

# Ecology North – Sahtu Hazardous Waste Inventory Project



**Technical Report**  
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# 1. INTRODUCTION

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Due to a number of factors, various Northern communities have been storing hazardous waste from the Industrial Commercial and Institutional (ICI) sector as well as from residents and other municipal sources at local municipal landfills. This project was developed to take a current inventory of hazardous and non-landfillable waste in each community. From the waste inventory, a cost estimate can be generated to plan for transportation, and disposal. Additionally, the authors of this report seek to provide guidance on proper management of hazardous waste. Inventory information, cost estimates for transportation and disposal and waste management guidance is intended to remove existing knowledge barriers and to equip communities for future waste management.

KBL Environmental Ltd. (KBL) was retained by Ecology North to inventory the nature and quantity of hazardous waste located on municipal lands in the NWT Sahtu communities: Norman Wells, Tulita, Colville Lake and Fort Good Hope. KBL mobilized two environmental technicians to inventory the nature, means of containment, size and quantity of hazardous waste located in Norman Wells and one consultant for each of the other 3 communities in the Sahtu region. An inventory was not conducted in Deline at this stage of the project because the bulk of their hazardous waste had already been shipped out of the community.

## 2. HAZARDOUS WASTE MANAGEMENT

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The following information is pertinent to the responsible management of hazardous waste. The practices highlighted below will help minimize risk, and decrease the cost associated with management of wastes. It is important that waste is properly characterized, labeled, segregated and stored and that inventory management systems are used in communities or at landfills. The communities can refer to these steps for guidance in their future management of hazardous and non-landfillable waste. To support proper waste classification, segregation, consolidation and transportation attached as Appendix A are KBL generated Standard Operating Procedures (SOPs).

### 2.1 Characterization

Characterization of waste is the first step to identifying chemical characteristics. It is important to establish early in the process if waste contains any hazardous properties including: corrosive, flammable or toxic to name the most common. This will determine if a waste is a dangerous good or not. If the waste is a dangerous good and will be leaving the site where it was generated, Federal Acts and Regulations will pertain to the waste and how it is to be handled and prepared for transportation. It is beneficial to characterize and label materials at the time it is generated, as this is the time that the most information about a waste is available. For example, if a maintenance garage has a drum that is being utilized for fluid changes and it is known that antifreeze and oil is combined into a drum, it is best to note that and label prior to transporting to a storage area.

In the situation that an unknown drum must be classified, KBL has developed a SOP titled “Classification and Inventory of Unknown Drums”. This document provides the step by step instructions to allow individuals to safely open and classify a drum of unknown contents. The SOP highlights the following items: an outside container assessment, a visual inspection of container contents, a field analysis, laboratory analysis (if needed) and labeling instructions, as included in Appendix A.

## 2.2 Labeling

Once the waste has been properly classified, each waste will require a label that provides information regarding the contents of the container. If the waste is considered to have hazardous properties, additional information will need to be provided including the following:

- Proper Shipping Name
- UN or PIN number
- Hazard Class

A sample of a KBL Hazardous waste label can be seen below. KBL has also included a section for an internal handling code, drum number (if applicable) and generator name.

**HAZARDOUS WASTE**

PROPER SHIPPING NAME: \_\_\_\_\_

PIN: \_\_\_\_\_ CLASS: \_\_\_\_\_

**Packing**  
Group: \_\_\_\_\_ DRUM NO.: \_\_\_\_\_

GENERATOR: \_\_\_\_\_

Waste specific labeling requirements can differ depending on the mode of transport that is selected to transport the waste off the generator's site. Waste shipments, including those containing dangerous goods can be shipped via road/rail, marine vessel or air. Rail and road (ground) shipments are regulated by the Transportation of Dangerous Goods Regulations Act (TDGR), maritime shipments are governed under the International Maritime Dangerous Goods Code (IMDG) and air shipments are regulated by International Air Transport Authority (IATA).

Personnel labeling containers should be provided with WHMIS training for additional information regarding labeling of goods for storage as well as the applicable Dangerous Goods training if they will be responsible for transporting the material.

## 2.3 Segregation & Storage

Proper segregation and storage of waste is required to ensure the health and safety of community residents, prevention of environmentally adverse effects as well as to ensure environmental compliance. Waste should be segregated by waste type and stored to ensure no drums are leaking or could pose an environmental impact. Prior to storage, all containers should be sealed, inspected for leaks or container integrity, labeled, palletized and inventoried if a tracking system is in place.

The Guideline for the General Management of Hazardous Waste for the GNWT is an excellent resource highlighting the general requirements for storage containers. According to Section 3 of the Guide, hazardous waste should be stored in containers according to the following:

- In the original containers, where possible, or in containers manufactured for the purpose of storing hazardous waste. The containers must be sound, sealable and not damaged or leaking. The Transport Authority regulates container specifications.
- Clearly labelled according to the requirements of the Work Site Hazardous Materials Information System (WHMIS) of the Safety Act or the relevant Transport Authority, if transport is planned.
- Bulked into 16 gauge or equivalent metal or plastic 205 litre drums, as appropriate.
- The containers should be sealed or closed at all times, unless in use.

Additionally, there should be enough space between the palletized drums or containers so that a walk around inspection can be performed routinely to ensure no leaks or failures of the containers while in storage. Empty drums should be sealed with bungs and neatly stacked on their sides to ensure moisture and precipitation cannot enter the drum. This can lead to increased disposal costs as any contaminated water collected in empty drums will increase waste handling and disposal costs.

Proper drum segregation should be practiced to ensure that two or more waste streams do not interact with each other. Some waste streams are so incompatible that fires, explosions or toxic vapours can be produced. KBL has created a SOP for Waste Segregation that includes an explanation on how to properly use a Waste Segregation Chart, as included in Appendix A.

## 2.4 Inventory Management

Inventory Management is an important step in managing all types of waste, especially hazardous wastes generated by a community. Periodic inventories should be conducted and maintained so the community is aware of what type of waste and how much of it is accumulating in their landfills and municipal shops. In addition to allowing a community to keep track of the volumes and types of wastes they are temporarily storing, this information will allow them to prioritize and budget for proper waste management in their communities. The storage of hazardous wastes is only considered a temporary option. Ultimately, all hazardous waste generated by a community will eventually have to be managed locally or removed and transported to an approved waste handling facility.

Inventory Management will identify what wastes are predominant and can lead to developing initiatives to reduce or eliminate certain waste streams. With routine inventories, communities will be able to monitor waste volumes and success or failure of a program. In the rare event of a landfill or community garage fire, this inventory could provide valuable safety information to first responders arriving at the fire. 100 empty drums or 100 full drums of fuel can have significant consequences in the event of an emergency situation in a remote location.

## 3. COMMUNITIES SUMMARY

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### 3.1 Norman Wells

The hazardous waste in Norman Wells is located at the solid waste facility (Latitude 65° 17' 0.4722N Longitude 126° 43' 49.27 W) The hazardous waste storage area at the landfill was located in the area near where general refuse is dumped and it appeared that waste was being dropped in general locations based on container type; however, there was no signage indicating where to drop off specific waste streams and waste was unorganized and scattered. There is a newly built area that is lined and bermed that would be appropriate temporary storage for hazardous waste streams. The inventoried material was sorted and stored in this area.

### 3.2 Colville Lake

Hazardous waste was located at a designated location at the Colville Lake solid waste facility (Latitude 67° 02' 18" N, Longitude 126° 05' 32" W). The hazardous waste was stored in the general refuse area and was being

dropped in general areas, but with no designation of waste streams types. Colville doesn't have a large quantity of waste. There are no lined and bermed areas appropriate for temporary storage of hazardous waste.

### 3.3 Fort Good Hope

The community of Fort Good Hope stores all of their waste at the landfill (Latitude 66° 17' 0 42"N, Longitude 128° 36' 34.49" W) . Fort Good Hope does have segregated and signed areas for various waste streams and they keep their hazardous waste area well organized. White metals could be further segregated to separate refrigerants. Although well organized, the areas designated for the storage of hazardous waste are not lined. There is one area where drums are stored that has had a gravel berm built up around the perimeter.

### 3.4 Tulita

The community of Tulita stores their hazardous waste at the local landfill. (Latitude 64° 54' 01" N, Longitude 125° 34' 39" W. The hazardous waste is located in one area of the landfill however no segregation or organization is taking place. Where some signage and separation had once existed, the area is too far over capacity for any segregation to be properly maintained.

### 3.9 Recommendations

The following are general recommendations that can be wholly or partially adopted and implemented at all of the visited communities in the Sahtu Region:

- Designated staff of foreman should have WHIMIS, TDGR, IMDG and or IATA training so that they can gain the knowledge with chemical hazards, classification and packaging of waste for transportation.
- Designate an easily accessible area of the landfill for the storage of containers and provide signage to assist residents in proper segregation of waste.
- In the designated area, construct a cell that is lined and has berms and clear signage.
- Ensure that containers are clearly labeled using appropriate stickers with contents written on the side of the container in paint pen in the case the label is faded or removed.
- Inspect containers prior to placement and segregate waste based on container type and ensure that they are upright with lids or bungs secured.
- Provide an area for special wastes, including: batteries, paints, oily pails, chemical pails and propane tanks so they don't get mixed with incompatible materials.
- Provide an area for appliances to keep them protected from equipment/vehicles damage.
- Empty drums should be sealed with bungs and stacked neatly on their sides to help identify the empties from those containing liquid waste.
- Ensure all drums with contents are stored upright /sealed with bungs and all empty drums are sealed and stored on their sides.
- Consolidate smaller volumes of like waste into one drum to reduce the number of drums with less than ½ full contents.
- Perform regular inspections and inventories of the labeled and stored wastes.

## 4. HAZARDOUS WASTE

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### 4.1 Waste Inventory

KBL worked with community government representatives to identify locations within the community where hazardous waste was stored. Once these areas were determined, an inventory of waste at each location was documented, identifying the nature, means of containment, size and quantity and geographic coordinates of the waste.

**Table 1: General waste inventory**

Description	Unit	Quantity	Notes
<b>Norman Wells</b>			
Drummed Waste	205L	259	Detailed list provided in Appendix B
Paint Material	Crate	5	1-4x4x4 crate of waste paint material
Totes of waste	1100L Tote	7	
Cylinders	100lb	70	
Cylinders	20lb	50	
Lead Acid Batteries	Pallets	43	Quantity of lead acid batteries found at landfill
Non Regulated Waste	Crates	22	
Pails of waste	Pallets	6	Pails hydrocarbon based material
<b>Colville Lake</b>			
Drummed Waste	205L	126	Detailed list provided in Appendix B
Empty Drums	205L	250	
Lead Acid Batteries	Pallet	2	
<b>Fort Good Hope</b>			
Drummed Waste	205L	276	Detailed list provided in Appendix B
Paint Material	Megabag	3	Mixed Waste Paint Related Materials
Cylinders	20 lb	120	
Cylinders	100 lb	54	
Non Regulated Waste	Megabag	2	Megabags containing oily plastics
Empty Drums	205L	175	
Lead Acid Batteries	Pallets	28	
Home Heating Fuel Tanks	Each	33	
<b>Tulita</b>			
Drummed Waste	205L	329	Detailed list provided in Appendix B
Empty Drums	205L	22	
Cylinders	20 lb	5	
Cylinders	100 lb	12	
Non Regulated Waste	Megabag	7	Megabags containing oily plastics
Lead Acid Batteries	Pallets	20	
Home Heating Fuel Tanks	Each	45	

## 4.2 Transportation & Disposal Cost Estimate

Pricing hereinafter includes all costs associated with transportation and disposal of inventoried waste from each community.

**Table 2: Estimated pricing for repackaging, transportation, and disposal services**

Description	Notes	Estimated Total
<b>Norman Wells</b>		
Resource Mobilization, Demobilization & Subsistence	3 staff for 7 days	\$13,680
Contracting Services	Staging + Loading	\$5,280
Transportation	17 loads @ \$11,346	\$192,882
Disposal – Suitable For Transport	KBL	\$103,432
Disposal – Not Suitable For Transport	Includes extra time and materials	\$14,610
		<b>Subtotal \$329,884</b>
<b>Colville Lake</b>		
Resource Mobilization, Demobilization & Subsistence	2 staff for 2 days	\$11,012
Contracting Services	Equipment for staging and loading	\$2,640
Transportation	4 loads @ \$17,655	\$70,620
Disposal – Suitable For Transport	KBL	\$26,715
Disposal – Not Suitable For Transport	Includes extra time and materials	\$195
		<b>Subtotal \$111,182</b>
<b>Fort Good Hope</b>		
Resource Mobilization, Demobilization & Subsistence	3 staff for 5 days	\$29,817
Contracting Services	Equipment for staging and loading	\$2,640
Transportation	11 loads @ \$14,488	\$159,368
Disposal – Suitable For Transport	KBL	\$72,585
Disposal – Not Suitable For Transport	Includes extra time and materials	\$3,245
		<b>Subtotal \$267,655</b>
<b>Tulita</b>		
Resource Mobilization, Demobilization & Subsistence	3 staff for 4 days	\$24,936
Contracting Services	Equipment for staging and loading	\$2,640
Transportation	8 loads @ \$11,088	\$88,704
Disposal – Suitable For Transport	KBL	\$58,640
Disposal – Not Suitable For Transport	Includes extra time and materials	\$13,880
		<b>Subtotal \$188,800</b>
		<b>Estimated Total: \$897,521</b>
		<b>20% Contingency: \$1,077,025</b>

- The above rates are for road transportation based on waste quantities currently located in the respective landfills.
- Fuel surcharge current at the time of transportation will be added to above rates.
- Quoted rates are for dedicated trucks to go into each community to transport waste out; every attempt would be made to use backhaul trucks for reduced rates.



## **5. CONCLUSION**

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Based on the defined scope of work, the project was successful with the completion of a detailed inventory of Hazardous Waste located in the four communities within the Sahtu region.

The information collected through this project will be useful to the communities to better understand their current inventory of hazardous waste, costs associated with the management of these wastes and areas that could be improved in the current management of hazardous waste. The communities that illustrated increased participation will benefit from exposure to technical staff and discussions of best practices in the field of hazardous waste management.