the presence of lead. Common examples of where lead amended paint is found include:

- barges and ships, heavy equipment
- steel fabrication/painting facilities
- pipelines
- fuel storage tanks
- steel bridges
- steel towers
- grain storage bins
- rail cars

The owner is responsible for evaluating painted steel structures or fabrication/ demolition sites for the presence of lead. Painted tanks or other steel structures should be sampled for confirmation of lead amended paint and lead concentration prior to sandblasting or other maintenance activities.

In addition to lead, industrial or steel coatings such as paint and paint primer, may contain other contaminants to be aware of such as arsenic, polychlorinated biphenyls (PCBs), cadmium, chromium, copper, magnesium and mercury. These are toxic substances if inhaled or ingested.

Paint Samples

A paint sample should be collected from tightly adhered paint and comprised of all layers of paint, from a one square inch area (2.5 cm). Make sure to scrape down to the metal, being careful not to include any metal in the sample. A plastic bag is an adequate container. The paint should then be analyzed, at the owner's expense, at an accredited laboratory. The analytical data should then be forwarded to EPS.

Rifle Range Backstop Samples

Sample collection from rifle range backstops should be done by following the procedures provided by an accredited analytical laboratory to ensure representative samples are obtained. Personal protective equipment may be required, consult WCB Safety Officers.

Soil Samples

Information on the procedures for sampling lead in soil are available from accredited analytical laboratories.

Important Analysis Note

Due to the complex chemical relationship of lead and iron, the Toxic Characteristic Leaching Procedure (TCLP) is not acceptable for lead analysis. Iron masks TCLP detection of lead. The only accepted lead analysis is called "Total Lead".

2.5 Sandblasting Contractors

Repainting of steel structures for rust protection usually involves sandblasting of the deteriorated paint, in preparation for a new coating of primer and paint. Painted tanks or other steel structures should be sampled for confirmation of lead and lead concentration prior to sandblasting or other maintenance activities. Consultation with the appropriate regulatory agencies prior to starting lead abatement projects is the responsible work strategy to prevent public, worker and environmental impairment.

Sandblasting Media Hazards

The International Agency for Research on Cancer, established by the World Health Organization in 1995, classified crystalline (free) silica as carcinogenic to humans when inhaled in the form of quartz or cristobalite from occupational sources. Selection of a non-hazardous sandblasting medium will reduce the hazard dust levels that need to be controlled and managed as hazardous wastes.

Non-carcinogenic sand types should be specified for sandblasting. Alternately, products like nutshells, solid carbon dioxide or baking soda-based abrasives should be used to remove deteriorated paint. Ultra-high pressure water jetting of leaded paint is recommended as paint and abrasive dusts are not produced. Names of alternate blasting media suppliers are available by contacting the paint associations listed in this document under section 4 Agency Contacts.

3 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. -- Canadian Council of Ministers of the Environment

3.1 Pollution Prevention

“Pollution prevention” methods eliminate the creation of environmental contaminants by preventing the waste from being created in the first place. “Pollution control” methods are geared towards treating the waste after it’s created.

Scientific advances in the paint and coatings industry have resulted in the development of superior paints and coatings that provide corrosion resistance on steel and other structures. Leaded paints are no longer required.

Approximately 500 protective coatings and linings are available to provide protection, without lead, for commercial and industrial structures. These coatings have been developed for five general exposure environments (categories) and special purpose materials i.e. exterior service, flooring, immersion service, buried pipe, buried structures and specialty function.

Coating subcategories that list more detailed exposure conditions; types of structures, heat resistance etc., as well as the generic coatings types (e.g. Acrylic, Epoxy, Zinc-rich, Polyurethane. etc.); and the recommended uses, are available in The Journal of Protective Coatings and Linings (ISSN 8755-1985).

Technology Publishing Company in cooperation with the Steel Structures Painting Council publishes the Journal of Protective Coatings and Linings on a monthly basis. The RWED Library has available, for viewing, all monthly issues of the journal from 1994. Coating manufacturers, coating consultants and new technologies are also listed.

Pollution prevention methods for structures with leaded paint include:

- repainting without complete paint removal
- spot painting, overcoating, zone coating, or deferring painting entirely
- alternatives to sandblasting such as cleaning with ultra-high pressure water jets, vacuum power tools, rotary power tools, vacuum head needle guns, and chemical strippers

Because of potential health and environmental hazards, sandblasting should only be considered after a thorough evaluation of the structure and the pollution prevention options.

Containment of Paint and Abrasive Debris

Regardless of the leaded paint removal method, total containment of the leaded paint and abrasive debris or paint strippers is a requirement of the *Environmental Protection Act*.

A containment system must be used to enclose an entire work area or paint removal tool. It includes cover panels, screens, scaffolds, supports and shrouds. The purpose of such a system is to minimize and prevent any generated debris from entering the environment, and to facilitate the controlled collection of the debris for disposal. Containment systems may also employ the use of ground covers or water booms.

Containment devices include:

- drop sheets or tarps
- shrouding or free-hanging enclosures
- total structure enclosures
- negative pressure containment

In general, high-pressure water jetting for paint removal is fast, less expensive than other methods and generates minimal waste. Also, worker safety is increased, as lead paint dust is not created. However, the water must be filtered to remove all paint residues and it must be tested for lead prior to discharge.

Filter fabric is used to remove the paint from the water. The filter fabric and paint residues require containment and managed as hazardous waste. The remaining water requires testing to ensure no more than 5 mg/l (ppm) of total lead remain prior to discharge to the environment or sewage lagoon (Guideline for Industrial Waste Discharges in the NWT). Water analysis is required by EPS prior to receiving discharge authorization.

3.3 Recovery of Abrasive and Paint Debris

Collection of paint residues must be undertaken frequently to prevent dispersal by wind or by sandblasting operations. A vacuum is recommended as a rapid on-site collection method. Sweeping and shoveling are also used for cleaning abrasives from the ground covers.

Collection containers must not allow sandblasting wastes to spill or leak into the environment. Open-top drums or strong plastic bags are examples of materials that can be used for waste collection and storage, pending disposal. Debris collection techniques include:

- capture from surface at point of cleaning (vacuum blasting)
- capture from containment enclosures (sweeping, vacuuming)

- capture from ground or over water (tarps, barges)
- channeling debris to specified collection points

3.4 Storage

Lead compounds or materials contaminated with lead must be stored in a safe and secure manner. They should be in leakproof containers to prevent release into the environment. Depending on the material, the packaging should be designed to prevent contact with precipitation or it should be stored indoors.

3.5 Transportation

Lead waste transported to a recycling, treatment, disposal or management facility must be properly classified, packaged, labelled and manifested, as required by the transport authority (air, road, rail, marine), as the case may be. Specific requirements for waste generators, carriers and receivers are detailed in the General Guideline.

Registration numbers, waste manifests and registered hazardous waste carrier lists are available from EPS. Waste management contacts are listed in the General Guideline.

For road transportation purposes, dry leaded paint waste or lead contaminated soils/materials from pistol and rifle range backstops can be classified as shown below.

<u>Shipping Name:</u>	Leachable Toxic Waste (L17)
	Classification: 9.3
	P.I.N.: UN9500
	Packing Group: III

Chemical stripping of lead paint generates both a corrosive waste and a lead leachable waste. The disposal options are the same as that for the dry wastes generated by mechanical means. However, the shipping requirements must reflect the additional hazards of being corrosive.

The shipping requirements will be based on the chemical characteristics of the chemical stripper used to remove the paint. Consultation with the TDGR, IATA or IMDG is recommended.

3.6 Disposal

Metallic Lead

Disposal of metallic lead, such as wheel weights or sheeting, can be done by shipping to a lead or metals foundry, or a metals recycler (metallic lead is not listed in the *Transportation of Dangerous Goods Act* or regulations).

Inorganic and Organic Lead Chemical Waste

Management is addressed in the Guideline for the Management of Waste Institution - Commercial and Industrial Chemicals.

Leaded Paint/Soils

Disposal options for leaded paint and sandblast residue, and lead contaminated soils/materials from pistol and rifle range backstops include transport to a registered hazardous waste disposal facility, or a lead or metals foundry. The receiving facility must be registered in the receiving province or territory and approved to manage that waste.

Names of recycling or disposal companies are available by contacting the waste management associations listed in Appendix II of the General Guideline. Generator registration numbers, waste manifests and registered hazardous waste carrier lists are available from the Environmental Protection Service.

Scientific advances in waste product stabilization and solidification utilizing cement, flyash, zeolites, etc., which chemically bind the lead and prevent environmental release are presently under review. EPS may approve the method, subject to conditions, if leachate test results are in accordance with the Guideline for Industrial Waste Discharges in the NWT and amendments.

If sandblast medium contains iron, the Toxic Characteristic Leaching Procedure (TCLP) cannot be used to meet requirements of the Guideline for Industrial Waste Discharges in the NWT.

Consideration will be given to proposals for alternate management methods that provide a level of environmental protection equivalent to those discussed in this guideline.

4 Agency Information

4.1 Key to Acronyms

EPA	Environmental Protection Act
EPS	Environmental Protection Service
GNWT	Government of the Northwest Territories
IATA	International Air Transportation Association
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
MSDS	Material Safety Data Sheets
SSPC	Steel Structures Painting Council
TCLP	Toxic Characteristic Leaching Procedure
TDGA	Transportation of Dangerous Goods Act
TDGR	Transportation of Dangerous Goods Regulations
General Guideline	Guideline for the General Management of Hazardous Waste in the NWT

4.2 Agency Contacts

Contact these agencies for further information on the proper management of waste lead and lead paint:

Government Departments

- Environmental Protection Service
Department of Resources, Wildlife and Economic Development
Government of the Northwest Territories
600, 5102 - 50 Avenue
Yellowknife, NT X1A 3S8

Phone: (867) 873-7654 Fax: (867) 873-0221

www.gov.nt.ca/RWED/eps/leg.htm

- Motor Vehicles
 Department of Transportation
 Government of the Northwest Territories
 76 Capital Drive, Suite 201
 Hay River, NT X0E 1G2

 Phone: (867) 874-5000 Fax: (867) 874-6088

- Workers' Compensation Board
 Box 8888, Yellowknife, NT, X1A 2R3

 Phone: (867) 920-3888 or 1-800-661-0792
 Fax: (867) 873-0262 or 1-866-277-3677

- Health Protection
 Department of Health and Social Services
 Government of the Northwest Territories
 Box 1320, Yellowknife, NT, X1A 2L9

 Phone: (867) 920-8646 Fax: (867) 873-0122
www.gov.nt.ca/HLTHSS

Paint and Environmental Associations

- Canadian Paint & Coating Association
 9900 Cavendish Blvd., Suite 103
 St-Laurent, Quebec H4M 2V2

 Phone: (514) 745-2611 Fax: (514) 745-2031

- Environmental Services Association of Alberta
 10303 Jasper Ave. N.W.
 Edmonton, Alberta T6E 3N6

 Phone: (780) 429-6363 Fax: (780) 429-4249
www.essa.org

- Steel Structure Painting Council of Canada
 (Northern Alberta & Northwest Territories)
 c/o Barry Grundy, Regional Manager
 Sil Industrial Minerals
 P.O. Box 6100 Station C
 Edmonton, Alberta T5B 4K5

Phone: (780) 478-7171 Fax: (780) 472-6984

- The Society for Protective Coatings
40 - 24th Street, 6th Floor
Pittsburgh, PA 15222-4656
USA

Phone: (412) 281-2331 Fax: (412) 281-9992
www.sspc.org

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Richard J. Lewis, Hawley's Condensed Chemical Dictionary, 13th Edition, John Wiley & Sons, Inc., New York, NY.

Canadian Council of Ministers of the Environment (CCME), 1999 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. ISBN 1-896997-34-1 Publication No. 1299.