

# Waste Management Plan

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## Contents

1	Summary .....	1
2	Introduction .....	1
3	Identification of Waste Types .....	2
4	Management of Each Waste Type .....	2
4.1	Management of Hazardous or Potentially Hazardous Waste.....	3
4.2	Management of Solid Waste .....	3
4.3	Management of Liquid Waste.....	3
4.4	Management of Drill Cuttings.....	4
5	Infrastructure Required for Waste Management.....	4
6	Monitoring and Evaluation .....	5
7	Contingencies.....	5
8	Acronyms and Definitions.....	5
9	References .....	6

## 1 Summary

This management plan has been prepared as a condition of the land use permitting process for an exploration permit in the Pine Point District. This plan identifies the different: ways in which waste minimization activities will be used, types of waste that might be produced as part of the permitted activities, and methods of waste handling and disposal.

## 2 Introduction

Darnley Bay Resources Limited (Darnley Bay) will be conducting enhanced mineral exploration activities in the Pine Point District (Figure 1). Exploration is critical to enhance the viability of the potential project economics. Darnley Bay's policy is to comply with all existing laws and regulations to help ensure protection of the environment. In accordance with the Mackenzie Valley Resource Management Act and subject to regulations, terms and conditions, a 5 year Land Use Permit (LUP) MV2016C0023 was granted by the Mackenzie Valley Land and Water Board (MVLWB) on December 19, 2016 for certain exploration activities in the Pine Point District with an expiry date of December 18, 2021. This Waste Management Plan will become effective upon issuance of a new Land Use Permit.

All exploration activities will be carried out by contactors at potential targets, drill sites, and at the camp. Darnley Bay activities associated with the drill program will include supervision of the program and recovery and analysis of the drill core. All contractors will be required by contract to comply with this Waste Management Plan and with all of the conditions spelled out in Land Use Permit.

Waste management activities typically undertaken in Darnley Bay's mineral exploration program (ordered most to least preferred) include:

<b>Source reduction</b>	Elimination or decreases of the volume/mass of waste generated by using alternative methods or processes
<b>Reuse</b>	Use of a product more than once for the same use or different purpose, either on site or off site
<b>Recycle/Recovery</b>	Process by which materials otherwise destined for treatment or disposal are collected, processed, and/or remanufactured into the same or different products either onsite or offsite
<b>Treatment</b>	A method which reduces the volume, mass and/or toxicity prior to disposal. Common methods of treatment are thermal, physical, chemical, and biological processes
<b>Release to the Environment</b>	As a last resort, waste disposal may be required when it is not technically or economically feasible to apply preceding waste management activities. Disposal is commonly associated with the final storage location for waste at approved disposal facilities.

*Source: MVLWB 2011*

The drilling operations may make use of a camp facility set up on previously disturbed ground. Any potential camp locations will first be approved by the GNWT Department of Lands Inspector.

This Waste Management Plan identifies the types of waste generated by exploration drilling and describes how each will be managed – including the infrastructure required.

### 3 Identification of Waste Types

In mineral exploration activities, the likely sources of waste materials are associated with the dozers, drills and camp. The types of waste expected to be generated through Darnley Bay’s exploration activities are listed in Table 1.

Table 1. Waste Types Potentially Generated at Pine Point Drilling Sites

Waste	Quantity per Month 2017	Max Quantity 2018 -2021	Transport from Site
<b>Hazardous or Potentially Hazardous</b>			
Ash	0	NA	To permitted contractor site in Hay River as produced
Batteries	3	3	To recycle as generated
Chemical Waste	24 liters	24 liters	To permitted contractor site in Hay River as produced
Contaminated Soils	100 kg	100 kg	Sealed 5 gallon buckets transported to contractors permitted site as produced
Used oil and filters, fuels, lubricants, greases and solvents	24 liters	24 liters	To permitted contractor site in Hay River as produced
<b>Non-Mineral</b>			
Domestic Refuse	<5 kg per day	<20 kg per day	Disposed of daily
Bulky Materials	0	0	
Scrap Metal	<1 kg per day	<5 kg per day	Removed to recycle as produced
Paper and Cardboard	<5 kg per day	<20 kg per day	Removed to recycle as required
Food waste and packaging	<5 kg per day	<20 kg per day	Removed from site to disposal daily or incinerated
Construction materials	0	Up to 1500 kg	Waste materials disposed of in landfill as accumulated
Plastics	<5 kg per day	<20 kg per day	Collected and delivered to recycling as accumulated
Tires	Max of 1	Max of 1	Taken to disposal as accumulated
Greywater	0	Max of 100 liters per day	Accumulated and trucked to disposal site as in Section 4.3
Sewage	<25 kg per day	< 250 kg per day	Accumulated and disposed as referenced in Section 4.3
<b>Mineral</b>			
Drill cuttings	maximum of 150 kg per day	maximum of 150 kg per day	Handled daily as referred to in Section 4.4

### 4 Management of Each Waste Type

Darnley Bay prefers to work with contractors that have experience in the NWT. Darnley Bay will require its contractors to comply with permit conditions and follow its management plans. Furthermore, Darnley Bay understands that the inspectors have a helpful role in ensuring that all contractors adhere to the permit; Darnley Bay will cooperate with the inspectors. The following procedures apply waste

management measures to reduce wildlife attractants, reclamation costs and health hazards. Some of the best practices for managing waste are outlined below.

#### **4.1 Management of Hazardous or Potentially Hazardous Waste**

Hazardous waste material generated from these drilling and/or camp operations will be temporarily stored at a designated, secure location within the camp at least 30 metres from all streams, rivers or lakes. In addition, the contractor will implement the following procedures:

- a) Store hazardous materials in clearly marked containers with lids (i.e., Drums).
- b) Remove hazard materials from the site every two weeks to an approved facility for receiving hazardous waste (i.e., Hay River).
- c) Complete an appropriate waste manifest form for transporting hazardous waste and submit this to the Darnley Bay project manager who will, in turn, immediately relay the information to the ENR Hazardous Waste Specialist.

To minimize the risk of chronic and accidental spills and their impacts to the environment with respect to the transportation, storage, use and disposal of petroleum products and hazardous substances, fuel storage areas will be lined with an impervious liner as a preventative measure against potential future soil and groundwater contamination from fuel spills. Additional measures that must be observed related to the safe handling and transfer of fuel are identified in Section m of the permit. Further discussion of safe fuel handling procedures and spill mitigation measures are identified in the Spill Contingency Plan.

#### **4.2 Management of Solid Waste**

Except for rubber or plastic materials, solid waste may be burned in an approved incinerator. Any incinerator must comply with Environment and Climate Change Canada's guidelines for appropriate incineration. Otherwise, the contractor will implement the following procedures:

- a) Store non-combustible solid waste in secure containers at least 30 metres from a water body.
- b) Progressively remove non-combustible solid wastes from the site and dispose at an approved facility for receiving solid waste (i.e., Hay River or Fort Resolution); use empty trucks to back-haul solid waste.
- c) At closure, remove all wastes from the site and dispose at a designated waste facility.

#### **4.3 Management of Liquid Waste**

Sewage generated from these operations refers to toilet waste while greywater refers to water from washing and kitchen facilities. Since sewage may contain pathogens, these waste liquids will be temporarily stored well away from the water supply.

##### *Sewage*

- a) Temporarily store sewage in a clearly-marked holding tank located at least 30 metres from any waterbody for future removal from the site.
- b) Routinely remove sewage from the site by pump truck and dispose of it at an approved facility for receiving and treating sewage waste (i.e., Hay River or Fort Resolution).

##### *Greywater*

- a) Temporarily store greywater in a clearly-marked holding tank located at least 30 metres from any waterbody for future removal from the site.
- b) Routinely remove greywater from the site by pump truck and dispose of it at an approved facility for receiving and treating greywater waste (i.e., Hay River or Fort Resolution).

#### **4.4 Management of Drill Cuttings**

While the core drilling process is designed to minimize waste product that is associated with recovery of drill core, some of the rock drilled through will be washed to the surface as “cuttings”. Cuttings will be deposited and buried in a shallow excavation or natural depression located more than 30m from the ordinary high water mark of any water feature. Shallow excavations may be established at drill sites in order to meet the needs of the exploration program. These will be established with the full knowledge and approval of the Inspector. Darnley Bay will work with the Inspectors to identify appropriate sites for safe disposal of drill cuttings. Care will be taken to ensure that cuttings disposal pits are appropriately sized, that all cuttings are fully buried, and that the site is appropriately restored.

There will not be any mine tailings in the exploration program. Therefore, tailings containment is of no concern to this project. The exploration program will not generate mine waste rock. Therefore, mine waste rock management is of no concern to this project.

### **5 Infrastructure Required for Waste Management**

The following infrastructure is required to manage waste generated from these mineral exploration and camp operations:

1. Holding Tanks - Appropriately sized and clearly marked tanks located within a cleared area and at least 30 metres from a river, stream or lake.
2. Pump Truck - Truck with an appropriately sized tank for transporting and disposing of liquid waste temporarily stored in the holding tanks.
3. Combustion Equipment – Incinerator designed for the purpose for which it is being used. Any incinerator must comply with Environment and Climate Change Canada’s guidelines for appropriate incineration. Any incinerator ash generated at the site will be collected and transported for disposal as hazardous waste to an approved waste disposal facility.
4. Excavated Pit – Area where cuttings can be stored during winter months and buried when weather permits.
5. Waste Disposal Facilities - registered and approved facilities that will receive waste materials generated through these operations (see Table 2).

**Table 2. Approved Waste Receiving Facilities**

<b>Waste Type</b>	<b>Facility, Waste Generator Number and Location</b>
Solid Waste	Town of Hay River, Hay River, NT
	Hamlet of Fort Resolution, Fort Resolution, NT
Liquid (sewage/greywater) waste	Town of Hay River, Hay River, NT
	Hamlet of Fort Resolution, Fort Resolution, NT
Hydrocarbon-contaminated soil	Town of Hay River (NTR023), Hay River, NT
	KBL Environmental Ltd. (NTR134), Yellowknife, NT
Used oil and waste fuel (Burners)	Bassett Petroleum (NTR100)
	Carter Industries (NTR107), 652395 Alberta Ltd. (L&P Disposals), High Level, AB
All other hazardous waste types including contaminated water	KBL Environmental Ltd. (NTR123), Yellowknife, NT

Note: The most current list is available from: NWT: Hazardous Waste Specialist, Environment Division, GNWT  
 Alberta: <http://esrd.alberta.ca/waste/hazardous-waste-management/hazardous-waste-approvals.aspx>  
 BC: <http://www.hazwastebc.com/>

## 6 Monitoring and Evaluation

Darnley Bay staff will oversee contractors’ operations and will work with them to make sure they are following this plan. The GNWT inspector has an important role in evaluating and monitoring the drill program and ensuring that waste is being handled and disposed of safely and properly. Darnley Bay project management will maintain open lines of communication with the Inspector. This plan will be reviewed annually by Darnley Bay; any changes that may be necessary or desirable will be discussed with the Inspector and then submitted to MVLWB.

## 7 Contingencies

Darnley Bay will work with the Inspector to address any non-compliance issues that may arise with the drilling contractors. Should unforeseen circumstances or natural events arise, Darnley Bay and its contractors will: #1 attempt to find a solution that falls within the allowable activities clearly defined in the permit; #2 contact the Inspector to seek advice on an appropriate response; and #3 seek a permit modification (last resort).

## 8 Acronyms and Definitions

AANDC	Aboriginal Affairs and Northern Development Canada
ENR	Environment and Natural Resources (GNWT)
GNWT	Government of the Northwest Territories
LUP	Land Use Permit
NA	Not Anticipated

## 9 References

Government of the Northwest Territories. Environment and Natural Resources. 2003. Used Oil and Waste Fuel Management Regulations - Plain Language Guide. 13p: <http://www.enr.gov.nt.ca/sites/default/files/guidelines>

Government of the Northwest Territories. 1998. Guideline for the General Management of Hazardous Waste in the NWT. 23p: <http://www.enr.gov.nt.ca/sites/default/files/guidelines>

Government of the Northwest Territories. 2015. Northern Land Use Guidelines – Camp and Support Facilities. 32p: [http://www.lands.gov.nt.ca/sites/default/files/nlug\\_-\\_camps.pdf](http://www.lands.gov.nt.ca/sites/default/files/nlug_-_camps.pdf)

Mackenzie Valley Land and Water Board. 2011. Guidelines for Developing a Waste Management Plan. 24p: [http://mvlwb.com/sites/default/files/documents/MVLWB-Guidelines-for-Developing-a-Waste-Management-Plan-Mar-31\\_11-JCWG.pdf](http://mvlwb.com/sites/default/files/documents/MVLWB-Guidelines-for-Developing-a-Waste-Management-Plan-Mar-31_11-JCWG.pdf)

Mackenzie Valley Land and Water Board. 2011. Water and Effluent Quality Management Policy. 20p. A: [http://mvlwb.com/sites/default/files/documents/MVLWB-Water-and-Effluent-Quality-Management-Policy-Mar-31\\_11-JCWG.pdf](http://mvlwb.com/sites/default/files/documents/MVLWB-Water-and-Effluent-Quality-Management-Policy-Mar-31_11-JCWG.pdf)

Guidance on ECCC approved incinerators may be found at: [www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=F53EDE13-1](http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=F53EDE13-1)

