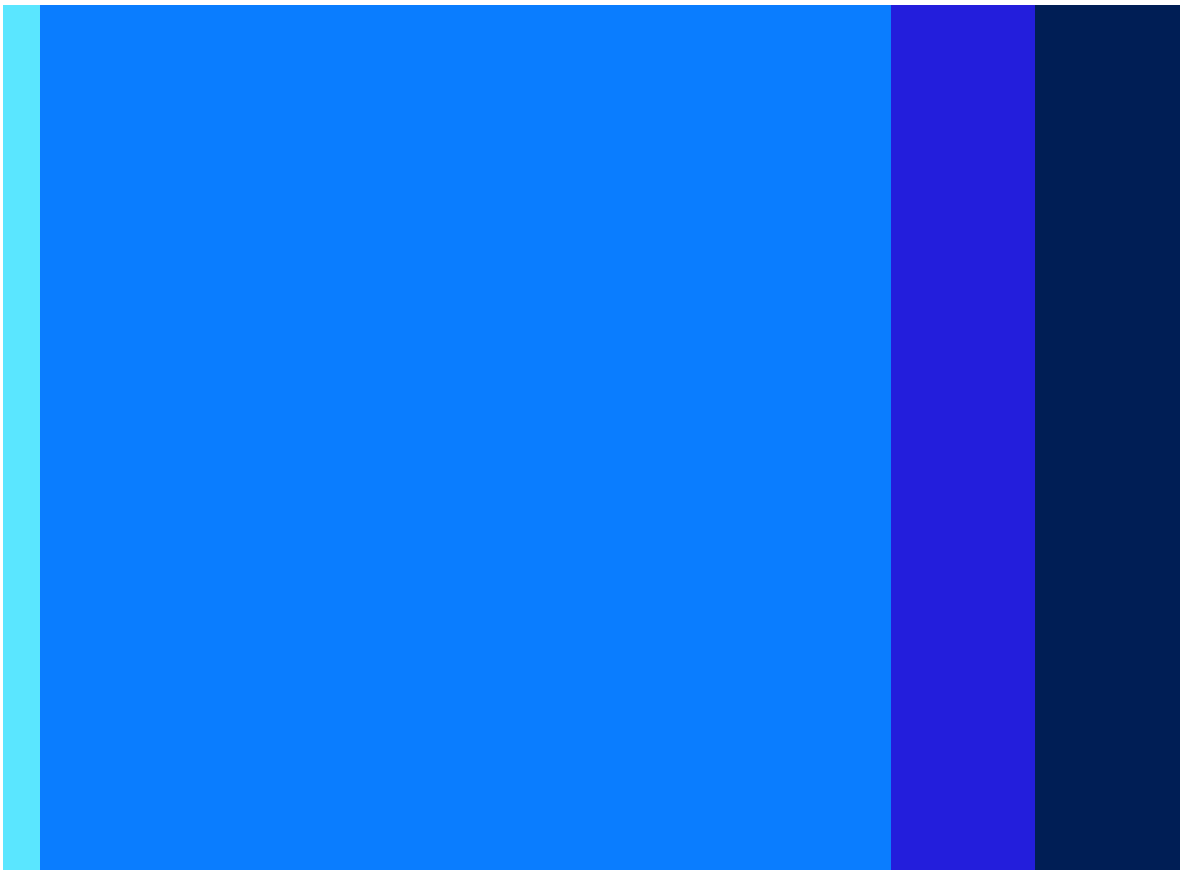
Jacobs

Waste Management Plan for the Northwest Territories

Version: 001

Westcoast Energy Inc.

Pointed Mountain Pipeline Abandonment Project



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Waste Management Plan for the Northwest Territories

Company Name: Westcoast Energy Inc.

Revision No.: 001 **Project Environment Lead:** William Kerr

Date: **Prepared By:** Westcoast Energy Inc.

File Name: MVLWB_Waste_Management_Plan_Jan2024

Document History and Status

Revision	Date	Description	Author	Checked	Reviewed	Approved
001	January 2024	Waste Management Plan for the Northwest Territories	Jacobs	Elsa Kaus & Adam Oswell	William Kerr	January 18, 2024

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Document Control and Revision Maintenance

The Project Environment Lead (PEL) or designate is responsible for the maintenance, revision, and distribution of this Waste Management Plan (WMP). It will be continually updated throughout the Project duration whenever new or updated information is available, taking into consideration environmental factors, local regulations and laws, and Project-specific changes.

Minor revisions, such as Project personnel contact details, will be required on a regular basis and will be considered minor version edits. Major revision edits caused by Project scope changes will require a version update and resubmission to the Mackenzie Valley Land and Water Board (MVLWB). The PEL or designate will be responsible for WMP revision updates and changes.

Revision #	Section(s) Revised	Description of Revision	Prepared by	Issue Date
0	N/A	First Version	Westcoast	January 18, 2024

Additional copies or updated versions of the WMP can be obtained from the PEL or designate. It is the responsibility of the PEL or designate to ensure previous versions of the WMP are promptly replaced with required personnel and at specified locations mentioned in this WMP.

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Acronyms and Abbreviations

BC	British Columbia
Enbridge	Enbridge Inc.
ETC	Enhanced Thermal Conduction
GNWT	Government of the Northwest Territories
MVLWB	Mackenzie Valley Land and Water Board
NPS	Nominal Pipe Size
NWT	Northwest Territories
PEL	Project Environment Lead
Project	Pointed Mountain Pipeline Abandonment Project
SDS	Safety Data Sheet
TDG	Transportation of Dangerous Goods
VOC	volatile organic compound
Westcoast	Westcoast Energy Inc.
WIS	Waste Information Sheets
WMP	Waste Management Plan

Units

ºC	degree(s) Celsius
km	kilometre(s)
m^3	cubic metre(s)

1. Introduction and Project Details

Westcoast Energy Inc. (Westcoast), a subsidiary of Enbridge, applied to the Mackenzie Valley Land and Water Board (MVLWB) in November 2023 for a Type A Land Use Permit and Type A Water License in support of the Pointed Mountain Abandonment Project (Project) activities within the Northwest Territories (NWT). The pipeline has been deactivated for several years with no prospective future use. As such, Westcoast is planning to take the Pointed Mountain Pipeline permanently out of service by moving on to the abandonment phase. Project details occurring in the NWT are shown in Table 1-1 and Appendix A (Project Map Package).

Westcoast has prepared this Waste Management Plan (WMP) to provide guidance for the management of wastes produced during typical abandonment activities within the NWT and to support the applications mentioned above. The MVLWB Guidelines for Developing a WMP (MVLWB 2011) was used as a reference for developing this document. Abandonment activities are planned to occur during winter 2024 and 2025, and no further wastes will be generated by the Project upon completion.

Table 1-1. Project and Waste Management Plan Information

Company Name	Westcoast Energy Inc.
Mailing Address	Fifth Avenue Place 425 1st Street S.W. Calgary, Alberta T2P 3L8
Project Name	Pointed Mountain Pipeline Abandonment Project
Site Names/ Locations	The permitted land use areas for this Project within the NWT are as follows: • Areas where aboveground infrastructure will be removed (PM-1, PM-2, PM-3, PM-4) • One area where an exposed section of pipe will be removed (PM-4A) • Areas along the existing Pointed Mountain Pipeline right-of-way where test lead posts will be removed • Access along the existing Pointed Mountain Pipeline right-of-way • Access along existing Government of the Northwest Territories (GNWT) roads • Paramount Road Laydown area • North Work Camp Site (Options 1 and 2) Refer to Appendix A – Project Map Package for the locations of Project activities, access, and temporary workspace.
Effective Date	January 18, 2024
Last Revision	January 18, 2024
Plan Version	001
Distribution List Internal	William Kerr, Environmental Specialist Bert Fillion, Construction Manager Environmental Inspector (TBD)
Distribution List External	Mackenzie Valley Land and Water Board (MVLWB) Contractor (TBD)

1.1 Enbridge Sustainability Policy

Enbridge operates in a manner that minimizes the impacts of its business activities on climate, land, air, water, wildlife, and biodiversity, as well as historical and cultural resources. Enbridge integrates environmental considerations over the life of its assets, from design and construction to operation and maintenance, and eventually to decommissioning and abandonment.

Please refer to the Enbridge Sustainability Policy in Appendix B.

1.2 Purpose and Scope

This WMP has been prepared in accordance with the Guidelines for Developing a WMP (MVLWB 2011) and all related territorial regulations. This WMP will assist Project personnel and contractors in minimizing, handling, treating, transporting, and diverting or disposing of generated wastes. It is intended as a tool to assist with the identification of appropriate waste management practices for each waste type generated by the Project in the NWT. All employees and contractors working on the Project in the NWT will receive training on this WMP, and a copy will be available to personnel conducting the abandonment activities.

The goal of this WMP is to reduce the impacts and disturbance of the Project on the environment and surrounding communities. A detailed background on the environmental aspects and considerations of the Project is within the Pointed Mountain Pipeline Abandonment Closure and Reclamation Plan (Westcoast 2023).

This WMP will, at a minimum, meet the regulations, guidelines, and applicable sections of the following:

- Canadian Environmental Protection Act
- Canadian Transportation of Dangerous Goods Act
- Canadian Hazardous Products Act
- Canadian Waters Act
- GNWT Environmental Protection Act
- GNWT Lands Act
- GNWT Public Health Act
- GNWT Forest Protection Act
- GNWT Guideline for Hazardous Waste Management
- GNWT Guideline for the Management of Waste Solvents
- GNWT Environmental Guideline for Contaminated Site Remediation

1.3 Project Description and Location

The approximately 56 kilometre (km) NPS 20 Pointed Mountain Pipeline was constructed in 1972 and deactivated in 2008 (from Mile Posts 0 to 21.71) and 2016 for the remainder. A 1.2 km segment of pipeline crossing the Kotaneelee River was removed in 2016. As part of the deactivation process, the pipeline was purged, cleaned of residual product, internally coated with corrosion inhibitor, filled with nitrogen gas to a minimum pressure of 70 kilopascals, and physically isolated from sources of upstream pressure.

Westcoast has determined that there is no prospective future use for this pipeline and will take it permanently out of service. The abandonment scope of work in the NWT includes the following:

- Removing the aboveground infrastructure at four locations (PM-1, PM-2, PM-3, and PM-4).
- Removing a section of exposed pipe at PM-4A.

- Removing the test lead posts along the pipeline right-of-way, where accessible.

Refer to Appendix A (Project Map Package) for the locations of abandonment activities, access, and temporary workspace. Bridge repair work along the access route will also be completed, if warranted. Some construction equipment may be staged during mobilization via barge on the north end of the Liard River ice bridge crossing to facilitate construction activities. As the footprint of the Project extends from the NWT to British Columbia (BC), figures and facilities will be updated within this WMP as the Project progresses.

Many of the Project facilities will be mobile, such as accommodations, office, laydown, and staging areas. Any changes to footprints will be adjusted within subsequent WMP revisions.

1.4 Site Description

The scope of work for each worksite in the NWT is listed in Table 1-2. Refer to the map package in Appendix A for site characteristics and environmental features, such as watercourses, water bodies, and wetlands.

Table 1-2. Abandonment Scope of Work

Worksite	Scope of Work
PM-1	• Remove pig launcher and associated kicker line, flare, aboveground flare piping, aboveground producer connection piping, structural steel, and risers. • Remove diesel and propane tanks. • Conduct remediation, Iron Creek Enhanced Thermal Conduction System.
PM-2	• Remove producer tap.
PM-3	• Remove nitrogen vent and valves.
PM-4	• Remove nitrogen vent and valves.
PM-4A	• Remove exposed pipeline.
Access – existing GNWT roads and trails	• Brush vegetation, if needed. • Plow and pack snow to create a driving surface for vehicles and equipment. • Ice bridge installation at the Petitot River and Liard River (IB-01 and IB-02).
Access – along existing Pointed Mountain Pipeline right-of-way	• Brush vegetation, if needed. • Plow and pack snow to create a driving surface for vehicles and equipment. • Ice bridge installation at the Kotaneelee River (IB-03).
Paramount Road Laydown area	• Laydown area to support abandonment activities
North Work Camp Site (Options 1 and 2)	• Camp site and accommodation • Fuel storage • Waste storage

2. Identification of Waste Types

The identification of waste under this WMP follows the MVLWB management hierarchy for waste management in a manner that aims to focus on the reduction, reuse, and recycling of materials before being identified as Project waste. The Project will implement the steps in Table 2-1 for waste identification.

Table 2-1. Project Waste Identification Process

Step	Description
Step 1	Find the specific Waste Information Sheets (WIS) in Appendix C.
Step 2	If there is any reason to suspect that the WIS information is not consistent with the waste's source or other characteristics, then a detailed classification may be warranted. Go to **Step 3**. **OR** If there is no WIS for the specific waste, testing is also needed. Go to **Step 4**.
Step 3	If it is noted on the WIS that testing is necessary to determine classification, then a suitable quantity of the waste must be analyzed by an accredited laboratory. Go to **Step 4**.
Step 4	To prepare for testing, obtain all information on the waste: its source, generation process, physical state, characteristics, quantity, and probable components. Information on the chemical properties of the waste may be found in the Project-specific Spill Contingency Plan (Jacobs 2024) or in the Enbridge Safety Data Sheets (SDS) database. Go to **Step 5**.
Step 5	Contact an accredited, analytical laboratory to perform chemical analyses on the material for waste characterization. The laboratory will provide the necessary information to obtain an appropriate sample (i.e., volumes, sampling containers, and procedures). If the waste is a mixture of solids and liquids, the sample should contain both liquids and solids. Although other parameters may be included, typical laboratory tests performed on waste materials include the following: Solids – flash point, leachate extraction Liquids – flash point, leachate extraction, corrosivity test Go to **Step 6**.
Step 6	Review the waste classification criteria to determine if the waste is classified as hazardous or nonhazardous (Appendix C). Most of the wastes generated during the Project are expected to be nonhazardous or domestic wastes. However, spills of hazardous materials may generate hazardous wastes.

2.1 General Classification Procedures

Classifications for most wastes to be generated have been pre-determined and are identified on the appropriate WIS in Appendix C. If a WIS is not included for a given waste type, the classification (nonhazardous or hazardous) of the waste must be determined through specific characteristics of the waste.

Table 2-2. Hazardous Waste Determination

Characterization Property	General Properties
Flammability	Waste has a flashpoint <61 degrees Celsius (°C). Waste ignites and propagates combustion in a test sample.
Waste Ignites and Propagates Combustion in a Test Sample	Waste generates heat at a rate greater than it loses heat and reaches the auto-ignition temperature.
Water Reactive	Waste generates flammable or explosive gases in contact with water.
Oxidizing Potential	Waste contributes oxygen for combustion.
Toxicity	Waste is either toxic via oral, dermal, or inhalation routes.
Corrosivity	Waste has a pH value less than 2.0 or greater than 12.5.
PCB Content	Waste contains polychlorinated biphenyls at a concentration equal to or greater than 50 milligrams per kilogram.
Leachate Toxicity	The leachate of the waste sample is toxic based on a regulated list of criteria.

3. Project Waste Types

The MVLWB waste management hierarchy will be continuously applied throughout the Project where applicable. Various types of waste have been identified that may be generated by equipment, crews, and construction activities. Information regarding waste type generation, handling, and potential impacts are included in Table 3-1. Waste management will be implemented to minimize waste production by reducing the use of materials, reusing materials when practical, recycling, and recovering used materials. Updates to the handling, disposal, and management of additional waste types will be developed as the Project planning progresses.

Table 3-1. Waste Types, Potential Effects, and Waste Management Rational

Waste Type / Stream	Description / Characteristics	Estimated Amount of Waste [a]	Potential Environmental Effects	Waste Management / Handling
Scrap/Bulk Metal	Any scrap metal, removed metal infrastructure, exposed pipes, bridge/culvert materials.	~30 tonnes	Could cause human and environmental health impacts if not removed.	Haul to an approved waste facility outside of the NWT for recycling or disposal.
Contaminated Soil	Soil containing residual materials released during past operations (i.e., known contamination at PM-1) or spilled onto the ground during abandonment activities. Material could include gasoline, diesel, aviation fuel, hydraulic fluid, engine oil, or antifreeze.	~1,300 m^3	Could cause human and environmental health impacts if not removed.	Thermal treatment system at PM-1. Should the on-site treatment be unsuccessful, the contaminated soil will be hauled for disposal at an appropriate facility outside of the NWT.
Contaminated Snow/Water	Snow or water contaminated with spilled material such as gasoline, diesel, aviation fuel, hydraulic fluid, engine oil, or antifreeze.	Unknown	Could cause human and environmental health impacts if not immediately removed. Potential impacts to aquatic species and water quality.	Transport to a licenced and approved waste facility outside of the NWT. Small amounts of contaminated snow or water can be handled by the ETC system at PM-1.
Contaminated Sorbent Material	Absorbent pads containing soaked-up spilled material, which could include gasoline, diesel, aviation fuel, hydraulic fluid, engine oil, or antifreeze.	Unknown	Could cause human and environmental health impacts if not removed from spill location. Animals could be attracted to the scent of spilled material.	Haul away for disposal at a licenced and approved landfill facility outside of the NWT.
Sewage/Greywater	Sewage and wash water generated from campsites.	1,100,000 L	If not treated, can cause illness due to fecal coliforms and other bacteria, biological hazard.	All sewage and greywater will be picked up by the Hamlet of Fort Liard, per the agreements in Appendix D.

Waste Management Plan for the Northwest Territories

Waste Type / Stream	Description / Characteristics	Estimated Amount of Waste [a]	Potential Environmental Effects	Waste Management / Handling
Domestic Garbage (camp garbage)	Food and other general waste from campsites.	~ 2,300 m^3	Can attract animals if not properly discarded.	Domestic garbage would be stored in covered metal containers, and hauled to an approved local municipal landfill, pending written agreement by the owning/operating authority. The Hamlet of Fort Liard has confirmed that weekly waste pick up will be provided from North Work Camp Site Location Option 1 (Appendix D).
Residual Vegetation and Slash from Brushing	Wood waste too small for use as timber or firewood.	N/A[b]	Could cause loss or alteration of wildlife habitat and increased fire hazard from accumulation of slash.	To be used as rollback material along the right-of-way. Will follow the Northern Land Use Guidelines: Roads and Trails (GNWT-Lands 2014).

[a] Estimates can be adjusted in subsequent versions of this document if more accurate information becomes available.

[b] Wood waste from brushing will be used as rollback material and does not contribute to the overall waste volume for the Project.

Note:

No waste from other territories or provinces will be disposed of within the NWT.

m^3 = cubic metre(s)

4. Waste Management

4.1 Waste Management Responsibilities

All Project personnel and contractors are responsible for the proper handling of any wastes generated and must comply with this WMP.

4.2 Storage and Treatment

Storage options for waste materials will vary depending on the type of waste generated. All wastes will be tracked and recorded by the contractor. An example of a tracking form is provided in Appendix E.

In some cases, waste may be treated, rather than disposed. In the case of sewage and wastewater from temporary campsites, a water treatment unit may be used.

When designating and storing waste, the following items require attention and consideration:

- Consult applicable waste storage guidelines and regulations if storage or treatment has not been identified.
- Whenever practical, transport wastes to a secure waste facility in a timely manner.
- Provide secondary containment under all containers and tanks holding liquid wastes to prevent the migration of contaminants.
- If practical, secure waste storage containers against wildlife and weather.
- Maintain a clean worksite at all times.
- Food wastes must be secured in animal proof containers and removed from worksites at the end of each day.
- Store nonhazardous waste in an area of low traffic.
- Waste storage must be at least 100 metres from any waterbody, wetlands, ditches, and drainage channels, where feasible. Otherwise, ensure adequate secondary containment measures are in-place.
- Contaminated soils will follow the process within Section 5.0 of this WMP.

4.3 Handling and Labelling

Handling information regarding specific wastes is included in Appendix C on the WIS. When handling material contaminated with hazardous materials, consult the Safety Data Sheet (SDS) for the product that was spilled. SDS's for typical types of hazardous materials or contaminants are included in the Project-specific Spill Contingency Plan (Jacobs 2024).

Each WIS is divided into the following five sections:

- General information
- Potential hazards
- Management methods
- Transportation of Dangerous Goods (TDG) Information
- Documentation

4.4 Transport and Disposal

Transportation and disposal of a waste will depend on the nature and identification of the waste. Refer to the SDS and confirmed disposal procedures before arranging the transportation and disposal of all waste. Disposal approval form and inventory documentation will be provided once a waste disposal facility has been selected.

4.4.1 Transportation Documents

Every waste shipment must be accompanied by the appropriate tracking documents. Waste transportation documentation such as the Hazardous Waste Generator Registration Form and Hazardous Waste Carrier Registration Form (Appendix E) will be utilized and copies retained in the Project records, if applicable.

4.4.2 Company Records

It is imperative to maintain accurate records of all wastes generated. Waste records will be retained as part of the Project records.

4.4.3 Transportation of Dangerous Goods Information

Federal TDG Regulations specify that consignors (shippers) of dangerous goods are responsible for assigning appropriate classifications. A typical TDG classification is provided in Appendix C as a guide in classifying the wastes for transportation. If field personnel feel that the subject waste characteristics or components may be different from the general information on the WIS, then the TDG classification may not be correct. Consult with the PEL or the applicable legislation for the NWT governing the shipment of waste.

Project personnel will follow and consult all federal and territory regulations for TDG where applicable.

4.4.4 Safety Marks

The TDG Regulations specify that all means of containment or means of transport that contain dangerous goods must have proper dangerous goods safety marks. In accordance with the federal TDG Regulations, safety marks must be as follows:

- Displayed in the means of containment.
- Visible, legible, and displayed against a contrasting colour.
- Made durable and weather resistant.
- Follow the specific dangerous good class and label size and orientation requirements as described in TDG Regulations.

4.5 Hazardous Materials Waste Disposal

Hazardous materials must be disposed of at a licenced hazardous waste (Class 1) receiving facility.
A special hauling licence is required to haul hazardous waste for disposal. Except for the contaminated materials to be treated on-site at PM-1, contaminated waste generated by the Project will be hauled outside of the NWT for proper treatment or disposal

Each shipment of hazardous waste from the NWT, must be documented using the territorially issued Waste Manifest (also known as a movement document) as described in the NWT Guideline for Hazardous Waste

Management (Appendix G). Appendix E also includes an example of the Waste Manifest. The process for waste transportation related to its destination is shown in Table 4-1.

The Waste Manifest meets both the requirements of the local jurisdiction for tracking the movement of a hazardous waste, as well as the requirements for a shipping document as prescribed by the federal TDG Regulations.

The manifest has six parts which must be completed by the generator (consignor), the transporter (carrier), and the receiver (consignee) of the waste.

Table 4-1. Waste Transportation and Disposal Procedures

Destination	Nonhazardous	Hazardous	Hazardous Recycled
Intra-territorial: Anywhere within the NWT	Truck Ticket or Waybill	Waste Manifest	Waste Manifest
Interprovincial: Outside the NWT	Truck Ticket or Waybill	Waste Manifest[a]	Waste Manifest[a]
International: Outside Canada	Truck Ticket or Waybill	Movement Document with copy of Import/Export Permit	Movement Document with copy of Import/Export Permit

[a] Alternate routings of Movement Document/Manifest copies may apply. Consult with the territorial environment agency.

4.5.1 Greywater and Sewage

Greywater and sewage that cannot be treated at the camp or facility and will be disposed of at a local municipal wastewater treatment plant, pending written approval from the water treatment facility authority. The Hamlet of Fort Liard has confirmed that weekly greywater and sewage pick up will be provided from North Work Camp Site Location Option 1 (Appendix D).

4.5.2 Animal Carcass Discovery

Animal carcasses will be reported to the NWT Wildlife and Forestry department of the Dehcho Regional office at:

Dehcho Regional Office Wildlife and Forestry – 1-867-695-7450

Animal carcasses will not be stored at Project locations but will be removed and disposed of based on consultation with the NWT Wildlife and Forestry department of the Dehcho Regional office.

4.6 Nonhazardous Waste Disposal

Nonhazardous materials must be disposed of at a licenced nonhazardous waste (Class 2)-receiving facility. Proper shipping documents must accompany all nonhazardous waste (Appendices C and E).

4.6.1 Domestic Waste

Domestic waste and refuse from camp activities, such as food waste, may be disposed of at a local licenced municipality landfill pending written approval from the landfill operator. Any waste that is not accepted at

a local licenced municipality landfill will be stored in appropriate containers at the camp location and transported outside of the NWT for proper disposal at an appropriate facility.

The Hamlet of Fort Liard has confirmed that weekly waste pick up will be provided from North Work Camp Site Location Option 1 (Appendix D).

4.6.2 Recycling

To follow best practices in waste reduction and the MVLWB management hierarchy, materials should be recycled wherever practical. Recyclable materials may be disposed of at a local licenced municipal facility pending written approval from the facility operator. Any recycling that is not accepted at a local licenced municipality facility will be stored in bins at the camp locations and hauled to the nearest accepting facility.

4.7 Waste Management Facilities

Westcoast has identified potential facilities and landfills that can manage Project wastes. All waste being transported to licenced landfills or facilities will require written approval from the landfill operator (Table4-2). Approvals will be obtained and confirmed as the Project moves through its planning and preparation stages.

Table 4-2. Potential Landfill and Facility Locations

Waste Type	Facility [a]
Scrap/Bulk Metal	• Fort Nelson Municipal Landfill (BC)
Domestic Garbage	• Fort Liard Lagoon and Landfill (NWT)
Hazardous/Contaminated Soil **Contaminated Sorbent Material**	• Contaminated soil will be treated on-site at PM-1 and will not require disposal. Should the on-site treatment be unsuccessful, contaminated soil will be hauled to an approved facility outside of the NWT. • Fort Nelson Municipal Landfill (BC) – Selected contaminated, hazardous and industrial wastes.
Sewage and Greywater	• Northern Rockies Water Treatment Plant (Fort Nelson, BC) • Fort Liard Lagoon and Landfill (NWT)[b]

Notes:

[a] Disposal facilities are subject to change throughout the Project duration based on approvals and waste quantities.

[b] No waste from outside of the NWT will be disposed of in the NWT.

5. Contaminated Soil Treatment

As the Project includes known contaminated soil at PM-1, specific management and treatment procedures have been identified for the Project. This process follows all applicable GNWT guidelines, as referenced in Appendix F.

Before excavating the contaminated soil, a minimum 10-mil polyethylene impermeable liner will be installed to allow it to be stockpiled in a way that will not result in cross-contamination of the underlying ground. The liner will be protected to prevent puncturing from equipment during treatment operations.

Enhanced Thermal Conduction (ETC) will be used to treat contaminated materials at PM-1. ETC is a stationary technology that uses heat to volatilize soil contamination. The heat is generated via multi-fuel burners and distributed to the soil via three steel manifolds layered within the stockpile(s). At the PM-1 site, the contaminated soil will be excavated and placed in 400 m^3 stockpiles atop three stacked manifolds running the length of each pile. The manifolds each distribute heated air through a third of the stockpile via a series of steel pipes traversing its width. Before activating the burners, the stockpiled soil will be encased in a stainless-steel Quonset to entrap air containing volatile organic compounds (VOCs) during the treatment process. Injected air will be transferred to the soil to heat it to a temperature between 260 and 425ºC (contaminant- and concentration-dependent) to volatilize the contaminant mass. The vapours generated from the treatment process, entrapped in the headspace of the Quonset, will be treated via thermal oxidizer to destroy the VOCs before venting the air to atmosphere (Iron Creek 2023).

Following treatment, the soil will be allowed to cool to accommodate sampling and laboratory analysis to verify the soil contamination has been treated to concentrations below the remediation criteria. The treated soil will be placed back into the excavation, hydrated, and machine compacted. Project Remedial Action Plan (Appendix G) provides a complete breakdown and rationale for the ETC use.

The ETC system will run on propane that is stored on-site in a 30 m^3 portable tank (a trailer-based propane tank for hauling and storage) and will be refilled by a regional supplier. It is estimated that approximately 75 to 110 m^3 of propane will be needed to treat the approximately 1,300 m^3 of contaminated soil.

6. Training Program

All Project personnel are given a Project-specific orientation prior to conducting any work. For workers in the NWT, this will include information on this WMP.

6.1 Training Records

Completion of training records will be retained within the Project files.

7. References

GNWT-Lands. 2014. Northern Land Use Guidelines: Roads and Trails. GNWT. Yellowknife, NWT. https://reviewboard.ca/upload/project_document/EA1415-01_Northern_Land_Use_Guideline_roads_and_trails.PDF.

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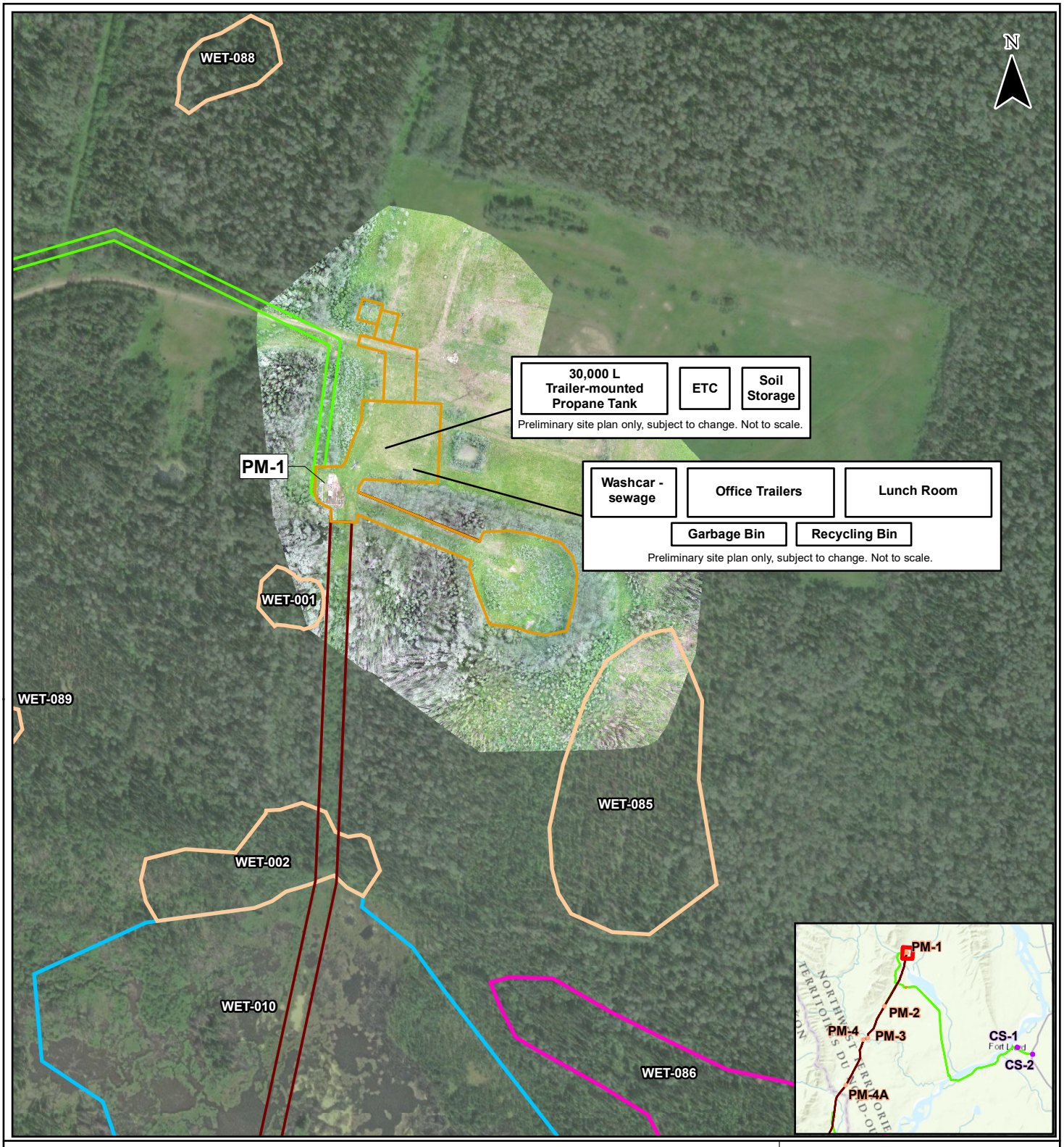
Westcoast Energy Inc. (Westcoast). 2023. Pointed Mountain Pipeline Abandonment Closure and Reclamation Plan. September. https://registry.mvlwb.ca/Documents/MV2023P0036/Westcoast%20-%20New%20Applications%20-%20Attachment%205%20-%20Closure%20and%20Reclamation%20Plan%20-%20Nov17_23.pdf.

Appendix A
Project Map Package



Right-of-Way
Temporary Workspace
Access Road

Wetland
Fen
Shallow Water
Swamp

FIGURE 1-1

PM-1 WORKSITE

WESTCOAST ENERGY INC.
POINTED MOUNTAIN PIPELINE
ABANDONMENT PROJECT

NAD 1983 UTM Zone 10N
Satellite Imagery: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.

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(All Locations Approximate)

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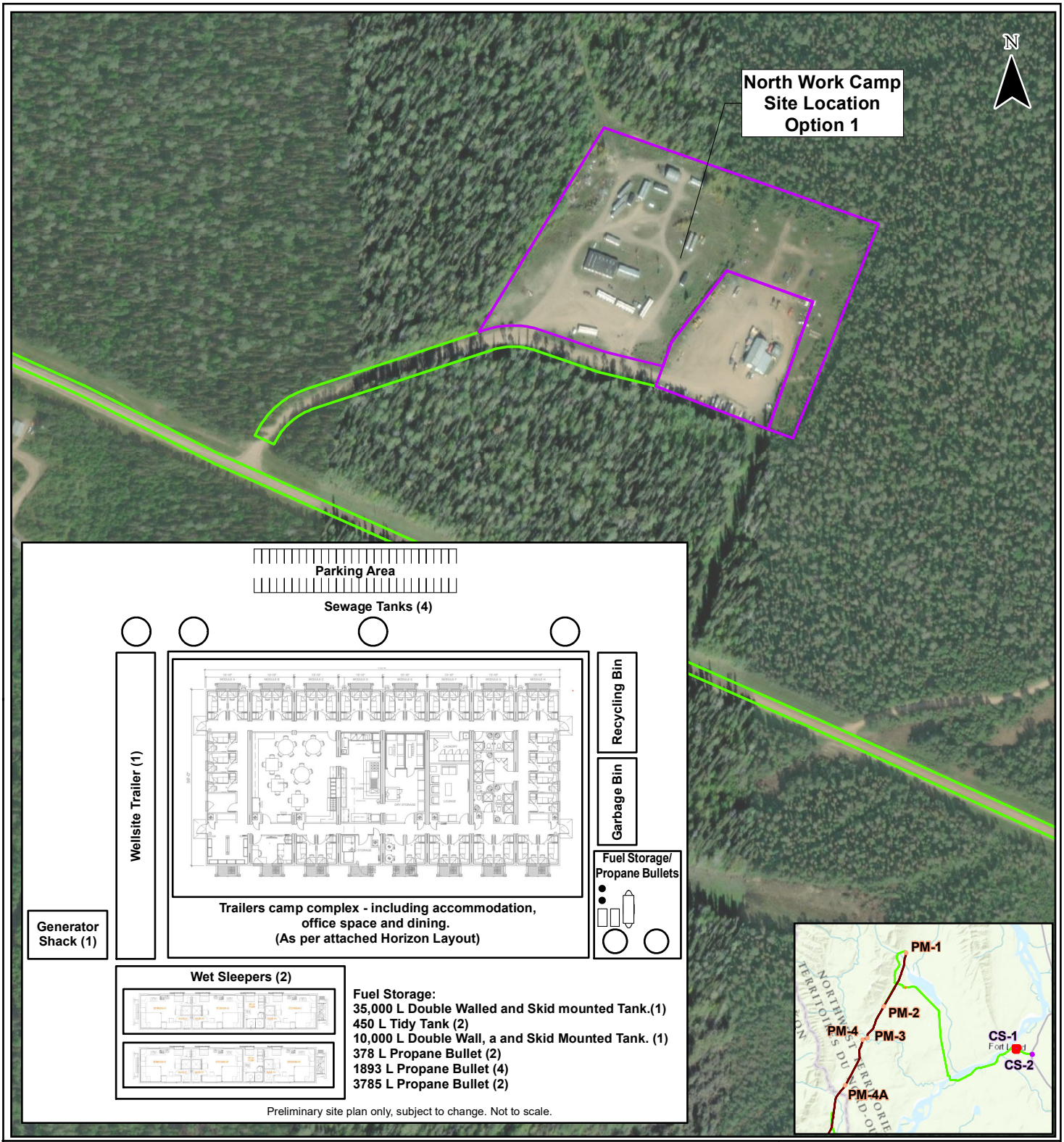

FIGURE 1-2

NORTH WORK CAMP SITE LOCATION OPTION 1

WESTCOAST ENERGY INC.
POINTED MOUNTAIN PIPELINE
ABANDONMENT PROJECT

NAD 1983 UTM Zone 10N
Satellite Imagery: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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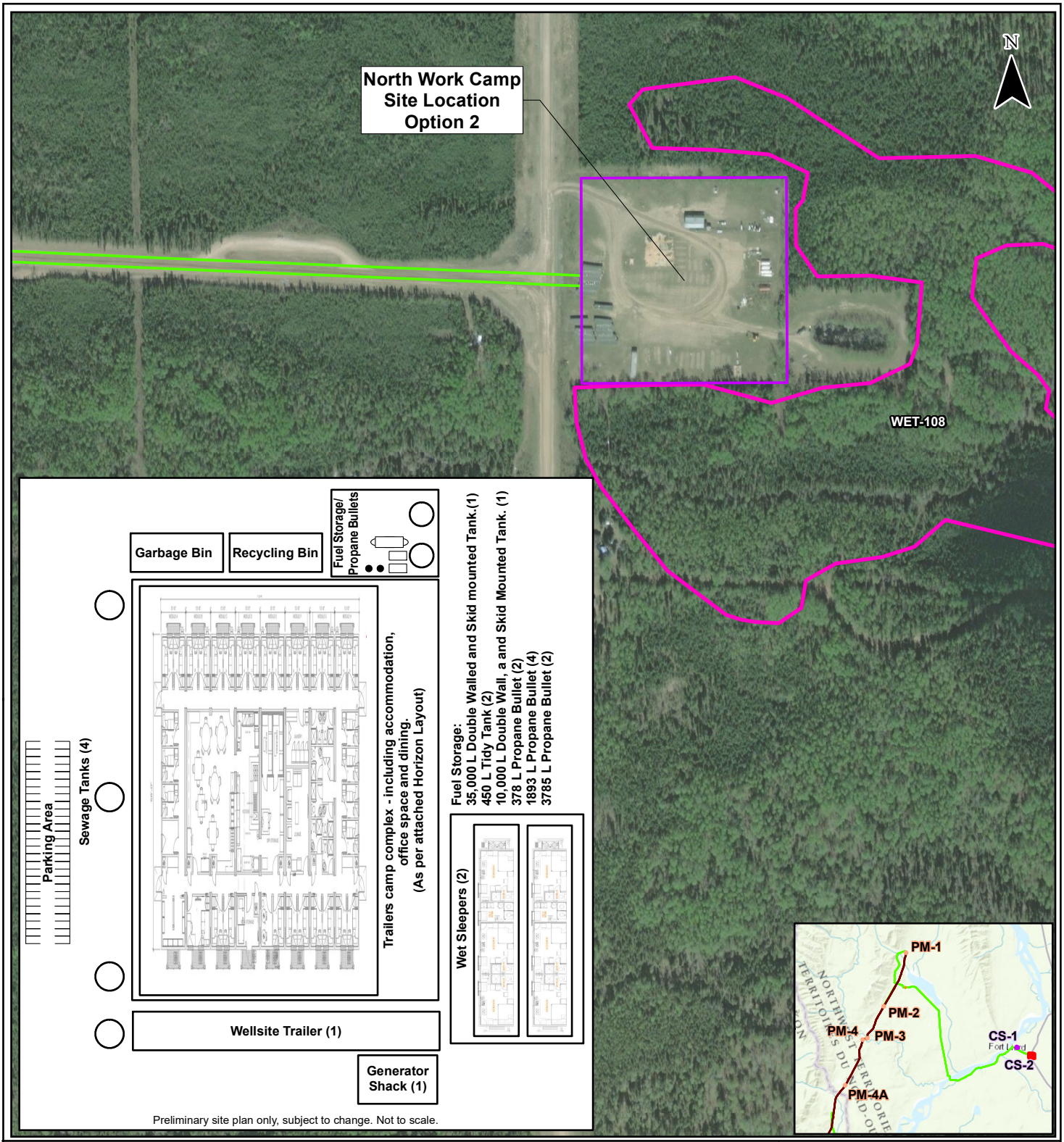

Camp
Access Road
Wetland
Treed Fen

FIGURE 1-3

NORTH WORK CAMP SITE LOCATION OPTION 2

WESTCOAST ENERGY INC.
POINTED MOUNTAIN PIPELINE
ABANDONMENT PROJECT

NAD 1983 UTM Zone 10N
Satellite Imagery: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.

SCALE: 1:5,000
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(All Locations Approximate)

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

January 2024 | CE862600

Appendix B
Enbridge Sustainability Policy

Enbridge Inc. Sustainability Policy

ENBRIDGE
Life Takes Energy

August 2022

Enbridge Sustainability Policy

Purpose: Enbridge delivers the energy that fuels quality of life and powers our economy. In fulfilling our purpose, we operate in accordance with our Statement on Business Conduct, our core values of Safety, Integrity, Respect and Inclusion, and the principles set out in this Sustainability Policy.

Enbridge is committed to integrating environmental, social and governance (ESG) considerations in all aspects and at all levels of our business. To us, this means operating in a safe, ethical, inclusive, transparent, and socially and environmentally responsible manner, taking a leadership role in the transition to a lower-emission economy, respecting human and Indigenous rights, and meaningfully engaging with and learning from our employees and the communities where we live and work.

Enbridge believes: Integrating ESG considerations into our business strategy, risk assessment processes and operating standards is essential to maintaining the resiliency of our business and creating long-term value for all our stakeholders.

Policy: As a leading energy infrastructure company, Enbridge recognizes that we have a responsibility to address the sustainability risks and opportunities stemming from our business activities. With oversight from the Board of Directors, we strive to:

- Ensure continued alignment of our business practices with our Statement on Business Conduct and core values
- Address the expectations of our employees, local and Indigenous communities in which we operate, governments, shareholders, customers and other stakeholders

Our operating practices are informed by the United Nations (UN) International Bill of Human Rights, the International Labor Organization's Declaration on Fundamental Principles and Rights at Work, the UN Guiding Principles on Business and Human Rights and the Organization for Economic Co-operation and Development's Guidelines for Multinational Enterprises.

This Policy sets out the principles and values that underpin our operating practices at all levels of our organization in the following areas of sustainability and corporate citizenship:

Business ethics and transparency

Enbridge will conduct its business in an open, honest and ethical manner. We are committed to maintaining the highest standards of integrity and corporate governance practices in order to maintain excellence in our daily operations and to promote confidence in our governance systems. Our risk management and operating standards recognize the importance of protecting all of our human, financial, physical, informational, social, environmental and reputational assets.

We report our sustainability performance through our annual Sustainability Report, and we commit to engaging with our stakeholders on how we can continuously improve our sustainability performance.

Enbridge will advise our partners, contractors and suppliers of our expectations regarding safe, ethical, environmental, social and governance related practices, both in connection with our relationships with them, and their relationships with their partners, contractors and suppliers. We will further screen and work with our partners, contractors and suppliers to achieve consistency with this policy.

This Policy applies to activities undertaken by or on behalf of Enbridge and its controlled subsidiaries anywhere in the world.

ENBRIDGE
Life Takes Energy

Our workforce

We are a diverse, equitable and inclusive workplace. We want all employees to feel valued and supported, be treated with fairness and dignity, and have equal opportunity to excel.

Enbridge applies fair wages and other labor practices that respect the national and local laws of the countries and communities where we operate. We are committed to providing equal opportunity in all aspects of employment and career advancement. We believe diversity unlocks innovation and we solve business challenges better when we bring people with diverse perspectives together.

Enbridge believes that everyone has the right to a safe and respectful work environment. We do not engage in or tolerate unlawful workplace conduct, including any form of discrimination, intimidation, harassment or retaliation against people who report incidents in good faith, as set out in our Respectful Workplace, Harassment, Violence Policy.

Enbridge supports financial, physical, social and mental well-being, and we maintain ongoing engagement with our employees to inform our workforce policies and programs. We invest in personal and professional development to equip our people with the skills and knowledge they need to implement Enbridge's business strategy and to support their professional goals.

Enbridge respects the rights of workers and employees to freedom of association and collective bargaining. We maintain and foster a cooperative approach to union and management relationships and to following labor laws of the countries in which we operate and our Statement on Business Conduct.

Health and safety

Safety is one of Enbridge's core values, our highest priority and is embedded in all aspects of our business. Enbridge is committed to ensuring everyone returns home safely at the end of each and every day, and that our assets are operated in a safe and reliable manner. We base our commitment to safety on our care for employees, contractors, the communities in which we operate and the environment.

Enbridge's focus on safety extends to the reliability of our assets, and specifically the design, construction, operation and maintenance of our energy infrastructure. Our attention to system safety underpins our commitment to the personal safety of our workers and the communities and people who live near our operations.

Our approach to health and safety is grounded in six safety principles, which articulate the safety mindset we strive for in pursuit of our goal of ensuring everyone returns home safely.

We operate in accordance with our Safety and Reliability Policy and governance framework, which identifies safety accountabilities and responsibilities at every level of our organization – from front-line employees and contractors to our Executive team and the Enbridge Board of Directors.

We work to build and maintain a culture that strives to engage every member of the Enbridge team in our shared pursuit of outstanding safety performance. We provide our employees and contractors the tools they need to ensure safe and reliable operations through health and safety training, and education programs. We investigate incidents and near misses to identify and address their root causes and we share and apply the lessons we learn to strengthen our systems and make our workplace safer.

Enbridge regularly engages with stakeholders and communities in which we operate about our safety practices and safety culture, and we work with industry peers, regulators and others to promote best practices and continuous improvement.

Environment

Enbridge operates in a manner that minimizes the impacts of our business activities on climate, land, air, water, wildlife and biodiversity, and historical and cultural resources. We integrate environmental considerations over the life of our assets – from design and construction to operation and maintenance, and decommissioning and deactivation of our infrastructure.

Our commitment to the environment is articulated in our Safety and Reliability Policy and our Environmental Protection Program defines environmental management accountabilities and responsibilities in our organization. We continually monitor and assess our environmental performance to enhance our environment program practices across our projects and operations.

We recognize that our projects and operations impact natural habitats, ecosystems and cultural resources. We implement avoidance and mitigation measures that aim to protect and maintain biodiversity, which in turn protect ecosystem function. We work in ways that respect the values and priorities of communities where we operate and the significance of cultural heritage to Indigenous peoples.

Enbridge understands the link between climate change and the environment. Our Climate Policy outlines the key principles that guide our efforts to play a leadership role in the transition to a lower-carbon future and identifies the actions we are taking to manage climate risks and respond to climate opportunities.

ENBRIDGE
Life Takes Energy

Community and Indigenous engagement and inclusion

Enbridge is committed to building and maintaining relationships based on trust and respect, and to contributing to the social and economic development of the communities where we live and work over the life of our assets.

We respect the diverse values and perspectives in communities where we operate, and we seek understanding and support for our projects and operations through timely, open and respectful engagement. We engage potentially affected communities, Indigenous nations and groups, and landowners early to assess and develop measures to avoid and/or mitigate adverse social and environmental impacts of our projects and operations.

Enbridge works with local and Indigenous communities to generate shared social and economic benefits through inclusion in our projects and operations, respecting their interests and priorities. We continually incorporate community and Indigenous perspectives to enhance our engagement approach and practices.

Human rights

Enbridge recognizes that we have a responsibility to address human rights impacts linked to our operations. Respect for human rights is embedded in our core values and all aspects of our business through our Statement on Business Conduct and our operating standards.

Our commitment to respect human rights is guided by the following principles:

- Enbridge will always strive to build trust and demonstrate respect for human dignity and rights in all interactions it enters into, including respect for cultures, customs and values of individuals and groups.
- We adopt a preventative approach that seeks to ensure Enbridge neither causes nor contributes to adverse human rights impacts through our activities, including through meaningful consultation with potentially affected stakeholders.
- Enbridge recognizes that Indigenous peoples have distinct rights. Our Indigenous Peoples Policy outlines the key principles that guide our engagement with Indigenous peoples, nations and groups that have interests in lands on which our assets are located, and our efforts to advance reconciliation with Indigenous peoples. The Policy and Enbridge's approach to Indigenous engagement and inclusion are aligned with and respect the UN Declaration on the Rights of Indigenous Peoples.
- Enbridge's core values of Safety, Integrity, Respect and Inclusion underpin our respect for the rights of others to express their views freely, including human rights defenders who lawfully exercise their right to protect recognized human rights through peaceful means. We strive to engage human rights defenders directly and in good faith about our business activities. Enbridge recognizes the right of human rights defenders to support, promote and defend the human rights of others, in line with the UN Declaration on Human Rights Defenders.
- As a signatory to the United Nations Global Compact (UNGC), Enbridge is committed to upholding the UNGC Principles. We adopt a zero-tolerance policy for human rights abuses and will not engage or be complicit in any activity that solicits or encourages human rights abuse such as threats and acts of violence, including against human rights defenders engaged in peaceful activities in line with the UN Declaration on Human Rights Defenders. Our zero-tolerance policy extends to the use of child labor, forced labor or human trafficking in any form in our operations or supply chain.
- We will work with governments and agencies to support and respect human rights and raise awareness within our sphere of influence. Our Security Policy is aligned with the Voluntary Principles on Security and Human Rights, which recognize that "force is used only when strictly necessary and to an extent proportional to the threat."
- Enbridge will provide ongoing leadership, resources, training and monitoring to ensure the effective implementation of the above principles and we will continue to engage with others to ensure respect for human rights throughout our operations. We will maintain an open-door policy for members of communities directly impacted by our operations and human rights defenders who wish to raise human rights risks. We expect the same of our employees, suppliers, contractors and business partners.

Corporate citizenship

As an employer with team members across North America, and an operator of energy infrastructure that runs through thousands of communities, Enbridge places high priority on the role we can play in contributing to their safety, vibrancy and sustainability. We collaborate with communities, Indigenous nations and groups and other partners to identify and develop opportunities that strengthen community partnerships, support networks and foster constructive relationships.

We consider donation and sponsorship opportunities in communities where we operate that meet established eligibility criteria. Our grant application review and selection process is designed to ensure our community investments meet the needs of our partners, align with our values, are used appropriately and do not result in conflicts of interest. We report our corporate citizenship performance in our annual Sustainability Report.

*Annual sign-off of the Statement on Business Conduct is a condition of employment at Enbridge. Policies supporting the Sustainability Policy are:

- Statement on Business Conduct
- Indigenous Peoples Policy
- Safety and Reliability Policy
- Climate Policy
- Supplier Code of Conduct
- Supplier Diversity Policy
- Privacy Policy
- Whistleblower Policy
- Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Policy

Appendix C
Waste Information Sheets

ENBRIDGE

Fuel - Diesel

Waste Information Sheet

General Information

Original Use:	Vehicle fuel.
Physical State:	Flammable liquid.
Components:	Mixture of hydrocarbons. May contain benzene, naphthalene, sulphur.

Potential Hazards

Class (WHMIS):	B3, D2B	**MSDS:**	Low Sulphur Diesel
Hazard Symbols:		**Protective Equipment:**	
Environmental:	Possible groundwater or surface water contamination if spilled or leaked. Can be toxic to aquatic life.		
Health:	Causes sever skin irritation. Aspiration hazard if swallowed. Use with adequate ventilation. Avoid contact or inhalation of fumes.		

Management Methods

Waste Classification:	NWT:	Hazardous Waste	Manitoba:	Hazardous Waste
	Alberta	Hazardous Waste/DOW	Ontario:	Hazardous Waste (221-I)
	Saskatchewan:	Waste Dangerous Good	Québec:	Residual Hazardous Material.
Storage:	Store in tightly closed approved containers at a field facility. Keep closed. Store in a cool, dry, well-ventilaged place away from heat, direct sunlight, and all sources of ignition.			
Treatment / Disposal:	Hazardous Waste Management Facility			
Comments:				
Reportable Release Quantity:	NWT:	100 litres	Ontario:	Any quantity
	Alberta:	200 litres	Québec:	Any quantity
	Saskatchewan:	100 litres (100 litres off-site)	TDG (includes loading / unloading): 200 litres	
	Manitoba:	100 litres		

TDG Information

Shipping Name	Class	PIN	Packing Group	Special Provisions
DIESEL FUEL	3	UN1202	III	82,88

Placards:	Class 3 (in bulk or over 500 kg).
Comments:	

Documentation

Transportation Documents:	TDG Shipping Document or provincial Manifest / Movement Document, as appropriate.
Company Records:	Maintain a copy of all waste information (i.e. manifests, shipping documents, disposal agreements) at the ENBRIDGE Field or Region office.

Need further information?
Contact Enbridge Environment Staff in Edmonton.

Fuel – Diesel
Waste Information Sheet
August 2009

ENBRIDGE

Fuel - Gasoline

Waste Information Sheet

General Information

Original Use: Vehicle fuel.
Physical State: Flammable liquid.
Components: Mixture of hydrocarbons. May contain ethanol, benzene, toluene, xylene.

Potential Hazards

Class (WHMIS): . B3, D2B
MSDS: Gasoline

Hazard Symbols:

Protective Equipment:

Environmental: Possible groundwater or surface water contamination if spilled or leaked. Can be toxic to aquatic life.

Health: May cause skin irritation, headaches, nausea or dizziness with prolonged exposure. Use with adequate ventilation. Avoid contact or inhalation of fumes.

Management Methods

Waste Classification:

NWT:	Hazardous Waste	Manitoba:	Hazardous Waste
Alberta	Hazardous Waste/DOW	Ontario:	Hazardous Waste (221-I)
Saskatchewan:	Waste Dangerous Good	Québec:	Residual Hazardous Material.

Storage: Store in tightly closed approved containers at a field facility. Keep closed. Store in a cool, dry, well-ventilaged place away from heat, direct sunlight, and all sources of ignition.

Treatment / Disposal: Hazardous Waste Management Facility

Comments:

Reportable Release Quantity:

NWT:	100 litres	Ontario:	Any quantity
Alberta:	200 litres	Québec:	Any quantity
Saskatchewan:	100 litres (100 litres off-site)	TDG (includes loading / unloading): 200 litres	
Manitoba:	100 litres		

TDG Information

Shipping Name	Class	PIN	Packing Group	Special Provisions
GASOLINE	3	UN1203	II	17, 82, 88

Placards: Class 3 (in bulk or over 500 kg).
Comments:

Documentation

Transportation Documents: TDG Shipping Document or provincial Manifest / Movement Document, as appropriate.
Company Records: Maintain a copy of all waste information (i.e. manifests, shipping documents, disposal agreements) at the ENBRIDGE Field or Region office.

Need further information?
Contact Enbridge Environment Staff in Edmonton.

Fuel – Gasoline
Waste Information Sheet
August 2009

ENBRIDGE

Garbage - Domestic Waste

Waste Information Sheet

General Information

Original Use: Includes waste from offices, miscellaneous warehouse packaging and construction camps. Does not include sanitary sewage. See also Metal-scrap and Containers waste information sheets.

Physical State: Mixed garbage. Synonyms: Trash, Refuse.

Components: Paper, metal, glass, organic, wood, cloth.

Potential Hazards

Class (WHMIS):	Not a controlled product.	**MSDS:**	Not Applicable.
Hazard Symbols:		**Protective Equipment:**	

Environmental: Accumulated garbage may attract wildlife. Illegal burning may produce toxic fumes. Landfills may cause gas venting and leachate problems. Possible spontaneous combustion. Possible hazardous containers if not properly segregated.

Health: Not expected to be a hazard.

Management Methods

Waste Classification:

NWT:	Non-Hazardous Waste.	Manitoba:	Non-Hazardous Waste.
Alberta:	Non-Hazardous Waste/Non-DOW.	Ontario:	Non-Hazardous Waste.
Saskatchewan:	Non-Hazardous Waste.	Québec:	Residual Material.

Storage: Store in bins or in areas of low traffic volumes on-site. Segregate waste types to facilitate recycling. Maintain waste volumes in a neat and orderly manner. Protect from wind.

Treatment / Disposal:
- Send / transfer to an approved landfill.
- Segregate and recycle paper, cardboard, glass, metal, and plastic.

Comments:
- Ontario requires that office buildings greater than 10,000 square metres have a source separation program.

Reportable Release Quantity:

NWT:	N/A	Ontario:	N/A
Alberta:	N/A	Québec:	N/A
Saskatchewan:	N/A	TDG (includes loading / unloading):	N/A
Manitoba:	N/A		

TDG Information

Shipping Name	Class	PIN	Packing Group	Special Provisions
Not TDG Regulated	N/A	N/A	N/A	N/A

Placards: N/A

Comments: If the waste is contaminated with dangerous goods, TDG Regulations may apply. Cover all open loads during transport.

Documentation

Transportation Documents: Truck Ticket or Waybil

Company Records: Maintain a copy of all waste information (i.e. manifests, shipping documents, disposal agreements) at the ENBRIDGE Field or Region office.

Need further information?
Contact Enbridge Environment Staff in Edmonton.

Garbage - Domestic Waste
Waste Information Sheet
August 2009

Lubricating Oil - Hydrocarbon and Synthetic

Waste Information Sheet

General Information

Original Use:	Lubrication of oilfield machinery, engines, compressors, and vehicles.
Physical State:	Hydrocarbon liquids and grease.
Components:	Chlorinated solvents, naphthalene, benzene, toluene, xylenes, lead, trace metals (i.e. Ba, Cr, V), triphenyl phosphate, butylated triphenyl phosphate, anti-rust and anti-oxidant additives.

Potential Hazards

Class (WHMIS):	Not a controlled product.	**MSDS:**	Lubricating Oil and above chemicals.
Hazard Symbols:		**Protective Equipment:**	
Environmental:	Potential groundwater and surface water contamination (hydrocarbons and metals) if applied to roads or other ground surfaces.		
Health:	Not an inhalation hazard if < 38°C. May cause some skin and tissue irritation.		

Management Methods

Waste Classification:	NWT:	Non-Hazardous.	Manitoba:	Non-Hazardous.
	Alberta:	Non-Hazardous Waste/Non-DOW	Ontario:	Non-Hazardous (252-L).
	Saskatchewan:	Waste Dangerous Good.	Québec:	Residual Material.
	Above waste classification applies to new and/or unused lubricating oils unless contaminated with heavy metals such as lead, barium or vanadium. Testing may be required.			
Storage:	Store in sealed drums at field facility. Larger quantities should be stored in storage tanks equipped with spill containment measures. Used lubricating oil *must* be segregated from other produced / waste liquids.			
Treatment / Disposal:	• Send to a lube oil recycling facility. Verify that recycler is licensed to receive and process lube oil. • Return to supplier for recycling.			
Comments:	Lube oil must be segregated from other waste fluids. Various jurisdictions have specific management requirements for spent lube oil			
Reportable Release Quantity:	NWT:	100 litres	Ontario:	Any quantity
	Alberta:	5 kg or litres	Québec:	Any quantity
	Saskatchewan:	100 litres (50 litres off-site)	TDG (includes loading / unloading): 5 kg or L	
	Manitoba:	100 litres		

TDG Information

Shipping Name	Class	PIN	Packing Group	Special Provisions
See TDG Comments Below	-	-	-	-

Placards:

Comments: Unused (clean) lubricating oils are not regulated under TDG; however, waste lubricating oils, as a result of use in older engines with lead bearings, can contain quantities of metals such as lead, barium or vanadium. Testing may be required. TDG classification and shipping names will depend on specific waste contaminants.

Documentation

Transportation Documents:	TDG Shipping Document or provincial Manifest / Movement Document, as appropriate.
Company Records:	Maintain a copy of all waste information (i.e. manifests, shipping documents, disposal agreements) at the ENBRIDGE Field or Region office.

Need further information?
Contact Enbridge Environment Staff in Edmonton.

Lubricating Oil - Hydrocarbon / Synthetic
Waste Information Sheet
August 2009

ENBRIDGE

Sewage

Waste Information Sheet

General Information

Original Use: Human and waste water sewage generated at camp and office facilities.
Synonyms: Biological wastes, black water.

Physical State: Liquid to sludge.

Components: Biological wastes, chlorine, sodium, and heavy metals.

Potential Hazards

Class (WHMIS):	Not Available	**MSDS:**	Not Available
Hazard Symbols:		**Protective Equipment:**	

Environmental: Heavy metals can severely contaminate soils, surface water and groundwater. Generated gases can be flammable.

Health: Untreated sewage effluent can provide a medium for epidemic causing bacteria.

Management Methods

Waste Classification:

NWT:	Non-Hazardous Waste.	Manitoba:	Non-Hazardous Waste.
Alberta:	Non-Hazardous Waste/Non-DOW.	Ontario:	Non-Hazardous Waste.
Saskatchewan:	Non-Hazardous Waste.	Québec:	Residual Material.

Storage: Contain in tanks or separate lined ponds.

Treatment / Disposal:

- Water conservation (usage and leak surveys). Effluent irrigation is viable but requires capital investment and engineering design (and applicable approvals/permits).
- Primary, secondary and tertiary treatment for water recovery, however larger capital investment required.
- Septic tanks and transport (if required) to local sewage treatment facility, if available, by commercial carrier. Sewage is usually regulated by the provincial public health act and/or clean water legislation.

Reportable Release Quantity: The following release quantities apply if there was not an approval in place to discharge sewage.

NWT:	Any quantity	Ontario:	Any quantity
Alberta:	Any quantity	Québec:	Any quantity
Saskatchewan:	Any quantity	TDG (includes loading / unloading):	Any quantity
Manitoba:	Any quantity		

TDG Information

Shipping Name	Class	PIN	Packing Group	Special Provisions
Not TDG Regulated	N/A	N/A	N/A	N/A

Placards: N/A

Comments: If the waste is contaminated with dangerous goods, TDG Regulations may apply. Be aware of specific legislation applying in each province/territory to the disposal of sewage. Sewage is usually regulated by the provincial public health act and/or clean water legislation.

Documentation

Transportation Documents: Truck Ticket or Waybill

Company Records: Maintain a copy of all waste information (i.e. manifests, shipping documents, disposal agreements) at the ENBRIDGE Field or Region office.

Need further information?
Contact Enbridge Environment Staff in Edmonton.

Sewage
Waste Information Sheet
August 2009

ENBRIDGE

Water - Oily

Waste Information Sheet

General Information

Original Use: Wash waters, cooling waters, buildings, drains, steam cleaning operations and may include run-off water. Collected in sumps. Synonyms: Waste water, waste water pond water, run-off holding pond water, roof run-off water, steam cleaning water.

Physical State: Liquid

Components: Water, iron oxides, calcium carbonate, sand/silt, oil and grease, trace metals (lead, chromium, thallium), BTEX

Potential Hazards

Class (WHMIS): B4

MSDS: Crude Oil.

Hazard Symbols:

Protective Equipment:

Environmental: Waste may contain polyaromatic hydrocarbons and volatile which will generate toxic fumes during decomposition of the waste. May also contain trace metals and sulfides. Potential groundwater contamination (metals, hydrocarbons) if stored in an unlined pond

Health: Not an inhalation hazard below 38°C. High vapour concentrate may irritate nose. Slight skin irritations.

Management Methods

Waste Classification:

NWT:	Non-Hazardous Waste.	Manitoba:	Non-Hazardous Waste.
Alberta:	Non-Hazardous Waste/Non-DOW.	Ontario:	Non-Hazardous Waste (251-L).
Saskatchewan:	Non-Hazardous Waste.	Québec:	Residual Material.

NOTE: Above classification unless low flash point, BTEX or hydrocarbon content.

Storage: Oil water should usually be handled in a closed system. Store in tanks. If necessary, impervious earthen/lined ponds if there is no possibility of mixing with other waters.

Treatment / Disposal:

- Waste waters containing more than 3% oils may allow for the recovery of hydrocarbons at approved reclaimers.
- Deep Well Disposal. Possible watershed release after treatment and approval from government environment department. Contact Enbridge Environment Staff for assistance.

Comments: The construction and operation of any facilities designed for the treatment of waste waters will require approval by the provincial environmental agency.

Reportable Release Quantity:

NWT:	100 litres	Ontario:	Any quantity
Alberta:	200 litres	Québec:	Any quantity
Saskatchewan:	Any quantity	TDG (includes loading / unloading):	200 litres
Manitoba:	100 litres		

TDG Information

Shipping Name	Class	PIN	Packing Group	Special Provisions
See TDG Comments Below	-	-	-	-

Placards: Dependent on specific contaminant.

Comments: Generally not TDG regulated. However, the TDG classification is dependent on the hydrocarbon content (flammable) and leachate test. If hydrocarbon contents are high the waste may be Classed as; FLAMMABLE LIQUIDS, N.O.S. ("Technical Name"), Class 3, UN 1993.

Documentation

Transportation Documents: TDG Shipping Document or provincial Manifest / Movement Document, as appropriate.

Company Records: Maintain a copy of all waste information (i.e. manifests, shipping documents, disposal agreements) at the ENBRIDGE Field or Region office.

Need further information?
Contact Enbridge Environment Staff in Edmonton.

Water – Oily
Waste Information Sheet
August 2009

Appendix D
Waste Management Agreements

From: Patricia Wai
To: Adam Oswell
Subject: Fwd: Pointed Mountain - MVLWB - Land Use Application - Waste Management Plan at Fort Liard
Date: Thursday, December 28, 2023 10:14:02 AM

Hello Adam,

Here you go.

Patricia

From: Patricia Wai <patricia.wai@enbridge.com>
Sent: Thursday, October 26, 2023 6:18 PM
To: Adam Oswell <adam.oswell@enbridge.com>; Samantha Hudec <shudec@communica.ca>; Kaylyn Echlin <kechlin@communica.ca>; Bert Fillion <Bert.Fillion@enbridge.com>; Mark Amundrud <Mark.Amundrud@enbridge.com>; Bernie Philip <Bernie.Philip@enbridge.com>
Subject: Fwd: Pointed Mountain - MVLWB - Land Use Application - Waste Management Plan at Fort Liard

Hello all,

We received a written confirmation from Hamlet of Fort Liard regarding the camp waste.

Thanks,
Patricia

From: John McKee - Senior Administrative Officer <sao@fortliard.com>
Sent: Thursday, October 26, 2023 10:50 AM
To: Patricia Wai <patricia.wai@enbridge.com>
Subject: [External] RE: Pointed Mountain - MVLWB - Land Use Application - Waste Management Plan at Fort Liard

Hi Patricia – you are correct – the Hamlet does provide weekly waste pickup at the Beaver Camp.

John

John W. McKee
Senior Administrative Officer
Hamlet of Fort Liard.
sao@fortliard.com

From: Patricia Wai <patricia.wai@enbridge.com>
Sent: Wednesday, October 25, 2023 3:29 PM
To: John McKee - Senior Administrative Officer <sao@fortliard.com>
Cc: Samantha Hudec <shudec@communica.ca>; Bert Fillion <Bert.Fillion@enbridge.com>; Adam Oswell <adam.oswell@enbridge.com>; 'RGTabandonment@communica.ca' <rgtabandonment@communica.ca>; Kaylyn Echlin <kechlin@communica.ca>; Mark Amundrud <Mark.Amundrud@enbridge.com>
Subject: Pointed Mountain - MVLWB - Land Use Application - Waste Management Plan at Fort Liard

Good afternoon John,

It was nice meeting you at your office to discuss the camp waste disposal for the Pointed Mountain Project on Oct 13th, 2023.
My understanding of our discussion was that the Hamlet of Fort Liard would be providing the camp waste disposal services to camp located at the Beaver Enterprise yard off Valley Main Street (Location Attached).
Please confirm that this plan will still work for the Hamlet. Once we have the regulatory approvals, we will provide a schedule update.

Thanks,
Patricia

Patricia Wai, **P.Eng.**, **PMP.**
Project Engineer, LP Core Projects
Projects

ENBRIDGE PIPELINES INC.
CELL: 587-966-8638 | patricia.wai@enbridge.com
200, 425 – 1st Street SW, Calgary, AB T2P 3L8

enbridge.com
Safety. Integrity. Respect. Inclusion.

With a spirit of reconciliation, I mindfully acknowledge that I live and work on the traditional lands of First Peoples, including the Plains Cree and Nakota Sioux, in Treaty 6 Territory, and the Métis.

Patricia

Appendix E
Waste Storage and Transportation Forms

Government of Northwest Territories / Gouvernement des Territoires du Nord-Ouest

FORM 2: HAZARDOUS WASTE CARRIER REGISTRATION FORM

Instructions

1. The following information must be provided in order to register and obtain a carrier number in the NWT. Incomplete applications will be returned to the applicant.
2. Completed registration forms are to be forwarded to environmental_protection@gov.nt.ca, or mailed to:
   Environment Division
   Department of Environment and Natural Resources
   Government of the Northwest Territories
   P.O. Box 1320, Yellowknife NT X1A 2L9
3. Use additional pages to provide information as required.

FORMULAIRE 2 : INSCRIPTION DES TRANSPORTEURS DE DÉCHETS DANGEREUX

Instructions

1. Veuillez fournir les renseignements suivants pour vous inscrire et pour obtenir un numéro de transporteur aux TNO. Les formulaires incomplets seront retournés aux demandeurs
2. Veuillez expédier les formulaires remplis par courriel (environmental_protection@gov.nt.ca), ou par la poste :
   Division de l'environnement
   Ministère de l'Environnement et des Ressources naturelles
   Gouvernement des Territoires du Nord-Ouest
   C. P. 1320, Yellowknife NT X1A 2L9
3. Au besoin, utilisez des feuilles supplémentaires pour fournir l'information nécessaire.

Section 1: Contact Information / Coordonnées

Carrier Company (Legal) Name: Nom de l'entreprise productrice (nom légal) :	
Mailing Address: Adresse postale :	
Contact Person: Personne-ressource :	Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :
Contact Person: Personne-ressource :	Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :

Section 2: Description of Carrier's Activities / Description des activités du transporteur

(Provide a separate table or reference waste management plan. / Veuillez fournir un tableau distinct ou faire référence au plan de gestion des déchets.)

Mode of Transport (check all that apply): Mode de transport (cochez tous ceux qui s'appliquent)	☐ Road / Routier ☐ Rail / Ferroviaire ☐ Ship / Maritime ☐ Air / Aérien
Proof of transport liability insurance is attached (certificate of insurance): Vous avez joint une preuve d'assurance responsabilité civile de transport (certificat d'assurance)	☐ Yes / Oui ☐ No / Non
Proof of training from the applicable Transport Authority is attached: Vous avez joint une preuve de formation de l'agence de transport concernée :	☐ Yes / Oui ☐ No / Non
A spill contingency plan is attached: Vous avez joint un plan d'urgence en cas de déversement :	☐ Yes / Oui ☐ No / Non

Describe types of hazardous waste (if not Dangerous Goods, indicate in description) **Décrivez le type de déchets dangereux (s'il ne s'agit pas de déchets dangereux, veuillez décrire le produit)**				
Shipping Name (description) **Désignation officielle (description)**	**UN No.** **Nº ONU**	**TDGR Class** **Catégorie du RTMD**	**Quantity generated (kg or L)** **Quantité transportée (en kg ou en L)**	**Monthly/Annually** **Mensuellement ou annuellement**

Section 3: I certify that the information provided on this form is correct, accurate and complete. **Je certifie que les renseignements fournis sont exacts, fiables, et complets.**	
Signature of Contact Person / Signature de la personne-ressource	Date (MM-DD-YYYY) / Date (MM-JJ-AAAA)
Name of Contact Person (Print): Nom de la personne-ressource (caractères d'imprimerie) :	
Title: Titre de poste :	
Phone: Nº de téléphone :	Email: Courriel :

Government of Northwest Territories / Gouvernement des Territoires du Nord-Ouest

FORM 1: HAZARDOUS WASTE GENERATOR REGISTRATION FORM

Instructions

1. The following information must be provided in order to register and obtain a generator number in the NWT. Incomplete applications will be returned to the applicant.
2. Completed registration forms are to be forwarded to environmental_protection@gov.nt.ca, or mailed to:
   Environment Division
   Department of Environment and Natural Resources
   Government of the Northwest Territories
   P.O. Box 1320, Yellowknife NT X1A 2L9
3. Use additional pages to provide information as required.

FORMULAIRE 1 : INSCRIPTION À TITRE DE PRODUCTEUR DE DÉCHETS DANGEREUX

Instructions

1. Veuillez fournir les renseignements suivants pour vous inscrire et pour obtenir un numéro de producteur aux TNO. Les formulaires incomplets seront retournés aux demandeurs.
2. Veuillez expédier les formulaires remplis par courriel (environmental_protection@gov.nt.ca), ou par la poste :
   Division de l'environnement
   Ministère de l'Environnement et des Ressources naturelles
   Gouvernement des Territoires du Nord-Ouest
   C. P. 1320, Yellowknife NT X1A 2L9
3. Au besoin, utilisez des feuilles supplémentaires pour fournir l'information nécessaire.

Section 1: Contact Information / Coordonnées			
Generator Company (Legal) Name: Nom de l'entreprise productrice (nom légal) :			
Mailing Address: Adresse postale :			
Contact Person: Personne-ressource :			Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :		
Alternate Contact Person: Personne-ressource supplémentaire :			Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :		

Section 2: Description of Waste Types Generated / Description des déchets produits
(Provide a separate table or reference waste management plan. / Utilisez un tableau séparé ou faites référence à votre plan de gestion des déchets.)

Location where waste is generated (coordinates or physical address):
Lieu où les déchets sont produits (coordonnées ou adresse physique) :

Describe types of hazardous waste (if not Dangerous Goods, indicate in description)
Décrivez le type de déchets dangereux (s'il ne s'agit pas de déchets dangereux, veuillez décrire le produit)

Shipping Name (description) **Désignation officielle (description)**	**UN No.** **N° ONU**	**TDGR Class** **Catégorie du RTMD**	**Quantity generated (kg or L)** **Quantité transportée (en kg ou en L)**	**Monthly/Annually** **Mensuellement ou annuellement**

Section 3: I certify that the information provided on this form is correct and accurate. Je certifie que les renseignements fournis dans le présent formulaire sont exacts, fiables, et complets.	
Signature of Contact Person / Signature de la personne-ressource	Date (MM-DD-YYYY) / Date (MM-JJ-AAAA)
Name of Contact Person (Print): Nom de la personne-ressource (caractères d'imprimerie) :	
Title: Titre de poste :	
Phone: N° de téléphone :	Email: Courriel :

WASTE MANAGEMENT
WASTE STORAGE RECORD FORM

ENBRIDGE

Region:		Name of Facility:	
Waste Generator Number:		Employee Responsible for Storage Area:	

SUMMARY OF WASTE DISPOSALS

DATE REC'D	INITIALS OF RECEIVER	WASTE TYPE	VOLUME OR WEIGHT	HAZ. WASTE? (Y/N)	# OF CONTAINERS	DATE REMOVED	INITIALS OF REMOVER	RECEIVING FACILITY	TDG MANIFEST # (IF HAZ. WASTE)	COMMENTS

MOVEMENT DOCUMENT
DOCUMENT DE MOUVEMENT

Movement Document Reference No.
N° de référence du document de mouvement

A **Exporter / foreign exporter**
Exportateur / expéditeur étranger

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Company name / Nom de l'entreprise

Mailing address / Adresse postale | City / Ville | Province | Postal code / Code postal

E-mail / Courrier électronique | Tel. No. / N° de tél. ( )

Shipping site address / Adresse du lieu de l'expédition

City / Ville | Province | Postal code / Code postal

Importer / foreign receiver
Importateur / destinataire étranger

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Mailing address / Adresse postale | City / Ville | Province | Postal code / Code postal

E-mail / Courrier électronique | Tel. No. / N° de tél. ( )

Receiving site address / Adresse du lieu de destination

City / Ville | Province | Postal code / Code postal

B **Carrier**
Transporteur

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Company name / Nom de l'entreprise

Mailing address / Adresse postale | City / Ville | Province | Postal code / Code postal

E-mail / Courrier électronique | Tel. No. / N° de tél. ( )

Vehicle / Véhicule	Registration No. / N° d'immatriculation	Prov.
Trailer – Rail car No. 1 1er remorque - wagon		
Trailer – Rail car No. 2 2e remorque - wagon		

Port of entry / Point d'entrée | Port of exit / Point de sortie

Carrier Certification: *I certify that I have received waste or recyclable material from the exporter / foreign exporter for delivery to the importer / foreign receiver as set out in Part A and that the information contained in Part B is correct and complete. /* ***Attestation du transporteur*** *: J'atteste avoir reçu les déchets ou matières recyclables de l'exportateur / expéditeur étranger en vue de leur livraison à l'importateur / au destinataire étranger, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets.*

Name of authorized person (print):
Nom de l'agent autorisé (caractères d'imprimerie) :

Tel. No. / N° de tél. ( )

Year / Année | Month / Mois | Day / Jour | Signature

Reference No(s). of other movement document(s) used
N° de référence des autres documents de mouvement utilisés

C **Importer / foreign receiver**
Importateur / destinataire étranger

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Importer / foreign receiver information same as in Part A
Les renseignements sur l'importateur / le destinataire étranger sont les mêmes qu'à la partie A

☐ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous

Company name / Nom de l'entreprise

Mailing address / Adresse postale

City / Ville | Province | Postal code / Code postal

E-mail / Courrier électronique | Tel. No. / N° de tél. ( )

Receiving site address / Adresse du lieu de destination

Date received / Date de réception
Year / Année | Month / Mois | Day / Jour

Time / Heure ☐ A.M. ☐ P.M.

If waste or recyclable material is to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire

Registration No./Provincial ID No.
N° d'immatriculation - d'id provincial

Prov. code Code prov.	Shipping name Appellation réglementaire	Class / Classe Sub. class(es) Classe(s) sub.	UN No. N° UN	Packing / risk gr. Gr. d'emballage/ de risque	Quantity shipped Quantité expédiée	Units L or / ou kg Unités	Packaging/Contenant No. / N°	Codes int.– ext.	LSPG Code Code LSPG
(i)									
(ii)									
(iii)									
(iv)									

Quantity received Quantité reçue	Units L or / ou kg Unités	Comments Commentaires	Handling Code / Code de manutention	Shipment / Envoi Accepted Accepté	 Refused Refusé	Decont. Pack. Cont.	 Veh. Véh.

If handling code "Other" (specify)
Si code de manutention « autre » (spécifier)

Notice No. N° de notification	Notice Line No. N° de ligne de la notification	Shipment Envoi	Of / De	D or R code Code D ou R	C code Code C	Basel Annex VIII or OECD Code Annexe VIII de Bâle ou Code OCDE	H code Code H	Y code Code Y	National code in country of / Code du pays Export Exportation	 Import Importation	Customs code(s) Code(s) de douanes
(i)											
(ii)											
(iii)											
(iv)											

Exporter / foreign exporter certification: *I certify that the information contained in Part A is correct and complete.*
Attestation de l'exportateur / expéditeur étranger : *J'atteste que tous les renseignements à la partie A sont exacts et complets.*

Name of authorized person (print)
Nom de l'agent autorisé (caractères d'imprimerie)

Signature

Tel. No. / N° de tél. ( )

Importer / foreign receiver certification: *I certify that the information contained in Part C is correct and complete. /* ***Attestation de l'importateur / destinataire étranger :*** *J'atteste que tous les renseignements à la partie C sont exacts et complets.*

Name of authorized person (print)
Nom de l'agent autorisé (caractères d'imprimerie)

Signature

Tel. No. / N° de tél. ( )

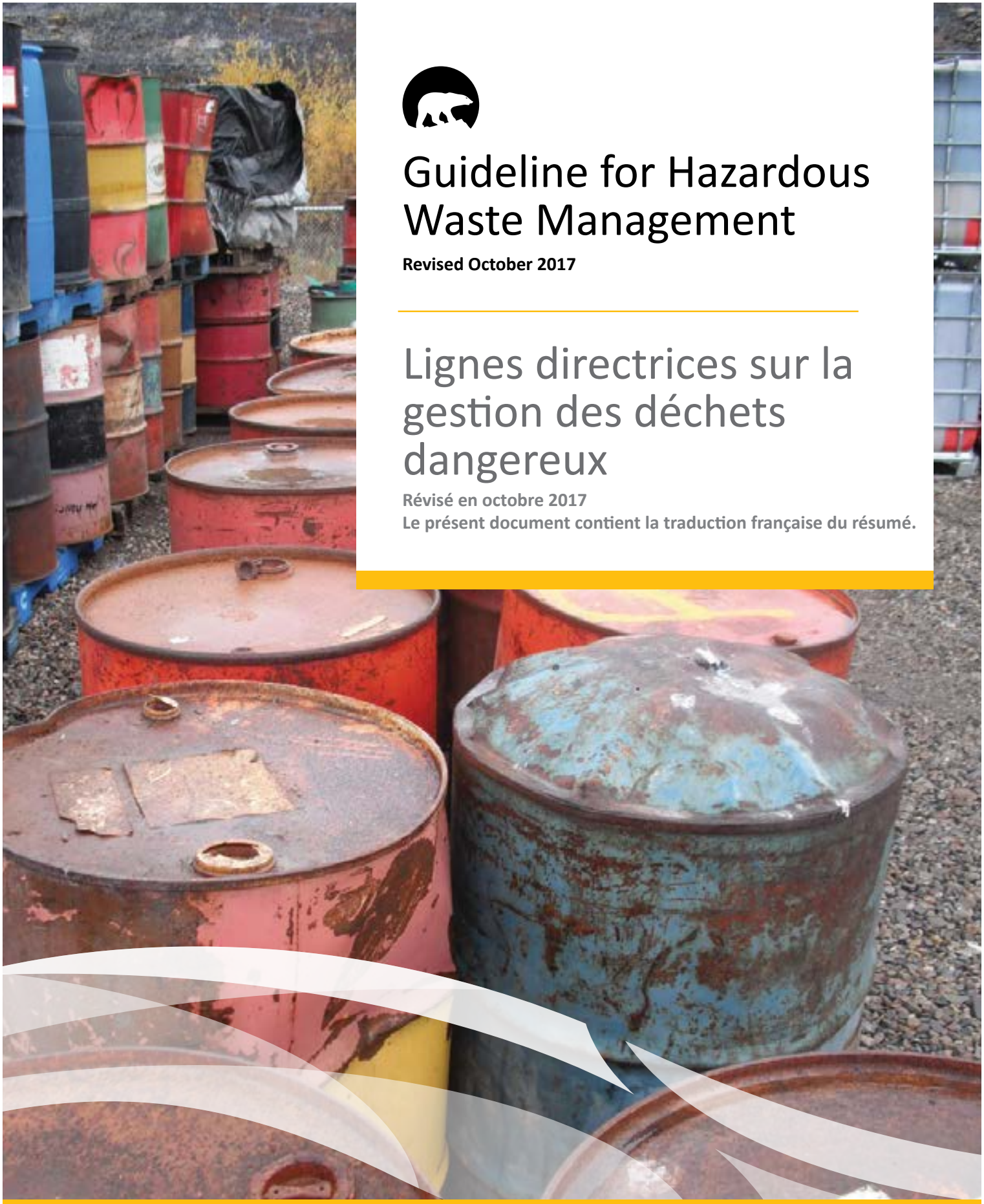
Special handling / Manutention spéciale
☐ Attached / Ci-joint : ☐ As follows / Ci-contre :

Date shipped / Date d'expédition
Year / Année | Month / Mois | Day / Jour

Time / Heure ☐ A.M. ☐ P.M.

Scheduled arrival date / Date d'arrivée prévue
Year / Année | Month / Mois | Day / Jour

Appendix F
Government of Northwest Territories Hazardous Waste Guidelines



Guideline for Hazardous Waste Management

Revised October 2017

Lignes directrices sur la gestion des déchets dangereux

Révisé en octobre 2017

Le présent document contient la traduction française du résumé.

Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest

Contents

1 Introduction

Industrial, commercial, and institutional (ICI) sectors often produce residual materials during their operations that are considered waste. Some wastes are more hazardous than others, due to their chemical, physical or biological properties. Hazardous waste is the term used to describe waste materials that require special handling and disposal/treatment to prevent adverse impacts on human health and the environment.

This guideline has been developed by the Environment Division of the Department of Environment and Natural Resources for the ICI sector. The purpose of this document is to:

- provide guidance to industrial, commercial, and institutional operators in the Northwest Territories (NWT) on the proper management of hazardous waste;
- increase awareness of the different types of hazardous waste; and
- support the tracking of hazardous waste from generation to final treatment/disposal.

Section 2.2 of the *Environmental Protection Act* (EPA) gives the Minister of Environment and Natural Resources of the Government of the Northwest Territories (GNWT) the authority to develop, coordinate and administer guidelines (See Appendix 1). This guideline does not alleviate the need to comply with any other Act or regulation applicable to the management of hazardous waste. Section 2.6 of this Guideline provides additional information on the roles and responsibilities of other regulatory agencies that may be involved with the management of hazardous waste due to their legislative responsibilities.

This guideline is for the general management of hazardous waste and should be read in conjunction with hazardous waste guidelines for specific substances that are available on ENR's website.

For more information regarding hazardous waste please visit our website (http://www.enr.gov.nt.ca/en/services/hazardous-waste) or contact:

Environment Division
Department of Environment and Natural Resources
Government of the Northwest Territories
7th floor, Scotia Centre
5102 50 Avenue

Mailing Address:
PO Box 1320
Yellowknife NT X1A 2L9

Tel: (867) 767-9236 ext. 53176
Fax: (867) 873-0221

1 Introduction

Au cours de leurs activités, les secteurs industriel, commercial et institutionnel (ICI) produisent souvent des matières résiduelles qui sont considérées comme des déchets. Certains déchets sont plus dangereux que d'autres en raison de leurs propriétés chimiques, physiques ou biologiques. On parle de déchets dangereux pour décrire les déchets qui exigent une élimination ou un traitement spécial pour prévenir toute répercussion négative sur la santé ou l'environnement.

Ces lignes directrices ont été élaborées par la division de l'environnement du MERN du GTNO pour les secteurs ICI. Les lignes directrices sur la gestion des déchets dangereux visent à :

- orienter les exploitants des secteurs ICI des TNO sur la gestion appropriée des déchets dangereux;
- sensibiliser aux différents types de déchets dangereux;
- encourager le suivi des déchets dangereux, de leur production à leur élimination ou traitement final.

La section 2.2 de la LPE confère au ministre de l'Environnement et des Ressources naturelles l'autorité de mettre au point, de coordonner et d'administrer des lignes directrices (voir l'annexe 1). Ces lignes directrices ne suppléent à aucune autre loi ou réglementation applicable à la gestion des déchets dangereux. La section 2.6 de ces lignes directrices contient des renseignements complémentaires sur les rôles et responsabilités d'autres organismes de réglementation qui pourraient participer à la gestion des déchets dangereux dans le cadre de leurs responsabilités législatives.

Ces lignes directrices concernent la gestion globale des déchets dangereux et doivent être consultées parallèlement aux lignes directrices sur les déchets dangereux relatives aux substances spécifiques.

On peut consulter ces lignes directrices ainsi que celles sur les autres déchets dangereux sur le site Web du MERN ou en communiquant avec le MERN (http://www.enr.gov.nt.ca/en/services/hazardous-waste) aux coordonnées suivantes :

Division de l'environnement
Ministère de l'Environnement et des Ressources naturelles
Gouvernement des Territoires du Nord-Ouest
5102, 50e Avenue
Centre Scotia, 7e étage

Adresse postale :
C. P. 1320
Yellowknife NT X1A 2L9

Tél. : 867-767-9236, poste 53176
Téléc. : 867-873-0221

1.1 Definitions

Carrier	Any person engaged in the transport of hazardous waste.
Cement returns	Excess cement circulated to the surface after downhole cementing.
Consignor	A person who offers a consignment of hazardous waste for transport.
Contaminant	Any noise, heat, vibration or substance and includes such other substances 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.
Contaminated water	Waste water or snow that contains any of the contaminants listed in Schedule I in a concentration greater than the corresponding amount.
Contaminated site	Areas of land, water, groundwater, or sediments that have levels of contaminants exceeding the remediation criteria described in the GNWT's *Guideline for Contaminated Site Remediation*.
Dangerous goods	Any product, substance or organism referred to in the prescribed classes of dangerous goods or included by its nature in any of the prescribed classes of dangerous goods in the schedule provided by the applicable transport authority.
Dioxin TEQ	The dioxin toxicity equivalent (TEQ) value which is determined by adding the products of the measured concentrations of each dioxin and furan constituent listed in Column I of Schedule II multiplied by the toxicity equivalency factor (TEF) listed opposite in Column II.
Discharge	Includes, but not so as to limit the meaning, any pumping, pouring, throwing, dumping, emitting, burning, spraying, spreading, leaking, spilling or escaping.
Drilling cuttings	The solid materials, fragments of rock and other materials brought to the surface during the drilling process.
Drilling mud	A suspension, usually in water but sometimes in oil (diesel), used in rotary drilling, consisting of various substances in a finely divided state (commonly bentonitic clays and chemical additives), introduced continuously down the drill pipe under pressure and through openings in the drill bit and transported back up in the annular space between the pipe and the walls of the hole to a surface pit or tank where it is conditioned and reintroduced into the wellbore. It is used to lubricate and cool the bit, carry the cuttings up from the bottom, and to prevent blowouts and cave-ins.
Drilling fluids	Any liquid mixture of clay, water, sediment, drilling muds, chemical additives, or other wastes that are pumped downhole while drilling and are specifically related to drilling activity.

Drillng waste	Waste substances associated with drilling a well or directional drilling including: a) Drilling cuttings; b) Drilling fluids; c) Drilling mud; d) Flowback fluid; e) Fracturing fluid; or f) Cement returns.
Effluent	Liquid material, treated or untreated, discharged into the environment.
Empty container	A container from which all: a) Hazardous waste has been emptied, to the greatest extent possible, using regular handling procedures. Its contents shall not exceed 0.1% of the container's original capacity or 0.2 litres, whichever is less. This does not include toxic gas in Class 2.3 of the TDGR or containers which previously came in direct contact with: i. Substances in Class 6.1 Packing Group I materials of the TDGR; or ii. Severely Toxic Contaminants. b) Flammable vapours have been reduced to less than twenty percent (20%) of the lower explosive limit for the material by purging, venting, or by the introduction of an inert material.
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).
Flowback fluid	The flow of fracturing fluid back to the wellbore after treatment is completed.
Fracturing fluid	The fluid used to perform a particular hydraulic fracturing treatment and includes the applicable base fluid and all additives.
Generator	The owner or person in charge, management or control of a hazardous waste or a facility or property that generates or contains hazardous waste.
Hazardous to the aquatic environment	Any product or substance classified as hazardous to the *aquatic* environment according to the classification system outlined in Chapter 4.1 Hazardous to the Aquatic Environment of Part 4 ENVIRONMENTAL HAZARDS provided in the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Hazardous waste	A contaminant which is no longer used for its original purpose and is intended for recycling, treatment, disposal or storage and is: a) A dangerous good according to the TDGR; b) Leachable waste; c) Hazardous to the aquatic environment; d) Waste containing dioxins and furans; e) Contaminated soil/snow/water from a contaminated site; f) Drilling waste; g) Listed waste; or h) Any other waste deemed hazardous. Hazardous waste does not include a material that is: a) Authorized for on-site disposal by the applicable regulator for the specific activity in which the hazardous waste was generated; b) Household hazardous waste being transported to a municipal collection depot; c) Included in Class 1, Explosives or Class 7, Radioactive materials of TDGR; d) Exempted as a small quantity; e) An empty container; or f) Goods that are defective, surplus, or otherwise not usable for their intended purpose and that are in the process of being returned directly to a manufacturer or supplier.
Hazardous waste management facility	A facility which is used for the collection, storage, treatment, recycling or disposal of hazardous waste.
Incompatible waste	Hazardous wastes which, when in contact with one another or other substances under normal conditions of storage or transportation, could react to produce heat, gas, fire, explosion, corrosive substances or toxic substances.
Landfill	A designated area of land where residual waste is placed, compacted, and covered.
Leachable waste	A substance that may contain any of the contaminants listed in Schedule I in a concentration greater than the corresponding amount when subjected to the leachate extraction procedure.
Leachate extraction procedure	A test method designed to determine both the organic and inorganic parameters present in solid and multi-phased waste. It is designed to simulate the characteristics a material may exhibit if placed in a landfill. Test determined by Method 1311 Toxicity Characteristic Leaching Procedure (TCLP) Test, US EPA or Leachate Extraction Procedure 164-GP-1-MP Canadian General Standards Board.
Listed waste	Wastes listed in Schedule III.
Long term storage	The storage of hazardous waste for a period of 180 days or more but does not include materials in transit.
Manage	To handle, transport, store, recycle, treat, destroy or dispose of hazardous waste.

Movement document	Means the form set out in Schedule VII.
Process residuals	Solid, semi-solid or sludge waste resulting from industrial operations.
Receiver	A person or company registered with the Environment Division, or by the applicable province or territory, authorized to receive and manage specified types of hazardous waste.
Record of disposal	A physical copy of the information outlined in Schedule VIII.
Severely toxic contaminants	Contaminants listed in Schedule IV.
Small quantity	Hazardous waste that is generated in any month is not greater than the amount in column II of Schedule V corresponding to the type of hazardous waste, or the aggregate quantity accumulated at any one time is not greater than the amount in column II of Schedule V corresponding to the type of hazardous waste.
Transport authority	The regulations controlling the management of dangerous goods under that mode of transport. These include: • Road and rail – *Transportation of Dangerous Goods Act* (TDGA) *and Regulations* (TDGR); • Air – *International Civil Aviation Organization Technical Instructions* (ICAO); and • Marine – *International Maritime Dangerous Goods Code* (IMDG).
Treatment or Treat	The handling or processing of a hazardous waste in such a manner as to change the physical, chemical or biological character or composition of the hazardous waste to eliminate or reduce: (a) one or more hazards of the waste; and/or (b) the volume.
Used oil	Means any oil, including lubrication oil, hydraulic fluid, metal working fluid and insulating fluid, that is unsuitable for its intended purpose due to the presence of impurities or the loss of original properties, but does not include waste oil derived from animal or vegetable fat, a petroleum product spilled on land or water or waste from a petroleum refining operation.
Waste containing dioxins and furans	A waste containing Dioxin TEQ in a concentration greater than 0.001 mg/kg.

List of Acronyms used in this Document

AER	Alberta Energy Regulator
CALA	Canadian Association for Laboratory Accreditation Inc.
CAPP	Canadian Association of Petroleum Producers
CCME	Canadian Council of Ministers of the Environment
ED	Environment Division
ENR	Environment and Natural Resources
EPA	*Environmental Protection Act*
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GNWT	Government of the Northwest Territories
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICI[1]	Industrial, Commercial, Institutional
IMDG	International Maritime Dangerous Goods Code
OROGO	NWT Office of the Regulator of Oil and Gas Operations
SCC	Standards Council of Canada (Environmental Laboratories)
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxicity equivalent value
TDGA/TDGR	The *Transportation of Dangerous Goods Act* and Regulations (Canada)
WHMIS	Work Site Hazardous Material Information System

[1] Industrial — Resource development activities, construction, fabrication, light and heavy manufacturing.
Commercial — Retail stores, mechanical shops, property managers, service and repair businesses, etc.
Institutional — Federal, Territorial, Municipal government departments and agencies, non-profit agencies.

2 Roles and Responsibilities

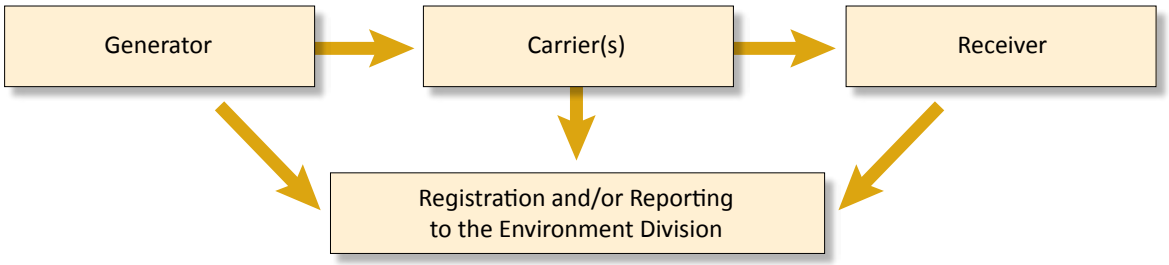
2.1 Environment and Natural Resources

The Department of Environment and Natural Resources (ENR) is the GNWT agency responsible for initiatives which control and prevent the discharge of contaminants, including hazardous wastes, and their impact on the natural environment. ENR is responsible for ensuring that environmentally acceptable management procedures, emission levels and disposal methods are maintained. Legislative authority is provided by the *Environmental Protection Act* (EPA) (See Appendix 1) and the *Pesticide Act*.

The Environment Division (ED) of ENR monitors the movement of hazardous waste from the generator to final disposal at the receiving facility through the use of a specified 6 part form called a hazardous waste movement document. A movement document form, or an equivalent record of disposal, must accompany all hazardous waste in transit regardless of the means of transport. Hazardous waste movement documents are provided by the Environment Division.

If hazardous waste is to be transported off the originating site, the generator must be registered with ED. Once registered, an identification number will be assigned which is required to complete the movement document. A carrier or receiver may either be registered in the NWT or in the province or territory in which the company is based. The basic framework for the off-site movement of hazardous waste and reporting is outlined in Figure 1.

Figure 1: Movement of Hazardous Waste and Record Keeping



The definitions of hazardous waste vary across Canada, although most provinces and territories register generators, carriers, receivers and utilize the hazardous waste movement document. The definition of hazardous waste in the NWT is unique because it includes waste types such as, contaminated soil and drilling waste which are frequently managed under different regulatory frameworks in other jurisdictions. It is important to confirm their ultimate disposal on a hazardous waste movement document or an equivalent record of disposal.

The environmental risks associated with these waste types may be mitigated through various forms of on-site management and their disposal may be specifically authorized by the applicable regulator. It is important to review all the sections of this Guideline as it pertains to the proposed activities.

2.2 Generators of Hazardous Waste

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

The generator is ultimately responsible for ensuring hazardous waste will be properly managed from the time it is generated to final disposal. Hazardous waste must be properly packaged, stored, transported, treated and disposed of. Contractors frequently manage waste on behalf of the generator; however, the generator is responsible for ensuring, in advance, that the waste management method is acceptable.

In general, the generator is responsible for the following:

- Packaging, classifying, quantifying, labelling, and storing hazardous waste properly (See Sections 4.2 and 4.3).
- Registering their hazardous waste management facility if applicable (see Section 2.5).
- Ensuring analysis (if required) is performed by a laboratory accredited by CALA or SCC (See Associations in Appendix 4).
- Ensuring the proper disposal of hazardous waste by an acceptable method. Appendix 2 of this Guideline describes how to determine if a receiver is authorized to receive the type of hazardous waste.
- Ensuring workers are trained in the management of hazardous waste including emergency/spill response in the event of a discharge.
- Complying with all other regulatory requirements for hazardous waste management including transportation, occupational health, and public health and safety.

When hazardous waste is to be transported off-site, the generator is required to:

- register as a generator of hazardous waste;
- ensure the waste is transported by a registered hazardous waste carrier to a receiver authorized to receive the type of hazardous waste; and
- ensure a movement document, or an equivalent record of disposal, is properly completed and accompanies the shipment (see Sections 4.5 and 4.6).

Hazardous waste management flowcharts for generators are shown in Figures 3 and 4 of Section 4.

2.3 Carriers of Hazardous Waste

Carriers must be registered with ED prior to transporting hazardous waste. Hazardous waste must be transported in accordance with the appropriate transport authority as defined below.

Air	International Civil Aviation Organization (ICAO)
Marine	International Maritime Dangerous Goods Code (IMDG)
Road, Rail	Transportation of Dangerous Goods Regulations (TDGR)

In general the carrier is responsible for the following:

- Completing Part B of the hazardous waste movement document (or alternate record of disposal) and retaining it during transit to authorized receiving facilities.
- Maintaining the appropriate placards on the transport vehicle.
- Ensuring staff are trained in the applicable mode of transport, and qualified to safely transport hazardous waste.
- Reporting spills that occur during transit to the NWT/Nunavut Spill Report Line at (867) 920-8130.

2.4 Receivers of Hazardous Waste

Hazardous waste management facilities that manage hazardous waste from other generators are registered as receivers. The operator of a hazardous waste management facility in the NWT is required to register the facility with ED to manage specified hazardous waste types. See Section 2.5 for information about registering a hazardous waste receiving facility. In the NWT, some current examples of receiving facilities may include municipal disposal sites for asbestos, authorized used oil burners for used oil and waste fuel, or hazardous waste transfer facilities.

Receiving facilities outside the NWT need to be authorized by the province or territory of destination to receive the specific type of hazardous waste. There is a wide range of facilities to manage various types of hazardous waste. A comprehensive listing is beyond the scope of this Guideline. See Section 4.6 for more information.

2.5 How to Register as a Hazardous Waste Generator, Carrier, Storage Facility, or Receiver

First, determine what type of hazardous waste you have. Figure 3 on page 26 may be referenced for assistance. Then, determine your hazardous waste management options or what type of registration you may need by referencing Figure 4 on page 27. Registration forms are provided on pages 28 and 30 for generators and carriers respectively. Section 4 outlines basic hazardous waste management practices.

ED requires the following information when applying for a hazardous waste generator or carrier registration number:

Registering as a Generator

- Company name, address, phone number and contact person, including position;
- Location and description of the activity taking place that results in the generation of the hazardous waste; and
- Expected type, quantity and method of storage of hazardous waste.

Registering as a Carrier

- Company name, address, phone number and contact person, including position;
- Proof of transport liability insurance; and
- Confirmation that the company meets the training requirements of the transport authority (certificate of training).

Registering a Storage Facility

A generator may also be required to register their storage facility. If the hazardous waste is not stored on the generator's property, the property owner will need to register their facility as a receiver. A storage facility can be a building, locker, compound or area used to store hazardous waste.

A storage facility must be registered with ED if:

- The facility is used or is intended for the storage of hazardous waste for a period of 180 days or more; and
- Quantities to be stored exceed the quantities set out in Schedule VI for individual waste classes or if the aggregate quantity for all classes of waste stored exceed 5,000 kg or L (except for contaminated soil and drilling waste where quantities exceed 50,000 kg or L).

Under the EPA, the Spill Contingency Planning and Reporting Regulations set the standards for reporting spills of contaminants and preparing spill contingency plans.

ED requires the following information when registering a hazardous waste storage facility:

- Company name, address, phone number and contact person, including position;
- Location and description of the facility;
- Expected types, quantities and method of storage of the hazardous waste;
- Approvals required to operate and occupy the land for that purpose; and
- Confirmation that the proponent has provided building plans to the Office of the Fire Marshal to ensure compliance with adopted codes and standards.

Registering as a Receiver

Facilities which store, treat, reprocess, consolidate, destroy or recycle hazardous waste(s) are classified as hazardous waste management facilities, and must register with ED prior to beginning operation. In addition to the information required for a storage facility ED requires a description of the waste management activities to be conducted.

Note: Facilities that burn used oil must be registered as receivers in accordance with Section 15 of the Used Oil and Waste Fuel Management Regulations. Separate application forms are available at ENR's website (http://www.enr.gov.nt.ca/en/services/hazardous-waste/used-oil-and-waste-fuel-burners) or by contacting ED.

A complete list of requirements for all potential hazardous waste management facilities is beyond the scope of this guideline. ED may request further information on a proposal, following an initial review of information provided.

A hazardous waste management facility may also require permits and licences from the applicable Land and/or Water Board or the Department of Lands depending on the activity, or for the deposit of any waste (see Section 2.6). Under these circumstances the review of proposed hazardous waste management activities that overlap with other agencies, occur in parallel without a duplicate review process.

2.6 Other Regulatory Agencies

Other agencies may be involved with the management of hazardous waste. Some of the other agencies that may be involved are identified below.

2.6.1 Department of Infrastructure, GNWT

The Road Licensing and Safety Division is responsible for administering the *Transportation of Dangerous Goods Act* and Regulations (NWT). The Department is also responsible for driver, vehicle and road safety under additional transport legislation.

The transportation of dangerous goods by rail (TDGR), marine (IMDG) or by air (ICAO) is regulated by Transport Canada.

2.6.2 Department of Lands, GNWT

The Department of Lands issues and manages various authorizations for use of public land. Where public land is leased to operators by the GNWT, the lease terms and conditions require proper management of hazardous waste, which is verified by regular inspections by the Department of Lands.

2.6.3 Workers' Safety and Compensation Commission (WSCC)

The WSCC is responsible for administering the NWT *Safety Act* and the Occupational Health and Safety (OHS) Regulations, which address the safety of workers and the work place. The Act states that the employer shall maintain their establishment and take all reasonable precautions to ensure the safety and health of every person in the establishment. The regulations also prescribe standards for protective clothing and equipment to be used by workers. The Work Site Hazardous Materials Information System Regulations were adopted to ensure employee training and safe storage and handling of controlled products at the employer's work site.

2.6.4 Office of the Fire Marshal, GNWT

The Office of the Fire Marshal has authority over the storage of flammable, combustible and hazardous materials under the *National Fire Code*. The National Fire Code is adopted by the GNWT through the Fire Prevention Regulations. Consult with the GNWT Department of Municipal and Community Affairs' regional Assistant Fire Marshal or your community Fire Chief if your activities may require the Office of the Fire Marshal's review.

2.6.5 Chief Public Health Officer, GNWT

The Chief Public Health Officer, GNWT should be consulted regarding requirements under the *Public Health Act* when waste management activities may affect public health.

2.6.6 Office of the Regulator of Oil and Gas Operations (OROGO)

OROGO regulates oil and gas activities on-shore in the NWT for the primary purposes of ensuring safety, environmental protection and conservation of oil and gas resources. OROGO does not regulate oil and gas activities in federal areas, the off-shore, the on-shore in the Inuvialuit Settlement Region, the Norman Wells proven area, or the inter-provincial/territorial transmission of oil and gas (pipelines).

2.6.7 Environment and Climate Change Canada (ECCC)

ECCC is responsible for regulating the management of hazardous waste from federal facilities and lands under the *Canadian Environmental Protection Act* (CEPA). CEPA regulates polychlorinated biphenyls (PCBs) under the PCB Regulations. International and Interprovincial shipments of hazardous waste are controlled under the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations and the Interprovincial Movement of Hazardous Waste Regulations.

2.6.8 National Energy Board (NEB)

NEB regulates oil and gas activities in federal areas, the off-shore, the on-shore in the Inuvialuit Settlement Region, the Norman Wells proven area, and the inter-provincial/territorial transmission of oil and gas (pipelines).

2.6.9 Natural Resources Canada (NRCAN)

The Explosives Safety and Security Branch of NRCAN is responsible for administering the *Explosives Act* and regulations and pursuing the advancement of explosives safety and security of the public and all the workers involved in the explosives industry in Canada.

2.6.10 Canadian Nuclear Safety Commission (CNSC)

The CNSC regulates and licenses radioactive waste management facilities. The responsibility for ensuring safe transport of radioactive waste is jointly shared between the CNSC and Transport Canada. The TDGR deals with the transport of all classes of dangerous goods, while the CNSC's Packaging and Transport of Nuclear Substances Regulations are primarily concerned with health, safety and security of the public, and protection of the environment related to the special characteristics of radioactive material.

2.6.11 Indigenous and Northern Affairs Canada (INAC)

INAC is the federal agency that has the mandate to manage land and water on designated federal lands, as well as off-shore oil and gas. They also make appointments and provide policy direction to the land and water boards.

2.6.12 Land and/or Water Boards

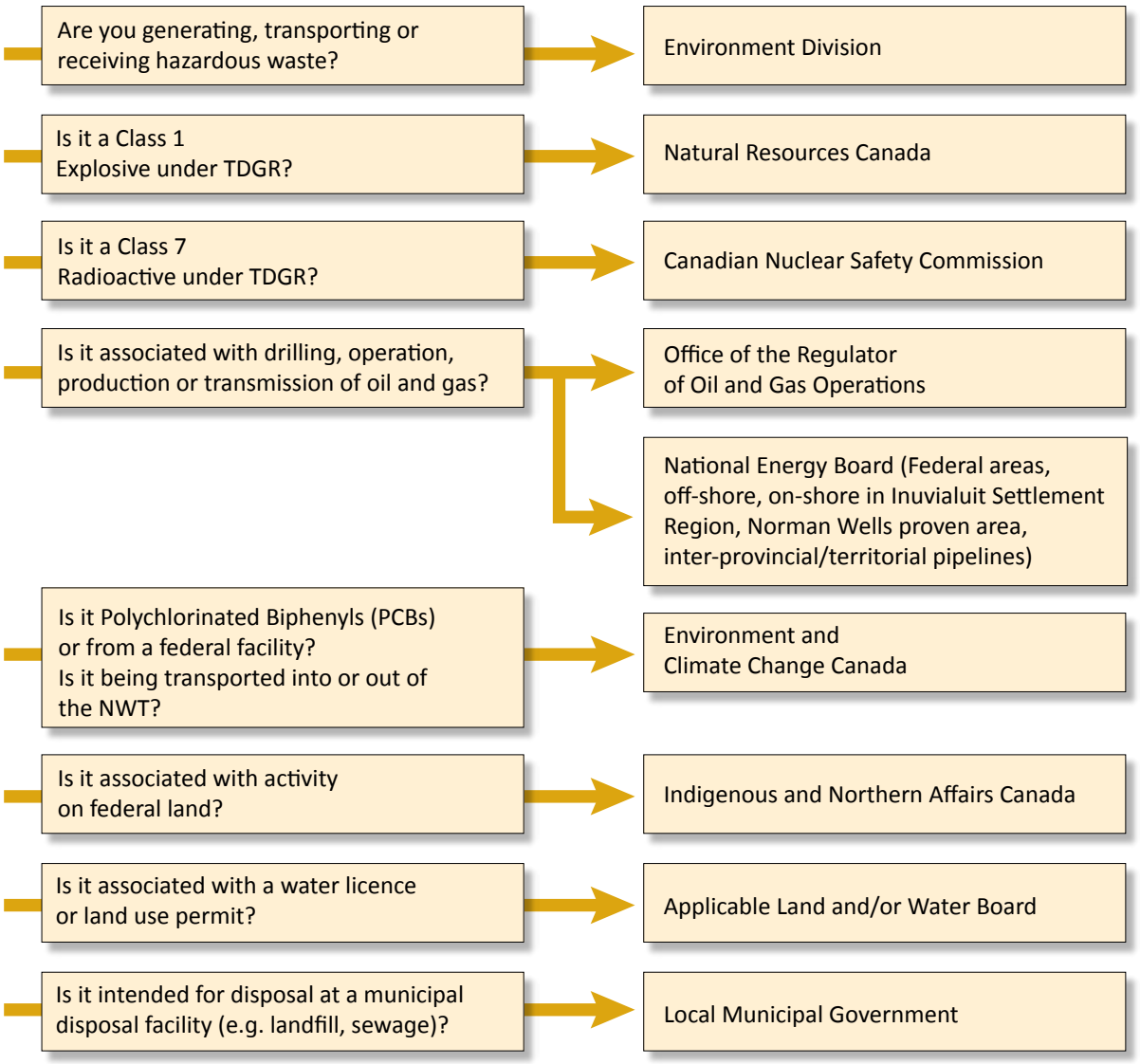
The Land and Water Boards of the NWT were established under the *Mackenzie Valley Resource Management Act* and the *Waters Act*. They have broad authority to regulate the use of land, water, and the deposit of waste. The Land and Water Boards set terms and conditions in permits and licences that pertain to waste disposal. Information about the boards of the Mackenzie Valley can be found at the following website, https://mvlwb.com. Information about the Inuvialuit Water Board can be found at the following link, https://www.inuvwb.ca. Further information about the Land and Water Boards of the NWT can be found at http://www.nwtboardforum.com.

2.6.13 Local Governments

Local municipal governments are incorporated in a number of ways, under a variety of legislation and they assume full authority for decisions about community public infrastructure including disposal facilities such as landfills and sewage lagoons. A complete list of municipal governments can be found at the following website (http://www.maca.gov.nt.ca/en/communitylist).

The contact information for all of the above agencies can be found in Appendix 4.

Figure 2: Regulatory Contacts for Hazardous Waste Management



3 Hazardous Waste Properties and Lists

3.1 General

Hazardous wastes are generated in a wide variety of workplace settings in the NWT and may be gases, liquids, solids or semi-solids. The definition of hazardous waste incorporates several terms that describe the different types of hazardous waste generated. Waste types a) through e) are classified based on their physical properties of being corrosive, flammable, reactive, persistent, bioaccumulative or toxic. Waste types f) and g) are named as hazardous wastes because of the known environmental liability associated with these waste types.

a) A dangerous good according to the TDGR;
b) Leachable waste;
c) Hazardous to the aquatic environment;
d) Waste containing dioxins and furans;
e) Contaminated soil/snow/water from a contaminated site;
f) Drilling waste;
g) Listed waste; or
h) Any other waste deemed hazardous.

In addition hazardous waste does not include a material that is:

a) Authorized for on-site disposal by the applicable regulator for the specific activity in which the hazardous waste was generated;
b) Household hazardous waste being transported to a municipal collection depot;
c) Included in Class 1, Explosives or Class 7, Radioactive materials of TDGR;
d) Exempted as a small quantity;
e) An empty container; or
f) Goods that are defective, surplus, or otherwise not usable for their intended purpose and that are in the process of being returned directly to a manufacturer or supplier.

It is important to check the definition of small quantity and empty container as they relate to the other definitions and schedules in this guideline.

Hazardous waste must not be mixed or diluted with any substance or divided into smaller quantities to avoid meeting the definition of a hazardous waste.

3.2 Hazardous Waste Types

a) Dangerous Goods

The definition of hazardous waste in this guideline incorporates the term “dangerous goods” as defined in the *Transportation of Dangerous Goods Act*. The Transportation of Dangerous Goods Regulations (TDGR) outlines a system for classifying dangerous goods. Therefore, the classification system used in the TDGR should be referred to for the most current criteria when it is applied to hazardous waste classification. There are nine classes of dangerous goods described in the TDGR, however the definition of hazardous waste only includes the criteria for Classes 2, 3, 4, 5, 6, 8, and 9. Class 1 explosives and Class 7 radioactive materials are exempt from the definition of hazardous waste. These materials are regulated by federal legislation. Appendix 3 outlines the properties of the seven dangerous goods chemical classes referenced in the definition of hazardous waste.

b) Leachable Waste

The leachability of solid waste is determined by analysing a representative sample according to the Toxicity Characteristic Leaching Procedure (TCLP), Test Method 1311 (as amended) developed by the U.S. Environmental Protection Agency. The purpose of the TCLP is to determine the mobility of organic and inorganic analytes present in liquid, solid, and multi-phase wastes. The TCLP analysis simulates landfill conditions where, over time, water and other liquids percolate through landfills. The percolating liquid often reacts with solid waste in the landfill, and may pose public and environmental health risks because of the contaminants it absorbs. The test is intended to determine if a waste is suitable for disposal in a landfill or disposal facility. The generator must use process knowledge to select the applicable parameters in Schedule I and ensure the waste types meets the numerical criteria assigned to the parameter.

c) Hazardous to the Aquatic Environment

This classification is intended for packaged products or bulk goods that are bought, sold, or used in a workplace setting. The classification may be found as a label on the product or on the safety data sheets of the product. This hazard classification system is not intended to be referenced as effluent criteria that require authorization from the applicable regulator.

Part 4 Environmental Hazards of the United Nations GHS outlines criteria for substances that are hazardous to the aquatic environment based on the following basic elements:

(a) Acute aquatic toxicity;
(b) Chronic aquatic toxicity;
(c) Potential for or actual bioaccumulation; and
(d) Degradation (biotic or abiotic) for organic chemicals.

d) Waste Containing Dioxins and Furans

Dioxins and furans are polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. Due to their extraordinary environmental persistence and capacity to accumulate in biological tissues, the release of dioxins and furans from human activity are slated for virtual elimination under the Canadian Council of Ministers of the Environment (CCME) Policy for Management of Toxic Substances and the federal Toxic Substances Management Policy.

In the NWT, dioxins and furans from human activities are most frequently formed as a result of incineration or open burning of garbage, and are also found as solid waste in the ash. They are also found in wood preservatives that used pentachlorophenol.

Waste containing dioxins and furans is classified as a hazardous waste if it contains Dioxin TEQ in a concentration greater than 0.001 mg/kg.

e) Contaminated Soil/Snow/Water

Contaminated soil/snow/water that is being removed from a contaminated site is managed as a hazardous waste in the NWT to ensure the material removed is transported to a registered receiving facility authorized to receive that waste.

Contaminated soil is soil, sand, gravel, rock or similar naturally occurring material that contains levels of contaminants exceeding the remediation criteria found in the Guideline for Contaminated Site Remediation. The hazardous waste management framework is not meant to be applied to activities that follow the tiered process or risk assessment or in-situ remediation according to the Guideline for Contaminated Site Remediation.

Contaminated soil may be exempt from the definition of hazardous waste where circumstances allow for:
- on-site remediation;
- re-use of petroleum hydrocarbon contaminated soil in an asphalt paving plant;
- re-use of soil that meets industrial criteria for landfill cover; or
- re-use of soil as industrial fill once a prior informed consent form has been completed.

Under these circumstances ED needs to be contacted to confirm an alternative record of disposal is completed that provides an equivalent level of accountability to confirm the disposal does not contribute to the likely discharge of a contaminant.

Contaminated snow or water may contain mixtures or emulsions of waste fuel, used oil, solvents, antifreeze, or other types of hazardous waste. Contaminated snow or water is a hazardous waste if it contains any of the contaminants listed in Schedule I in a concentration greater than the corresponding amount.

If the contaminated water is suitable for disposal in a municipal sewage lagoon then it is not considered hazardous waste. It is important to check the municipal sewer by-law or with the municipality about their water licence prior to disposing of contaminated water in a municipal sewage lagoon.

f) Drilling Waste

Drilling wastes are generated from sub-surface drilling activities and are usually made up of two components: drilling fluids and solids (i.e. cuttings). In the NWT, drilling wastes are typically generated from the following activities:
- oil and gas exploration/production;
- mineral exploration; or
- horizontal directional drilling for infrastructure installation.

The management of drilling waste requires careful consideration of the various authorizations that may be required from the applicable regulator. Drilling wastes vary in volume and chemical composition, therefore management methods vary depending on the specific type or method of drilling activity. For drilling that requires the use of fluids, these fluids can be water-based, oil-based and may include a wide variety of added substances.

The following are potential components of drilling wastes:

a) Drilling cuttings;
b) Drilling mud;
c) Drilling fluids;
d) Fracturing fluid;
e) Flowback fluid; and
f) Cement returns.

Regulatory Oversight

This guideline makes a distinction between the on-site, and the off-site, management and disposal of drilling waste. Individual projects may choose to manage their drilling waste on-site or off-site, or some combination of both.

On-Site Drilling Waste Management and Disposal

The regional Land and/or Water Board authorize the disposal of drilling waste onto land or into water, through terms and conditions in either a Land Use Permit (LUP) or a Water Licence (WL) (See Section 2.6.12). The deposit of drill waste by injection into an underground formation or reservoir is authorized by the applicable energy regulator (see section 2.6.6 and 2.6.8). Prior to receiving authorization the operator is required to submit a project proposal which includes details pertaining to waste management and disposal. Approved drilling waste management plans in the NWT may reference suitable drilling waste management guidance developed in other jurisdictions, but may also require additional methods suitable for the NWT.

Off-Site Transportation and Disposal

The off-site transportation and disposal of drilling waste in the NWT requires proper tracking and record keeping. The framework for managing hazardous waste, such as generator, carrier, receiver registration and the use of hazardous waste movement documents (or alternative record of disposal), are used to account for the ultimate disposal of all drilling wastes when they are transported to other receiving facilities. In addition, the generator must also determine if the properties of the drilling wastes require it to be classified as a dangerous good.

The off-site management and disposal of drilling waste in the NWT requires authorization from the applicable regulator. This may be done through the review of, but not limited to the:

a) Receiving site design, operation and capacity;
b) Receiving site approvals and any associated operational requirements;
c) Analytical testing of the drilling wastes or the receiving environment;
d) Information that indicates no hazardous drilling additives or chemicals were used; or
e) Waste management plans that reference suitable drilling waste management practices prior to disposal (i.e. storage, transport, handling, disposal method, etc.).

g) Listed Waste

ED has included a specific list of wastes in Schedule III that are known to have hazardous properties. The waste types listed are common to several types of industrial, commercial and institutional activities. Further testing or application of process knowledge, of these wastes is required to determine if they can be managed as non-hazardous waste. The generator must also use their knowledge of the specific characteristics of these waste types to help determine if they are also classified as dangerous goods.

The small quantity thresholds for various listed wastes are specified in Schedule V.

1. Saturated absorbent materials contaminated with leachable amounts of hazardous waste:
   - Granular sorbent;
   - Sorbent pads/booms;
   - Shop towels (rags);
   - Used activated carbon; or
   - Any material used to contain leaks and spills of hazardous waste.

2. Household hazardous waste is generated from common activities such as home, yard, and vehicle maintenance. Household hazardous waste from a single residence is exempt from the requirements of this guideline, but a collection of consolidated household hazardous waste from numerous residences is managed as hazardous waste. Collections of household hazardous waste are those that are collected and segregated at collection events or have accumulated at municipal facilities over time.

3. Incinerator ash is a process residual generated in incinerators used in various industrial activities. Incinerator ash might contain high levels of metals, dioxins and/or furans. This waste stream must undergo analytical testing for leachable metals as well as dioxins and furans to confirm the absence of contaminants (Schedule I and II) prior to disposal in solid waste facilities in the NWT.

4. Used oil and used oil filters are regulated in accordance with the Used Oil and Waste Fuel Management Regulations that contain criteria for the use of used oil for the purpose of heat recovery, as well as how used oil filters are to be managed. Section 20 of these regulations state the following.
   20. *No person shall dispose of a filter used to filter oil unless, 24 hours before disposing of the filter,*
   (a) the inner chamber of the filter is punctured and the contents are drained; or
   (b) the filter is mechanically crushed or shredded and the contents have been collected.

The management of the following waste types are defined and discussed further in separate guidelines listed below:

5. Waste asbestos, defined in the Guideline for the Management of Waste Asbestos;
6. Biomedical waste, defined in the Guideline for the Management of Biomedical Waste;
7. Lead paint that produces a leachate greater than 5 mg/L, Guideline for the Management of Waste Lead and Lead Paint;
8. Glycol (Antifreeze) solutions, defined in the Guideline for the Management of Waste Antifreeze;
9. Halocarbons, defined in the Guideline for the Management of Ozone Depleting Substances and Halocarbon Alternatives;
10. Waste paint, defined in the Guideline for the Management of Waste Paint;
11. Mercury-containing lamps, defined in the Guide to Recycling Mercury-Containing Lamps.

h) Any Other Waste Deemed Hazardous

A waste might need to be managed as a hazardous waste under circumstances not defined in this guideline. ENR could receive new information that a waste type or chemical is hazardous, but not captured by any of the classifications in this guideline. Additionally, ENR may contact the responsible party directly in writing, or verbally, with specific waste management requirements.

4 Storage and Management of Hazardous Waste

Waste management is intended to reduce or eliminate the effects of waste on the environment, to provide for public and worker safety and to maximize the efficient use of resources. Once hazardous waste has been created, the proper treatment and disposal can be expensive. While it is the responsibility of the waste generator to pay for all disposal costs, various waste management options are available to reduce the cost and volume of waste requiring treatment.

4.1 Pollution Prevention

A more effective and proactive management practice is to eliminate or reduce the generation of the waste. This is referred to as pollution prevention.

> **Minimizing or avoiding the creation of pollutants and waste can be more effective in protecting the environment than treating them, or cleaning them up after they have been created.**
> *– Canadian Council of Ministers of the Environment*

Pollution control options treat waste after it has been created, whereas pollution prevention measures avoid the creation of waste.

Waste generators in the NWT can reduce costs and prevent pollution by implementing reduction, reuse and recycling programs through changes in operational procedures, maintenance practices and raw material usage. An overall waste management plan should incorporate these ideas.

1. Reduce

The aim of reduction is to eliminate the production of a hazardous waste by using raw materials more efficiently. Methods of reduction include substitution or reduction of a raw material, production redesign, process changes, and improved maintenance activities. Methods which are technically and economically practical in any given situation should be used to reduce or eliminate waste streams.

2. Reuse and Recycle

Reusing or recycling hazardous waste in operating processes within the generating facility is another means of pollution prevention. Alternatively, other users may be found to reuse the material that would otherwise require treatment or disposal. ENR encourages the reuse and recycling of hazardous waste in the following ways:

(a) Waste exchanges and associations offer some opportunity for the reuse or recycling of waste. Waste exchanges put potential users of waste materials in contact with waste generators. Appendix 4 lists a number of waste material exchanges and management associations; and

(b) Recycling programs are in place for some hazardous wastes such as used oil, waste fuels, solvents and batteries. For information on recycling programs, contact the waste management associations listed in Appendix 4 or ED.

4.2 General Requirements for Storage Containers

Hazardous waste should be stored in containers as follows:

- 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 Work Site Hazardous Materials Information System (WHMIS) and/or the relevant Transport Authority, if transportation is planned.
- Bulked into specified means of containment that is outlined in the TDGR. If the hazardous waste is not a dangerous good, the means of containment must be suitable to ensure that the contents will remain secure during storage and transportation.
- The containers should be sealed or closed at all times, unless in use.

4.3 General Requirements for Storage Facilities

Hazardous waste must be stored in a safe and secure manner. In general, hazardous waste should be stored according to the following points:

- Drainage is controlled to prevent spills or leaks from leaving the site and to prevent run-off from entering the site.
- Wastes are segregated by chemical compatibility to ensure safety of the public, workers and facility. The National Fire Code as well as TDGR can be referenced for segregation criteria.
- Hazardous wastes are stored in a secure area with controlled access. Only persons authorized to enter and trained in waste handling procedures should have access to the storage site.
- Regular inspections of stored hazardous wastes are performed and recorded. Containers are placed so that each container can be inspected for signs of leaks or deterioration. Leaking or deteriorated containers must be immediately removed and their contents transferred to a sound container.
- A record of the type and amount of waste in storage should be maintained.
- Hazardous waste containers must not be allowed to fill up with water when stored outdoors. Drums frequently accumulate water from rainfall and snowmelt, if stored upright, outside, without proper sealing.
- Empty containers need to be stored on their side to prevent water from entering.
- Storage sites must have emergency response equipment and material appropriate for the hazardous waste stored on site.
- Where the hazardous waste storage site is to be used for long term storage and the amount of waste in storage exceeds the quantity requirements set out in Schedule VI, the site needs to be registered in accordance with Section 2.5 of this guideline.
- Hazardous waste storage sites must meet all local by-law and zoning requirements. It is recommended that the local Fire Chief be advised of the storage facility and its contents for emergency planning and response purposes.

4.4 Hazardous Waste Treatment or Disposal

It is not acceptable for hazardous waste to be abandoned, poured down sewers, dumped on land or discarded at a landfill.

Treating hazardous waste to reduce or eliminate hazards is the final option after implementing appropriate pollution prevention options. It is the responsibility of the generator to treat or dispose of hazardous waste properly. Although a discussion of treatment and disposal methods is beyond the scope of this guideline, the following are general points for consideration:

- The generator is required to determine and follow the proper management method for the hazardous waste generated. Information on proper management methods for hazardous waste types can be found at the following sources:
  - the manufacturer's Safety Data Sheet (SDS) provided with the raw materials;
  - the manufacturer;
  - this guideline and other relevant legislation; and
  - waste management consultants and associations.
- Open burning of hazardous waste is prohibited.
- Mixing different types of hazardous waste in the same container may cause dangerous chemical reactions. It is also important to control the quality of any waste to ensure it can be recycled or disposed of properly. Contaminating wastes with other wastes may prevent reuse/recycling options and increase disposal costs.
- Hazardous waste containers should be emptied, to the greatest extent possible, using regular handling procedures, or by triple rinsing with an appropriate cleaning agent. Rinsings must be managed according to their waste characteristics. Containers must be rendered unusable by puncturing or crushing prior to disposal. This is especially of concern for containers which could otherwise be used for water or food storage.

4.5 Record of Disposal Requirements

A completed six-part hazardous waste movement document (waste manifest) is a record of disposal that accompanies the transportation of hazardous waste from registered generators to carriers to receivers. The completed movement document form provides:

- Detailed information on the types and amounts of hazardous waste shipped;
- A record of who is in charge, management or control of the hazardous waste; and
- Information on the storage, treatment or disposal of the waste and confirmation that the hazardous waste arrived at an authorized receiver.

The generator (consignor), carrier and receiver (consignee) must each complete their portion of the movement document. The information provided on the movement document, as well as other TDGR requirements (i.e. labelling and placarding) are also intended to assist first responders (police, ambulance, fire fighters) with hazard information should a transportation accident occur. Movement documents are available from ED.

Copies of the completed movement document are required to be forwarded according to the instructions on the back of each copy, as follows:

- Copy 1 Sent to ED upon consignment to a carrier by the generator.
- Copy 2 Retained by the generator.
- Copy 3 Sent to ED upon receiving the consignment by the receiver.
- Copy 4 Returned to the carrier by the receiver.
- Copy 5 Retained by the receiver.
- Copy 6 Sent to the generator by the receiver.

A hazardous waste movement document must be used under the following circumstances:

1) The inter-provincial/territorial movement of hazardous waste according to the Interprovincial Movement of Hazardous Waste Regulations.
2) The normal movement of all types of hazardous waste within the NWT (except used oil).
3) The requirement of the use of a movement document in a province or territory of destination.

An alternate record of disposal that contains all the information outlined in Schedule VIII may be utilized under the following circumstances:

1) Used oil transported to a registered used oil burner in the NWT in accordance with the Used Oil and Waste Fuel Management Regulations.
2) The movement document is not required for the particular waste type in the province or territory of destination.

4.6 Disposal of Hazardous Waste Outside of the NWT

Hazardous waste can be sent to a hazardous waste management facility outside of the NWT if the receiving facility is registered in the receiving province or territory and is authorized to manage that waste. Waste types such as contaminated soil or drilling waste may not be considered hazardous waste in other provinces or territories but must still be transported to authorized disposal facilities. Hazardous waste generated in the NWT is commonly transported to Alberta or British Columbia (BC) for treatment or disposal. A list of hazardous waste management facilities in these provinces is available by visiting Alberta Environment and Parks website http://aep.alberta.ca/waste/waste-facilities/hazardous-facilities.aspx or the BC Environmental Industries Associations website (http://www.hazwastebc.com). The list of organizations in Appendix 4 can help to determine the best hazardous waste management option.

It is important for generators to know the differences in hazardous waste regulations between provincial/territorial jurisdictions and ensure that the hazardous waste is disposed of in a manner that satisfies all jurisdictions where the hazardous waste will be generated, transported and disposed.

It is important for generators to use shipping names of hazardous waste that align with the province or territory of destination. If the waste receiving facility is not familiar with the movement document for a particular type of waste it is important to ensure a complete record of disposal is utilized and that the receiving site provides a signed copy that confirms the ultimate disposal. Under these circumstances the generator in the NWT is required to provide the signed copy to ED.

International and interprovincial/territorial shipments of hazardous waste are also controlled under the federal Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations and the Interprovincial Movement of Hazardous Waste Regulations.

4.7 Alternative Management Methods

ED will give consideration to proposals for alternate management methods that provide an equivalent level of environmental protection to those identified in this guideline. Staff in the Environment Division are available to discuss and review proposed hazardous waste treatment and disposal options.

5 Conclusion

This guideline outlines the basics of hazardous waste management in the NWT. It is intended to provide direction when making hazardous waste management decisions to prevent the discharge of contaminants, or situations that contribute to the likely discharge of contaminants. It does not replace the existing legislation which is referenced in the guideline. Please contact the appropriate agency before proceeding. For more information regarding hazardous waste please visit our website (http://www.enr.gov.nt.ca/en/services/hazardous-waste) or contact:

Environment Division
Department of Environment and Natural Resources
Government of the Northwest Territories
7th floor, Scotia Centre
5102 50th Avenue

Mailing Address:
PO Box 1320
Yellowknife NT X1A 2L9

Tel: (867) 767-9236 ext. 53176
Fax: (867) 873-0221

Figure 3: Decision Flow Chart for Determining if a Waste is a Hazardous Waste

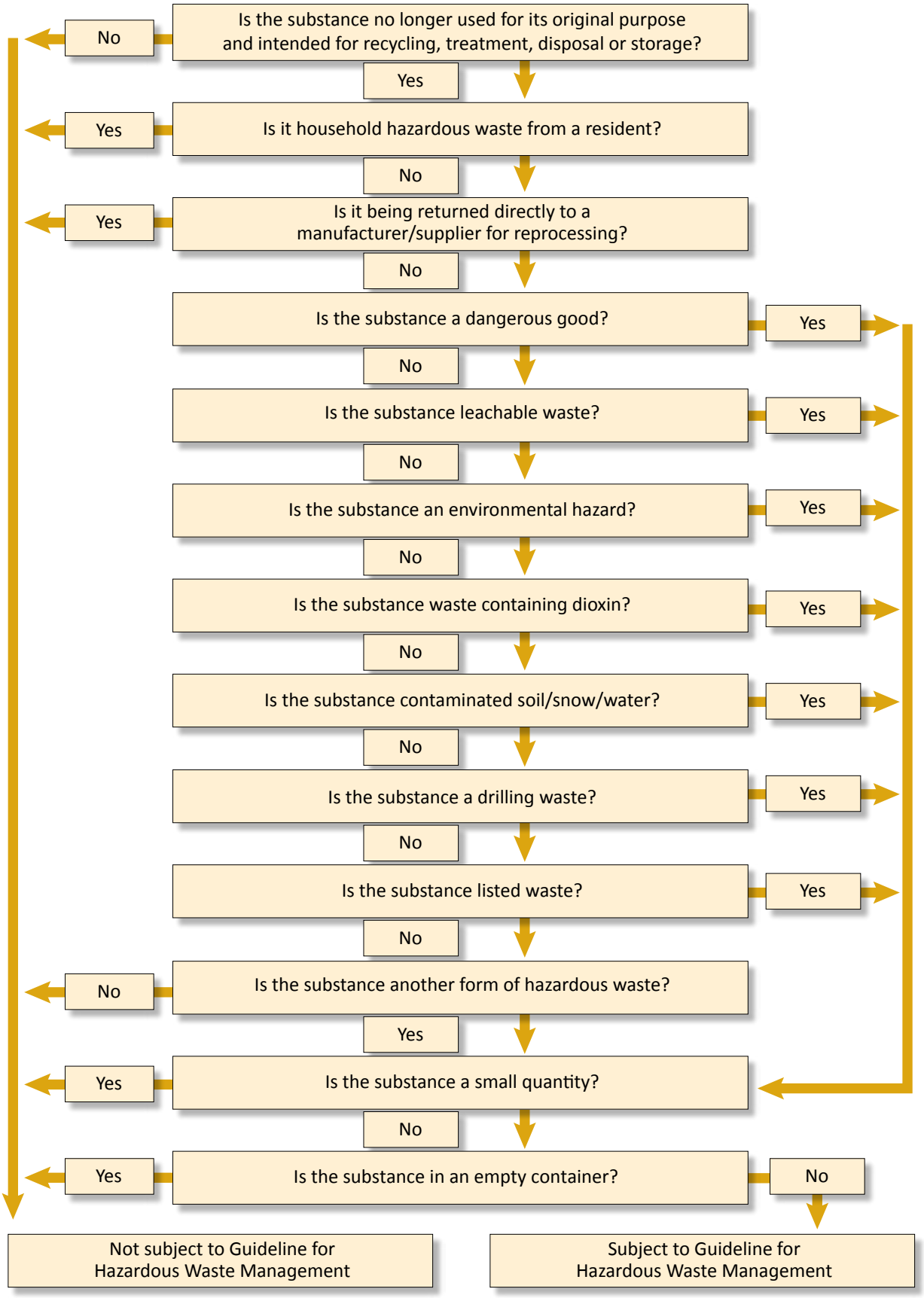
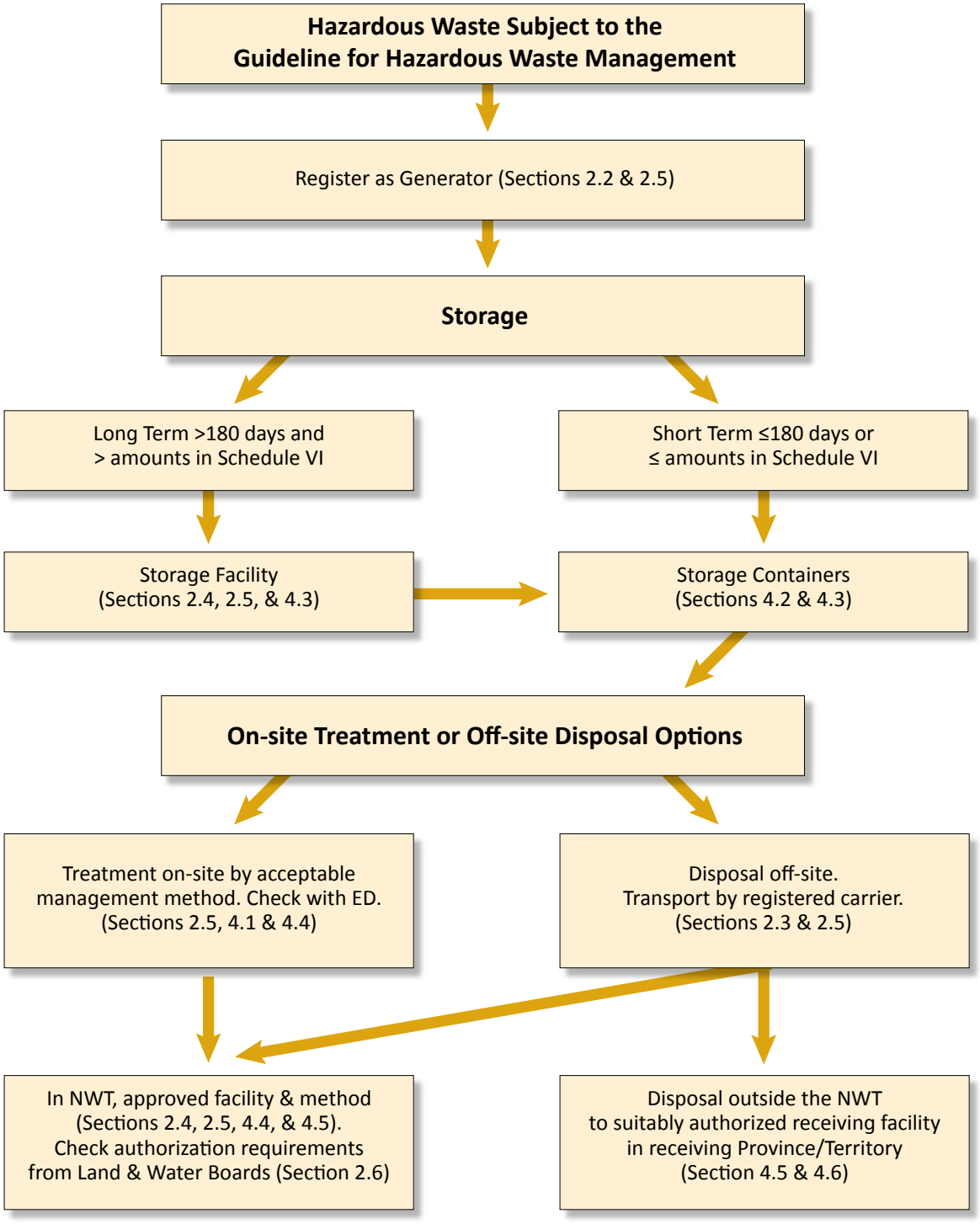


Figure 4: Hazardous Waste Management Process for Generators



Government of Northwest Territories / Gouvernement des Territoires du Nord-Ouest

FORM 1: HAZARDOUS WASTE GENERATOR REGISTRATION FORM

Instructions

1. The following information must be provided in order to register and obtain a generator number in the NWT. Incomplete applications will be returned to the applicant.
2. Completed registration forms are to be forwarded to EnvironmentalProtection@gov.nt.ca, or mailed to:
   Environment Division
   Department of Environment and Natural Resources
   Government of the Northwest Territories
   P.O. Box 1320, Yellowknife NT X1A 2L9
3. Use additional pages to provide information as required.

FORMULAIRE 1 : INSCRIPTION À TITRE DE PRODUCTEUR DE DÉCHETS DANGEREUX

Instructions

1. Veuillez fournir les renseignements suivants pour vous inscrire et pour obtenir un numéro de producteur aux TNO. Les formulaires incomplets seront retournés aux demandeurs.
2. Veuillez expédier les formulaires remplis par courriel (Environmental Protection@gov.nt.ca), ou par la poste :
   Division de l'environnement
   Ministère de l'Environnement et des Ressources naturelles
   Gouvernement des Territoires du Nord-Ouest
   C. P. 1320, Yellowknife NT X1A 2L9
3. Au besoin, utilisez des feuilles supplémentaires pour fournir l'information nécessaire.

Section 1: Contact Information / Coordonnées

Generator Company (Legal) Name: Nom de l'entreprise productrice (nom légal) :	
Mailing Address: Adresse postale :	
Contact Person: Personne-ressource :	Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :
Alternate Contact Person: Personne-ressource supplémentaire :	Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :

Section 2: Description of Waste Types Generated / Description des déchets produits

(Provide a separate table or reference waste management plan. / Utilisez un tableau séparé ou faites référence à votre plan de gestion des déchets.)

Location where waste is generated (coordinates or physical address):
Lieu où les déchets sont produits (coordonnées ou adresse physique) :

Describe types of hazardous waste (if not Dangerous Goods, indicate in description)
Décrivez le type de déchets dangereux (s'il ne s'agit pas de déchets dangereux, veuillez décrire le produit)

Shipping Name (description) Désignation officielle (description)	UN No. N° ONU	TDGR Class Catégorie du RTMD	Quantity generated (kg or L) Quantité transportée (en kg ou en L)	Monthly/Annually Mensuellement ou annuellement

Section 3: I certify that the information provided on this form is correct and accurate. Je certifie que les renseignements fournis dans le présent formulaire sont exacts, fiables, et complets.	
Signature of Contact Person / Signature de la personne-ressource	Date (MM-DD-YYYY) / Date (MM-JJ-AAAA)
Name of Contact Person (Print): Nom de la personne-ressource (caractères d'imprimerie) :	
Title: Titre de poste :	
Phone: N° de téléphone :	Email: Courriel :

Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest

FORM 2: HAZARDOUS WASTE CARRIER REGISTRATION FORM

Instructions

1. The following information must be provided in order to register and obtain a carrier number in the NWT. Incomplete applications will be returned to the applicant.
2. Completed registration forms are to be forwarded to environmental_protection@gov.nt.ca, or mailed to:
   Environment Division
   Department of Environment and Natural Resources
   Government of the Northwest Territories
   P.O. Box 1320, Yellowknife NT X1A 2L9
3. Use additional pages to provide information as required.

FORMULAIRE 2 : INSCRIPTION DES TRANSPORTEURS DE DÉCHETS DANGEREUX

Instructions

1. Veuillez fournir les renseignements suivants pour vous inscrire et pour obtenir un numéro de transporteur aux TNO. Les formulaires incomplets seront retournés aux demandeurs
2. Veuillez expédier les formulaires remplis par courriel (environmental_protection@gov.nt.ca), ou par la poste :
   Division de l'environnement
   Ministère de l'Environnement et des Ressources naturelles
   Gouvernement des Territoires du Nord-Ouest
   C. P. 1320, Yellowknife NT X1A 2L9
3. Au besoin, utilisez des feuilles supplémentaires pour fournir l'information nécessaire.

Section 1: Contact Information / Coordonnées

Carrier Company (Legal) Name: Nom de l'entreprise productrice (nom légal) :	
Mailing Address: Adresse postale :	
Contact Person: Personne-ressource :	Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :
Contact Person: Personne-ressource :	Title: Titre de poste :
Phone: N° de téléphone :	Email: Courriel :

Section 2: Description of Carrier's Activities / Description des activités du transporteur

(Provide a separate table or reference waste management plan. / Veuillez fournir un tableau distinct ou faire référence au plan de gestion des déchets.)

Mode of Transport (check all that apply): Mode de transport (cochez tous ceux qui s'appliquent)	☐ Road / Routier ☐ Rail / Ferroviaire ☐ Ship / Maritime ☐ Air / Aérien
Proof of transport liability insurance is attached (certificate of insurance): Vous avez joint une preuve d'assurance responsabilité civile de transport (certificat d'assurance)	☐ Yes / Oui ☐ No / Non
Proof of training from the applicable Transport Authority is attached: Vous avez joint une preuve de formation de l'agence de transport concernée :	☐ Yes / Oui ☐ No / Non
A spill contingency plan is attached: Vous avez joint un plan d'urgence en cas de déversement :	☐ Yes / Oui ☐ No / Non

Describe types of hazardous waste (if not Dangerous Goods, indicate in description) **Décrivez le type de déchets dangereux (s'il ne s'agit pas de déchets dangereux, veuillez décrire le produit)**				
Shipping Name (description) **Désignation officielle (description)**	**UN No.** **Nº ONU**	**TDGR Class** **Catégorie du RTMD**	**Quantity generated (kg or L)** **Quantité transportée (en kg ou en L)**	**Monthly/Annually** **Mensuellement ou annuellement**

Section 3: I certify that the information provided on this form is correct, accurate and complete. **Je certifie que les renseignements fournis sont exacts, fiables, et complets.**	
Signature of Contact Person / Signature de la personne-ressource	Date (MM-DD-YYYY) / Date (MM-JJ-AAAA)
Name of Contact Person (Print): Nom de la personne-ressource (caractères d'imprimerie) :	
Title: Titre de poste :	
Phone: Nº de téléphone :	Email: Courriel :

Schedule I: Leachate Disposal Standards for Solid Waste / Process Residuals

Item	Parameter	Concentration (mg/L)
1.	Antimony	0.6
2.	Arsenic	2.5
3.	Barium	100
4.	Benzene	0.5
5.	Beryllium	5.0
6.	Boron	500
7.	Cadmium	0.5
8.	Carbon tetrachloride (Tetrachloromethane)	0.5
9.	Chloramines	300
10.	Chlorobenzene (Monochlorobenzene)	8.0
11.	Chloroform	6.0
12.	Chromium	5.0
13.	Cobalt	100
14.	Copper	100
15.	Cresol (Mixture – total of all isomers, when isomers cannot be differentiated)	200
16.	Cyanide	20
17.	2,4-DCP / (2,4-Dichlorophenol)	90
18.	1,2-Dichlorobenzene (o-Dichlorobenzene)	20
19.	1,4-Dichlorobenzene (p-Dichlorobenzene)	0.5
20.	1,2-Dichloroethane (Ethylene dichloride)	0.5
21.	1,1-Dichloroethylene (Vinylidene chloride)	1.4
22.	Dichloromethane (also see – methylene chloride)	5.0
23.	2,4-Dinitrotoluene	0.13
24.	Polychlorinated dibenzo dioxins and furans (TEQ)	0.0000015

Item	Parameter	Concentration (mg/L)
25.	Ethyl benzene	0.24
26.	Fluoride	150
27.	Hexachlorobenzene	0.13
28.	Hexachlorobutadiene	0.5
29.	Hexachloroethane	3.0
30.	Lead	5.0
31.	Mercury	0.1
32.	Methyl ethyl ketone / Ethyl methyl ketone	200
33.	Naphthalene	0.5
34.	Nitrate + Nitrite	1000
35.	Nitrilotriacetic acid (NTA)	40
36.	Nitrite	320
37.	Nitrobenzene	2
38.	Pentachlorophenol	6.0
39.	Pyridine	5.0
40.	Selenium	1.0
41.	Silver	5.0
42.	Tetrachloroethylene	3.0
43.	2,3,4,6-Tetrachlorophenol / (2,3,4,6-TeCP)	10
44.	Toluene	2.4
45.	Trichloroethylene	0.5
46.	Trihalomethanes – Total (also see – Chloroform)	10
47.	Uranium	2.0
48.	Xylene	0.5
49.	Zinc	500

Schedule II: Dioxin Toxicity Equivalency Factors

Column I – Congeners	Column II – TEF*
2,3,7,8-tetrachlorodibenzo-p-dioxin	1.0
1,2,3,7,8-pentachlorodibenzo-p-dioxin	0.5
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0.1
1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0.1
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0.1
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	0.01
octachlorodibenzo-p-dioxin	0.001
2,3,7,8-tetrachlorodibenzofuran	0.1
1,2,3,7,8-pentachlorodibenzofuran	0.05
2,3,4,7,8-pentachlorodibenzofuran	0.5
1,2,3,4,7,8-hexachlorodibenzofuran	0.1
1,2,3,6,7,8-hexachlorodibenzofuran	0.1
1,2,3,7,8,9-hexachlorodibenzofuran	0.1
2,3,4,6,7,8-hexachlorodibenzofuran	0.1
1,2,3,4,6,7,8-heptachlorodibenzofuran	0.01
1,2,3,4,7,8,9-heptachlorodibenzofuran	0.01
octachlorodibenzofuran	0.001

* Toxicity Equivalency Factor

Schedule III: Listed Waste

1.	Absorbent material
2.	Household hazardous waste consolidated at a municipal collection depot
3.	Incinerator ash (bottom/fly ash)
4.	Used oil and used oil filters*
5.	Waste asbestos (defined in the Guideline for the Management of Waste Asbestos)
6.	Biomedical waste (defined in Guideline for the Management of Biomedical Waste)
7.	Lead paint that produces a leachate greater than 5 mg/L (defined in the Guideline for the Management of Waste Lead and Lead Paint)
8.	Glycol (Antifreeze) solutions (defined in the Guideline for the Management of Waste Antifreeze)
9.	Halocarbons (defined in the Guideline for the Management of Ozone Depleting Substances and Halocarbon Alternatives)
10.	Waste paint (defined in the Guideline for the Management of Waste Paint)
11.	Mercury-containing lamps (defined in the Guide to Recycling Mercury-Containing Lamps)

* No person shall dispose of a filter used to filter oil unless, 24 hours before disposing of the filter,
(a) the inner chamber of the filter is punctured and the contents are drained; or
(b) the filter is mechanically crushed or shredded and the contents have been collected.

Schedule IV: Severely Toxic Contaminants

Item	Substances
1.	(4-Chlorophenyl)cyclopropylmethanone, O-[(4-nitrophenyl)methyl]oxime
2.	Benzenamine, N-phenyl-, Reaction Products with Styrene and 2,4,4-Trimethylpentene (BNST)
3.	Chlorobiphenyls
4.	Chlorinated Alkanes
5.	Dibenzofuran
6.	Dibenzo-para-dioxin
7.	Dichloromethane
8.	Hexabromocyclododecane (HBCD)
9.	Hexachlorobutadiene, which has the molecular formula C4Cl6
10.	Hexavalent chromium compounds
11.	Long-Chain (C9-C20) Perfluorocarboxylic Acids (PFCAs), their Salts and their Precursors
12.	Mercury
13.	Perfluorooctane Sulfonate (PFOS), Its Salts and Its Precursors
14.	Polychlorinated dibenzodioxins
15.	Polychlorinated Dibenzofurans
16.	Polychlorinated Naphthalenes (PCNs)
17.	Polychlorinated Terphenyls
18.	Tetrabutyltin
19.	Tetrachlorobenzenes (TeCBs)
20.	Tetrachloroethylene
21.	Tributyltins

Schedule V: Small Quantity Threshold for Types of Hazardous Waste

	Column I: Hazardous Waste Type	Column II: Amount
1.	All hazardous waste unless otherwise specified	5 kg or L
2.	Dangerous Goods Class 6.1, Packing Group I	1 kg or L
3.	Waste batteries	50 kg
4.	Contaminated snow/water	20 kg or L
5.	Contaminated soil	500 kg
6.	Waste Glycol	20 L
7.	Incinerator ash	20 kg
8.	Waste paint	20 kg or L
9.	Used Oil	20 L
10.	Leachable waste containing Severely Toxic Contaminants	1 kg or L
11.	Severely Toxic Contaminants in pure form	n/a hazardous waste in any quantity

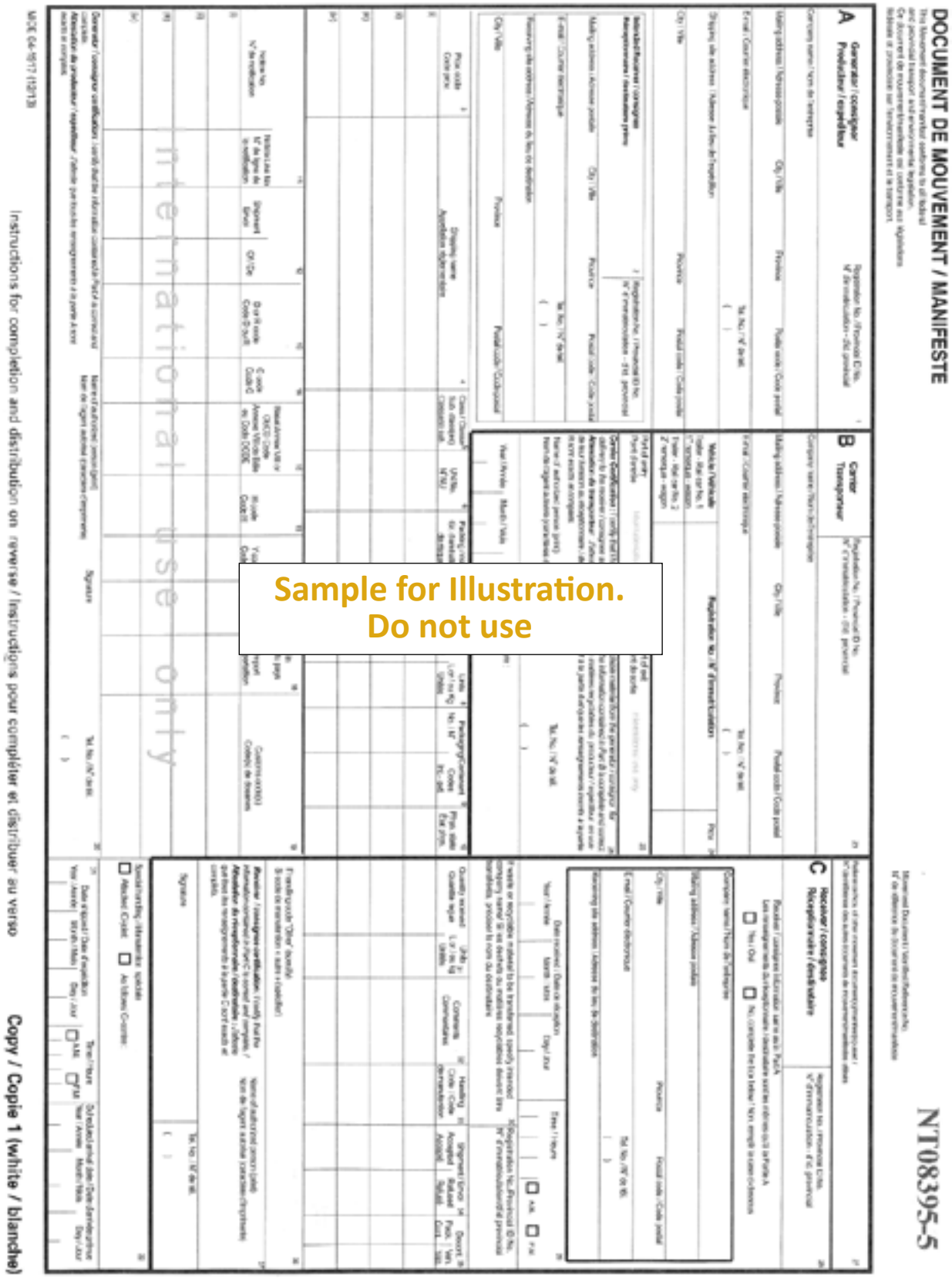
Schedule VI: Registration Volumes

Minimum quantity of hazardous waste[1] necessary for registration as a Hazardous Waste Storage Facility.

Waste Classification TDG		Quantity[2] (Kg or L)
2.1	Compressed Gas (flammable)	500[3]
2.2	Compressed Gas (non-corrosive, non-flammable, non-toxic)	5,000[3]
2.3	Compressed Gas (toxic)	200[3]
3	Flammable Liquids Packing Group I	1,000
3	Flammable Liquids Packing Group II	2,000
3	Flammable Liquids Packing Group III	5,000
4.1	Flammable Solids	5,000
4.2	Substances Liable to Spontaneous Combustion	1 00
4.3	Water-reactive Substances	50
5.1	Oxidizing Substances	1,000
5.2	Organic Peroxides	50
6.1	Toxic Substances Packing Group I	1,000
6.1	Toxic Substances Packing Group II	2,000
6.1	Toxic Substances Packing Group III	5,000
6.2	Infectious Substances	500[3]
6.2	Infectious Substances Category A requiring an ERAP	any amount
8	Corrosive Substances Packing Group I	1,000
8	Corrosive Substances Packing Group II	2,000
8	Corrosive Substances Packing Group III	5,000
9	Miscellaneous	1,000[4]
Other Hazardous Waste Types		
	Polychlorinated Biphenyls	100
	Leachable waste	5,000
	Hazardous to the Aquatic Environment	5,000
	Waste containing dioxins and furans	5,000
	Contaminated soil	50,000
	Drilling waste	50,000
	Used Oil, Glycol, Contaminated Water	5,000
Total Aggregate Quantity of Hazardous Waste[5]		**5,000**

[1] This applies to hazardous waste and not dangerous goods.
[2] Quantity refers to liquids when the amount is expressed in litres (L) and solids when expressed in kilograms (Kg).
[3] Total liquid volume capacity of the container.
[4] PCB storage is regulated by Environment and Climate Change Canada under the *Canadian Environmental Protection Act*. Storage of products containing PCBs in a concentration of 50 mg/kg or more and in an amount of 100 litres or more, 100 kilograms or more, or in a lesser amount if it contains 1 kilogram or more of PCBs.
[5] Except for Contaminated soil and Drilling waste where total aggregate quantity must exceed 50,000 kg.

Schedule VII: Illustration of a Movement Document



Schedule VIII: Information Required in a Record of Disposal

1) Generator, carrier, and receiver (disposal, recycling facility) are registered and identified with the following:
   a) Registration numbers (where applicable);
   b) Name of generator, carrier and receiver, mailing address and contact information;
   c) Shipping and receiving site address is identified;
   d) Name of person(s) consigning the waste, transporting, and receiving;
   e) Telephone number; and
   f) Date of shipment and receiving.

2) Intended receiver is declared prior to transportation, and the receiver is authorized to receive that waste.

3) The hazardous waste is identified and the description identifies the:
   a) Common name of the waste (i.e. used oil, contaminated soil);
   b) Amount of waste being transported in metric units (kg or L);
   c) Number and means of containment (e.g., drum, bulk, tank, etc.); and
   d) Physical state, solid, liquid or gas (e.g. S, L, G).

4) Multiple copies are made and the generator, carrier, as well as the receiver all receive a copy of the record of disposal (like 6-part movement document) that confirms who is in control of the waste:
   a) Upon shipment;
   b) During transportation; and
   c) At the receiving facility.

5) ENR receives a completed and signed copy of the record of disposal upon:
   a) Shipment from the generator; and
   b) Receipt at the receiver.

Appendix 1:

Environmental Protection Act

The following is a subset of the *Environmental Protection Act,* R.S.N.W.T. 1988, c. E-3.[1]

1. In this Act,

"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, and the discharge of contaminants into 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;

3. (2) The Chief Environmental Protection Officer may appoint inspectors and shall specify in the appointment that powers that may be exercised and the duties that may be performed by the inspector under this Act and regulations.

[1] The *Environmental Protection Act* (EPA) is updated from time to time. As this is a subset of the EPA, ENR recommends the reader review the official Act.

4. (1) Where the Chief Environmental Protection Officer is of the opinion, based on reasonable grounds, that it is necessary or advisable for the protection of the environment to do so, the Chief Environmental Protection Officer may, by order directed to any person, require that person
   (a) to install safeguards to prevent the discharge of contaminants into the environment;
   (b) to site, transport or store any contaminant in the manner set out in the order; or
   (c) to have on hand at all times the equipment and material necessary to alleviate the effect of any discharge of contaminants that may be specified in the order.

   (2) Where an inspector believes on reasonable grounds that a discharge of a contaminant in contravention of this Act, the regulations or a provision of a permit or licence is likely to occur, the inspector may issue an order requiring any person whose actions may increase the likelihood of a discharge or the owner or person in charge, management or control of the contaminant to take the preventive measures that the inspector considers necessary. R.S.N.W.T. 1988,c.117(Supp.),s.7.

5. (1) Subject to subsection (3), no person shall discharge or permit the discharge of a contaminant into the environment.

   (2) REPEALED, R.S.N.W.T. 1988,c.117(Supp.),s.8.

   (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;
   (a.1) the discharge
      (i) is authorized by an Act of the Parliament of Canada or the Northwest Territories or by regulations made under any of those Acts, and
      (ii) is not addressed in 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 combatting 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 (a) 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 licence 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 licence 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.

Appendix 2:

Selecting a Hazardous Waste Receiver

The following information is provided as best practice and needs to be interpreted according to the type of hazardous waste being offered.

As a hazardous waste generator, it is important to carefully choose a hazardous waste receiver. Generators are responsible for their waste until it is legally and properly received at a suitably authorized facility.

Selection Factors

Below is a list of considerations when selecting a hazardous waste receiver:

- Ensure waste has been properly classified, either through characterization by a qualified consultant or environmental testing laboratory, or by reviewing the process generating the waste along with the original raw materials used in the process.
- Ensure the hazardous wastes are managed by companies that are capable of appropriately managing the wastes. This is important for hazardous waste disposal outside or inside of the NWT.
- Find out if the hazardous waste receiver has carried out any facility audits. Many waste receivers are required to submit audit reports to the provincial or territorial authority. Request a copy of the receivers most recent audit report. Most competent waste receivers arrange third party audits at their facilities and are willing to share and discuss the results with their potential clients.
- Get references from business colleagues who have used a specific hazardous waste receiver.
- Find out if the hazardous waste receiver has the appropriate authorization to manage your hazardous waste(s). Authorized receivers are required to have a facility registration number issued by the provincial or territorial authority.
- Check the Waste Receiver Assessment Program (http://www.wrapaudit.com/index.php) to see if a Waste Facility Environmental Review has been completed on behalf of other waste generators for the receiving facility.
- Ensure that the treatment/disposal methods proposed by companies are the appropriate and approved technology for your wastes. The receiver should be willing to provide a letter confirming how and when the hazardous waste was managed at the location named in the letter and that the management complied with all relevant regulatory requirements.
- Check the receiver's insurance coverage and review their environmental impairment liability, general liability and vehicle insurance coverage (if applicable).
- Check the Health and Safety record of the receiver and request a clearance letter from the applicable worker (Occupational) health and safety agency.

Note: If the receiver selected does not comply with the requirements of the applicable legislation and are charged with a violation while managing your wastes, the generator may also be held liable.

Appendix 3:

Dangerous Goods Classifications

Class 1: Explosives[1]

Class 2: Compressed Gases

Division 2.1: Flammable Gases
Division 2.2: Non-Flammable Gases
Division 2.3: Toxic Gases

Class 3: Flammable Liquids

Packing Group I: Boiling point ≤35°C and any Flash Point
Packing Group II: Boiling point: >35°C and Flash Point < 23°C
Packing Group III: If criteria for Packing Group I or II are not met

Class 4: Flammable Solids, Substances Liable To Spontaneous Combustion, Dangerous When Wet

Division 4.1: Flammable Solids
Division 4.2: Spontaneously Combustible
Division 4.3: Dangerous When Wet

Class 5: Oxidizers, Organic Peroxides

Division 5.1: Oxidizers
Division 5.2: Organic Peroxides

Class 6: Toxic Substances, Infectious Substances

Criteria for 6.1 Toxic Substances Packing Groups as per the TDGR					
Route of Exposure	**Oral**	**Dermal**	**Inhalation mist**	**Inhalation vapor**	
Unit of Measure	LD50 mg/kg	LD_{50} mg/kg	LC50 mg/L	V	LC50 mL/m³
Packing Group I	≤ 5	≤ 50	≤ 0.2	≥ 10 X LC50	≤ 1000
Packing Group II	> 5 but ≤ 50	> 50 but ≤ 200	> 0.2 but ≤ 2	≥ LC50	≤ 3000
Packing Group III	> 50 but ≤ 300	> 200 but ≤ 1000	> 2 but ≤ 4	≥ 0.2 X LC50	≤ 5000

Division 6.2: Infectious Substances

Class 7: Radioactive Materials[1]

Class 8: Corrosives

Class 9: Miscellaneous Dangerous Goods

[1] Class 1 and 7 are regulated under federal legislation and not subject to this guideline.

Appendix 4:

Regulatory Agencies, Land and Water Boards, Waste Exchanges, and Associations

Regulatory Agencies

1. Environmental Health
   Department of Health and Social Services
   5015 49th St
   Box 1320
   Yellowknife, NT X1A 2L9
   Phone: (867) 767-9066 ext. 49262

2. Lands Administration
   Department of Lands
   PO Box 1320
   1st Floor Gallery Building (4923 - 52nd Street)
   Yellowknife, NT X1A 2L9
   Phone: (867) 765-6701 Fax: (867) 669-8908

3. Office of the Fire Marshal
   Department of Municipal and Community Affairs
   600, 5201-50th Avenue
   Yellowknife, NT X1A 2S9
   Phone: (867) 873-7469 Fax: (867) 873-0206

4. Office of the Regulator of Oil and Gas Operations
   4th floor, 5201-50th Avenue
   P.O. Box 1320
   Yellowknife, NT X1A 2L9
   Phone: (867) 767-9097 Fax: (867) 920-0798

5. Road Licensing and Safety Headquarters
   Department of Transportation
   5015 - 49th Street
   PO Box 1320
   Yellowknife, NT X1A 2L9
   Phone: (867) 767-9088 ext. 31169 Fax: (867) 873-0120

6. Workers' Safety and Compensation Commission
   Centre Square Tower, 5th Floor
   5022 49 Street
   Box 8888
   Yellowknife, NT X1A 2R3
   General Inquiries phone: (867) 920-3888 Fax: (867) 873-4596
   Toll Free: 1-800-661-0792

7. Indigenous and Northern Affairs Canada
   NWT Region
   4923-52nd Street
   P.O. Box 1500
   Yellowknife, NT X1A 3Z4
   Phone: (867) 669-2500 Fax: (867) 669-2715

8. Canadian Nuclear Safety Commission
   Western Regional Office
   220 4th Avenue S.E., Suite 670
   Calgary, AB T2G 4X3
   Phone: (403) 292-5181 Fax: (403) 292-6985
   Nuclear Emergency (24 Hour) (613) 995-0479
   General Inquiries: info@cnsc-ccsn.gc.ca
   Phone: 613-995-5894 or 1-800-668-5284 (in Canada)

9. Environmental Protection Branch
   Environment and Climate Change Canada
   5019 52nd St,
   P.O. Box 2310
   Yellowknife, NT X1A 2P7
   Phone: (867) 669-4730 Fax: (867) 873-8185

10. Environment Branch
    National Energy Board
    444 Seventh Ave. S.W.
    Calgary, AB T2P 0X8
    Phone: (403) 299-3676 Fax: (403) 292-5503

11. Explosives Regulatory Division, Western Region
    Natural Resources Canada
    Unit 214 755 Lake Bonavista Dr. S.E.
    Calgary, AB T2J 0N3
    Phone: (403) 292-4766 Fax: (403) 292-4689

12. Transport Canada
    Prairie and Northern Region
    4915 - 48th Street
    3rd Floor, YK Centre East
    P.O. Box 1439
    Yellowknife, NT X1A 2P1
    Phone: (888)-463-0521

Land and Water Boards

Gwich'in Land and Water Board	(867) 777-4954	http://glwb.com/
Mackenzie Valley Land and Water Board	(867) 669-0506	http://mvlwb.com/
Sahtu Land and Water Board	(867) 598-2413	http://slwb.com/
Wek'eezhii Land and Water Board	(867) 765-4592	http://wlwb.ca/
Inuvialuit Water Board	(867) 678-2942	www.inuvwb.ca
Environmental Impact Screening Committee	(867) 777-2828	http://www.screeningcommittee.ca/contact.html

Waste Exchanges

Canadianenvironmental.com		http://www.canadianenvironmental.com/
Stobec	(800) 561-6511	http://stobec.com/index.html
Waste Exchange Network		http://www.wastechange.com/canada.html

Associations

BC Environment Industry Association	(604) 683-2751	http://www.hazwastebc.com
Canadian Association for Laboratory Accreditation Inc. (CALA)	(613) 233-5300	http://www.cala.ca
Eco Canada	(800) 890-1924	http://www.eco.ca
Environmental Services Association of Alberta	(800) 661-9278	http://www.esaa.org
Manitoba Environmental Industries Association	(204) 783-7090	http://www.meia.mb.ca
Northern Territories Water and Waste Association	(867) 873-4325	http://ntwwa.com/
Saskatchewan Environmental Industry and Managers Association	(306) 250-4991	http://www.seima.sk.ca/
Standards Council of Canada (Environmental Laboratories)	(613) 569-7808	https://www.scc.ca/en/accreditation/laboratories
Waste Receiver Assessment Program	(403) 269-4351	http://www.wrapaudit.com

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Appendix G
Remedial Action Plan

Jacobs

Pointed Mountain Pipeline Abandonment Project

Remedial Action Plan
PM-1 Site, Kilometre Post 0.0, Northwest Territories

REM-0193, REM2018-034

FINAL

September 2023

Westcoast Energy Inc.

Jacobs

REM-0193, REM2018-034

Pointed Mountain Pipeline Abandonment Project

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Document No.:	FES0524221054CGY
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Client Name:	Westcoast Energy Inc.

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Acronyms and Abbreviations

BC	British Columbia
BTEX	benzene, toluene, ethylbenzene, xylenes
CCME	Canadian Council of Ministers of the Environment
CER	Canada Energy Regulator
COC	contaminant of concern
COPC	contaminant of potential concern
ESA	Environmental Site Assessment
ETC	enhanced thermal conduction
F	fraction(s)
Guideline	Government of the Northwest Territories Environmental Guideline for Contaminated Site Remediation
km	kilometre(s)
KP	Kilometre Post
m	metre(s)
m^2	square metre(s)
m^3	cubic metre(s)
mbgs	metre(s) below ground surface
mg/kg	milligram(s) per kilogram
NPS	Nominal Pipe Size
NWT	Northwest Territories
PAH	polycyclic aromatic hydrocarbon
PHC	petroleum hydrocarbon
Project	Pointed Mountain Pipeline Abandonment Project
RAP	Remedial Action Plan
Site or PM-1 Site	the site area of aboveground infrastructure located at Kilometre Post 0.0
Westcoast	Westcoast Energy Inc.

1. Introduction

Westcoast Energy Inc. (Westcoast) retained Jacobs to provide a Remedial Action Plan (RAP) for the PM-1 Site (PM-1 Site or the Site), located at Kilometre Post (KP) 0.0 of the Pointed Mountain Pipeline in the Northwest Territories (NWT). Appended Figure 1 shows the alignment of the Pointed Mountain Pipeline through the NWT, Yukon, and British Columbia (BC).

The Pointed Mountain Pipeline is a deactivated Nominal Pipe Size (NPS) 20 gas gathering pipeline that is no longer connected to the Westcoast pipeline network and thus has no prospective future use. Westcoast is planning to abandon the Pointed Mountain Pipeline in 2023.

The RAP provides details for the remediation of the petroleum hydrocarbon (PHC)-contaminated soil at PM-1. The CER Reference number is REM-0193, REM2018-034.

The remedial activities described herein will be completed in conjunction with the Pointed Mountain Pipeline Abandonment Project (the Project).

2. PM-1 Site Background

This section provides background information about the Site, relevant to the remediation plan.

2.1 Site Description

The Pointed Mountain Pipeline, constructed in the early 1970s, is approximately 56 kilometres (km) in length, with the northernmost 31 km in the NWT, a central segment of 20 km in the Yukon, and the southernmost 5 km in BC. The pipeline has been deactivated for several years (KP 0.0 to KP 34.92 in 2008 and KP 34.92 to KP 55.64 in 2016), has been filled with nitrogen and connected to an active cathodic protection system to prevent corrosion (Westcoast 2020).

The buried pipeline has aboveground components described as follows. A key component of the Project is removal of this infrastructure at PM-1:

- NPS 24 pig launcher and catch basin
- Pipe supports (10)
- NPS 20 S-bend riser
- NPS 6 flare riser
- Flare stack control panel
- Aboveground diesel tanks (2), tubing, and support frames
- Aboveground propane tanks (4)
- NPS 4 aboveground flare piping, kicker piping, and associated valves and actuators
- NPS 20 aboveground piping and associated valves and actuators
- Building, platform, and stairs
- Cathodic protection
- NPS 20 risers and elbows and check valves on the piping to the producer plant (2)
- Nitrogen vent and valve on Pointed Mountain Pipeline

Site photographs are provided in Appendix A.

2.2 Physical Setting

The Phase II ESA (Jacobs 2022a) details the regional and local geology, local groundwater use, and Site topography and drainage and is considered a companion to this document. The conceptual site model in Appendix B summarizes the additional pertinent details about Site conditions that inform the RAP.

2.3 Investigative Summary

A Phase I ESA was completed in August 2021, the desktop portion of which identified areas of potential environment concern (APECs) at the Site, along with associated contaminants of potential concern (COPCs) (Jacobs 2022a). In addition to the Phase I ESA, two soil investigations were conducted at the PM-1 Site, namely:

1) A preliminary soil assessment in September 2020 to investigate the extent of a historical diesel release.
2) A Phase II ESA completed in August 2021 to further evaluate the extent of soil contamination identified at the Site in 2020.

To delineate the historical diesel impacts in soil as well as to assess additional APECs identified during the Phase I ESA (Jacobs 2022a), 23 boreholes were completed at the Site. Three surface soil samples were also collected in locations where deeper investigation was restricted by the presence of aboveground and underground infrastructure. These APECs are described in Exhibit 1.

Figure 2 presents the borehole and surface sample locations.

Exhibit 1. PM-1 APEC and COPC Summary

Identified APECs	COPCs
Former methanol AST (15,000-L)	Methanol
Two diesel ASTs, 8,620-L capacity	PHC F1-F4, BTEX, PAHs
Pig launcher, unidentified substance leaking from pig catch basin	PHC F1-F4, BTEX, PAHs
Generator building (location of 2018 diesel release)	PHC F1-F4, BTEX, PAHs
Former flare stack and pad	PHC F1-F4, BTEX, PAHs
Risers with associated valves and actuators. Hydraulic fluid observed leaking from the actuator system	PHC F1-F4, BTEX, PAHs
Areas of stressed vegetation, potentially associated with broadleaf control	Herbicides

AST = aboveground storage tank
BTEX = benzene, toluene, ethylbenzene, and xylene
COPC = contaminant of potential concern
F = fraction(s)
L = litres(s)

Tables 1 to 3 (appended to this document) present the results of the COPC analyses completed on soil samples collected during the two soil investigations. A comparison of analyte concentrations to the referenced guidelines established the following contaminants of concern (COCs) at the Site:

- BTEX
- PHC F1, F2, and F3
- PAHs (naphthalene, and phenanthrene)

2.4 Extent of Soil Contaminant Plume at the PM-1 Site

Figure 2 presents the locations of boreholes in which PHCs, BTEX, and PAHs were identified in soil at concentrations above applied guidelines. The interpolated areal extent of the soil contamination, determined using geostatistical three-dimensional kriging methods within C Tech Development Corporation's (C Tech) Earth Volumetric Studio (EVS) software, is also depicted.

Based on its prevalence, soil PHC F2 concentrations have been used in the estimation. The interpolation showed the contamination in two separate plumes, one associated with the historical diesel spill (approximately 390 square metres [m^2], impacts to approximately 3 metres below ground surface [mbgs]), the other associated with the pigging barrel (approximately 60 m^2 to 1 mbgs). The total estimated volume of PHC contaminated soil is 1,230 cubic metres (m^3).

3. Remedial Action Plan

The RAP outlined in this section describes the proposed activities to be conducted to remediate soil COCs.

3.1 Remediation Criteria

Remediation criteria presented in Exhibit 2 reflects the use of the most stringent Canadian Council of Ministers of the Environment (CCME) guidelines, regardless of grain size, and is inclusive of all human health and ecological exposure pathways.

Exhibit 2. Remediation Criteria

Contaminant of Concern	Numerical Guideline	Rationale for Selection	Guideline Source Document
Benzene	▪ 0.0068 mg/kg	Most conservative guideline (fine- or coarse-grained) available in CCME documentation	▪ Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health Benzene (CCME 2004a)
Toluene	▪ 0.08 mg/kg	Most conservative guideline (fine- or coarse-grained) available in CCME documentation	▪ Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health Toluene (CCME 2004b)
Ethylbenzene	▪ 0.018 mg/kg	Most conservative guideline (fine- or coarse-grained) available in CCME documentation	▪ Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health Ethylbenzene (CCME 2004c)
Xylenes	▪ 2.4 mg/kg	Most conservative guideline (fine- or coarse-grained) available in CCME documentation	▪ Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health Xylenes (CCME 2004d)
PHC F1	▪ 30 mg/kg	Most conservative guideline (fine- or coarse-grained) available in CCME and NWT documentation	▪ Canada-Wide Standard for Petroleum Hydrocarbons in Soil (CCME 2008)
PHC F2	▪ 150 mg/kg	Most conservative guideline (fine- or coarse-grained) available in CCME documentation	
PHC F3	▪ 300 mg/kg	Most conservative guideline available in CCME documentation (fine- or coarse-grained)	
Naphthalene	▪ 0.013 mg/kg	Most conservative guideline available in CCME documentation (not affected by grain size)	▪ Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health Polycyclic Aromatic Hydrocarbons (CCME 2010)
Phenanthrene	▪ 0.046 mg/kg	Most conservative guideline available in CCME documentation (not affected by grain size)	▪ Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health Polycyclic Aromatic Hydrocarbons (CCME 2010)

mg/kg = milligram(s) per kilogram

Generic numerical soil guidelines provided within the Government of the NWT's *Environmental Guideline for Contaminated Site Remediation* (the Guideline) (Government of the NWT 2003) were adopted from the CCME guidelines and standards that were current at the time it was issued. Many of these guidelines and standards listed in the Guideline have been superseded. As such, the most current CCME guidelines and standards used herein are in concordance with the Guideline.

3.2 Rationale for Remedial Approach

The following points were considered when determining the preferred remedial option for the contaminated soil at the PM-1 Site, based on the Project schedule and preferences of the local Indigenous groups and other affected parties:

- Short remedy duration – treatment must be achievable within one field season. Preference was given to technologies that would not require long-term power requirements for operation and maintenance of equipment or facilities, for example.
- Established technology with a high success rate of treatment to the established guidelines.
- Seasonal flexibility (i.e., can be mobilized and operated in either summer or winter conditions).
- Ex situ, onsite treatment preferred due to the known volume of contaminated soil to be treated and the capability of treating additional volume, if encountered, in a cost-effective manner.
- Proven technology, capable of gaining regulatory approval as well as approval by local Indigenous groups, other stakeholders, and affected parties.

Based on the above criteria, Iron Creek Group's (Iron Creek's) patented ex situ enhanced thermal conduction (ETC) technology was chosen as the preferred remedial option.

3.3 Description of Remedial Method – Ex Situ Enhanced Thermal Conduction

ETC is a stationary technology that uses heat to volatilize soil COCs. The heat is generated via multi-fuel burners and distributed to the soil via three steel manifolds layered within the stockpiles. At the PM-1 Site, the contaminated soil will be excavated from the area shown on Figure 2 and placed in 400 cubic metre (m^3) stockpiles atop three stacked manifolds running the length of each pile. The manifolds each distribute heated air through a third of the stockpile via a series of steel pipes traversing its width. Prior to activating the burners, the stockpiled soil will be encased in a stainless-steel Quonset to entrap air containing volatile organic compounds (VOCs) during the soil treatment process. Injected air will be transferred to the soil to heat it to a temperature between 260 to 425 degrees Celsius (contaminant- and concentration-dependent) to volatilize the contaminant mass. The vapours generated from the treatment process, entrapped in the headspace of the Quonset, will be treated via thermal oxidizer to destroy the VOCs prior to release of the air to the atmosphere (Iron Creek 2022).

Following treatment, the soil will be allowed to cool to accommodate sampling and laboratory analysis to verify the soil COCs have been treated to concentrations below the remediation criteria. The treated soil will be placed back into the excavation, hydrated, and machine compacted.

Based on the estimated volume of contaminated soil at the Site (approximately 1,230 m^3), it is estimated that the soil will be treated in three batches over a 3- to 4-week period. The approximate footprint of the operation is 12 metres (m) by 48 m. The work will be staged within Westcoast's lease boundary such that a second 400-m^3 stockpile will be constructed, complete with air injection piping, while another is undergoing treatment. Once laboratory sampling has verified the treatment process, the Quonset will be moved from atop the treated soil and constructed on another untreated stockpile to restart the process.

3.3.1 Water Management

The clay in some boreholes was noted to be wet during the investigation. It is expected that this was perched water in gravel seams rather than groundwater, given the timing of the work (September 2020 and August 2021). There was no substantial water accumulation in the boreholes during the investigation; therefore, the likelihood of there being substantial water present in the excavation is similarly considered low.

3.3.2 Remedial Verification Sampling

The plume will be excavated to the approximate lateral and vertical extents shown on appended Figure 2, and with the assistance of the remediation contractor, Jacobs will collect soil samples from the excavation limits (i.e., the walls or base) to verify source removal. Given the lateral and vertical extent of the proposed excavation, an approximate sampling grid of 3 m horizontal by 1 m vertical is proposed for screening purposes.

A subset of these samples from a variety of depths along the sidewalls, as well as the excavation base, will be submitted for laboratory analysis of BTEX, PHC F1 to F4, and PAHs to confirm compliance with the remediation criteria presented in Subsection 3.1 prior to backfilling with the treated soil. Samples will be chosen for submission based on field screening of soil headspace vapour concentrations of PHCs and VOCs, subsurface soil stratigraphy, including major and minor soil types, colour, apparent moisture content, firmness, cohesiveness, inclusions, and indicators of apparent contamination. Samples will be submitted to an accredited laboratory on a rush turn-around-time basis, depending on the schedule of the pipeline abandonment activities. If contaminated soil is encountered beyond the current assumed extent of remediation, it will be included in the treatment volume.

The treated soil will be sampled at an approximate rate of one sample, composed of several aliquots per 50 m^3 of treated soil. Each sample will be formed from several aliquots within the allotted volume and submitted to an accredited laboratory to confirm the success of the treatment in achieving the remediation criteria.

3.3.3 Site Restoration

Following treatment and confirmatory sampling, the soil will be hydrated and placed back into the excavation footprint in approximate 200- to 300-millimetre lifts and compacted to grade level and left to naturally recover. Further details on planned restoration and post-construction monitoring are presented in the Environmental and Socio-Economic Assessment (Jacobs 2022b).

3.4 Contingency Plans and Performance Measures

The remediation will be conducted in conjunction with, and in the same location as, the remaining aboveground infrastructure at the Site that is to be decommissioned and demolished as part of the Project. The remedial activities are not expected to pose any additional risk to humans or ecological life in comparison to the pipeline abandonment activities.

Additional detail on proposed contingencies is provided in the following documents, which have been submitted to the Canada Energy Regulator (CER):

- Pointed Mountain Pipelines Abandonment Project Environmental and Socio-Economic Assessment (Jacobs 2020)
- Environmental Protection Plan Westcoast Energy Inc. Pointed Mountain Pipelines Abandonment Project (Enbridge 2020)

Performance measures to evaluate success of the remedial measures were outlined in Subsection 4.3.1.

3.5 Schedule

Remediation of the PM-1 Site is expected to occur in January or February 2025. Based on the projected volume of impacted soil at the PM-1 Site, the overall timeline for excavation, soil treatment, completion of confirmatory soil analyses, and backfilling is approximately 1 month.

3.6 Post-Remediation Activities

Because the remediation involves complete source treatment, no post-remediation monitoring is planned. The Site will be left to equilibrate to its natural surroundings following backfilling.

4. Engagement with Potentially Affected Persons

Westcoast has notified and consulted with the local government in the area (Member of the Northwest Territories Legislative Assembly, Member of Parliament, municipal representatives), Indigenous groups, surrounding landowners, and the Government of NWT, amongst others regarding the Project. All work outlined in this RAP will be limited to the PM-1 Site. The interpolated areal extent of the soil contamination is contained within Westcoast's lease boundary.

Consultation and engagement is active, ongoing and being managed by Westcoast under a separate process. As per the CER Remediation Process Guide (2020), a record of the engagement will be provided to CER.

5. Summary

This RAP describes the proposed activities to be conducted by Westcoast to remediate approximately 1,240 m^3 of PHC-, BTEX-, and PAH-impacted soil by onsite ex situ ETC. Groundwater or surface water will be managed as part of the remediation activities if encountered within the excavation.

6. Closure

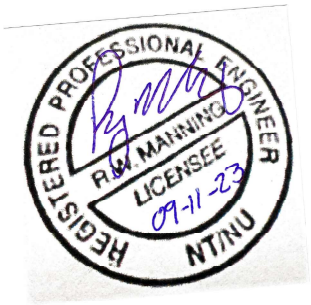
Jacobs has prepared this RAP for the exclusive use of Westcoast, using generally accepted scientific and technical practices and environmental guidelines, regulations, and criteria and standards in effect at the time of RAP preparation.

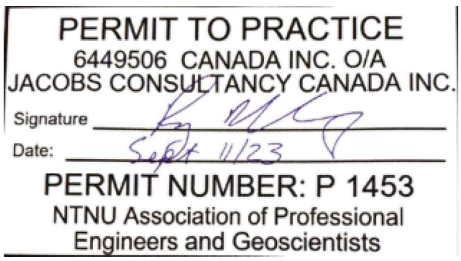
Use of the information provided in this report is subject to the Limitations detailed in Section 8.

Respectfully submitted,
Jacobs Consultancy Canada Inc.

Ryan Manning, P.Eng.
Senior Technical Consultant

Melissa Magnuson, P.Eng.
Project Manager





7. Limitations

In preparing this RAP, Jacobs may have relied, in whole or in part, on data and information provided by Westcoast and third-parties. Therefore, while Jacobs has used its best efforts in preparing this RAP, if the data, information, or statements supplied by Westcoast or third-parties is found to be incorrect or inaccurate, Jacobs' conclusions set forth in this RAP may change. No warranty, expressed or implied, is made.

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Any opinions or recommendations presented apply to Site conditions existing when services were performed. Jacobs cannot report on or accurately predict events that are not reasonably foreseeable. Such events may change the Site conditions after the described services are performed, whether occurring naturally or caused by external forces.

Where Jacobs provides both electronic file and hard copy versions of reports, drawings and other Project-related documents and deliverables, the signed and sealed hard copy or ConsignO encrypted electronic versions will be considered final and legally binding. The electronic reports and documents will be used only and exactly as submitted by Jacobs. Any corruption and change to the content and quality of the electronic reports and documents as a result of subsequent electronic re-transmission will be the sole responsibility of the party completing the re-transmission.

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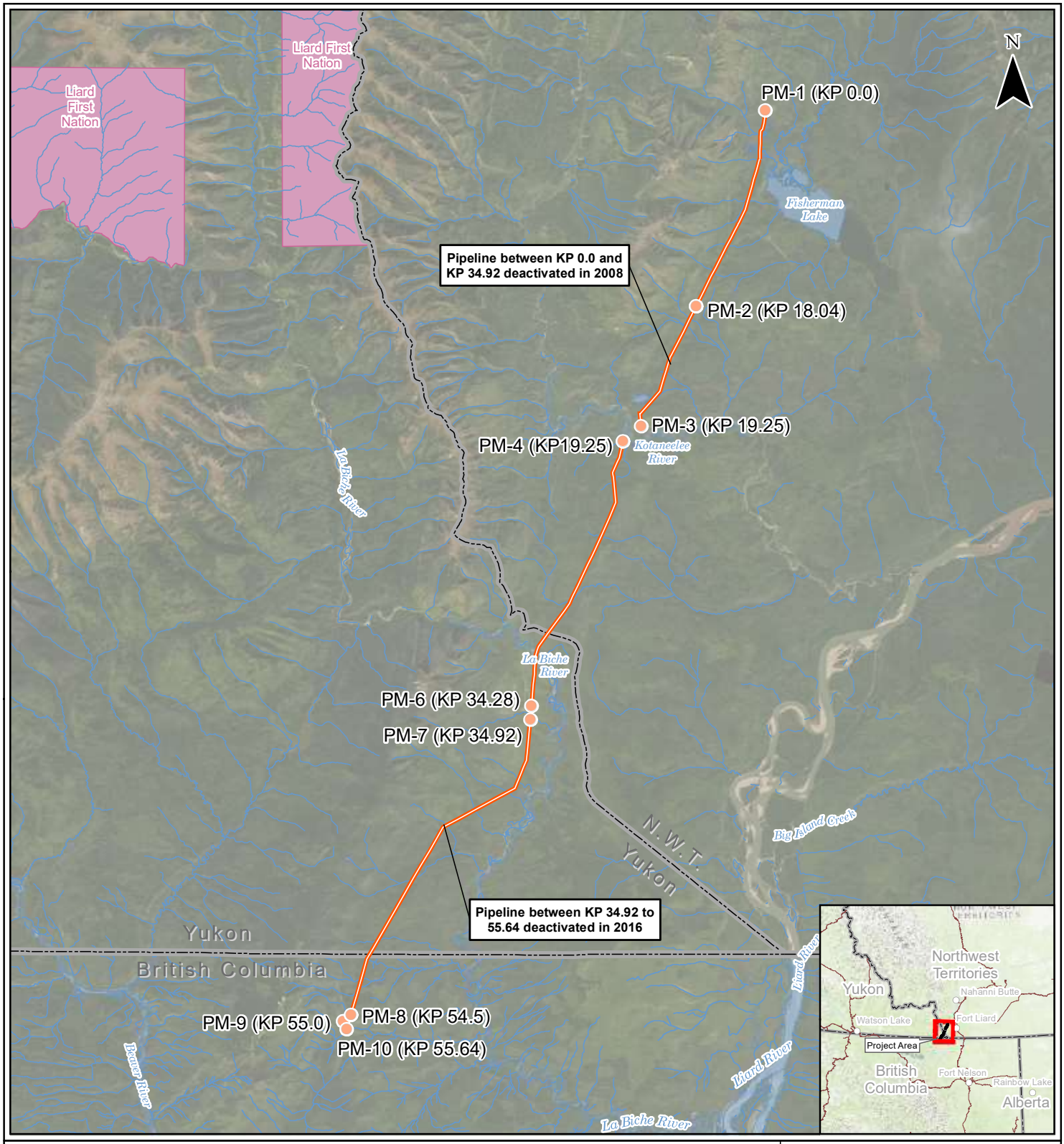
Figures



Site Location
Pointed Mountain Pipeline Route
Provincial Boundary
Watercourse
Water Body
First Nations (Interim Protected Lands)

FIGURE 1

PROJECT OVERVIEW
REMEDIAL ACTION PLAN
PM-1 SITE, NORTHWEST TERRITORIES

WESTCOAST ENERGY INC.
POINTED MOUNTAIN PIPELINE ABANDONMENT PROJECT

NAD 1983 UTM Zone 10N
Satellite Imagery: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Roads: NRCan 2014-2015; Railway: NRCan 2012.

SCALE: 1:275,000
0 5 10
Kilometres
(All Locations Approximate)

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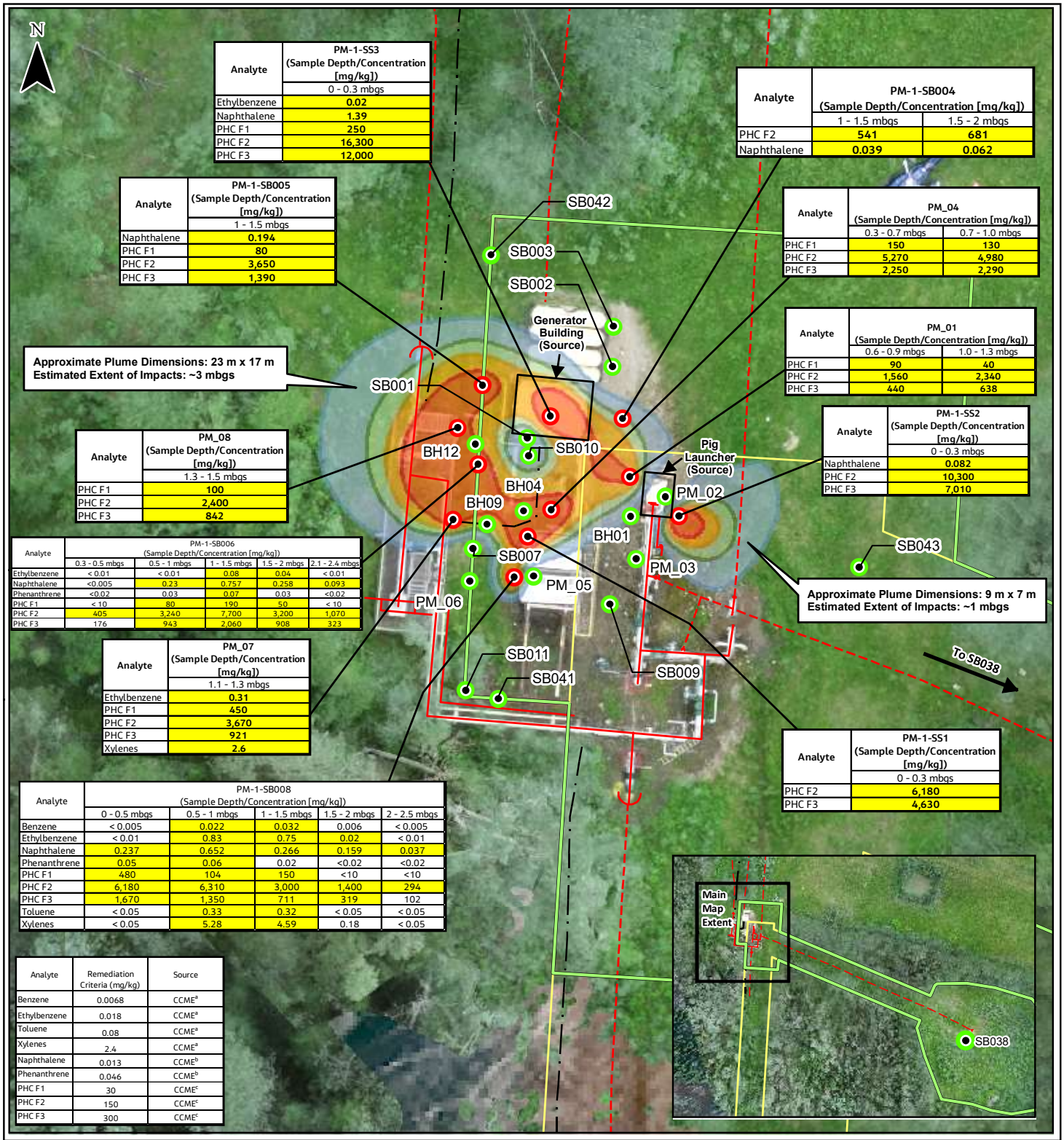
May 2022

CE810600



Analyte	PM-1-SS3 (Sample Depth/Concentration [mg/kg])
	0 - 0.3 mbgs
Ethylbenzene	0.02
Naphthalene	1.39
PHC F1	250
PHC F2	16,300
PHC F3	12,000

Analyte	PM-1-SB004 (Sample Depth/Concentration [mg/kg])	
	1 - 1.5 mbgs	1.5 - 2 mbgs
PHC F2	541	681
Naphthalene	0.039	0.062

Analyte	PM-1-SB005 (Sample Depth/Concentration [mg/kg])
	1 - 1.5 mbgs
Naphthalene	0.194
PHC F1	80
PHC F2	3,650
PHC F3	1,390

Analyte	PM_04 (Sample Depth/Concentration [mg/kg])	
	0.3 - 0.7 mbgs	0.7 - 1.0 mbgs
PHC F1	150	130
PHC F2	5,270	4,980
PHC F3	2,250	2,290

Analyte	PM_01 (Sample Depth/Concentration [mg/kg])	
	0.6 - 0.9 mbgs	1.0 - 1.3 mbgs
PHC F1	90	40
PHC F2	1,560	2,340
PHC F3	440	638

Analyte	PM_08 (Sample Depth/Concentration [mg/kg])
	1.3 - 1.5 mbgs
PHC F1	100
PHC F2	2,400
PHC F3	842

Analyte	PM-1-SS2 (Sample Depth/Concentration [mg/kg])
	0 - 0.3 mbgs
Naphthalene	0.082
PHC F2	10,300
PHC F3	7,010

Analyte	PM-1-SB006 (Sample Depth/Concentration [mg/kg])				
	0.3 - 0.5 mbgs	0.5 - 1 mbgs	1 - 1.5 mbgs	1.5 - 2 mbgs	2.1 - 2.4 mbgs
Ethylbenzene	< 0.01	< 0.01	0.08	0.04	< 0.01
Naphthalene	<0.005	0.23	0.757	0.258	0.093
Phenanthrene	<0.02	0.03	0.07	0.03	<0.02
PHC F1	< 10	80	190	50	< 10
PHC F2	405	3,240	7,700	3,200	1,070
PHC F3	176	943	2,060	908	323

Analyte	PM_07 (Sample Depth/Concentration [mg/kg])
	1.1 - 1.3 mbgs
Ethylbenzene	0.31
PHC F1	450
PHC F2	3,670
PHC F3	921
Xylenes	2.6

Analyte	PM-1-SS1 (Sample Depth/Concentration [mg/kg])
	0 - 0.3 mbgs
PHC F2	6,180
PHC F3	4,630

Analyte	PM-1-SB008 (Sample Depth/Concentration [mg/kg])				
	0 - 0.5 mbgs	0.5 - 1 mbgs	1 - 1.5 mbgs	1.5 - 2 mbgs	2 - 2.5 mbgs
Benzene	< 0.005	0.022	0.032	0.006	< 0.005
Ethylbenzene	< 0.01	0.83	0.75	0.02	< 0.01
Naphthalene	0.237	0.652	0.266	0.159	0.037
Phenanthrene	0.05	0.06	0.02	<0.02	<0.02
PHC F1	480	104	150	<10	<10
PHC F2	6,180	6,310	3,000	1,400	294
PHC F3	1,670	1,350	711	319	102
Toluene	< 0.05	0.33	0.32	< 0.05	< 0.05
Xylenes	< 0.05	5.28	4.59	0.18	< 0.05

Analyte	Remediation Criteria (mg/kg)	Source
Benzene	0.0068	CCME[a]
Ethylbenzene	0.018	CCME[a]
Toluene	0.08	CCME[a]
Xylenes	2.4	CCME[a]
Naphthalene	0.013	CCME[b]
Phenanthrene	0.046	CCME[b]
PHC F1	30	CCME[c]
PHC F2	150	CCME[c]
PHC F3	300	CCME[c]

- Borehole/Surface Sample Location
- Analyte Concentrations Less Than Applied Guidelines
- Analyte Concentrations Greater Than Applied Guidelines

- Westcoast Site Boundary
- Pipeline - Aboveground
- Pipeline - Underground
- Power - Underground
- Pointed Mountain Pipeline Right-of-Way

Soil PHC F2 Concentrations (mg/kg)
- 150 - 499
- 500 - 999
- 1000 - 1999
- >2000

Notes:
1. Tier 2 assessment completed. CCME guidelines chosen reflect the elimination of exposure pathways applicable to vapour inhalation and consumption of potable groundwater. Governing risks are via the ecological direct soil contact and freshwater aquatic life exposure pathways.
2. Plume extent has been estimated by statistical kriging using Earth Volumetric Studio (C Tech 2021).
3. CCME = Canadian Council of Ministers of the Environment
4. PHC = Petroleum hydrocarbon
5. Yellow highlight indicates value exceeds referenced guideline.
6. F = fraction, ILCR = incremental life cancer risk, mbgs = metre(s) below ground surface, mg/kg = milligram(s) per kilogram

FIGURE 2

**SOIL ANALYTICAL RESULTS
REMEDIAL ACTION PLAN
PM-1 SITE, NORTHWEST TERRITORIES**

**WESTCOAST ENERGY INC.
POINTED MOUNTAIN PIPELINE
ABANDONMENT PROJECT**

NAD 1983 UTM Zone 10N

Notes:
Satellite Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Roads: NRCan 2014-2015; Railway: NRCan 2012.
[a]Canadian Council of Ministers of the Environment (CCME). 2004. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Residential/parkland land use, most stringent of fine- and coarse-grained guidelines. ILCR of 10-5 applied for benzene.
[b]Canadian Council of Ministers of the Environment (CCME). 2010. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health - Polycyclic Aromatic Hydrocarbons. Residential/parkland land use.
[c]Canadian Council of Ministers of the Environment (CCME). 2008. Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil. January. Residential/parkland land use, most stringent of fine- and coarse-grained guidelines.

SCALE: 1:350
0 7.5 15
Metres
(All Locations Approximate)

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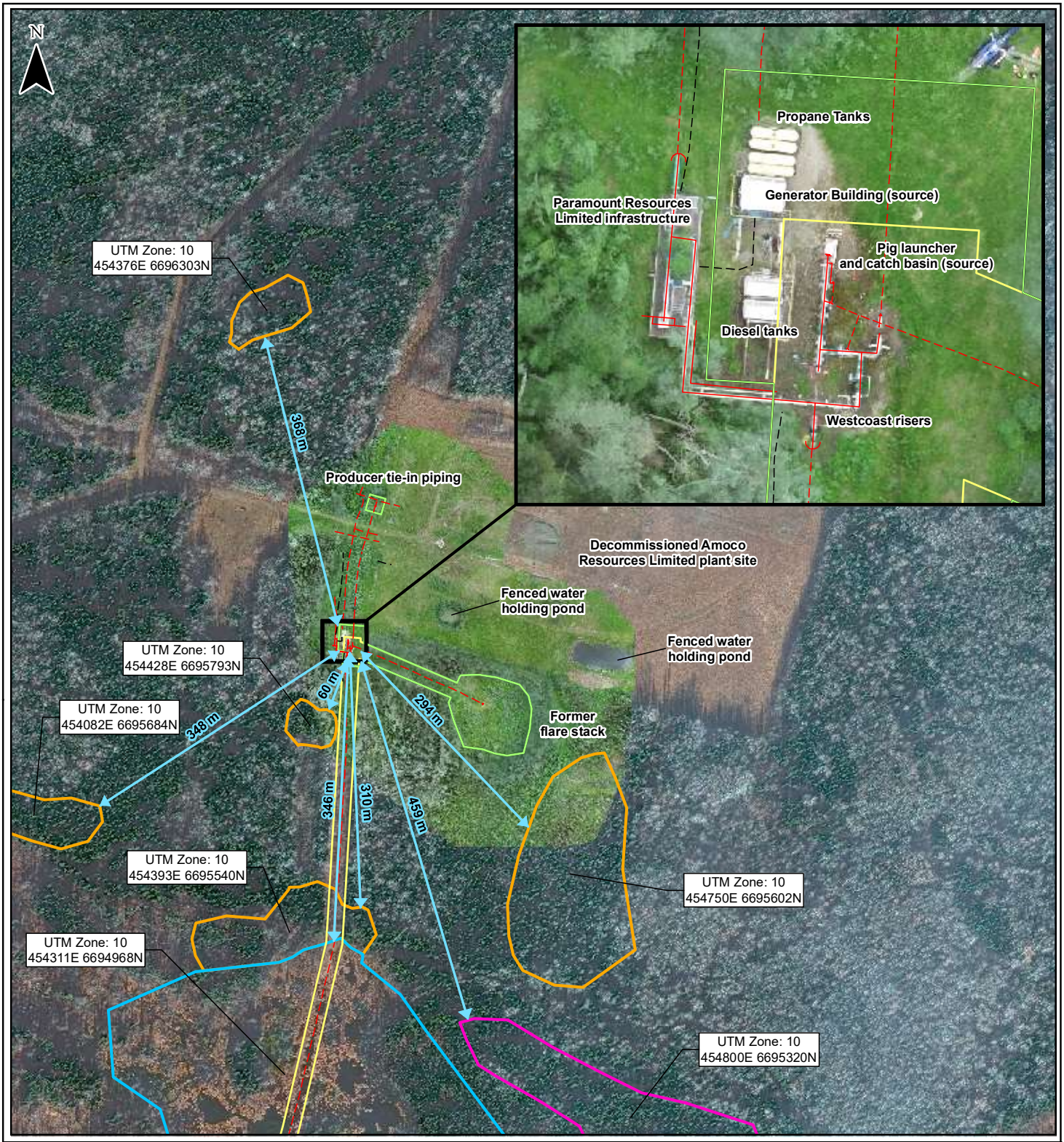
May 2022 | CE810500



Underground Pipeline
Aboveground Pipeline
Underground Power
Pointed Mountain Pipeline Right-of-Way
Westcoast Site Boundary
Distance to Waterbody (m)

Wetlands
Fen
Shallow Water
Swamp

FIGURE 3

RECEPTOR OVERVIEW
REMEDIAL ACTION PLAN
PM-1 SITE, NORTHWEST TERRITORIES

WESTCOAST ENERGY INC.
POINTED MOUNTAIN PIPELINE ABANDONMENT PROJECT

NAD 1983 UTM Zone 10N
Satellite Imagery: ; Roads: NRCan 2014-2015; Railway: NRCan 2012; Wetlands: Jacobs 2021.

SCALE: 1:6,500
0 100 200
Metres
(All Locations Approximate)

ENBRIDGE

Jacobs

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

May 2022 | CE810600

Tables

Table 1. Soil Analytical Results - Petroleum Hydrocarbons

Remedial Action Plan, PM-1 Site, Kilometre Post 0.0, Northwest Territories

Sample ID	Sample Date (DD-MMM-YY)	Sample Depth	Combustible Hydrocarbons	Volatile Organic Compounds	Benzene	Toluene	Ethylbenzene	Xylenes, Total	PHC F1	PHC F1-BTEX	PHC F2	PHC F3	PHC F4	Moisture Content
		mbgs	ppm_v	ppm_v	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
				CCME [a,b]	0.0068	0.08	0.018	2.4	NG	30	150	300	2800	NG
September 2020														
PM_01_SOa	20-Sep-20	0.0 - 0.3	100	2	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**29**	**16**	25
PM_01_SOb	20-Sep-20	0.6 - 0.9	130	18	<0.005	<0.05	<0.01	**0.05**	**90**	**90**	**1560**	**440**	**44**	24
PM_01_SOc	20-Sep-20	1.0 - 1.3	300	280	<0.005	<0.05	<0.01	<0.05	**40**	**40**	**2340**	**638**	**44**	23
PM_02_SOa	20-Sep-20	0.5 - 0.8	135	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**23**	**10**	15
PM_03_SOa	20-Sep-20	0.3 - 0.5	40	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**64**	**26**	20
PM_03_SOb	20-Sep-20	1.0 - 1.2	60	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**28**	**13**	23
PM_04_SOa	20-Sep-20	0.3 - 0.7	190	38	<0.005	<0.05	<0.01	<0.05	**150**	**150**	**5270**	**2250**	**353**	21
PM_04_SOb	20-Sep-20	0.7 - 1.0	55	26	<0.005	<0.05	**0.04**	**0.11**	**130**	**130**	**4980**	**2290**	**423**	22
PM_05_SOa	20-Sep-20	0.5 - 0.8	25	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**29**	**17**	26
PM_05_SOb	20-Sep-20	1.0 - 1.2	145	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**79**	**37**	24
PM_06_SOb	20-Sep-20	1.1 - 1.3	180	18	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**36**	**20**	21
PM_07_SOa	20-Sep-20	1.1 - 1.3	0	26	<0.005	<0.05	**0.31**	**2.6**	**450**	**450**	**3670**	**921**	**34**	21
PM_08_SOa	20-Sep-20	0.7 - 1.0	60	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	**29**	**16**	24
PM_08_SOb	20-Sep-20	1.3 - 1.5	130	26	<0.005	<0.05	<0.01	**0.11**	**100**	**100**	**2400**	**842**	**93**	22
August 2021														
PM-1-SB001A	17-Aug-21	0.1 - 0.5	60	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**46**	**20**	22
PM-1-SB001B	17-Aug-21	0.5 - 1.0	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**48**	**20**	21
PM-1-SB001C	17-Aug-21	1.0 - 1.5	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**53**	**22**	23
PM-1-SB001D	17-Aug-21	1.5 - 1.8	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**33**	**12**	15
PM-1-SB002A	17-Aug-21	0.1 - 0.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**35**	**18**	21
PM-1-SB002B	17-Aug-21	0.5 - 1.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**49**	**20**	17
PM-1-SB002C	17-Aug-21	1.0 - 1.5	60	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**35**	**12**	22
PM-1-SB002D	17-Aug-21	1.9 - 1.9	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**41**	**13**	16
PM-1-SB003A	17-Aug-21	0.3 - 0.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**209**	**55**	21
PM-1-SB003B	17-Aug-21	0.5 - 1.0	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**38**	**16**	25
PM-1-SB003C	17-Aug-21	1.0 - 1.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**43**	**18**	19
PM-1-SB003D	17-Aug-21	1.5 - 2.0	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**39**	**14**	18
PM-1-SB004A	17-Aug-21	0.1 - 0.5	15	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**26**	< 10	21
PM-1-SB004B	17-Aug-21	0.5 - 1.0	15	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**45**	**21**	22
PM-1-SB004C	17-Aug-21	1.0 - 1.5	15	--	< 0.005	< 0.05	< 0.01	< 0.05	**20**	**20**	**541**	**186**	**21**	21
PM-1-SB004D	17-Aug-21	1.5 - 2.0	15	--	< 0.005	< 0.05	< 0.01	< 0.05	**10**	**10**	**681**	**225**	**22**	21
PM-1-SB004E	17-Aug-21	2.0 - 2.5	15	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**35**	**11**	12
PM-1-SB004F	17-Aug-21	2.5 - 3.0	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**29**	< 10	10
PM-1-SB005A	17-Aug-21	0.1 - 0.5	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**26**	**14**	23
PM-1-SB005B	17-Aug-21	0.5 - 1.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**41**	**16**	24
PM-1-SB005C	17-Aug-21	1.0 - 1.5	5	--	< 0.005	< 0.05	< 0.01	< 0.05	**80**	**80**	**3650**	**1390**	**163**	21
PM-1-SB005D	17-Aug-21	1.5 - 2.0	30	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**88**	**94**	**33**	23
PM-1-SB005E	17-Aug-21	2.0 - 2.5	15	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**57**	**68**	**23**	13
PM-1-SB006A	17-Aug-21	0.3 - 0.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**405**	**176**	**21**	26
PM-1-SB006B	18-Aug-21	0.5 - 1.0	10	--	< 0.005	< 0.05	< 0.01	< 0.05	**80**	**80**	**3240**	**943**	**39**	24
PM-1-SB006C	18-Aug-21	1.0 - 1.5	40	--	< 0.005	< 0.05	**0.08**	**0.14**	**190**	**190**	**7700**	**2060**	**52**	22
PM-1-SB006D	18-Aug-21	1.5 - 2.0	60	--	< 0.005	< 0.05	**0.04**	**0.34**	**50**	**50**	**3200**	**908**	**41**	23
PM-1-SB006E	18-Aug-21	2.1 - 2.4	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**1070**	**323**	**22**	14
PM-1-SB007A	18-Aug-21	0.1 - 0.4	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**12**	**22**	< 10	16
PM-1-SB007B	18-Aug-21	0.5 - 1.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**11**	**52**	**24**	24
PM-1-SB007C	18-Aug-21	1.0 - 1.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**13**	**64**	**34**	22
PM-1-SB007D	18-Aug-21	1.5 - 2.0	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**39**	**15**	22
PM-1-SB007E	18-Aug-21	2.0 - 2.5	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**12**	**41**	**14**	12
PM-1-SB008A	18-Aug-21	0.0 - 0.5	140	--	< 0.005	< 0.05	< 0.01	< 0.05	**480**	**480**	**6180**	**1670**	**20**	20
PM-1-SB008B	18-Aug-21	0.5 - 1.0	80	--	**0.022**	**0.33**	**0.83**	**5.28**	**110**	**104**	**6310**	**1350**	**26**	21
DUP-3-0821	18-Aug-21	0.5 - 1.0	--	--	**0.01**	**0.25**	**0.61**	**3.88**	93	**88**	**7610**	**1650**	**22**	19
RPD			--	--	NC	28%	31%	31%	17%	17%	19%	20%	NC	10%
PM-1-SB008C	18-Aug-21	1.0 - 1.5	40	--	**0.032**	**0.32**	**0.75**	**4.59**	**156**	**150**	**3000**	**711**	**40**	21
PM-1-SB008D	18-Aug-21	1.5 - 2.0	120	--	**0.006**	< 0.05	**0.02**	**0.18**	< 10	< 10	**1400**	**319**	< 10	22
PM-1-SB008E	18-Aug-21	2.0 - 2.5	30	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**294**	**102**	**11**	12
DUP-4-0821	18-Aug-21	2.0 - 2.5	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**311**	**101**	< 10	13
RPD			--	--	NC	NC	NC	NC	NC	NC	6%	1%	NC	8%
PM-1-SB009A	18-Aug-21	0.2 - 0.5	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**31**	< 10	< 10	20
PM-1-SB009B	18-Aug-21	0.5 - 1.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	< 10	< 10	19
PM-1-SB009C	18-Aug-21	1.0 - 1.5	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**42**	**19**	23
DUP-6-0821	18-Aug-21	1.0 - 1.5	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**33**	**18**	23
RPD			--	--	NC	NC	NC	NC	NC	NC	NC	24%	5%	0%
PM-1-SB010A	21-Aug-21	0.0 - 0.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**28**	**72**	**28**	22
PM-1-SB010B	21-Aug-21	0.5 - 1.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**80**	**32**	22
DUP-7-0821	21-Aug-21	0.5 - 1.0	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**75**	**34**	22
RPD			--	--	NC	NC	NC	NC	NC	NC	NC	6%	6%	0%
PM-1-SB010C	21-Aug-21	1.0 - 1.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**58**	**23**	23
PM-1-SB010D	21-Aug-21	1.5 - 2.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**33**	**13**	12
DUP-2-0821	18-Aug-21	1.5 - 2.0	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**42**	**14**	21
RPD			--	--	NC	NC	NC	NC	NC	NC	NC	24%	7%	55%
PM-1-SB011A	18-Aug-21	0.3 - 0.5	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**38**	**23**	20
PM-1-SB011B	18-Aug-21	0.5 - 1.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**56**	**26**	18
DUP-1-0821	18-Aug-21	0.5 - 1.0	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**33**	**19**	23

Table 1. Soil Analytical Results - Petroleum Hydrocarbons

Remedial Action Plan, PM-1 Site, Kilometre Post 0.0, Northwest Territories

Sample ID	Sample Date (DD-MMM-YY)	Sample Depth	Combustible Hydrocarbons	Volatile Organic Compounds	Benzene	Toluene	Ethylbenzene	Xylenes, Total	PHC F1	PHC F1-BTEX	PHC F2	PHC F3	PHC F4	Moisture Content
		mbgs	ppm_v	ppm_v	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
RPD			--	--	NC	NC	NC	NC	NC	NC	NC	52%	31%	24%
PM-1-SB011C	18-Aug-21	1.0 - 1.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**57**	**32**	20
PM-1-SB011D	18-Aug-21	1.5 - 2.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**55**	**33**	20
PM-1-SB038A	21-Aug-21	0.0 - 0.2	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**41**	**18**	19
PM-1-SB038B	21-Aug-21	0.5 - 1.0	5	--	< 0.005	**0.06**	< 0.01	< 0.05	< 10	< 10	< 10	**32**	**16**	25
PM-1-SB038C	21-Aug-21	1.0 - 1.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**38**	**15**	15
PM-1-SB041A	18-Aug-21	0.1 - 0.5	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**34**	< 10	17
PM-1-SB041B	18-Aug-21	0.5 - 1.0	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	< 10	< 10	21
PM-1-SB041C	18-Aug-21	1.0 - 1.5	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**24**	**10**	21
PM-1-SB041D	18-Aug-21	1.5 - 2.0	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**29**	**14**	21
DUP-5-0821	18-Aug-21	1.5 - 2.0	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**20**	**11**	19
RPD			--	--	NC	NC	NC	NC	NC	NC	NC	37%	24%	NC
PM-1-SB042A	21-Aug-21	0.0 - 0.2	5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**32**	**16**	20
PM-1-SB042B	21-Aug-21	0.8 - 1.0	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**35**	**19**	14
PM-1-SB042C	21-Aug-21	1.0 - 1.5	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**33**	**16**	21
PM-1-SB042D	21-Aug-21	1.5 - 2.0	15	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**48**	**21**	22
PM-1-SB042E	21-Aug-21	2.0 - 2.5	15	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**37**	**16**	22
PM-1-SB043A	21-Aug-21	0.1 - 0.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**87**	**44**	19
DUP-8-0821	21-Aug-21	0.1 - 0.5	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**59**	**33**	21
RPD			--	--	NC	NC	NC	NC	NC	NC	NC	38%	29%	10%
PM-1-SB043B	21-Aug-21	0.5 - 1.0	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**45**	**21**	21
PM-1-SB043C	21-Aug-21	1.0 - 1.5	< 5	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	**66**	**29**	22
PM-1-SS1	21-Aug-21	0.0 - 0.3	10	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**6180**	**4630**	**47**	43
PM-1-SS2	21-Aug-21	0.0 - 0.3	15	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	**10300**	**7010**	**164**	21
PM-1-SS3	21-Aug-21	0.0 - 0.3	50	--	< 0.005	< 0.05	**0.02**	**1.32**	**250**	**250**	**16300**	**12000**	**164**	26
TB-1 Soil	21-Aug-18	--	--	--	< 0.005	< 0.05	< 0.01	< 0.05	< 10	< 10	< 10	< 10	< 10	<1

[a] Canadian Council of Ministers of the Environment (CCME). 2004. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Residential/parkland land use, most stringent of fine- and coarse-grained guidelines. ILCR of 10^{-5} applied for benzene.

[b] Canadian Council of Ministers of the Environment (CCME). 2008. Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil. January. Residential/parkland land use, most stringent of fine- and coarse-grained guidelines.

Notes:
-- = not measured
Grey highlight indicates value exceeds referenced guideline.
Bold indicates the analyte was detected
BTEX = benzene, toluene, ethylbenzene, and xylenes
F = fraction
ILCR = incremental life cancer risk
mbgs = metre(s) below ground surface
mg/kg = milligram(s) per kilogram
NC = RPD could not be calculated as one or more results was less than, or within 5 times, the detection limit
NG = no guideline
ppm_v = parts per million by volume
RPD = relative percentage difference calculated using:

$$RPD\% = \frac{|S - D|}{\frac{1}{2}(S + D)} \times 100\%$$

Where:
S = Sample value
D = Duplicate or replicate value

Table 2. Soil Analytical Results – Polycyclic Aromatic Hydrocarbons

Remedial Action Plan, PM-1 Site, Kilometre Post 0.0, Northwest Territories

Sample ID	Sample Date	Sample Depth mbgs	7-Methylnaphthalene mg/kg	Acenaphthene mg/kg	Acenaphthylene mg/kg	Acridine mg/kg	Anthracene mg/kg	BaP TPE mg/kg	Benzo[a]anthracene mg/kg	Benzo[a]pyrene mg/kg	Benzo[b+j]fluoranthene mg/kg	Benzo[ghi]perylene mg/kg	Benzo[k]fluoranthene mg/kg	Chrysene mg/kg	Dibenzo[ah]anthracene mg/kg	Fluoranthene mg/kg	Fluorene mg/kg	Indeno[1,2,3-cd]pyrene mg/kg	Naphthalene mg/kg	Phenanthrene mg/kg	Pyrene mg/kg	Quinoline mg/kg	TACR - Coarse NA	TACR - Fine NA
		CCME[a]	NG	0.28	320	NG	2.5	5.3	1	0.6	1	NG	1	6.2	1	15.4	0.25	1	0.013	0.046	7.7	NG	1	1
PM-1-SB001A	17-Aug-21	0.1 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB001B	17-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB001C	17-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB001D	17-Aug-21	1.5 - 1.8	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB002A	17-Aug-21	0.1 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB002B	17-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB002C	17-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB002D	17-Aug-21	1.9 - 1.9	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB003A	17-Aug-21	0.3 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB003B	17-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB003C	17-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB003D	17-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB004A	17-Aug-21	0.1 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB004B	17-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB004C	17-Aug-21	1.0 - 1.5	**0.016**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	**0.039**	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB004D	17-Aug-21	1.5 - 2.0	**0.048**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	**0.062**	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB004E	17-Aug-21	2.0 - 2.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB004F	17-Aug-21	2.5 - 3.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB005A	17-Aug-21	0.1 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB005B	17-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB005C	17-Aug-21	1.0 - 1.5	**0.156**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	**0.06**	< 0.02	**0.194**	**0.03**	**0.01**	< 0.05	0.0136	0.0259
PM-1-SB005D	17-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	**0.007**	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB005E	17-Aug-21	2.0 - 2.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB006A	17-Aug-21	0.3 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB006B	18-Aug-21	0.5 - 1.0	**0.038**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	**0.05**	< 0.02	**0.23**	**0.03**	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB006C	18-Aug-21	1.0 - 1.5	**0.813**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	**0.13**	< 0.02	**0.757**	**0.07**	**0.02**	< 0.05	0.0136	0.0259
PM-1-SB006D	18-Aug-21	1.5 - 2.0	**0.306**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	**0.05**	< 0.02	**0.258**	**0.03**	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB006E	18-Aug-21	2.1 - 2.4	**0.107**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	**0.02**	< 0.02	**0.093**	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB007A	18-Aug-21	0.1 - 0.4	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB007B	18-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB007C	18-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB007D	18-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB007E	18-Aug-21	2.0 - 2.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB008A	18-Aug-21	0.0 - 0.5	**0.018**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	**0.08**	< 0.02	**0.237**	**0.05**	**0.02**	< 0.05	0.0136	0.0259
PM-1-SB008B	18-Aug-21	0.5 - 1.0	**0.733**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	**0.09**	< 0.02	**0.652**	**0.06**	**0.02**	< 0.05	0.0136	0.0259
DUP-3-0821	18-Aug-21	0.5 - 1.0	**0.629**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	0.11	< 0.02	**0.618**	**0.06**	**0.02**	< 0.05	0.0136	0.0259
RPD	-	-	15%	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	20%	NC	5%	NC	NC	NC	NC	NC
PM-1-SB008C	18-Aug-21	1.0 - 1.5	**0.292**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	0.04	< 0.02	**0.266**	**0.02**	**0.01**	< 0.05	0.0136	0.0259
PM-1-SB008D	18-Aug-21	1.5 - 2.0	**0.204**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	0.03	< 0.02	**0.159**	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB008E	18-Aug-21	2.0 - 2.5	**0.038**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	**0.037**	< 0.02	< 0.01	< 0.05	0.0136	0.0259
DUP-4-0821	18-Aug-21	2.0 - 2.5	**0.046**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	**0.033**	< 0.02	< 0.01	< 0.05	0.0136	0.0259
RPD	-	-	19%	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	11%	NC	NC	NC	NC	NC
PM-1-SB009A	18-Aug-21	0.2 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB009B	18-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB009C	18-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
DUP-6-0821	18-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
RPD	-	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
PM-1-SB010A	21-Aug-21	0.0 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB010B	21-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
DUP-7-0821	21-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
RPD	-	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
PM-1-SB010C	21-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB010D	21-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB011A	18-Aug-21	0.3 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB011B	18-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
DUP-1-0821	18-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
RPD	-	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
PM-1-SB011C	18-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB011D	18-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
DUP-2-0821	18-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
RPD	-	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
PM-1-SB038A	21-Aug-21	0.0 - 0.2	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB038B	21-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB038C	21-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB041A	18-Aug-21	0.1 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB041B	18-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB041C	18-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB041D	18-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
DUP-5-0821	18-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
RPD	-	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
PM-1-SB042A	21-Aug-21	0.0 - 0.2	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259

Table 2. Soil Analytical Results – Polycyclic Aromatic Hydrocarbons

Remedial Action Plan, PM-1 Site, Kilometre Post 0.0, Northwest Territories

Sample ID	Sample Date	Sample Depth	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Acridine	Anthracene	BaP TPE	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b+j]fluoranthene	Benzo[ghi]perylene	Benzo[k]fluoranthene	Chrysene	Dibenzo[ah]anthracene	Fluoranthene	Fluorene	Indeno[1,2,3-cd]pyrene	Naphthalene	Phenanthrene	Pyrene	Quinoline	TACR - Coarse	TACR - Fine
		mbgs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	NA	NA
PM-1-SB042B	21-Aug-21	0.8 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB042C	21-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB042D	21-Aug-21	1.5 - 2.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB042E	21-Aug-21	2.0 - 2.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB043A	21-Aug-21	0.1 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
DUP-8-0821	21-Aug-21	0.1 - 0.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
RPD	-	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
PM-1-SB043B	21-Aug-21	0.5 - 1.0	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SB043C	21-Aug-21	1.0 - 1.5	< 0.005	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	< 0.01	< 0.05	0.0136	0.0259
PM-1-SS1	21-Aug-21	0.0 - 0.3	**0.007**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.02	**0.03**	< 0.05	0.0136	0.0259
PM-1-SS2	21-Aug-21	0.0 - 0.3	**0.038**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	0.082	< 0.02	**0.05**	< 0.05	0.0136	0.0259
PM-1-SS3	21-Aug-21	0.0 - 0.3	**1.31**	< 0.005	< 0.005	< 0.05	< 0.004	0.0225	< 0.02	< 0.03	< 0.03	< 0.05	< 0.02	< 0.05	< 0.005	< 0.01	< 0.01	< 0.02	**1.39**	< 0.02	**0.06**	< 0.05	0.0136	0.0259

[a] Canadian Council of Ministers of the Environment (CCME). 2010. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health – Polycyclic Aromatic Hydrocarbons. Residential/parkland land use.

Notes:

Grey highlight indicates value exceeds referenced guideline.

Bolding indicates the analyte was detected

mbgs = metre(s) below ground surface

mg/kg = milligram(s) per kilogram

NG = no guideline

NC = RPD could not be calculated as one or more results was less than, or within five times, the detection limit

B[a]P TPE = benzo[a]pyrene total potency equivalents

RPD = relative percentage difference calculated using:

$$RPD\% = \frac{|S - D|}{\frac{1}{2}(S + D)} \times 100\%$$

Where:

S = Sample value

D = Duplicate or replicate value

Table 3. Soil Analytical Results - Herbicides and Organic Halides

Remedial Action Plan, PM-1 Site, Kilometre Post 0.0, Northwest Territories

Sample ID	Sample Date	Sample Depth	Atrazine	Bromacil	Diuron	Linuron	Simazine	Tebuthiuron	Extractable Organic Halides	Glyphosate
		mbgs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		CCME	NG	NG	NG	NG	NG	NG	NG	NG
PM-1-SS1	21-Aug-21	0.0 - 0.3	<0.0081R	**0.247 J**	**0.06 J**	<0.045R	<0.028R	<0.041R	<5R	**0.22 J**
PM-1-SS2	21-Aug-21	0.0 - 0.3	<0.0081R	**0.0821 J**	**0.05 J**	<0.045R	<0.028R	<0.041R	<5R	**0.06 J**
PM-1-SS3	21-Aug-21	0.0 - 0.3	**0.322 J**	**0.128 J**	**0.51 J**	<0.045R	<0.028R	<0.041R	<5R	<0.03R

Notes:
Bold indicates the anayte was detected
mbgs = metre(s) below ground surface
mg/kg = milligram(s) per kilogram
NG = no guideline
R = The sample result was rejected because of deficiencies in the ability to analyze the sample and meet the quality control criteria. The presence or absence of the analyte could not be verified. Data qualified "R" were not used in the decision-making process.
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Table 4. Soil Analytical Results - Particle Size Analysis

Remedial Action Plan, PM-1 Site, Kilometre Post 0.0, Northwest Territories

Sample ID	Sample Date (DD-MMM-YY)	Sample Depth mbgs	Sieve Analysis (75 microns) % Retained	Sieve Texture
PM_03_SOa	20-Sep-20	0.3 - 0.5	28	Fine
PM_07_SOa	20-Sep-20	1.1 - 1.3	19	Fine
PM-1-SB004C	17-Aug-21	1.0 - 1.5	13	Fine

Note:
mbgs = metre(s) below ground surface

Appendix A
Photograph Log for Site PM-1

Appendix A. Photograph Log for PM-1 Site

Photograph 1: Aerial view of former Amoco Gas Plant site north of the PM-1 aboveground infrastructure, facing southeast.

Photograph 2: Facing southwest towards aboveground infrastructure at PM-1.

Photograph 3: Facing northwest towards aboveground infrastructure at PM-1. Tall riser on the left side of the photograph owned by Paramount Resources Ltd.

Photograph 4: Facing south towards aboveground infrastructure at PM-1. Tall riser in the background is owned by Paramount Resources Ltd.

Photograph 5: Facing southeast towards diesel aboveground storage tanks on platforms.

Photograph 6: Elevated diesel aboveground storage tanks. Facing southeast. Tall riser on the right side of the photograph owned by Paramount Resources Ltd.

Photograph 7: Flare stack surrounded by metal guard in cleared area east of PM-1 infrastructure.

Appendix B
Conceptual Site Model

Exhibit B-1. Revised Conceptual Site Model

Category	Subcategory	Description	Result
Site Characteristics			
Land use	Onsite	Current: Industrial Future: Naturalized area	Guidelines for most conservative land use carried forward: CCME – residential/parkland
	Offsite (within 30 m of Site boundary)	The PM-1 Site is surrounded by a mix of oil and gas industrial land use and natural forested land in all directions.	
Site conditions	Soil stratigraphy	Results from boreholes advanced in the area around PM-1 indicate the subsoil to be predominantly silty clay or clay to full depth of investigation. Sand, gravel, or fill was observed near surface (up to 0.75 mbgs) in 15 boreholes. A layer of sand and gravel at 2.0 to 2.5 mbgs (auger refusal) was encountered in PM-1-SB005 on the west side of the Site.	Due to the presence of both fine- and coarse-grained constituents and the lack of geotechnical data, the most stringent of the CCME's guidelines were selected, without consideration of grain size.
	Grain size	Three particle size analysis tests were completed from boreholes PM_03, PM_07, and PM-1-SB004 which indicated the soil to be fine-grained (see Table 4).	
Other	Local hydrogeology – depth to groundwater, groundwater flow direction, hydraulic conductivity	Unknown; no monitoring wells were installed during investigation.	
	Preferential pathways – underground facilities, pipelines	The Pointed Mountain Pipeline exits the south end of Westcoast's lease from the pigging barrel. A tie-in pipeline enters the Site from the north and a flare line exits the Site to the southeast. Paramount operates underground infrastructure immediately west of the PM-1 Site (pipeline and buried powerline connects to the infrastructure from the north). A buried power line is present between the generator building and exits the Site to the west (toward the Paramount infrastructure).	
Groundwater use	Onsite	None	
	Offsite (within 500 m)	None	

Exhibit B-1. Revised Conceptual Site Model

Category	Subcategory	Description	Result
Surface Water	Drainage	The Site is poorly drained.	
	Onsite	None	
	Offsite (within 500 m)	A treed swamp is located approximately 60 m south of the Site. A shallow surface waterbody was observed approximately 346 m south of the Site. Another swamp is located approximately 294 m southeast of the Site. A third swamp is located approximately 310 m south of the Site, and a fourth is located approximately 348 m southwest of the Site. A fen is located approximately 459 m south of southeast of the Site. Additionally, two ponds were observed during the Phase I ESA approximately 130 m and 280 m northeast of the PM-1 infrastructure. The ponds were suspected to be septic and process water holding ponds associated with the former gas plant infrastructure and were observed to be fenced and covered. As such, they are unlikely to support aquatic life, and are not considered potential receptors.	
Exposure Assessment			
Human Health Pathways	Soil ingestion	Intake of contaminated soil is considered in the CCME residential/parkland guidelines.	Included in assessment
	Soil dermal contact	Dermal contact is considered in the CCME residential/parkland guidelines.	Included in assessment
	Vapour inhalation (indoor air)	Human health risks via the vapour inhalation pathway were considered, as the future land use at this Site is unknown.	Included in assessment
	Protection of potable groundwater	Though no domestic water wells were identified during a records search of the area around the PM-1 Site, future land use is unknown and groundwater supplies are present.	Included in assessment

Exhibit B-1. Revised Conceptual Site Model

Category	Subcategory	Description	Result
Ecological Health Pathways	Direct Soil Contact	CCME allows exclusion of this pathway for PHC F1 to F4 below certain depths, normally between 1.5 and 3.0 mbgs. Based on the shallow depth of investigation, this pathway is applicable.	Included in assessment
	Nutrient Energy Cycling	Not applicable to any of the COPCs.	
	Protection of Groundwater for Aquatic Life	CCME freshwater aquatic life guidelines consider potential receptors within 300 m of a soil plume. This pathway cannot be excluded due to the wetland located less than 100 m south of the Site.	Included in assessment
	Management Limit	Applicable to PHC F1 to F4 in soil under the CCME frameworks at depths at which the ecological direct soil contact pathway is eliminated.	Excluded from assessment; the ecological direct soil contact is applicable to the full depth of contamination.

Sources:

Canadian Council of Ministers of the Environment (CCME). 2008. *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale*. January. CWS for PHCs in Soil: Scientific Rationale - Supporting Technical Document (mvlwb.ca).

m = metre(s)
mbgs = metre(s) below ground surface
CCME = Canadian Council of Ministers of the Environment
COPC = contaminant of potential concern
ESA = Environmental Site Assessment
F = fraction
Paramount = Paramount Resources Ltd.
PHC = petroleum hydrocarbon