BAKER LAKE

LANDFARM FACILITY PLAN

Prepared for:

Government of Nunavut

Petroleum Products Division,

Rankin Inlet, NU

Department of Community & Government Services

October 2022

Figure 1. Baker Lake Proposed landfarm

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DEFINITIONS

Spill	The accidental and/or uncontrolled discharge of any volume of fuel or HAZMAT from its storage container or structure, vehicle, pipe, or other container: into the natural environment; or within a building**.**
Land Farm	A land farm means a surface-level soil remediation technology for petroleum contaminated soils that reduces concentrations of petroleum constituents through biodegradation to a level safe for human health and the environment. This technology usually involves spreading excavated contaminated soils in a thin layer on the ground surface and stimulating aerobic microbial activity within the soils through aeration.
Groundwater	Groundwater is water that exists underground in saturated zones beneath the land surface.
Muster Area	A muster area is a location where employees are to assemble after evacuating their workplace or work area due to an emergency.

1. INTRODUCTION

This Spill Contingency Plan has been prepared for the proposed Landfarm in Baker Lake, where applicable, each section herein begins with a table (unnumbered) that lists the various sections.

This plan meets the following plans as follows -

- Contingency Plan for operations,
- Operation and Maintenance Plan,
- Quality Assurance/Quality Control (QA/QC) Plan,
- Closure and Reclamation Plan,
- Abandonment and Restoration Plan,
- Fuel Management Plan,
- Location of All Nearby Water Bodies to Land-farm, **(in figure 3)**
- Water Remediation / Treatment Plan,
- Waste acceptance criteria,
- Cell 2 Water,
- MSDS, including Diesel, Gasoline, Jet A-1

1.1 PURPOSE OF THE PLAN

Spill Contingency Planning	**Section 3 and 4 (1) (2) a, b, c, d, e, f, g, h, I,**		

This Plan is intended to meet regulatory requirements listed in Consolidation of Spill Contingency Planning and Reporting Regulations R-068-93, Section 3 and 4 (1)(2) a, b, c, d, e, f, g, h, I, and j.

The Environmental Protection Act (EPA) gives the Government of Nunavut authority to take measures to ensure the preservation, protection, and enhancement of the environment, with the goal of long-term sustainability and stewardship.

The Emergency Contact Information.

Spill Contingency Plan Distribution List

Title	Contact Information	Organization and Location
Environmental Service Specialist	Sulaimon Ayilara (867) 645-8444 SAyilara@gov.nu.ca	GN PPD Rankin Inlet, NU
Director PPD	Bernard Bourque (867) 645-8421 BBourque@gov.nu.ca	GN PPD Rankin Inlet, NU P.O. Box 590, Rankin Inlet Nunavut, XOC OGO
Assistant Manager Operations	Titaaq Komaksiutiksak TKomaksiutiksak@gov.nu.ca	GN PPD Rankin Inlet, NU
Licensing office	867) 360-6338 licensing@nwb-oen.ca	Nunavut Water Board P.O. Box 119 Gjoa Haven, NU, X0B 1J0
Manager of Licensing	Richard Dwyer (867) 360-6338 richard.dwyer@nwb-oen.ca	Nunavut Water Board P.O. Box 119 Gjoa Haven, NU, X0B 1J0
Local Senior Administrative Officer (SAO)	Sheldon Dorey (867) 793-2874 sdorey@bakerlake.ca	Hamlet of Baker Lake, NU
Fire Department	Vince Inuktak (867) 793-2900	Hamlet of Baker Lake, NU
Arctic Fuel Svc	Kenny Hachey (867) 793-2311 kennyhachey@hotmail.com	Fuel Delivery Contractor Hamlet of Baker Lake, NU

1.1 PROJECT DESCRIPTION AND SITE MAP

Spill Contingency Planning and Reporting Regulations R-068-93	**Section 3 and 4 (c)**		

1.2 LOCATION OF FACILITY

The landfarm Facility will store capacity with **5000 cubic meters of contaminated soil** capacity.

The Landfarm proposed size is **80 meter Long X 40 meter width**.

The proposed Facility is in the Hamlet of Baker Lake (Baker Lake) at - The map coordinates **Latitude 646550.447, Longitude – 7135564.12.**

Baker Lake - where the river widens; is in the Kivalliq Region of Nunavut on mainland Canada and from Hudson Bay, it is near the nation's geographical centre and is notable for being the Canadian Arctic's sole inland community.

Baker Lake is located at the mouth of the Thelon River on the shore of Baker Lake. Three major rivers, including Thelon, the Kazan, and the Dubawnt, flow into Baker Lake. The lake is also connected to Hudson Bay by way of Chesterfield Inlet.

Figure 2.Proposed location of landfarm in Baker Lake in Red ink

Figure 3. Nearest waterbody above in yellow ink highlight

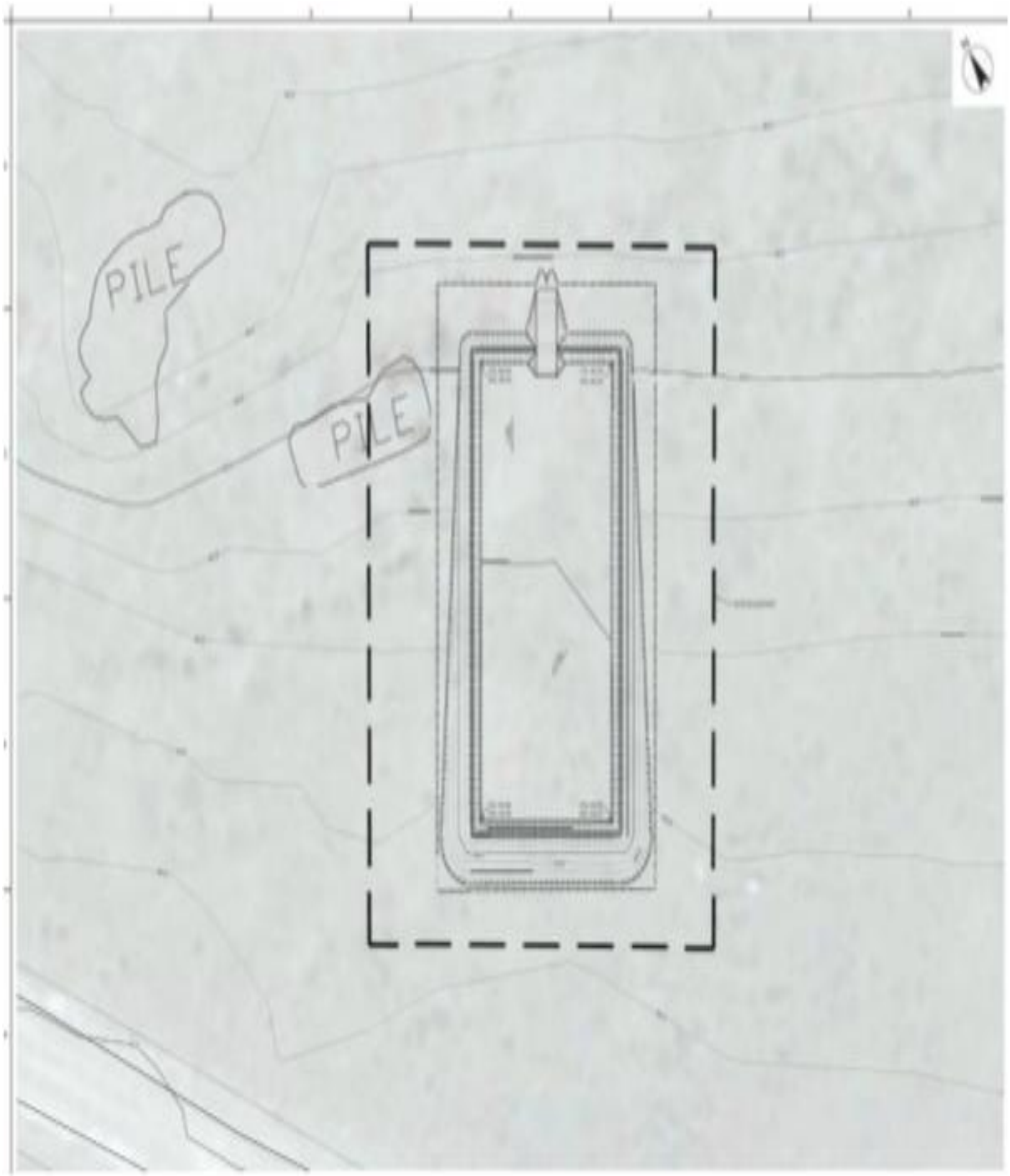


Figure 4. Project Design

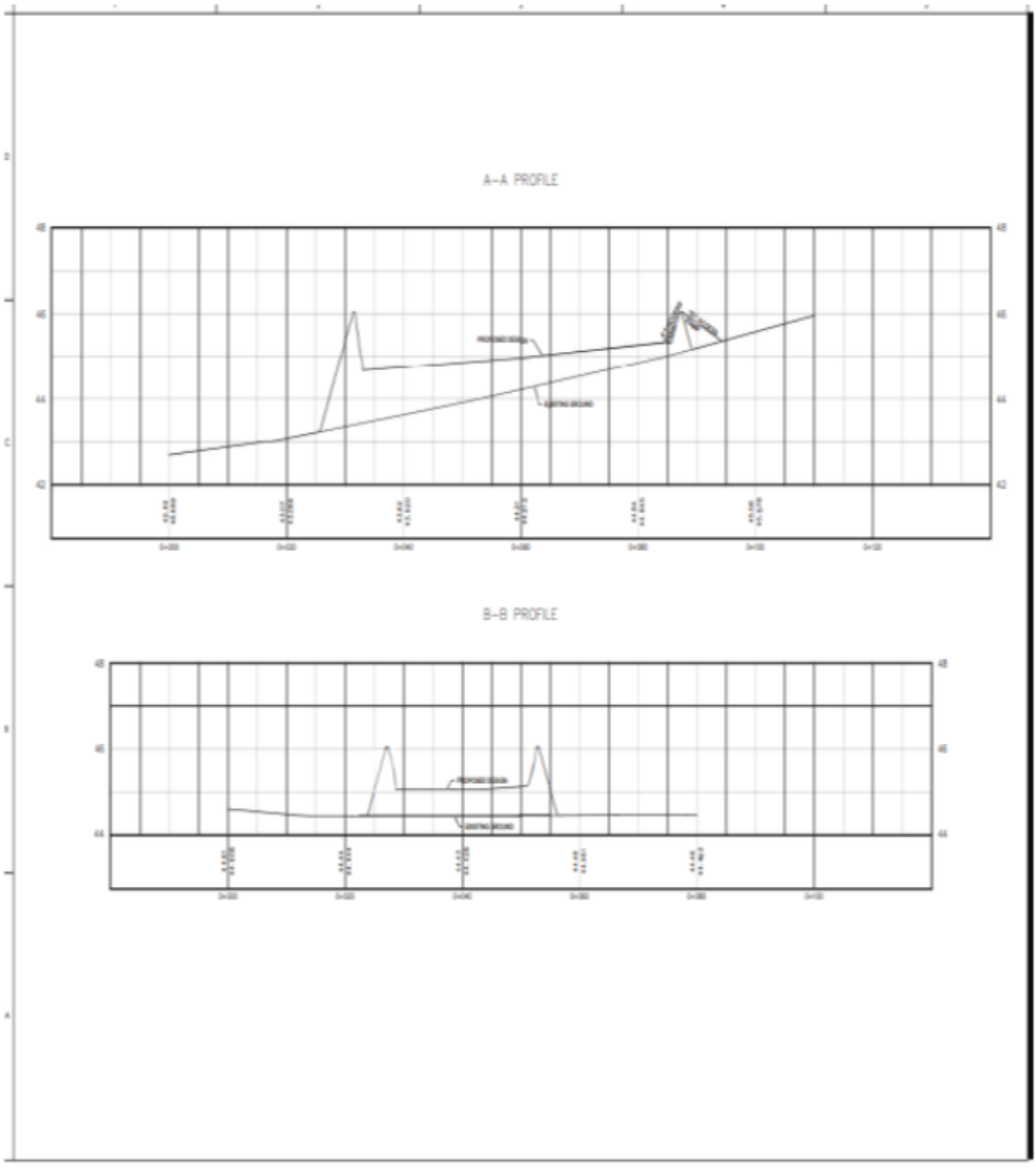


Figure 5. Project Design of Berm with liner around to protect seapage

Surface Water Contamination

Surface water contamination occurs when petroleum products are not controlled, are released onto the ground surface outside of engineered secondary containment (e.g., during spill) and flow overland or migrate through the soil into a surface water body. Gasoline and diesel have a lighter density than water so initially float on the water surface then begins to slowly dissolve into the water body. Contamination of surface water can also occur if petroleum product is released into engineered secondary containment that has surface water accumulations (e.g., precipitation).

Groundwater Contamination

Groundwater contamination occurs when petroleum products are not controlled, are released onto the ground surface outside of engineered secondary containment (e.g., during spill) and migrate through the soil into the groundwater table. Contaminated groundwater can migrate and contaminate local surface water bodies. One liter of gasoline can contaminate one million liters of groundwater.

The groundwater table in the vicinity of the Facility flows southward from the tank farm towards Baker Lake. Groundwater is not used as a source of drinking water in the Hamlet of Baker Lake, but shallow groundwater likely discharges into Baker Lake.

Description and Rating of Likelihood of Spill

Likelihood Rating	Likelihood
1	Certain
3	Very Possible
5	Possible
7	Unlikely
9	Very Unlikely

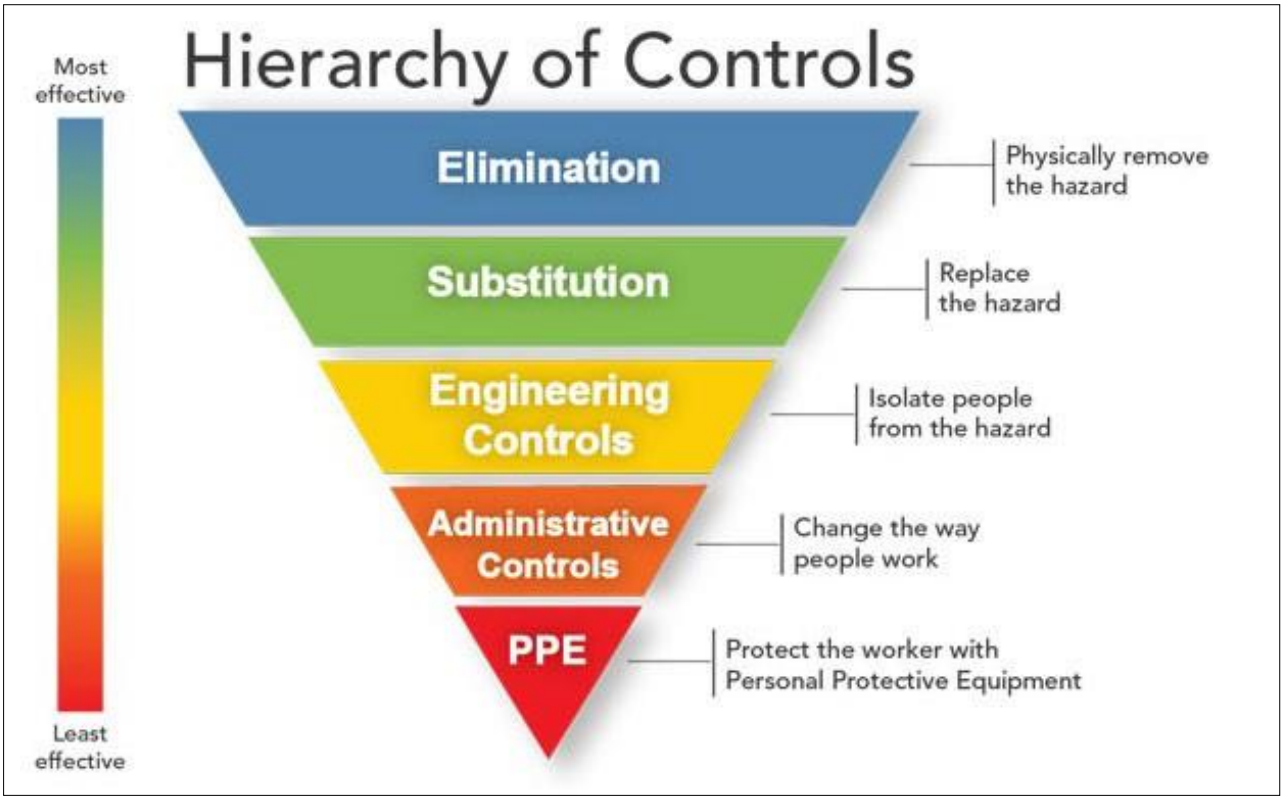
The likelihood is assessed based on recent previous spill events and current preventive measures

Notes:

1. L – Likelihood
2. C – Consequence

2 CONTROLS

Controls prevent unwanted events from occurring (preventive) or mitigate the impact of an event on the environment (mitigative). Controls are described in the context of the Hierarchy of Controls



COMPLIANCE TO CONTROLS

The primary regulatory requirements for the environment that apply to this Facility are listed in Consolidation of Spill Contingency Planning and Reporting Regulations R-068-93, Section 3 and 4 (1)(2) a, b, c, d, e, f, g, h, I, and j to ensure that the applicable regulations are monitored and adhered to is a preventive control by the operation and PPD environmental unit and ensure compliance.

Briefly, the effectiveness of controls reduces as one moves down the control pyramid.

Elimination and substitution were considered at the design phase but can contribute to corrective actions implemented at the Facility to respond to unwanted events that occur.

The predominant forms of controls at the Facility are engineering, administrative and personal protective equipment (PPE). Most of the engineering controls related to the tanks and related infrastructure were described. This section describes the preventive administrative controls in place at the Facility to mitigative controls.

2.1 CONTINGENCY PLAN FOR OPERATIONS

Contingency plan is put in place against a "what if" scenario that could affect operation and maintenance activities at the landfarm. Some of the potential occurrence of negative event including natural disaster, flood, and spill. Spill is the worse case scenario in a landfarm, and all plan is in place to ensure spill is contain, clean up and operational activities resume during the summer months.

- Contingency planning policy statement.
- Impact analysis.
- Preventive controls, which is the proactive measures that prevent outages and disruptions can ensure system availability and reduce costs related to contingency measures and lifecycle.
- Contingency strategies which discuss about thorough recovery strategies ensure that a system may be recovered fast and completely after a disruption.
- Testing, training, and exercises - Plan testing validates recovery capabilities, training prepares recovery personnel for plan activation and exercising the plan identifies planning gaps. Combined, these activities improve plan effectiveness and overall organization preparedness.
- Plan maintenance – This involves regular update to remain current with system enhancements and positive changes.

Contingency plans are in place against operational inadequacy. PPD always respond to

a. Immediate deployment of spill equipment whenever there is spill incident, whereby ensuring everyone is safe. Clean up is begin after spill to control area and environment.

b. Landfarm is periodically inspected and keep in good condition to avoid contaminated soil escape out of the berm. The soil within the landfarm will be sampled at the beginning and end of each summer treatment season to verify the nature and extent of contamination within the soils to be remediated. The soil samples will be collected and tested for Extractable Hydrocarbons F1 - F4, Benzene, Toluene, Ethylbenzene, Xylene (BTEX), Total Petroleum Hydrocarbons (TPH) and total lead.

c. Samples of the precipitation runoff and snowmelt water collected within the landfarm facility liner will be conducted early each summer following the spring melt to determine water quality prior to the startup of the treatment system.

d. Repeated sampling of soil and water (duplicate sampling), collection of more than one sample for a given analysis at a given location. The replicate samples are collected, handled, and analyzed using the standard procedures applied to routine samples. Replicate sampling,

combined with the results of other quality control procedures, can help indicate sources of error and are particularly useful in identifying problems with accuracy and sampling methods. This to ensure result reliance and assurance.

ROLES AND RESPONSIBILITIES

The key roles at the Facility and their individual responsibilities are presented in ensuring that the requirements of this Plan are assigned and that all parties are aware of their responsibilities is a preventive administrative control.

Roles and Responsibilities

Position	Organization	Responsibilities
Director	Government of Nunavut Petroleum Products Division Rankin Inlet, NU	-Ensure that regulatory obligations of the Facility are met
Manager Field Operations	Government of Nunavut Petroleum Products Division Rankin Inlet, NU	-Ensure that resources are available for implementation of this E2 Plan -Ensure that E2 Plan is implemented -Approve any costs of response or restoration activities
Environmental Services Specialist	Government of Nunavut Petroleum Products Division Field Operations Kivalliq	-Maintain license with the NWB -Write Spill contingency Plan and submitted plan to Nunavut Water Board - Assessment of immediate spill on site with on site assessment of event within 24hrs of spill -Procure or arrange additional internal or contract support to help response and clean-up -Preparation and execution of major communications -Receive information from fuel delivery contractor and report to environmental regulatory agencies, PPD and the GN -Procure Environmental Site Assessment

		of impacted areas -Assist together with the Manager to develop a long-term remediation action plan

Arctic Fuel Services Ltd.	Fuel/Landfarm Management Contractor Hamlet of Baker Lake, NU	-Prepare spill response equipment -Ensure that Arctic Fuel employees are trained and competent to effectively respond to environmental emergencies -Maintain response supplies and equipment including but not limited to spill kits and PPE -Coordinate all emergency response activities until PPD representative assumes role of Incident Command -Calling out and mobilizing other emergency services which may be required -Co-ordinating and directing emergency services and ensuring all necessary action is taken to control the emergency -Assign duties to team members -Establish procurement arrangement with local contractors and community members -Maintaining a log of all action taken and decisions and orders made -Authorizing expenditures required to preserve life and health for operations personnel -Report to regulatory authorities -Execute all facets of contingency Plan
PPD Operation Staffs		-Ensure that they participate in training related to the Plan and understand their individual responsibilities -Immediately report all spills or adverse conditions to PPD operation and environmental services -Support spill response as directed by PPD -Wildlife Office to determine a suitable site to store or dispose of the contaminated gravel or sorbent material

Local - Senior Administrative Officer (SAO), Baker Lake Hamlet	Hamlet of Baker Lake, NU	-Ensure effective communication to resident of the Hamlet in-case of event. -Provide input to this Plan -Provide support in an emergency (e.g., communications, evacuations)
Fire Chief	Hamlet of Baker Lake, NU	-Firefighting response upon call
24–Hour Spill Report Line	Environment and Natural Resources Yellowknife, NWT	-Create a spill report number for tracking of all spill information and follow-up on clean up

3. PERSONNEL TRAINING AND RESPONSIBILITIES

Training for the Plan is managed in accordance with appliable legal requirements under environmental, health, safety, and environmental legislation and GN government requirements. The training methods may include lectures, audio visual presentations; and/or field simulations exercises. All training records are maintained by PPD and kept in the database by the Environmental Services Specialist.

Training Applicable to the Plan

Training Module	Frequency	Participants
Plan Requirements	New Employee at Hire	Employee
Spill Response	New Employee within 3-months of hire	All landfarm staff and Fuel Management Contractor
Plan Test Exercises	Annually	All PPD staff
Basic Health and Safety	Provided PPD Safety Rule Book at hire	All employees
WHMIS	New Employee at Hire – 4 years	All employees and employers
First Aid	New Employee at Hire Renewal – 3 Years	All employees
CPR Level C	New Employee at Hire Renewal – 3 Years	All employees
Transport of Dangerous Goods (TDG)	New Employee at Hire Renewal – 2 Years	-PPD operation staff -Fuel Truck Drivers

3.1 INFRASTUCTURES AND EQUIPMENT

Spill Contingency Planning and Reporting Regulations R-068-93, Section 3, and 4			

Some Contractor's physical resources and equipment are maintained to help in event of spill at the landfarm to clean-up large spill event in compliance to Contingency Plan. The major equipment contractor in Baker Lake is the Baker Lake Consulting Services (BLCS) who supply us with heavy duty equipment in the community.

3.2 FUEL MANAGEMENT PLAN

All heavy-duty equipment (loader, excavator, screening plant, forklift) to be used inside the landfarm will be provided by Baker Lake Construction Services (BLCS), a contracting company in the Hamlet of Baker Lake with diesel fuel usage and management inside all equipment on site.

PPD does not own any heavy-duty equipment and thereby not responsible for the usage as they will be on rental during construction of the landfarm facility.

However, precautionary measure will be made during the fuel usage in the equipment and management to ensure environmental protection against spillage during refueling of the equipment by their owner.

4. SPILL KITS EQUIPMENT

A summary of the spill kits maintained to support the implementation of the Plan presented in

Spill Response Equipment.

Location	Content
Spill kits box at south side of the landfarm.	Contains - ➢ 2 Spill drum of 55 gallon ➢ 20 5”x10’ oil only boom ➢ 50 – oil only pads ➢ 1 – oil only rolls (150’) ➢ 10 – green nitrile gloves (pairs) ➢ 5 – splash goggles ➢ 5 – Tyvek suits ➢ 5 – yellow Hazmat disposal bags ➢ 4 – 24” x 24” x 4’ yellow berm ➢ 6 Aggressors Men’s Insulated Rubber Boots (various sizes) ➢ 12 Disposable coveralls (various sizes) ➢ Heavy duty garbage bags, 50 pack ➢ 5 Safety Glasses; clear anti-fog lens ➢ 5 Chemical Resistant gloves, orange PVC coated, gauntlet cuff ➢ 5 Thermal Insulated high performance work gloves ➢ 2 packs of hand sanitizing wipes (20/box) ➢ 5 Spading Forks ➢ 2 Clear Plastic Sheeting 6mm 40ftx100ft ➢ Dispenser Box Wipes ➢ 4 Fiberglass Rakes ➢ 5 Bow rakes ➢ 5 Square Point Shovel with long handle ➢ Safety First Aid Kit for 6-15 persons ➢ First Aid Kit 1-5 persons

4.1 OPERATIONS & EMERGENCY RESPONSE EQUIPMENT

Some Response Equipment includes.

Item	Owner / Operator or Responsible	Location
Dump Truck	Local Contractor	BLCS, Baker Lake
Backhoe	Local Contractor	BLCS, Baker Lake
Bulldozer	Local Contractor	BLCS, Baker Lake
Wheel Loader	Local Contractor	BLCS, Baker Lake
Flatbed Truck / Trailer	Local Contractor	BLCS, Baker Lake

All Equipment are rented by Bake Laker Contracting Services (BCLS) for all construction activities of the landfarm.

4.2 REPORTING AND NOTIFICATIONS

Spill Contingency Planning and Reporting Regulations R-068-93, Section 3, and 4	**(f)**		

The Plan reporting and notification requirements -

Reporting spill.

Spill Contingency Plan identifies lines of authority and responsibility, established proper reporting and communication procedures, and described an action plan to be implemented in the event of a spill. All the information necessary to effectively control and clean up a spill.

- Stop source of spill.
- Clean up the spill.
- Write a spill report or call spill number for reporting a spill on the 24-Hour Spill Report Line by calling (867) 920-8130.

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER
B	OCCURRENCE DATE: MONTH – DAY – YEAR	OCCURRENCE TIME	☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	____-_____
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS			

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC	SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN	FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Instructions for Completing the NT-NU Spill Report Form

This form can be filled out electronically and e-mailed as an attachment to spills@gov.nt.ca. Until further notice, please verify receipt of e-mail transmissions with a follow-up telephone call to the spill line. Forms can also be printed and faxed to the spill line at 867-873-6924. Spills can still be phoned in by calling collect at 867-920-8130.

A. Report Date/Time	The actual date and time that the spill was reported to the spill line. If the spill is phoned in, the Spill Line will fill this out. **Please do not fill in the Report Number**: the spill line will assign a number after the spill is reported.
B. Occurrence Date/Time	Indicate, to the best of your knowledge, the exact date and time that the spill occurred. Not to be confused with the report date and time (see above).
C. Land Use Permit Number /Water Licence Number	This only needs to be filled in if the activity has been licenced by the Nunavut Water Board and/or if a Land Use Permit has been issued. Applies primarily to mines and mineral exploration sites.
D. Geographic Place Name	In most cases, this will be the name of the city or town in which the spill occurred. For remote locations – outside of human habitations – identify the most prominent geographic feature, such as a lake or mountain and/or the distance and direction from the nearest population center. **You must include the geographic coordinates** (Refer to Section E).
E. Geographic Coordinates	This only needs to be filled out if the spill occurred outside of an established community such as a mine site. Please note that the location should be stated in degrees, minutes and seconds of Latitude and Longitude.
F. Responsible Party Or Vessel Name	This is the person who was in management/control/ownership of the substance at the time that it was spilled. In the case of a spill from a ship/vessel, include the name of the ship/vessel. Please include full address, telephone number and e-mail. Use box K if there is insufficient space. **Please note that, the owner of the spilled substance is ultimately responsible for any spills of that substance, regardless of who may have actually caused the spill.**
G. Contractor involved?	Were there any other parties/contractors involved? An example would be a construction company who is undertaking work on behalf of the owner of the spilled substance and who may have contributed to, or directly caused the spill and/or is responding to the spill.
H. Product Spilled	Identify the product spilled; most commonly, it is gasoline, diesel fuel or sewage. For other substances, avoid trade names. Wherever possible, use the chemical name of the substance and further, identify the product using the four digit UN number (eg: UN1203 for gasoline; UN1202 for diesel fuel; UN1863 for Jet A & B)
I. Spill Source	Identify the source of the spill: truck, ship, home heating fuel tank and, if known, the cause (eg: fuel tank overfill, leaking tank; ship ran aground; traffic accident, vandalism, storm, etc.). Provide an estimate of the extent of the contaminated/impacted area (eg: 10 m^2)
J. Factors Affecting Spill	Any factors which might make it difficult to clean up the spill: rough terrain, bad weather, remote location, lack of equipment. Do you require advice and/or assistance with the cleanup operation? Identify any hazards to persons, property or environment: for example, a gasoline spill beside a daycare centre would pose a safety hazard to children. Use box K if there is insufficient space.
K. Additional Information	Provide any additional, pertinent details about the spill, such as any peculiar/unique hazards associated with the spilled material. State what action is being taken towards cleaning up the spill; disposal of spilled material; notification of affected parties. If necessary, append additional sheets to the spill report. Number the pages in the same format found in the lower right hand corner of the spill form: eg. "Page 1 of 2", "Page 2 of 2" etc. **Please number the pages to ensure that recipients can be certain that they received all pertinent documents.** If only the spill report form was filled out, number the form as "Page 1 of 1".
L. Reported to Spill Line by	Include your full name, employer, contact number and the location from which you are reporting the spill. Use box K if there is insufficient space.
M. Alternate Contact	Identify any alternate contacts. This information assists regulatory agencies to obtain additional information if they cannot reach the individual who reported the spill.
N. Report Line Use Only	**Leave Blank**. This box is for the **Spill Line's use only**.

5 ANNUAL REPORTING

In accordance with Section 26, annual Reporting provides insufficient detail regarding what information will be provided in annual reports. Annual reports should be sufficiently detailed to convey a thorough understanding of the project.

Annual reports contain but are not limited to the following information:

- Waste quantity and quality (pre- and post-treatment)
- Treatment summary and any items of note
- Details of monitoring, sampling, and sample analyses
- Results, including: (1) Raw data, (2) Data summary table(s) that include comparison to relevant limits (for example, treatment targets, discharge/disposal criteria, baseline/reference data, environmental guidelines) and (3) Discussion of monitoring results. Any exceedances should be clearly indicated and discussed, including causes and response actions.
- Details of any spills and accompanying response actions

5.1 INCIDENT REPORT AND INVESTIGATIONS

Incident reporting and investigation are crucial in managing risks at the Facility and can help reduce the likelihood or severity of future incidents. All incidents, including near misses and actual incidents, should be investigated, documented, and reported. Incident documentation should start immediately upon notification, ensuring that it is safe to do so (see **SOP – Emergency Response Steps**).

Incidents should be documented in writing and through photographs. The minimum documented information should include the information required in the NT-NU Spill Report, regardless of whether the incident is reportable or not. The following investigation steps should be taken for all near misses and incidents:

a. Report the incident occurrence to the designated person. This initial report should include a brief description the incident, apparent causes of incident, the time of incident and any immediate actions taken to control the incident.
b. When it is safe to do so, investigate the incident and collect evidence of what happened, why it happened and the impacts of the incident. Data may be collected through observation,

interviews, and collection of data (e.g., fuel level measurements, fuel pump flow measurements, size / depth of spilled product).

c. Identify causal factors and root cause. A fishbone diagram (example below) can be used to help identify the causal factors and outcomes and then identify the root cause. This assessment should be completed with all the parties involved with the incident and leadership from PPD.
d. Identify corrective actions for the root cause and any other causal factors that require stronger preventive or mitigative controls.
e. Develop an implementation plan for corrective actions with the person responsible and target due date identified and the approvals required documented.

f.Implement the plan.

g. As little time as possible should be lost between the moment of an incident and the beginning of the investigation. In this way, one is most likely to be able to observe the conditions as they were at the time, prevent disturbance of evidence, and identify witnesses.

6. EMERGENCY RESPONSE

There are nine (9) key steps to managing emergencies:

1. Take Charge of the Scene.
2. Call for Help.
3. Assess the Scene.
4. Protect Human Health & Safety.
5. Secure the Scene and Community.
6. Apply Immediate Control Measures.
7. Communicate to Partners.
8. Document and Investigate Emergency Event.
9. Plan Clean-Up and Restoration.

6.1 OPERATION AND MAINTENANCE P L A N

The O & M plan primary objective is to provide communities throughout the territory with operational landfarm in order to properly handle, remediate and dispose of petroleum hydrocarbon (PHC) impacted soils. This will allow communities a method to treat contaminated soil without spending excessive amounts of money shipping the material south, or further polluting community dumps which are not set up to handle this sort of contamination.
The secondary objective is to provide PPD and their contractors a place to remediate all contaminated soil caused from a spill that PPD or their contractors is liable for.

The operation and maintenance of the facility had been sole responsibility of the PPD over the years with annual inspection of the landfarm by the CIRNAC officer who brings out area to be fix and effort made immediately to fix and maintain them effectively.
The operation also includes the soil screening from rock, soil remediation mixing with fertilizer inside the landfarm and soil testing to monitor remediation over the years.
Water sample inside the berm are sent out to the laboratory to ensure no contamination of hydrocarbon before water discharge, approval is given by the CIRNAC for water discharge annually.

Soil characteristics include particle size, soil texture, bulk density, moisture content, and permeability. Soil nutrient composition is also important since nutrients are required for effective biodegradation. Microorganisms that break down PHCs in soil work best in an aerobic environment; therefore, introducing oxygen into the soil is important. Climatic conditions influence landfarm efficiency. Climatic factors include rainfall, snow, wind effects, and temperature. Rain and snowmelt will change the moisture content of the remediating soil, and runoff can cause soil erosion. Landfarm soil erosion can also occur during windy periods particularly during tilling or plowing operations. Temperature affects the rate of remediation because bacterial metabolism rates are typically reduced at very low temperatures. However, bacteria on site are acclimatized and subsequently better adapted to the cold environment, maintaining metabolic activity at colder temperatures.

ACTIVITIES REQUIRED AND ESTIMATED SCHEDULE

Restoration activities may include, but not be limited to:

- Facility repair and/or re-build
- Community repair and/or re-build
- Soil Remediation
- Surface Water Remediation
- Groundwater Remediation
- Record-keeping procedures - Baker Lake is a new proposed landfarm and **no record of remediation of contaminated soil yet until landfarm operation begin in 2023** after construction of the landfarm. However, the Environmental Services Specialist will keep record of all soil intake and exit after treatment.

6.2.1 SOIL REMEDIATION THROUGH ADDITIVES (FERTILIZER)

Landfarm treatment is an ex-situ bioremediation technique commonly used to treat contaminated soil, particularly for petroleum hydrocarbons (PHC). In general, landfarming involves the manipulation of soil conditions to promote volatization and biodegradation of contaminants within the soil. Fertilizer is applied in solid form during tilling to increase nitrogen and phosphorous concentrations. Choosing a slow-release fertilizer will reduce application frequency.

Manipulation may involve, but is not limited to;

- Aeration through tiling,
- Adjustment of moisture content (i.e., the addition of water),
- Microorganisms (predominantly aerobic), which metabolize and breakdown PHCs in affected soils,
- PH adjustments using chemicals,
- Soil conditioning, such as the addition of bulking agents to assist in aeration and moisture retention, or chemicals to promote biological activity.

The objective of landfarm is to remediate contaminated soil through addition of additives like

fertilizer which aid revitalization of the hydrocarbon in the soil. Soil sample procedure will be obtained to ensure parameters of BTEX, F1 to F4 are meet against levels of petroleum hydrocarbons in soil as a minimum, based on the GN and CCME Guidelines.

The feasibility and cost of each option will be site and event specific but generally, off-site disposal or treatment can be expensive and degrade the local ecosystem or underlying permafrost if appropriate back-fill material not replaced. The simplest ex-situ treatment method is biodegradation. Petroleum products can degrade naturally when ideal temperature and nutrient conditions exist for micro-organisms to thrive. Tilling the affected soil increases the rate of volatilization and maximizes the exposure of the soil to the organisms and oxygen to increase the speed of degradation. Lower-cost in-situ remediation has not been widely adopted in northern Communities as these methods may incur high energy and on-going maintenance costs and environmental factors must be managed.

A contaminated soil depth less than 0.5 m within cell(s) or in windrows is recommended. However, the type of equipment available for tilling, as well as the landfarm space availability, will dictate soil depth. Typically, landfarming is practiced with soil depths between 0.4 and 0.5. Contaminated soil should not be applied on a continuous layer of snow or ice or when the existing soil base is saturated with moisture. The expected remediation time for contaminated soils is 6 months to 18 months but may be longer depending on biodegradation conditions, the volume of soil, and the contamination levels of the soil.

TABLES

Table 1 Remediation Requirements

	Soil Texture	Agricultural Land Use	Residential or Parkland Land Use	Commercial Land Use	Industrial Land Use
Fraction 1	Fine	210 (170[a])	210 (170[a])	320 (170[a])	320 (170[a])
	Coarse	30[b]	30[b]	320 (240[a])	320 (240[a])
Fraction 2	Fine	150	150	260 (230[a])	260 (230[a])
	Coarse	150	150	260	260
Fraction 3	Fine	1300	1300	2500	2500
	Coarse	300	300	1700	1700
Fraction 4	Fine	5600	5600	6600	6600
	Coarse	2800	2800	3300	3300
Benzene	Fine	0.0068	0.0068	0.0068	0.0068
	Coarse	0.03	0.03	0.03	0.03
Toluene	Fine	0.08	0.08	0.08	0.08
	Coarse	0.37	0.37	0.37	0.37
Ethylbenzene	Fine	0.018	0.018	0.018	0.018
	Coarse	0.082	0.082	0.082	0.082
Xylene	Fine	2.4	2.4	2.4	2.4
	Coarse	11	11	11	11
Lead	Fine	70	140	260	600
	Coarse				
Polychlorinated Biphenyls	Fine	0.5	1.3	33	33
	Coarse				

Notes: All values are in parts per million (ppm)
a = Where applicable, for protection of potable groundwater
b = Assumes contamination near residence

Data from CCME *Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil*, (2001) Revised January 2008 and the Government of Nunavut *Environmental Guideline for Site remediation* (2009).

Analyzed Water Parameters and Detection Limits

Analytical Package	Parameters	Detection Limits	Unit
Total and Dissolved Metals (ICP-T, ICP-D)	Aluminum (Al)	0.0002	mg/L
	Antimony (Sb)	0.000005	mg/L
	Arsenic (As)	0.00002	mg/L
	Barium (Ba)	0.00002	mg/L
	Beryllium (Be)	0.000002	mg/L
	Bismuth (Bi)	0.000005	mg/L
	Boron (B)	0.005	mg/L
	Cadium (Cd)	0.000005	mg/L
	Calcium (Ca)	0.05	mg/L
	Chromium (Cr)	0.00005	mg/L
	Cobalt (Co)	0.00005	mg/L
	Copper (Cu)	0.00005	mg/L
	Iron (Fe)	0.01	mg/L
	Lead (Pb)	0.000005	mg/L
	Lithium (Li)	0.0002	mg/L
	Magnesium (Mg)	0.05	mg/L
	Manganese (Mn)	0.000005	mg/L
	Mercury (Hg)	0.00005	mg/L
	Molybdenum (Mo)	0.00005	mg/L
	Nickel (Ni)	0.00005	mg/L
	Phosphorus (P)	0.05	mg/L
	Potassium (K)	0.2	mg/L
	Selenium (Se)	0.00004	mg/L
	Silicon (Si)	0.05	mg/L
	Silver (Ag)	0.000005	mg/L
	Sodium (Na)	0.2	mg/L
	Strontium (Sr)	0.00001	mg/L
	Thallium (Tl)	0.000002	mg/L
	Tin (Sn)	0.00002	mg/L
	Titanium (Ti)	0.00005	mg/L
	Uranium (U)	0.000002	mg/L
	Vanadium (Va)	0.00001	mg/L
	Zinc (Zn)	0.0001	mg/L

Analytical Package	Parameters	Detection Limits	Unit
Routine Parameters (R)	Alkalinity ($CaCO_3$)	5	mg/L
	Acidity ($CaCO_3$)	5	mg/L
	Chloride	0.5	mg/L
	Carbonate (Co_3)	5	mg/L
	Bicarbonate (HCO_3)	5	mg/L
	Total Hardness ($CaC0_3$)	1	mg/L
	Hydroxide (OH)	5	mg/L
	Sulphate (SO_4)	0.05	mg/L
	Total Suspended Solids (TSS	3	mg/L
	Total Dissolved Solids (TDS)	5	mg/L
	Total Organic Carbon (TOC)	1	mg/L
	Total Inorganic (TIC)	1	mg/L
	pH	0.1	-
	Conductivity (uS/cm)	0.2	uS/cm
	Turbidity	0.1	NTU
Nutrients (N)	Nitrate (NO_3)	0.006	mg/L
	Nitrite (NO_2)	0.002	mg/L
	Ammonia (NH3)	0.005	mg/L
	Orthophosphate	0.001	mg/L
	Total Phosphorus	0.001	mg/L
Biological (B)	Biochem Oxygen Demand	5	mg/L
	Fecal Coliforms	1	CFU/100 mL
	Oil & Grease	1	mg/L
Petroleum Hydrocarbons (PHCs)	Benzene	0.0005	mg/L
	Ethylbenzene	0.0005	mg/L
	Toluene	0.0005	mg/L
	o-Xylene	0.0005	mg/L
	m+p-Xylene	0.0005	mg/L
	Xylenes	0.0005	mg/L
	F1(C6-C10)	0.1	mg/L
	F1-BTEX	0.1	mg/L
	F2 (>C10-C16)	0.25	mg/L
	F3 (C16-C34)	0.25	mg/L
	F4 (C34-C50)	0.25	mg/L

Figure 6. Detection limits

6.2.2 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN

As per the Part J – Item 12 of the License, the QA/QC Plan reflect the operation and/or technology being utilized. “The QA/QC Plan shall be acceptable to an accredited laboratory and include, when being submitted to the Board, a cover letter from an accredited laboratory confirming acceptance of the Plan for analyses to be performed under the License.”

PPD presently work with ALS Laboratory and Paracel laboratories to analyses water and soil samples for results.

Samples of water are in 3 parts of;

- 2022 BL WT 01, which is Water Treated (WT)
- 2022 BL WT 01, which is the repeat test for Water Treated (WT)
- 2022 BL TANK FARM, which is sample water from inside the Tank farm
- 2022 BL WATER CELL, which is water inside the Cell berm 2

Nunavut CGS - Petroleum Products Division
ATTN: SULAIMON AYILARA
Box 590
Rankin Inlet NU X0C 0G0

Date Received: 21-JUN-22
Report Date: 24-JUN-22 09:52 (MT)
Version: FINAL

Client Phone: 867-645-8444

Certificate of Analysis

Lab Work Order #: L2716452
Project P.O. #: NOT SUBMITTED
Job Reference: BAKER LAKE WATER TREATMENT 2022
C of C Numbers:
Legal Site Desc:

Craig Riddell, B.Sc.Ag
Account Manager

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Figure 7. Certificate of Analysis for water treatment in Baker Lake

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2716452-1 2022 BL WT 01							
Sampled By: CLIENT on 17-JUN-22 @ 06:00							
Matrix: WATER							
Miscellaneous Parameters							
Xylenes (Total)	<0.00064		0.00064	mg/L		22-JUN-22	
Total THMs	<0.0013		0.0013	mg/L		22-JUN-22	
VOC plus F1 by GCMS							
Acetone	<0.050		0.050	mg/L		21-JUN-22	R5805562
Benzene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Bromobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromochloromethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromodichloromethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Bromoform	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromomethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
n-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
sec-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
tert-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Carbon disulfide	<0.0050		0.0050	mg/L		21-JUN-22	R5805562
Carbon Tetrachloride	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Chlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Chloroethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Chloroform	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Chloromethane	<0.0050		0.0050	mg/L		21-JUN-22	R5805562
2-Chlorotoluene	<0.020		0.020	mg/L		21-JUN-22	R5805562
4-Chlorotoluene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dibromochloromethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,2-Dibromoethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dibromomethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,3-Dichlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,4-Dichlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dichlorodifluoromethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,1-dichloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,2-Dichloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,1-dichloroethene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
trans-1,2-Dichloroethene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dichloromethane	<0.0050		0.0050	mg/L		21-JUN-22	R5805562
1,2-Dichloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,3-Dichloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
2,2-Dichloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,1-Dichloropropene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
cis-1,3-Dichloropropene	<0.0020	DLM	0.0020	mg/L		21-JUN-22	R5805562
trans-1,3-Dichloropropene	<0.0020	DLM	0.0020	mg/L		21-JUN-22	R5805562
Ethylbenzene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
F1	<0.10		0.10	mg/L		21-JUN-22	R5805562
Hexachlorobutadiene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Hexane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
2-Hexanone (Methyl butyl ketone)	<0.020		0.020	mg/L		21-JUN-22	R5805562
Isopropylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
4-Isopropyltoluene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
MEK	<0.020		0.020	mg/L		21-JUN-22	R5805562
MIBK	<0.020		0.020	mg/L		21-JUN-22	R5805562
MTBE	<0.00050		0.00050	mg/L		21-JUN-22	R5805562

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Figure 8. - 2022 BL WT 01, which is Water Treated (WT)

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2716452-1 2022 BL WT 01							
Sampled By: CLIENT on 17-JUN-22 @ 06:00							
Matrix: WATER							
VOC plus F1 by GCMS							
Styrene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,1,1,2-Tetrachloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,1,2,2-Tetrachloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Tetrachloroethene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Toluene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,2,3-Trichlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,2,4-Trichlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,1,1-Trichloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,1,2-Trichloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Trichloroethene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Trichlorofluoromethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,2,3-Trichloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,2,4-Trimethylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,3,5-Trimethylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Vinyl Chloride	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
M+P-Xylenes	<0.00040		0.00040	mg/L		21-JUN-22	R5805562
o-Xylene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Surrogate: 4-Bromofluorobenzene (SS)	80.3		70-130	%		21-JUN-22	R5805562
Surrogate: 1,4-Difluorobenzene (SS)	98.4		70-130	%		21-JUN-22	R5805562
Surrogate: 3,4-Dichlorotoluene (SS)	93.0		70-130	%		21-JUN-22	R5805562
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		23-JUN-22	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		23-JUN-22	
F2-F4-O.Reg 153/04 (July 2011)							
F2 (C10-C16)	<100		100	ug/L	23-JUN-22	23-JUN-22	R5806238
F3 (C16-C34)	<250		250	ug/L	23-JUN-22	23-JUN-22	R5806238
F4 (C34-C50)	<250		250	ug/L	23-JUN-22	23-JUN-22	R5806238
Chrom. to baseline at nC50	YES			ppm	23-JUN-22	23-JUN-22	R5806238
Surrogate: 2-Bromobenzotrifluoride	90.5		60-140	%	23-JUN-22	23-JUN-22	R5806238
L2716452-2 2022 BL TANK FARM							
Sampled By: CLIENT on 17-JUN-22 @ 07:00							
Matrix: WATER							
Miscellaneous Parameters							
Xylenes (Total)	<0.00064		0.00064	mg/L		22-JUN-22	
Total THMs	<0.0013		0.0013	mg/L		22-JUN-22	
VOC plus F1 by GCMS							
Acetone	<0.050		0.050	mg/L		21-JUN-22	R5805562
Benzene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Bromobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromochloromethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromodichloromethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Bromoform	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromomethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
n-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
sec-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
tert-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Carbon disulfide	<0.0050		0.0050	mg/L		21-JUN-22	R5805562
Carbon Tetrachloride	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Chlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Chloroethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Chloroform	<0.00050		0.00050	mg/L		21-JUN-22	R5805562

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Figure 9. - 2022 BL TANK FARM, which is sample water from inside the Tank farm and repeat water of WT

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2716452-2 2022 BL TANK FARM							
Sampled By: CLIENT on 17-JUN-22 @ 07:00							
Matrix: WATER							
VOC plus F1 by GCMS							
Surrogate: 1,4-Difluorobenzene (SS)	100.4		70-130	%		21-JUN-22	R5805562
Surrogate: 3,4-Dichlorotoluene (SS)	92.7		70-130	%		21-JUN-22	R5805562
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.10		0.10	mg/L	22-JUN-22	22-JUN-22	R5805687
F3 (C16-C34)	<0.25		0.25	mg/L	22-JUN-22	22-JUN-22	R5805687
F4 (C34-C50)	<0.25		0.25	mg/L	22-JUN-22	22-JUN-22	R5805687
Surrogate: 2-Bromobenzotrifluoride	102.8		60-140	%	22-JUN-22	22-JUN-22	R5805687
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		22-JUN-22	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		22-JUN-22	
L2716452-3 2022 BL WATER CELL							
Sampled By: CLIENT on 17-JUN-22 @ 07:00							
Matrix: WATER							
Miscellaneous Parameters							
Xylenes (Total)	<0.00064		0.00064	mg/L		22-JUN-22	
Total THMs	<0.0013		0.0013	mg/L		22-JUN-22	
VOC plus F1 by GCMS							
Acetone	<0.050		0.050	mg/L		21-JUN-22	R5805562
Benzene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Bromobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromochloromethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromodichloromethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Bromoform	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Bromomethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
n-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
sec-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
tert-Butylbenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Carbon disulfide	<0.0050		0.0050	mg/L		21-JUN-22	R5805562
Carbon Tetrachloride	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Chlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Chloroethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Chloroform	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
Chloromethane	<0.0050		0.0050	mg/L		21-JUN-22	R5805562
2-Chlorotoluene	<0.020		0.020	mg/L		21-JUN-22	R5805562
4-Chlorotoluene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dibromochloromethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,2-Dibromoethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dibromomethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,3-Dichlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,4-Dichlorobenzene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dichlorodifluoromethane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,1-dichloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,2-Dichloroethane	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
1,1-dichloroethene	<0.00050		0.00050	mg/L		21-JUN-22	R5805562
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
trans-1,2-Dichloroethene	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
Dichloromethane	<0.0050		0.0050	mg/L		21-JUN-22	R5805562
1,2-Dichloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562
1,3-Dichloropropane	<0.0010		0.0010	mg/L		21-JUN-22	R5805562

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Figure 10. - 2022 BL WATER CELL, which is water inside the Cell berm 2

ALS Environmental

Quality Control Report

Workorder: L2716452 Report Date: 24-JUN-22

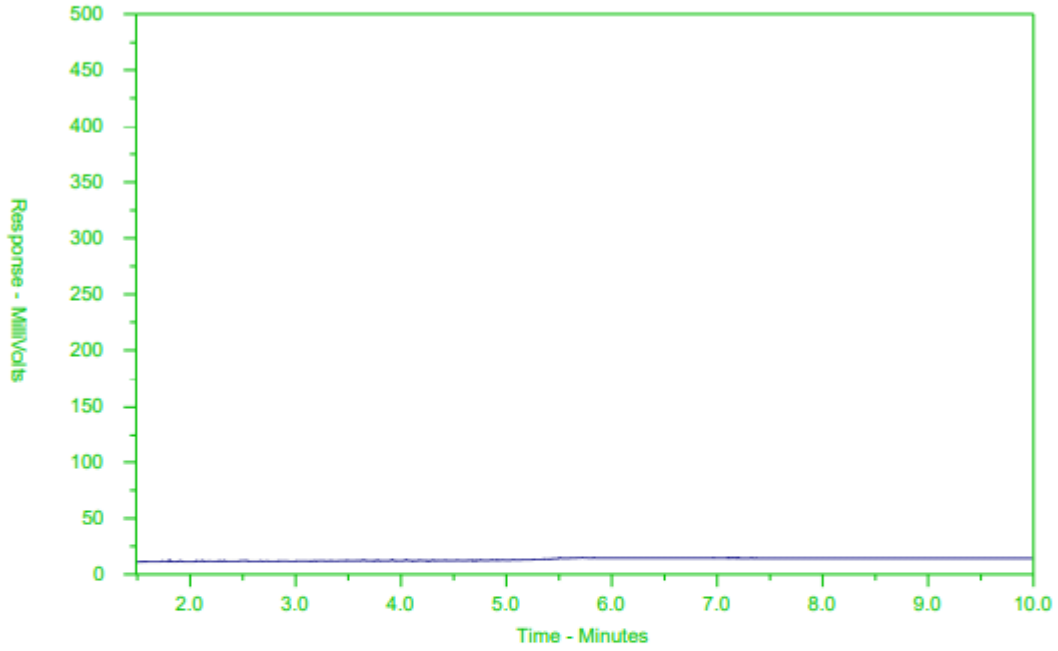
Client: Nunavut CGS - Petroleum Products Division
Box 590
Rankin Inlet NU X0C 0G0
Contact: SULAIMON AYILARA

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R5806238								
WG3742943-2 LCS								
F2 (C10-C16)			96.8		%		70-130	23-JUN-22
F3 (C16-C34)			102.7		%		70-130	23-JUN-22
F4 (C34-C50)			92.1		%		70-130	23-JUN-22
WG3742943-1 MB								
F2 (C10-C16)			<100		ug/L		100	23-JUN-22
F3 (C16-C34)			<250		ug/L		250	23-JUN-22
F4 (C34-C50)			<250		ug/L		250	23-JUN-22
Surrogate: 2-Bromobenzotrifluoride			87.8		%		60-140	23-JUN-22
F2-F4-FID-WP	**Water**							
Batch R5805687								
WG3742541-2 LCS								
F2 (C10-C16)			102.0		%		70-130	22-JUN-22
F3 (C16-C34)			92.3		%		70-130	22-JUN-22
F4 (C34-C50)			98.3		%		70-130	22-JUN-22
WG3742541-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	22-JUN-22
F3 (C16-C34)			<0.25		mg/L		0.25	22-JUN-22
F4 (C34-C50)			<0.25		mg/L		0.25	22-JUN-22
Surrogate: 2-Bromobenzotrifluoride			97.9		%		60-140	22-JUN-22
VOC+F1-HSMS-WP	**Water**							
Batch R5805562								
WG3742069-4 DUP		**L2716452-1**						
Acetone		<0.050	<0.050	RPD-NA	mg/L	N/A	30	21-JUN-22
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	21-JUN-22
Bromobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	21-JUN-22
Bromochloromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	21-JUN-22
Bromodichloromethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	21-JUN-22
Bromoform		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	21-JUN-22
Bromomethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	21-JUN-22
n-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	21-JUN-22
sec-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	21-JUN-22
tert-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	21-JUN-22
Carbon disulfide		<0.0050	<0.0050	RPD-NA	mg/L	N/A	30	21-JUN-22
Carbon Tetrachloride		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	21-JUN-22
Chlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	21-JUN-22

Figure 11. Quality Control Report from ALS lab

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2716452-1
Client Sample ID: 2022 BL WT 01



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

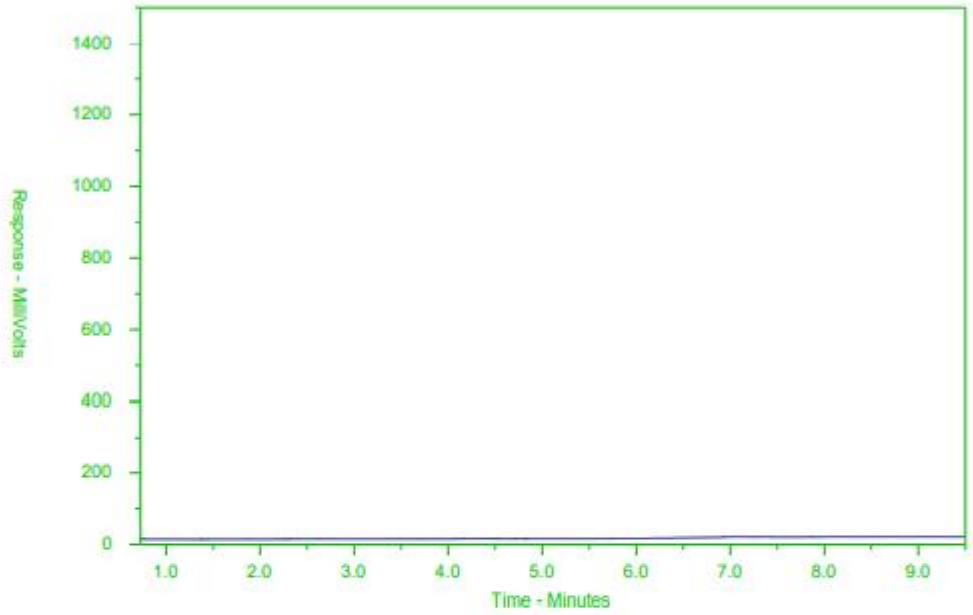
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

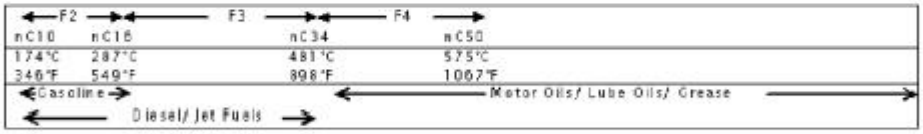
Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Figure 12. Hydrocarbon Report F2-F4

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2716452-2
Client Sample ID: 2022 BL TANK FARM





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

6.2.3 WATER REMEDIATION/TREATMENT

PPD has a water treatment system in Hamlet of Baker Lake site to treat impacted water on site through positive pressure aerators and a water treatment system.

Presently, the Cell 2 berm is a temporary berm with impacted water generated from snowmelt, inside tank farm contaminated area water, all stored inside the cell berm. This water is treated, samples taken and sent to ALS laboratory for results through the Chain of Custody (CoC)

Chain of Custody for samples taking and tracking

Discharge criteria and discharge procedures for treated effluent

Upon positive result that shows all parameter for water is meet, approval is given by the Nunavut Department of Environment (DOE) for discharge which is critically discharge to 31m highland away from waterbody (Baker Lake). All discharge criteria are met before discharge.

Procedures to manage any treated waste (soil and water) that does not meet discharge criteria or disposal criteria

All water that does not meet discharge are loaded on tanker and move to the Agnico Eagle Mine in Baker Lake for further treatment. The Agnico Eagle Mine has advanced treatment method and equipment on their facility and rescue PPD on the social responsibility basis for the community interrelation.

6.2.4 GROUNDWATER MONITORING PLAN

Groundwater contamination is difficult to clean up, it is a long-term endeavor. As noted above, the areal extent and concentration of groundwater contamination is determined through the ESA process. Groundwater monitoring-wells are typically drilled for the purpose of collecting ground water samples for analysis. Well may also be used to remove hydrocarbons from the contaminant plume.

Soil and Water samples are taken yearly, before the snow season, immediately after the contaminated soil is turned. This is a good indicator of the progress of the remediation. All samples are taken on a 10 by 10-meter grid. Piezometers will be checked yearly until freeze up. Any water collected in any piezometer are tested for:

- Water PH
- PHC, VOC
- BTEX, F1 to F4
- Total Metals
- TSS (Total Surfaced Solids), all meeting the below parameters and maximum concentration of any grab sample.

Parameter	Maximum Concentration of any Grab Sample
- Total Suspended Solids (mg/L)	50
- Total Lead (µg/L)	1
- Benzene (µg/L)	370
- Toluene (µg/L)	2
- Ethylbenzene (µg/L)	90

During construction of the landfarm, background groundwater parameters were collected and tested for reference. QA/QC programs will be implemented soon as part of our monitoring program.

6.3 CLOSURE AND RECLAMATION PLAN (CRP)

The Licensing required a plan of the closure of the landfarm at expiration of years of operation and maintenance usually 10 -15 years. This involve decommission and return of the area back to its original states through reclamation, regrading, and revegetation.

Minimum required information is as follow –

- Geographic location of the landfarm is proposed in **Latitude 646550.447 and Longitude -7135564.12**, (UTM), near the Hamlet of Baker Lake landfill site. The landfarm capacity 5000 CU.M. of contaminated soil.
- Extensive testing of the soil beneath and surrounding the Landfarm for contamination.
- Decommissioning of materials including the berms, rock pad, liners, and all other materials used.
- Regrading, revegetation and returning the contaminated areas to their natural states.
- Shipment of contaminated liner and other materials to environmentally save facility in South.
- Communication and progress report document, inspect and report reclamation efforts to the NWB.

6.4 ABANDONMENT AND RESTORATION PLAN (ARP)

Upon landfarm closure and reclamation of affected area, the Baker Lake landfarm will be shutdown and final abandonment of the area, to return the site to as near as possible to natural conditions.

The project which will be a landfarm facility proposed to hold 5000 cubic meters of contaminated soil which will later be abandoned, restored back to natural state before facility was built permits, licenses and authorizations have been obtained.

Contact Detail for plan abandonment and restoration –

Government of Nunavut,
Petroleum Product Division,
Headquarters in Rankin Inlet, NU X0G 0C0,
Telephone – (867) 645-8444
Email – sayilara@gov.nu.ca

The Final Abandonment and Restoration plan includes –

- **Inspection and Documentation** – Before abandonment of the landfarm used site, a complete inspection of all areas will be conducted with photographs taken to document the conditions prior to leaving the site and will be archived along with any photos taken before, during and after abandonment.

- **Equipment, Fuel, and building** – The used landfarm site will not be allow for buildings purposes during the period of abandonment as no project will occur within the site to allow restoration procedures. The equipment and materials used on the landfarm will be decommissioned, dismantled, packaged, secured, and shipped off site to the South. All remaining fuel and empty drums will be removed from site. The soil under and surrounding any area where fuel was stored will be thoroughly inspected for any contamination with photographs will be taken and reported to the Nunavut Water Board.
- **Wastes** - All wastes generated on site will be classified into combustible wastes, non-combustible wastes, recyclable wastes, and hazardous waste. All waste that can be accepted at the Baker Lake Hamlet landfill, will be disposed of there and anything that cannot e.g., hazardous waste will be backhauled for recycling or proper disposal.

- **Impacted snow/soil** - Any contaminated soil, snow, including ice-melt will be treated and cleaned. All contaminated soil, snow, and ice will be sealed in 205 L steel drums and stored in the hazardous waste storage area to await backhaul to a registered hazardous waste receiver.

Security, Signage, and Fencing

The landfarm requires perimeter fencing to demarcate the landfarm limits and restrict entrance to the facility. Fencing should be of sufficient quality to:

- Prohibit wildlife and personnel from entering the contaminated soil or sump areas.
- Limit snow drifting within the landfarm area.

The landfarm facility must have warning signs, posted in both English and the local dialect, noting that:

- Dumping of materials without the permission of PPD, Environmental Services Specialist is prohibited.
- The dangers and risks the facility poses to personal and visitors.

Signage must also denote the responsible authority, operating period, and slip/trip, PHC-contaminated material, open water. The sump area should be clearly demarcated at the start and end of the season to warn personnel when snow cover may conceal underlying thin ice.

Ponding of PHC-contaminated water in the landfarm facility is a concern for possible bird landings. Sumps will be covered with ropes at two-metre intervals with flagging tape applied at one-metre intervals; sump areas will be monitored once per day during spring freshet and after rainfall events, and weekly at other times, to verify the effectiveness of bird deterrents.

REFERENCES

The following regulations and guidelines are also applicable to this plan:

- Nunavut Waters Regulations (SOR/2013-69)
- Environmental Guidelines for Contaminated Site Remediation
- Environmental Protection Act 1999
- Consolidation of Spill Contingency Planning and Reporting Regulations R-068-93, Section 3 and 4 (1)(2) a, b, c, d, e, f, g, h, I, and j
- Nunavut Guideline for Contaminated Site Remediation

Standard Operating Procedures

FACILITY SAFETY RULES

The following safety rules apply to the Baker Lake Landfarm soil remediation Facility (the Facility) and satellite operations in the Hamlet of Baker Lake (the Community).

1. All workers, contractors and visitors shall sign-in to the Facility on the Attendance Sheet when arriving on-site and sign-out when leaving the site.
2. Smoking is not permitted at the Facility or during any fuel handling, clean-up, or restoration activities in the Hamlet of Baker Lake.
3. A buddy system must be always observed when workers are in the work area. Personnel must always work within sight of their assigned partner (buddy).
4. Personnel must always wear the prescribed personal protective equipment (PPE) while working at the Facility or during any soil drop off, soil remediation, spill, clean-up, or restoration activities in the landfarm (**SOP - Personal Protective Equipment).**
5. Personnel shall not undertake any task that they have not received designated training. See training requirements.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following personal protective equipment (PPE) requirements apply to the Facility and satellite operations in the Hamlet of Baker Lake (the Community). All required PPE is available.

1. The standard PPE that must be worn while working at the facility includes:
   - Steel-toe work boots
   - Safety glasses
   - Earing protections when operation equipment or when in areas where noise levels require personnel to raise their voices to be heard
2. All personnel must wear oil-resistant rubber steel-toed safety boots with textured bottoms during any fuel handling, clean-up, or restoration activities at the Facility or in the Hamlet of Baker Lake.
3. Personnel handling contaminated materials will wear outer chemical resistant gloves. Sleeves will be taped whenever handling heavily contaminated wet materials. This will happen during removal of oil-soaked sorbents or shoveling oil-soaked snow and dirt.
4. Selection of outer PPE will be based on the potential for whole body contact with the product. A potential for repeated contact will require rain gear (top/bottoms). Clothing will be kept fully zippered when handling those materials. Supervising personnel may authorize the removal of suit tops if there is not potential for upper body contact.
5. Personnel with limited skin contact potential may wear disposable clean guard garments or equivalent.
6. Personnel with no exposure potential (e.g., Inspectors) need not wear protective clothing.
7. All personnel on cleaning operations will wear safety glasses (regular glasses will be satisfactory) incase of spill by the landfarm berm.
8. Washing solutions will be provided and labelled in accordance with WHMIS workplace labelling requirements.
9. During very cold or extended exposure to cold working conditions, personnel may be at risk of hypothermia (i.e., body temperature falls below 36°C (96.8°F)). In addition to working in pairs (**see SOP - Facility Safety Rules**) appropriate outdoor wear must be provided and worn.

EMERGENCY RESPONSE STEPS

Take Charge of Scene

- The first person on scene shall assume the role of Incident Commander (IC)
- The IC can be transferred as those will authority arrive on-scene
- Establish an incident command centre (ICC) close to the event but not in the line-of-fire of the event (see **SOP - Emergency Communications**)

Call for Help

- Sound the alarm
- Call 911 for immediate fire or medical support
- Call 867-645-8444 to request support from PPD
- Brief each partner for a coordinated response
- The Emergency Contact List is in this Plan

Assess the Scene

- Determine the nature and extent of the emergency
- Assess escalating factors (e.g., volume of source, ability to control source, weather wind conditions
- Update partners as new information becomes available

Protect Human Health & Safety

- Check Attendance Log to determine who is on-site. Determine if rescue might be required.
- Don PPE and collect first aid equipment
- Approach event from upwind
- Do not endanger yourself or others; wait for support to enter hazardous atmosphere
- Administer first aid and/or support first aid administrator
- Control impact of hazard on the Community; (see **SOP Emergency Communications)** initiate evacuation, if warranted

Secure the Scene

- Stop the source (e.g., shut off valves, turn the container over so hole is facing upward, shut-off utilities)
- Remove potential sources of ignition (e.g., vehicles)
- Remove unnecessary personnel from event area; restrict access to event area

Apply Control Measures

- Contain spill (see XX - Spill Containment & Recovery)

Communicate to Partners

- Communicate per **SOP Emergency Communications**
- Notify and Report per **Table 17** in this E2 Plan

Document and Investigate

- Document and investigate per **SOP Incident Reporting and Investigation**

- Plan clean-up and restoration per **Section 6.0** of E2 Plan

SPILL CONTAINMENT & RECOVERY

The following spill containment and recovery procedures are available and shall be used, as appropriate, to respond to spills at the Baker Lake Landfarm and/or within the Hamlet of Baker Lake.

General

1. Regardless of the size of the spill, the steps in **SOP - Emergency Response Steps** shall be followed.
2. If a small spill occurs within the lined area, the Fuel Management Contractor will disable the source of spill, remove the product, then decontaminate the liner using proper equipment.
3. If the spill is resulting from a tank overflow within the secondary containment at the Facility, the Fuel Management Contractor will disable the source of the spill.
4. If the spill occurred or extended beyond the secondary containment area, the tank farm lined area, the Fuel Management Contractor will immediately contain the spill, control the source of the spill, and create a clean-up and restoration plan.
5. If operational spills are caused by failure of equipment, any further operation of this equipment should be stopped immediately, and measures will be taken to prevent further releases. Do not restart equipment until problem has been rectified.
6. Any leaking component will be isolated from the rest of system and will not put in service until fully repaired. If the isolation of the leaking component is not possible, then the whole system will be withdrawn from service until the leak is repaired.
7. Transport of the bulk fuel is performed by contractors and subcontractors who should be well versed in the content of this plan.

Reporting

Any spill of fuel or waste oil must be reported to provincial spill lines. Applicable spills require a written report to Environment Canada. A final report will be created and must contains the following:

- Confirmation of spill volume
- Actions taken
- Future remediation/monitoring requirements
- Sketch map and/or photographs of the spill area

FIRE RESPONSE

In event of fire, all occupants must leave the site immediately through the closest emergency exit or muster point.

If you discover a fire or smoke:

1. Rescue any person in immediate danger, if possible.
2. Alert everyone.
3. Turn off electric and gas equipment in your area as you evacuate, if possible.
4. Evacuate using the nearest exit. Follow the EXIT signs.
5. If the fire can be controlled, extinguish using a fire extinguisher.
6. Report the incident by calling 911.

Fires, at the incipient stage, should be extinguished without delay. This applies to most spill fires and tank vehicle events. If the fire is too large to be controlled by the initial attack capability, PPD's will ask the help from local fire department and other community stakeholders.

e sure you familiarize yourself with all emergencies exits, alarm stations and fire guisher locations around the landfarm.

Personal Protection	
Ventilation	Use adequate ventilation (normally assured at the landfarm due to being outdoors).
Respiratory protection	Not generally required unless needed to prevent respiratory irritation. Use organic cartridge respirator per MSDS recommendations.
Eye protection	For splash protection, use chemical goggles and face shield
Skin protection	Use gloves resistant to the material being used, i.e., neoprene or nitrile rubber. Use protective garments to prevent excessive skin contact.
Health Hazard Data	
Acute effects of overexposure	Eye: May cause mild irritation, with stinging and redness of eyes.
	Skin: May cause severe irritation. Repeated or prolonged contact may cause defatting of the skin, resulting in dermatitis. Dermal LD50 for diesel fuel is >5 mg/kg (rabbit).
	Inhalation: May cause irritation to nose, throat or lungs. Headache, nausea, dizziness, unconsciousness may occur.
	Ingestion: Swallowing small amounts is not likely to produce harmful effects. Ingestion of larger amounts may produce abdominal pail, nausea and vomiting. Aspiration into lungs can produce severe lung damage and is a medical emergency.

First Aid and Emergency Procedures	
Eye	Flush eyes with running water for at least 15 minutes. If irritation or adverse symptoms develop, seek medical attention.
Skin	Immediately wash skin with soap and water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.
Inhalation	Remove from exposure. If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention.
Ingestion	Do not induce vomiting. Seek immediate medical attention.
Fire	
Fire extinguishing media	Dry chemical, foam, or carbon dioxide.

Safe Handling of Contaminated Soil and Snow

Safety Data Sheets
For;

- **Diesel,**
- **Gasoline,**
- **Jet A-1**

Material Safety Data Sheet

DIESEL FUEL

1 . Product and company identification

Product name : DIESEL FUEL

Synonym : Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, D60, P40, P50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel, Furnace special, Biodiesel blend, B1, B2, B5, Diesel Low Cloud (LC).

Code : W104, W293; SAP: 120, 121, 122, 125, 126, 129, 130, 135, 287, 288

Material uses : Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining Diesel has a higher flash point requirement, for safe use in underground mines.

Manufacturer : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

In case of emergency : Petro-Canada: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Bright oily liquid.

Odour : Mild petroleum oil like.

WHMIS (Canada) :

Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview :

Routes of entry :

Potential acute health effects

Inhalation :

Ingestion :

Skin :

Eyes :

Potential chronic health effects

WARNING!

COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.

Combustible liquid. Severely irritating to the skin. Irritating to eyes. Keep away from heat, sparks and flame. Do not get in eyes. Avoid breathing vapour or mist. Avoid contact with skin and clothing. Use only with adequate ventilation. Wash thoroughly after handling.

Dermal contact. Eye contact. Inhalation. Ingestion.

Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.

Severely irritating to the skin.

Irritating to eyes.

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Kerosine (petroleum), hydrodesulfurized / Fuels, diesel / Fuel Oil No. 2	64742-81-0 / 68334-30-5 / 68476-30-2	95 - 100
Fatty acids methyl esters	61788-61-2 / 67784-80-9 / 73891-99-3	0 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : Combustible liquid

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), sulphur compounds (H2S), smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Flammable in presence of open flames, sparks and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Runoff to sewer may create fire or explosion hazard.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Kerosine (petroleum), hydrodesulfurized	**ACGIH TLV (United States). Absorbed through skin.** TWA: 200 mg/m³ 8 hour(s).
Fuels, diesel	**ACGIH TLV (United States). Absorbed through skin.** TWA: 100 mg/m³, (Inhalable fraction and vapour) 8 hour(s).
Fuel oil No. 2	**ACGIH TLV (United States). Absorbed through skin.** TWA: 100 mg/m³, (Inhalable fraction and vapour) 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: nitrile, neoprene, polyvinyl alcohol (PVA), Viton. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Bright oily liquid.

Flash point : Diesel fuel: Closed cup: ≥40°C (≥104°F)
Marine Diesel Fuel: Closed Cup: ≥60°C (≥140°F)
Mining Diesel: Closed Cup: ≥52°C (≥126°F)

Auto-ignition temperature : 225°C (437°F)

Flammable limits : Lower: 0.7%
Upper: 6%

Colour : Clear to yellow (This product may be dyed red for taxation purposes).

Odour : Mild petroleum oil like.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : 150 to 371°C (302 to 699.8°F)

Melting/freezing point : Not available.

Relative density : 0.80 to 0.88 kg/L @ 15°C (59°F)

Vapour pressure : 1 kPa (7.5 mm Hg) @ 20°C (68ºF).

Vapour density : 4.5 [Air = 1]

Volatility : Semivolatile to volatile.

Evaporation rate : Not available.

Viscosity : Diesel fuel: 1.3 - 4.1 cSt @ 40°C (104°F)
Marine Diesel Fuel: 1.3 - 4.4 cSt @ 40°C (104°F)

Pour point : Not available.

Solubility : Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

10 . Stability and reactivity

Chemical stability : The product is stable.

Hazardous polymerisation : Under normal conditions of storage and use, hazardous polymerisation will not occur.

Materials to avoid : Reactive with oxidising agents and acids.

Hazardous decomposition products : May release COx, NOx, SOx, H2S, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Kerosine (petroleum), hydrodesulfurized	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>5000 mg/m³	4 hours
Fuels, diesel	LD50 Dermal	Mouse	24500 mg/kg	-
	LD50 Oral	Rat	7500 mg/kg	-
Fuel oil No. 2	LD50 Oral	Rat	12000 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

11 . Toxicological information

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Kerosine (petroleum), hydrodesulfurized	A3	-	-	-	-	-
Fuels, diesel	A3	3	-	-	-	-
Fuel oil No. 2	A3	3	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1202	DIESEL FUEL	3	III		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

United States

HCS Classification : Combustible liquid
Irritating material

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

15 . Regulatory information

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

Canada inventory : All components are listed or exempted.

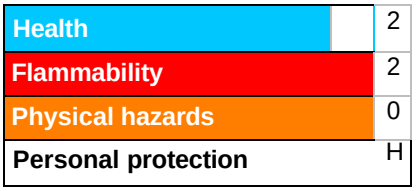
United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.

Hazardous Material Information System (U.S.A.) :



National Fire Protection Association (U.S.A.) :

References : Available upon request.
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Date of printing : **7/6/2021.**

Date of issue : 6 July 2021

Date of previous issue : 7/3/2015.

Responsible name : **Product Safety - JDW**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

GASOLINE, UNLEADED

1 . Product and company identification

Product name : GASOLINE, UNLEADED

Synonym : Regular, Unleaded Gasoline (US Grade), Mid-Grade, Plus, Super, WinterGas, SummerGas, Supreme, SuperClean WinterGas, RegularClean, PlusClean, Premium, marked or dyed gasoline, TQRUL, transitional quality regular unleaded, BOB, Blendstock for Oxygenate Blending, Conventional Gasoline.

Code : W102E, SAP: 102 to 117

Material uses : Unleaded gasoline is used in spark ignition engines including motor vehicles, inboard and outboard boat engines, small engines such as chain saws and lawn mowers, and recreational vehicles.

Manufacturer : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

In case of emergency : Petro-Canada: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Clear liquid.

Odour : Gasoline

WHMIS (Canada) :

Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview : WARNING!

FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.

Flammable liquid. Irritating to eyes, respiratory system and skin. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Avoid contact with eyes, skin and clothing. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Contains material which may cause heritable genetic effects. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Ingestion : Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Skin : Irritating to skin.

Eyes : Irritating to eyes.

Potential chronic health effects

Chronic effects : This product contains an ingredient or ingredients, which have been shown to cause chronic toxic effects. Repeated or prolonged exposure to the substance can produce blood disorders.

Carcinogenicity : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : Contains material which may cause heritable genetic effects.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Gasoline	86290-81-5	85-100
Toluene	108-88-3	15-40*
Benzene	71-43-2	0.5-1.5
Ethanol	64-17-5	0.1-0.3

**Montreal: may vary from 3-40%*
**Edmonton: may vary from 1-5%*

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Flammability of the product : Flammable liquid (NFPA) .

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), polynuclear aromatic hydrocarbons, phenols, aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Extremely flammable in presence of open flames, sparks, shocks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapour may generate static charge causing ignition. May accumulate in confined spaces.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire. Vapours may form explosive mixtures with air.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly

closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Gasoline	**ACGIH TLV (United States).** TWA: 300 ppm 8 hour(s). STEL: 500 ppm 15 minute(s).
Toluene	**ACGIH TLV (United States).** TWA: 20 ppm 8 hour(s).
Benzene	**ACGIH TLV (United States). Absorbed through skin.** TWA: 0.5 ppm 8 hour(s). STEL: 2.5 ppm 15 minute(s).
Ethanol	**ACGIH TLV (United States).** STEL: 1000 ppm 15 minute(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: polyvinyl alcohol (PVA), Viton®. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
Eyes	:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
Skin	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Environmental exposure controls	:	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	:	Clear liquid.
Flash point	:	Closed cup: -50 to -38°C (-58 to -36.4°F) [Tagliabue.]
Auto-ignition temperature	:	257°C (494.6°F) (NFPA)
Flammable limits	:	Lower: 1.3% (NFPA) Upper: 7.6% (NFPA)
Colour	:	Clear to slightly yellow or green, undyed liquid. May be dyed red for taxation purposes.
Odour	:	Gasoline
Odour threshold	:	Not available.
pH	:	Not available.
Boiling/condensation point	:	25 to 220°C (77 to 428°F) (ASTM D86)
Melting/freezing point	:	Not available.
Relative density	:	0.685 to 0.8 kg/L @ 15°C (59°F)
Vapour pressure	:	<107 kPa (<802.5 mm Hg) @ 37.8°C (100°F)
Vapour density	:	3 to 4 [Air = 1] (NFPA)
Volatility	:	Not available.
Evaporation rate	:	Not available.
Viscosity	:	Not available.
Pour point	:	Not available.
Solubility	:	Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform and benzene. Dissolves fats, oils and natural resins.

10 . Stability and reactivity

Chemical stability	:	The product is stable.
Hazardous polymerisation	:	Under normal conditions of storage and use, hazardous polymerisation will not occur.
Materials to avoid	:	Reactive with oxidising agents, acids and interhalogens.
Hazardous decomposition products	:	May release COx, NOx, phenols, polycyclic aromatic hydrocarbons, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Gasoline	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	13600 mg/kg	-
Toluene	LD50 Dermal	Rabbit	12125 mg/kg	-
	LD50 Oral	Rat	636 mg/kg	-
	LC50 Inhalation Vapour	Rat	7585 ppm	4 hours
Benzene	LD50 Dermal	Rabbit	>8240 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-
	LC50 Inhalation Vapour	Rat	13700 ppm	4 hours
Ethanol	LD50 Oral	Rat	7060 mg/kg	-
	LC50 Inhalation Vapour	Rat	>32380 ppm	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Gasoline	A3	2B	-	-	-	-
Toluene	A4	3	D	-	-	-
Benzene	A1	1	A	+	Proven.	+
Ethanol	A3	-	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : There is a wealth of information about the teratogenic hazards of Toluene in the literature; however, based upon professional judgement regarding the body of evidence, WHMIS classification as a teratogen is not warranted.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1203	GASOLINE	3	II		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Flammable liquid
Irritating material
Carcinogen

Canada

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

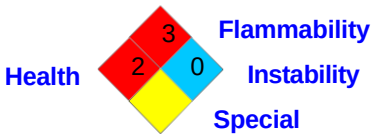
16 . Other information

Label requirements : FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.

Hazardous Material Information System (U.S.A.) :

Health	*	2
Flammability		3
Physical hazards		0
Personal protection		H

National Fire Protection Association (U.S.A.) :



References

Date of printing Date of issue
Date of previous issue

: Available upon request.
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: **10/10/2021.**

: 10 October 2021

: 4/9/2015.

Responsible name : **Product Safety - DSR**

Indicates information that has changed from previously issued version. **For Copy of (M)SDS** : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution.
Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

1 . Product and company identification

Product name Synonym : JET A/A-1 AVIATION TURBINE FUEL

Code Material uses : Jet A-1; Jet A-1-DI; Aviation Turbine Kerosene (ATK); JP-8; NATO F-34; Jet F-34; Turbine Fuel, Aviation, Kerosene Type (CAN/CGSB-3.32)

: W213, SAP: 149

Manufacturer : Used as aviation turbine fuel. May contain a fuel system icing inhibitor. In the arctic, Jet A-1 may also be used as diesel fuel (if it contains a lubricity additive) and heating oil.

In case of emergency : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

: Petro-Canada: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Clear liquid.

Odour : Kerosene-like.

WHMIS (Canada) :

Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).

The WHMIS classification of Jet A/A-1 is B3.
The WHMIS classification of Jet A/A-1-DI, JP-8, Jet F-34 and NATO F-34, which all contain FSII (Diethylene Glycol Monomethyl Ether), is B3, D2A.

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview :

Routes of entry :

CAUTION!

Potential acute health effects

Inhalation :

COMBUSTIBLE LIQUID AND VAPOUR. MAY CAUSE EYE AND SKIN IRRITATION. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

Ingestion :

Combustible liquid. Slightly irritating to the eyes and skin. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Avoid contact with eyes, skin and clothing. Contains material which may cause birth defects, based on animal data. Avoid exposure during pregnancy. Use only with adequate ventilation. Wash thoroughly after handling.

Skin :

Dermal contact. Eye contact. Inhalation. Ingestion.

Eyes :

Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.

Slightly irritating to the skin.

Slightly irritating to the eyes.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity	:	No known significant effects or critical hazards.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	Contains material which may cause birth defects, based on animal data.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.
Medical conditions aggravated by over-exposure	:	Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Complex mixture of petroleum hydrocarbons (C9-C16)*(Kerosene)	8008-20-6	99.9
Fuel System Icing Inhibitor (FSII) (if added**): (Diethylene Glycol Monomethyl Ether)	111-77-3	0.1 - 0.15
Anti-static, antioxidant and metal deactivator additives	Not applicable	<0.1

*Aromatic content is 25% maximum (benzene: nil).
**Please note that Jet A-1-DI, JP-8, Jet F-34 and NATO F-34 all contain Fuel System Icing Inhibitor.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : Class II - combustible liquid (NFPA).

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or

Not suitable : foam. Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards

Special remarks on explosion hazards : Flammable in presence of open flames, sparks and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite. May accumulate in confined spaces.

: Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion- proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling :

Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source.

Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Kerosene	**ACGIH TLV (United States). Absorbed through skin.** TWA: 200 mg/m³ 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: A NIOSH-approved air- purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure

levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: polyvinyl alcohol (PVA), Viton®. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls	:	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	:	Clear liquid.
Flash point	:	Closed cup: ≥38°C (≥100.4°F) [Tag. Closed Cup]
Auto-ignition temperature	:	210°C (410°F)
Flammable limits	:	Lower: 0.7% Upper: 5%
Colour Odour	:	Clear and colourless.
Odour threshold pH	:	Kerosene-like.
Boiling/condensation point	:	Not available.
Melting/freezing point Relative density	:	Not available.
Vapour pressure	:	140 to 300°C (284 to 572°F)
Vapour density	:	Not available.
Volatility Evaporation rate Viscosity	:	0.775 to 0.84 (Water=1)
Pour point	:	0.7 kPa (5.25 mm Hg) @ 20°C (68ºF).
Solubility	:	4.5 [Air = 1]
	:	Volatile.
	:	Not available.
	:	1.0 - 1.9 cSt @ 40ºC (104ºF)
	:	<-51ºC (<-60°F)
	:	Insoluble in water. Partially miscible in some alcohols. Miscible with other petroleum solvents.

10 . Stability and reactivity

Chemical stability Hazardous polymerisation Materials to avoid : The product is stable.

: Under normal conditions of storage and use, hazardous polymerisation will not occur.

Hazardous decomposition products : Reactive with oxidising agents, acids and alkalis.

: May release COx, NOx, SOx, aldehydes, acids, ketones, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Kerosene	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>5000 mg/m³	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Kerosene	A3	3	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues.

Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1863	FUEL, AVIATION, TURBINE ENGINE	3	III		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

United States

HCS Classification : Combustible liquid

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).

The WHMIS classification of Jet A/A-1 is B3.
The WHMIS classification of Jet A/A-1-DI, JP-8, Jet F-34 and NATO F-34, which all contain FSII (Diethylene Glycol Monomethyl Ether), is B3, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

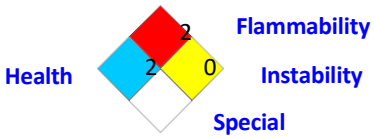
15 . Other information

Label requirements : COMBUSTIBLE LIQUID AND VAPOUR. MAY CAUSE EYE AND SKIN IRRITATION. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :

Health	*	2
Flammability		2
Physical hazards		0
Personal protection		H

National Fire Protection Association (U.S.A.) :



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- Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

PPD Organizational Communication Flowchart as below diagram -