North Arrow
MINERALS INC.

SPILL CONTINGENCY PLAN

LUXX PROJECT, NUNAVUT

Date: December 11, 2017

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1. INTRODUCTION

This Spill Contingency Plan has been prepared specifically for the Luxx Project (NTS 55O/12) operated by North Arrow Minerals Inc. ("North Arrow"). The plan demonstrates that North Arrow Minerals Inc. will have appropriate response capabilities and measures in place to effectively address potential spills at its Luxx Project site.

1.1 Corporate Details

North Arrow Minerals Inc.
Suite 960 - 789 West Pender Street
Vancouver, BC V6C 1H2

1.2 Term of Spill Contingency Plan

This version of the North Arrow Minerals Inc. Spill Contingency Plan shall be in effect from date of acceptance of applicable land use permits. Any future changes and/or amendments will be submitted to the Nunavut Water Board and INAC/AANDC.

1.3 Purpose and Scope

The purpose of this Spill Contingency Plan is to provide a plan of action for all spills of hazardous materials that may occur on the Luxx Project, NU. This plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to respond to a spill. It details spill response procedures that will minimize potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all information required in responding to a spill.

1.4 North Arrow Minerals Inc. Environmental Policy

It is the policy of North Arrow Minerals Inc. to comply with all existing laws and regulations to help ensure the protection of the environment. North Arrow Minerals Inc. cooperates with other groups committed to protecting the environment and ensures that employees, government, and the public is informed on the procedures followed to help protect the environment.

North Arrow Minerals Inc. endeavours to take every reasonable precaution toward ensuring the protection and conservation of the natural environment and the safety and health of all employees and contractors from any potential harmful effects of stored materials and operations.

The plan is presented to all staff during their on-site orientation sessions. All employees and contractors are aware of the locations of the plan on site at the Luxx Project and in North Arrow's offices.

During the orientation meeting, training sessions are scheduled to ensure employees have an understanding of the steps to be undertaken in the event of a spill. All employees and contractors are shown where spill kits are stored, are aware of their contents and are trained in using spill equipment and responding to spills. The company is committed to keeping personnel up to date on the latest technologies and spill response methods.

2. PROJECT AND SITE DESCRIPTION

2.1 Project Description

This project, located in the East Kivalliq Region of Nunavut, approximately 90 kilometres north of Rankin Inlet, consists of predominately Crown lands (mineral leases) and Inuit-Owned Lands. Year-round access to the property is via plane, equipped with skis or floats, or helicopter. The property is bounded in a general sense by the following minimum and maximum latitudes/longitudes:

Min Lat (degree/minute)	63°35'2.4"	Min Long (degree/minute)	-91°45'2.16"
Max Lat (degree/minute)	63°37'30"	Max Long (degree/minute)	-91°38'53.52"

A map illustrating the regional context of the property and the project area is located in Appendix 2.

2.2 Current Permits/Licences

Permit/License No.	Regulatory Body	Type	Expiry
N2016C0005	INAC	Land Use Permit - Drilling	March 10, 2018
2BE-LUX1618	Nunavut Water Board	Water License Type B	July 14, 2018
15EN052	NIRB	NIRB Screening	

2.3 List of Hazardous Materials On-site

Fuel storage areas at the Luxx Project will include the main storage site adjacent to the camp helicopter landing pad; in addition small fuel caches will be located adjacent to active drill sites when drilling is underway. All containers of hazardous materials will be marked with North Arrow's name.

Petroleum products and hazardous materials that will be considered in this Spill Contingency Plan include:

- Diesel fuel
- Jet "A/B" fuel
- Hydraulic oil
- Lubricating oil
- Propane
- Antifreeze

Table 1 presents a list of hazardous materials anticipated to be located at the Luxx Project site, the type of storage container, the maximum quantities stored, and the general location.

Table 1: List of hazardous materials stored on-site, type of storage container, the storage quantities, and storage locations where known

Material	Storage Container	Maximum on-site	Storage Location and Uses
Diesel fuel	205 litre drums	6 (1,230 litres)	Six drums at active drilling sites, remainder in town at fuel storage facility
Jet A/B fuel	205 litre drums	1 (205 litres)	One drum at each active drilling site for emergency purposes
Oil (Engine and 2 stroke)	1 litre container	12 (12 litres)	Active drilling sites
Hydraulic Oil	20 litre containers	100 litres	At drill site – for drill hydraulic pressure
Propane	1 tank	100 lbs	Heaters for personnel when required
Antifreeze	5 litre containers	25 litres	At drill site - engine coolant

2.4 Petroleum and Chemical Product Storage and Transport

All fuel will be stored no closer than the regulated distance from the normal high water mark of any water body (>31 metres).

Other petroleum-based materials found on-site in very small quantities will be located in the drill shack. These include lubricants/oil/grease for the maintenance of the drilling equipment. The drill shack will be located over 31 metres from the normal high water mark of any water body when drilling land-based targets.

All fuel, oil and any chemicals are transported to site by plane and/or helicopter and to any drill sites by helicopter.

2.5 Petroleum Product Transfer

Manual and automatic pumps (and aviation fuel filters for jet fuel) are used for the transfer of all petroleum products. Smoking, sparks, or open flames are **prohibited** in fuel storage and fuelling areas at all times. Portable drip trays and appropriately sized fuel transfer hoses with pumps are used when refuelling aircraft or other equipment, to avoid any leaks/drips onto the land.

2.6 Spill Containment Equipment

Equipment available on site to assist in responding to a hazardous materials spill includes various hand held tools including shovels. In addition to these, one spill kit will be situated at each active drill site with additional spill kits located in Chesterfield Inlet and on the helicopter.

Spill kits are located wherever fuel is stored or used. The typical spill kit has a sorbent capacity of 240 litres and the contents include:

1 – 360 litre/79 gallon polyethylene over pack drum
4 – oil sorbent booms (5” X 10’)
100 – oil sorbent sheets (16.5” X 20” X 3/8”)
1 – drain cover (36” X 36” X 1/16”)
1 – *Caution* tape (3” X 500’)
1 – 1 lb plugging compound
2 – pair Nitrile gloves
2 – pair Safety goggles
2 – pair Tyvel coveralls
1 – instruction booklet
10 – printed disposable bags (24” X 48”)
1 – empty fuel drum

2.7 Existing Preventative Measures

Planning for an emergency situation is imperative, due to the nature of the materials stored on site as well as the remoteness of the site. Along with the preventative measures outlined below, adequate training of staff and contractors is paramount.

All hazardous materials arrive by air as needed throughout periods of active exploration. They are unloaded by airplane and helicopter pilots and North Arrow staff and contractors and carefully placed in the fuel storage and hazardous materials storage areas.

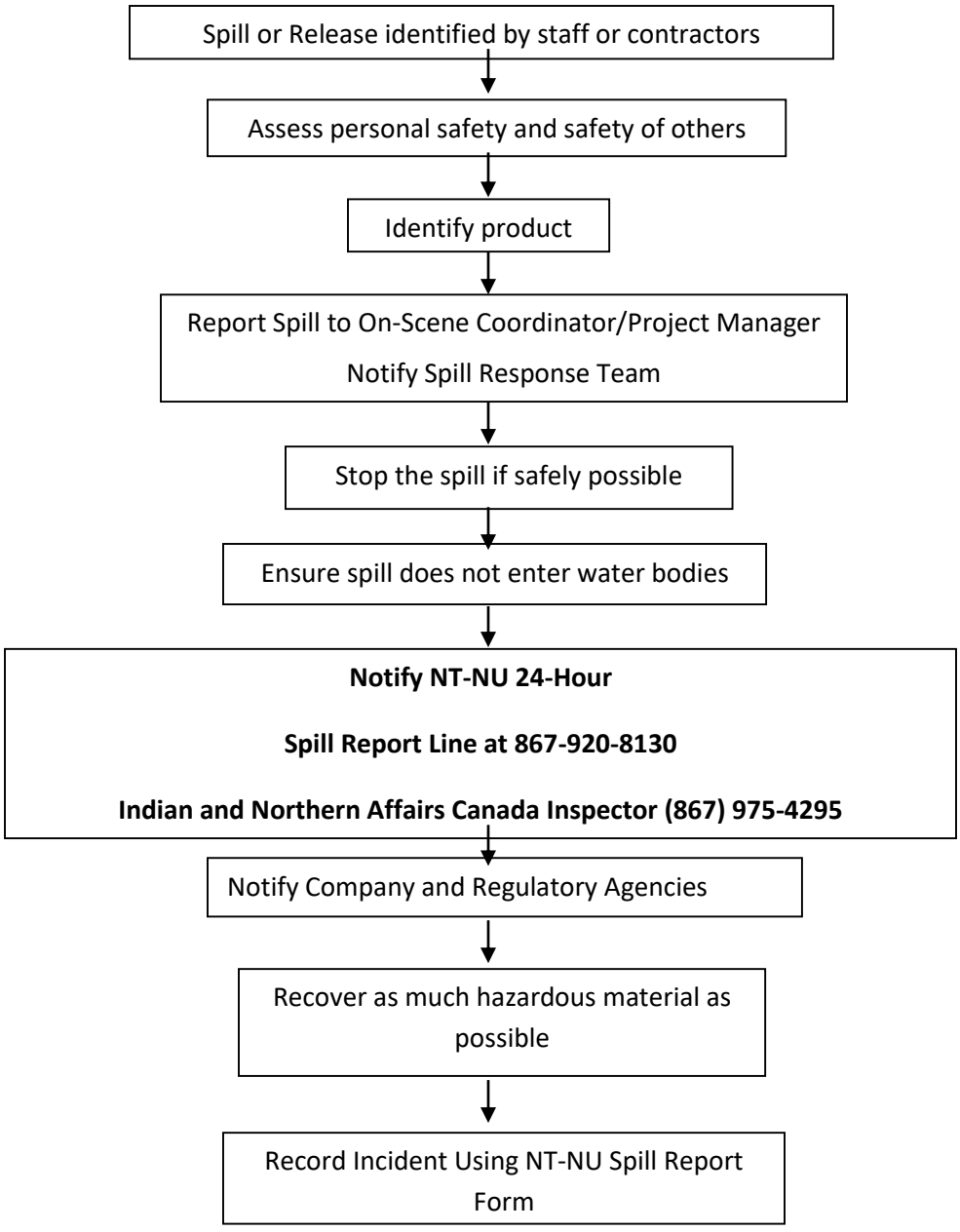
The designated fuel monitor conducts daily visual inspections to check for leaks or damage to the fuel storage containers, as well as for stained or discoloured soils/snow around the fuel storage areas and adjacent equipment. For example, lids/caps are checked for tight seals. A checklist is used to ensure no areas are missed.

2.8 Copies of Spill Contingency Plan

Several copies of the plan are will be kept on-site at the drill at all times, as well as in Chesterfield Inlet with the crews. As well, copies will also be located at North Arrow offices.

3. RESPONSE ORGANIZATION

The following is a flow chart to illustrate the sequence of events in the event of a hazardous material spill occurring at the Hope Bay Project.



3.1 Spill Response Team

North Arrow will appoint a qualified On-Scene Coordinator and appropriate personnel to make up the Luxx Spill Response Team for the Luxx Project. The key personnel that make up the Luxx Spill Response Team are as follows:

In addition to the On-Scene Coordinator and the Project Manager, approximately 2-3 additional personnel will be available on site to assist in spill response and cleanup activities.

The responsibilities of the On-Scene Coordinator are as follows:

1. Assume complete authority over the spill scene and coordinate all personnel involved.
2. Evaluate spill situation and develop overall plan of action.
3. Activate the spill contingency plan
4. Immediately report the spill to:
   NT-NU 24-Hour Spill Report Line (867) 920-8130
   Indian and Northern Affairs Canada Inspector (867) 975-4295
   Other regulatory agencies and North Arrow management (see *Table 2 – Emergency Contacts*).
5. Obtain additional manpower, equipment, and material if not available on site for spill response.

The responsibilities of the Project Manager are as follows:

1. Provide regulatory agencies and North Arrow management with information regarding the status of the cleanup activities.
2. Act as a spokesperson on behalf of North Arrow with regulatory agencies as well as the public and media.
3. Prepare and submit a report on the spill incident to regulatory agencies (including the INAC Inspector) within 30 days of the event.

4. REPORTING PROCEDURE

The On-Scene Coordinator must be notified immediately of any spill either by phone, radio, or in person.

The following is the spill reporting procedure:

1. Report immediately to the NT-NU 24-Hour Spill Report Line
   (867) 920-8130
   Indian and Northern Affairs Canada Inspector (867) 975-4295
   And other regulatory agencies, and North Arrow management
   (see *Table 2 – Emergency Contacts*)
2. Complete the NT-NU Spill Report Form and fax the report to Spill Report Line fax **(867) 873-6924** or e-mail it to **spills@gov.nt.ca**

Table 2 – Emergency Contacts

CONTACT	TELEPHONE NUMBER
INAC - Land Use Inspector	(867) 975-4295
North Arrow Minerals Inc.	(604) 668-8355 (Office); (604) 336-4813 (Fax)
Environment Canada 24 hour Duty Officer	(867) 766-3737, (867) 873-8185 (Fax)
INAC – Water Resource Officer, Rankin Inlet	867-645-2830
INAC – Nunavut Regional Office, Rankin Inlet	867-645-2831
Custom Helicopters	(204) 338-7953
Rankin Inlet Fire Department	(867) 645-2525
RCMP, Chesterfield Inlet	(867) 898-0123
Kivalliq Health Centre	(867) 645-8300
On-Site Project Geologist	*Information to be supplied once phone system is established on the property*
Fisheries and Oceans	(867) 979-8007
Nunavut Department of Environment	(867) 975-7700
Manager, Pollution Control and Air Quality, Environmental Protection, Govt of Nunavut	(867) 975-7748; (867) 975-7739 (Fax)

5. ACTION PLANS

5.1 Initial Action

The instructions to be followed by the first person on the spill scene are as follows:

1. Always be alert and consider your safety first.
2. If possible, identify the material that has been spilled. If you are not sure of the material, use caution and consider your safety first.
3. Assess the hazard of people in the vicinity of the spill.
4. If possible, safely try to stop the flow of material to minimize potential for environmental impacts.
5. Immediately report the spill to the On Scene Coordinator.
6. Resume any effective action to contain, mitigate, or terminate the flow of the spilled material.

The following pages include specific instructions to be followed in the response to various types of spills including diesel fuel, hydraulic oil, lubricating oil, gasoline, aviation fuel (Jet "B"), antifreeze, and propane.

5.2 SPILL RESPONSE ACTIONS
DIESEL FUEL, HYDRAULIC OIL, AND LUBRICATING OIL

Take action only if safety permits – stop the source flow if safe to do so and eliminate all ignition sources.
Never smoke when dealing with these types of spills.

On Land
Build a containment berm using soil material or snow and place a plastic tarp at the foot of the berm for easy capture of the spill after all vapours have dissipated.
Remove the spill by using absorbent pads or excavating the soil, gravel or snow.
Remove spill splashed on vegetation using particulate absorbent material.

On Muskeg
Do not deploy personnel and equipment on marsh or vegetation.
Remove pooled oil with sorbent pads and/or skimmer.
Flush with low pressure water to herd oil to collection point.
Burn only in localized areas, e.g., trenches, piles or windrows.
Do not burn if root systems can be damaged (low water table).
Minimize damage caused by equipment and excavation.

On Water
Contain spill as close to release point as possible.
Use containment boom to capture spill for recovery after vapours have dissipated.
Use absorbent pads to capture small spills.
Use skimmer for larger spills.

On Ice and Snow
Build a containment berm around spill using snow.
Remove spill using absorbent pads or particulate sorbent material.
The contaminated ice and snow must be scraped and shovelled into plastic buckets with lids, 205 litre drums, and/or polypropylene bags.

Storage and Transfer
All contaminated water, ice, snow, soil, and clean up supplies will be stored in closed, labelled containers. All containers will be stored in a well-ventilated area away from incompatible materials.

Disposal
All contaminated material will be transported to an appropriate disposal facility.

5.3 SPILL RESPONSE ACTIONS
GASOLINE AND JET A AVIATION FUEL

Take action only if safety permits – stop the source flow if safe to do so and eliminate all ignition sources.
Never smoke when dealing with these types of spills.

On Land
Build a containment berm using soil material or snow and place a plastic tarp at the foot of the berm for easy capture of the spill after all vapours have dissipated.
Remove the spill by using absorbent pads or excavating the soil, gravel or snow.
Remove spill splashed on vegetation using particulate absorbent material.

On Muskeg
Do not deploy personnel and equipment on marsh or vegetation.
Remove pooled gasoline or Jet A with sorbent pads and/or skimmer.
Flush with low pressure water to herd oil to collection point.
On advice from regulatory agencies, burn only in localized areas, e.g., trenches, piles or windrows.
Do not burn if root systems can be damaged (low water table).
Minimize damage caused by equipment and excavation.

On Water
Contain spill as close to release point as possible.
Use containment boom to capture spill for recovery after vapours have dissipated.
Use absorbent pads to capture small spills.
Use skimmer for larger spills.

On Ice and Snow
Build a containment berm around spill using snow.
Remove spill using absorbent pads or particulate sorbent material.
The contaminated ice and snow must be scraped and shovelled into plastic buckets with lids, 205 litre drums, and/or polypropylene bags.

Storage and Transfer
All contaminated water, ice, snow, soil, and clean up supplies will be stored in closed, labelled containers. All containers will be stored in a well-ventilated area away from incompatible materials.

Disposal
All contaminated material will be transported to an appropriate disposal facility.

5.4 SPILL RESPONSE ACTIONS
PROPANE

Take action only if safety permits. Gases stored in cylinders can explode when ignited.
Keep vehicles away from area.
Never smoke when dealing with these types of spills.

On Land
Do not attempt to contain the propane release.

On Water
Do not attempt to contain the propane release.

On Ice and Snow
Do not attempt to contain the propane release.

General
It is not possible to contain vapours when released.
Water spray can be used to knock down vapours if there is no chance of ignition.
Small fires can be extinguished with dry chemical of CO_2.
Personnel should withdraw immediately from area unless a small leak is stopped immediately after it has been detected.
If tanks are damaged, gas should be allowed to disperse and no recovery attempt should be made.
Personnel should avoid touching release point on containers since frost forms very rapidly.
Keep away from tank ends.

Storage and Transfer
It is not possible to contain vapours when released.

Disposal
All contaminated material will be transported to an appropriate disposal facility.

6.0 PROCEDURES FOR TRANSFERRING, STORING, AND MANAGING SPILL-RELATED WASTES

In most cases, spill cleanups are initiated at the far end of the spill and contained moving toward the centre of the spill. Sorbent socks and pads are generally used for small spill cleanup. A pump with attached fuel transfer hose can suction spills from leaking containers or large accumulations on land or ice, and direct these larger quantities into empty drums. Hand tools such as cans, shovels, and rakes are also very effective for small spills or hard to reach areas. Heavy equipment can be used if deemed necessary but may be constrained by transportation to site constraints.

Used sorbent materials are to be placed in plastic bags for future disposal at an approved disposal facility. All materials mentioned in this section are available in the spill kits located on at the drill shack and in Chesterfield Inlet at the crew houses. Following cleanup, any tools or equipment used will be properly washed and decontaminated, or replaced if this is not possible.

For most of the containment procedures outlined in Section 5, spilled petroleum products and materials used for containment will be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

7.0 PROCEDURES FOR RESTORING AFFECTED AREAS

Once a spill has been contained, North Arrow will consult with the Indian and Northern Affairs Canada Inspector assigned to the property to determine the level of cleanup required. The Inspector may require a site-specific study to ensure appropriate cleanup levels are met. Criteria that may be considered include natural biodegradation of oil, replacement of soil and re-vegetation.

8.0 TRAINING

All employees working on the Luxx Project will be trained in the safe operation of all machinery and tools to help prevent hazardous material spills. All employees on site will also be required to participate in an orientation session, during which all locations of the spill plan and spill kits will be provided. An overview of the plan will be provided by the On-Scene Coordinator leading the orientation session. Specific training sessions are scheduled for individuals directly involved in handling hazardous materials to ensure they know all steps to be undertaken in handling these materials, as well as the steps involved in the event of a spill, including the proper use of spill kits.

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APPENDIX 1

NT/NU Spill Report Instructions and Form

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 EQUIPMENT	
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

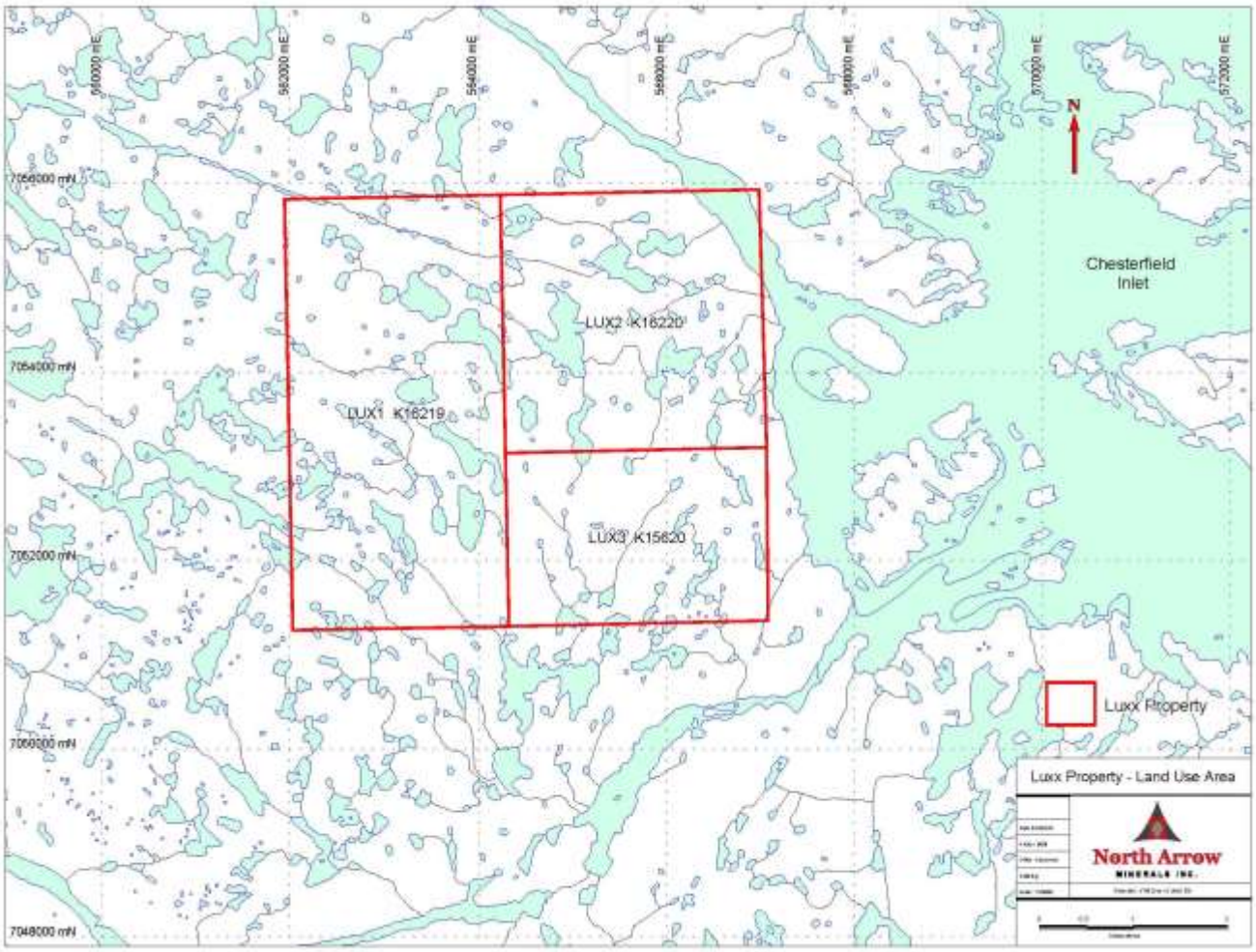
N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

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			

APPENDIX 2

Property Location Map



Suite 960 – 789 West Pender Street, Vancouver, BC Canada V6C 1H2
Tel: 604.668.8355 Fax: 604.336.4813 www.northarrowminerals.com

APPENDIX 3

MSDS Sheets

SAFETY DATA SHEET

JET A/A-1 AVIATION TURBINE FUEL

000003001081

Version 2.0 | Revision Date 2016/07/20 | Print Date 2016/07/20

SECTION 1. IDENTIFICATION

Product name	:	JET A/A-1 AVIATION TURBINE FUEL
Synonyms	:	Jet A-1; Jet A-1-DI; Aviation Turbine Kerosene (ATK); JP-8; NATO F-34; Jet F-34; Aviation Turbine Fuel, Kerosene Type (CAN/CGSB 3.23 & CAN/CGSB 3.24)
Product code	:	101851, 100123
Manufacturer or supplier's details		Petro-Canada P.O. Box 2844, 150 - 6th Avenue South-West Calgary Alberta T2P 3E3 Canada
Emergency telephone number		Suncor Energy: +1 403-296-3000; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	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.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Clear liquid.
Colour	Clear and colourless
Odour	Kerosene-like.

GHS Classification

Flammable liquids	:	Category 3
Skin irritation	:	Category 2
Reproductive toxicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Central nervous system)
Aspiration hazard	:	Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapour.
May be fatal if swallowed and enters airways.
Causes skin irritation.
May cause drowsiness or dizziness.
Suspected of damaging fertility or the unborn child.

Precautionary statements : **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting/ equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ eye protection/ face protection.
Use personal protective equipment as required.
Response:
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
IF exposed or concerned: Get medical advice/ attention.
Do NOT induce vomiting.
If skin irritation occurs: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation

Skin contact

Inhalation : Inhalation may cause central nervous system effects. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.

Skin : May irritate skin.

Eyes : May irritate eyes.

Ingestion : Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.
Aspiration hazard if swallowed - can enter lungs and cause damage.

Aggravated Medical Condition : None known.

Other hazards

None known.

IARC No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
kerosine (petroleum)	8008-20-6	90 - 100 %
2-(2-methoxyethoxy)ethanol	111-77-3	0 - 0.2 %

SECTION 4. FIRST AID MEASURES

If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.

In case of 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 recognized skin cleanser. Wash clothing before reuse. Seek medical advice.
In case of eye contact	:	Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
If swallowed	:	Rinse mouth with water. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.
Most important symptoms and effects, both acute and delayed	:	First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry chemical Carbon dioxide (CO2) Water fog. Foam
Unsuitable extinguishing media	:	Do NOT use water jet.
Specific hazards during firefighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Material can create slippery conditions.
Environmental precautions	:	If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up	:	Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Non-sparking tools should be used. Ensure adequate ventilation. Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Avoid contact with skin, eyes and clothing. Do not ingest. Keep away from heat and sources of ignition. Keep container closed when not in use.
Conditions for safe storage	:	Store in original container. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep in a dry, cool and well-ventilated place. Keep in properly labelled containers. To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
kerosine (petroleum)	8008-20-6	TWA	100 mg/m3	NIOSH REL
		TWA	500 ppm 2,000 mg/m3	OSHA Z-1
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
		TWA	400 ppm 1,600 mg/m3	OSHA P0

Engineering measures	:	Use only in well-ventilated areas. Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

Respiratory protection	:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. 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.
Filter type	:	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.
Hand protection Material	:	polyvinyl alcohol (PVA), Viton(R). 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.
Remarks	:	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.
Eye protection	:	Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.
Protective measures	:	Wash contaminated clothing before re-use.
Hygiene measures	:	Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Clear liquid.
Colour	:	Clear and colourless
Odour	:	Kerosene-like.
Odour Threshold	:	No data available

pH	:	No data available
Pour point	:	-51 °C (-60 °F)No data available
Boiling point/boiling range	:	140 - 300 °C (284 - 572 °F)
Flash point	:	> 38 °C (100 °F) Method: Tagliabue
Auto-Ignition Temperature	:	210 °C (410 °F)
Evaporation rate	:	No data available
Flammability	:	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.
Upper explosion limit	:	5 %(V)
Lower explosion limit	:	0.7 %(V)
Vapour pressure	:	5.25 mmHg (20 °C / 68 °F)
Relative vapour density	:	4.5
Relative density	:	0.775 - 0.84 (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	1.0 - 1.9 cSt (40 °C / 104 °F)
Explosive properties	:	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.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	:	Extremes of temperature and direct sunlight.

Incompatible materials	:	Reactive with oxidising agents, acids and alkalis.
Hazardous decomposition products	:	May release COx, NOx, SOx, aldehydes, acids, ketones, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Eye contact
Ingestion
Inhalation
Skin contact

Acute toxicity

Product:

Acute oral toxicity	:	Remarks: No data available
Acute inhalation toxicity	:	Remarks: No data available
Acute dermal toxicity	:	Remarks: No data available

Components:

kerosine (petroleum):

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

Skin corrosion/irritation

Product:
Remarks: No data available

Serious eye damage/eye irritation

Product:
Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity
No data available

STOT - single exposure
No data available

STOT - repeated exposure
No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish	:	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates	:	Remarks: No data available
Toxicity to algae	:	Remarks: No data available
Toxicity to bacteria	:	Remarks: No data available

Persistence and degradability

Product:

Biodegradability	:	Remarks: No data available

Bioaccumulative potential
No data available

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Offer surplus and non-recyclable solutions to a licensed disposal company. Waste must be classified and labelled prior to recycling or disposal. Send to a licensed waste management company. Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

Contaminated packaging : Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	: UN 1863
Proper shipping name	: Fuel, aviation, turbine engine
Class	: 3
Packing group	: III
Labels	: Class 3 - Flammable Liquid
Packing instruction (cargo aircraft)	: 366

IMDG-Code

UN number	: UN 1863
Proper shipping name	: FUEL, AVIATION, TURBINE ENGINE
Class	: 3
Packing group	: III
Labels	: 3
EmS Code	: F-E, S-E
Marine pollutant	: no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

National Regulations

49 CFR

UN/ID/NA number	: UN 1863
Proper shipping name	: Fuel, aviation, turbine engine
Class	: 3
Packing group	: III
Labels	: Class 3 - Flammable Liquid
ERG Code	: 128
Marine pollutant	: no

SECTION 15. REGULATORY INFORMATION

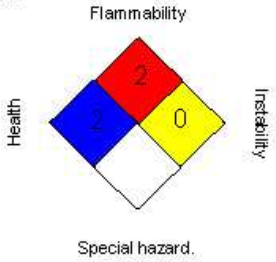
The components of this product are reported in the following inventories:

DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	2*
FLAMMABILITY	2
PHYSICAL HAZARD	0
PERSONAL PROTECTION	H

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

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: 1 905-804-4752

Prepared by : Product Safety: +1 905-804-4752

Revision Date : 2016/07/20

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

DIESEL FUEL

000003000395

Version 3.1 | Revision Date 2017/04/20 | Print Date 2017/04/20

SECTION 1. IDENTIFICATION

Product name	:	DIESEL FUEL
Synonyms	:	Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, 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), Marine Gas Oil, Marine Gas Oil Dyed.
Product code	:	102762, 102763, 102755, 102302, 102744, 101801, 100678, 100677, 101802, 100107, 100668, 100658, 100911, 100663, 100652, 100460, 100065, 101796, 101793, 101795, 101792, 101794, 101791, 100768, 100643, 100642, 100103, 101798, 101800, 101797, 101788, 101789, 101787, 102531, 100734, 100733, 100640, 100997, 100995, 100732, 100731, 100994
Manufacturer or supplier's details		Petro-Canada P.O. Box 2844, 150 - 6th Avenue South-West Calgary Alberta T2P 3E3 Canada
Emergency telephone number		Suncor Energy: +1 403-296-3000; Canutec Transportation: 1-888- 226-8832 (toll-free) or 613-996-6666; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining diesels, marine diesels, MDO and naval distillates may have a higher flash point requirement.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Bright oily liquid.
Colour	Clear to yellow (This product may be dyed red for taxation purposes)
Odour	Mild petroleum oil like.

GHS Classification

Flammable liquids : Category 3

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Acute toxicity (Inhalation)	:	Category 4
Skin irritation	:	Category 2
Carcinogenicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Central nervous system)
Specific target organ toxicity - repeated exposure	:	Category 2 (Liver, thymus, Bone)
Aspiration hazard	:	Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapour.
May be fatal if swallowed and enters airways.
Causes skin irritation.
Harmful if inhaled.
May cause drowsiness or dizziness.
Suspected of causing cancer.
May cause damage to organs (Liver, thymus, Bone) through prolonged or repeated exposure.

Precautionary statements : **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground and bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting/ equipment.
Use non-sparking tools.
Take action to prevent static discharges.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
IF exposed or concerned: Get medical advice/ attention.

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Do NOT induce vomiting.
If skin irritation occurs: Get medical advice/ attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry	:	Eye contact Ingestion Inhalation Skin contact Skin Absorption
Target Organs	:	Skin Eyes Respiratory Tract
Inhalation	:	May cause respiratory tract irritation. Inhalation may cause central nervous system effects. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.
Skin	:	Causes skin irritation.
Eyes	:	Causes eye irritation.
Ingestion	:	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Aspiration hazard if swallowed - can enter lungs and cause damage.
Aggravated Medical Condition	:	None known.

Other hazards

None known.

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH	Confirmed animal carcinogen with unknown relevance to humans

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
fuels, diesel	68334-30-5	70 - 100 %
fuel oil no. 2	68476-30-2	
kerosine (petroleum)	8008-20-6	
kerosine (petroleum), hydrodesulfurized	64742-81-0	
Alkanes, C10-20-branched and linear	928771-01-1	0 - 25 %
Soybean oil, Methyl ester	67784-80-9	0 - 5 %
Rape oil, Methyl ester	73891-99-3	
Fatty acids, tallow, Methyl esters	61788-61-2	

SECTION 4. FIRST AID MEASURES

If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.

In case of 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 recognized skin cleanser.
Wash clothing before reuse.
Seek medical advice.

In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

If swallowed : Rinse mouth with water.
DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice.

Most important symptoms and effects, both acute and delayed : None known.

Protection of first-aiders : First Aid responders should pay attention to self-protection and use the recommended protective clothing
It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

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SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry chemical Carbon dioxide (CO2) Water fog. Foam
Unsuitable extinguishing media	:	Do NOT use water jet.
Specific hazards during fire-fighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), sulphur compounds (H2S), smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Material can create slippery conditions.
Environmental precautions	:	If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Non-sparking tools should be used. Ensure adequate ventilation. Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Avoid contact with skin, eyes and clothing. Do not ingest.

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Keep away from heat and sources of ignition.
Keep container closed when not in use.

Conditions for safe storage : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
kerosine (petroleum)	8008-20-6	TWA	200 mg/m3 (total hydrocarbon vapor)	CA BC OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
kerosine (petroleum), hydrodesulfurized	64742-81-0	TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH

Engineering measures : Use only in well-ventilated areas.
Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. 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.

Filter type : 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.

pours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.

Upper explosion limit	:	6 %(V)
Lower explosion limit	:	0.7 %(V)
Vapour pressure	:	7.5 mmHg (20 °C / 68 °F)
Relative vapour density	:	4.5
Relative density	:	0.8 - 0.88
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	1.3 - 4.1 cSt (40 °C / 104 °F)
Explosive properties	:	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.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	:	Extremes of temperature and direct sunlight.
Incompatible materials	:	Reactive with oxidising agents and acids.
Hazardous decomposition products	:	May release COx, NOx, SOx, H2S, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Eye contact
Ingestion
Inhalation
Skin contact
Skin Absorption

Acute toxicity

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Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Assessment: The substance or mixture has no acute dermal toxicity
Remarks: No data available

Components:

fuels, diesel:

Acute oral toxicity : LD50 (Rat): 7,500 mg/kg,

Acute dermal toxicity : LD50 (Mouse): 24,500 mg/kg,

fuel oil no. 2:

Acute oral toxicity : LD50 (Rat): 12,000 mg/kg,

Acute inhalation toxicity : LC50 (Rat): 4.1 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

kerosine (petroleum):

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg,

Acute inhalation toxicity : LC50 (Rat): > 5 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg,

kerosine (petroleum), hydrodesulfurized:

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg,

Acute inhalation toxicity : LC50 (Rat): > 5.2 mg/l
Exposure time: 4 hrs
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg,

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

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No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish	:	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates	:	Remarks: No data available
Toxicity to algae	:	Remarks: No data available
Toxicity to bacteria	:	Remarks: No data available

Persistence and degradability

Product:

Biodegradability	:	Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water

courses or the soil.
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste must be classified and labelled prior to recycling or disposal.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

Contaminated packaging : Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	: UN 1202
Proper shipping name	: Diesel fuel
Class	: 3
Packing group	: III
Labels	: Class 3 - Flammable Liquid
Packing instruction (cargo aircraft)	: 366

IMDG-Code

UN number	: UN 1202
Proper shipping name	: DIESEL FUEL
Class	: 3
Packing group	: III
Labels	: 3
EmS Code	: F-E, S-E
Marine pollutant	: no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

National Regulations

TDG

UN number	: UN 1202
Proper shipping name	: DIESEL FUEL
Class	: 3
Packing group	: III
Labels	: 3
ERG Code	: 128
Marine pollutant	: no

SECTION 15. REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

For Copy of SDS	:	Internet: www.petro-canada.ca/msds Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228 For Product Safety Information: 1 905-804-4752
Prepared by	:	Product Safety: +1 905-804-4752
Revision Date	:	2017/04/20

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

PROPANE

000003000646

Version 2.0 | Revision Date 2016/07/20 | Print Date 2016/07/20

SECTION 1. IDENTIFICATION

Product name	:	PROPANE
Synonyms	:	Propane HD-5, Propane commercial, Liquified Petroleum Gas (LPG), C3H8, CGSB Propane Grade 1, CGSB Propane Grade 2, odorized propane, stenched propane, automotive propane.
Product code	:	100139
Manufacturer or supplier's details		Petro-Canada P.O. Box 2844, 150 - 6th Avenue South-West Calgary Alberta T2P 3E3 Canada
Emergency telephone number		Suncor Energy: +1 403-296-3000; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	Propane is used as a fuel gas, refrigerant and as a raw material for organic synthesis. It is also used as a laboratory gas. The grade determines the propane content. It is supplied as pressurized liquid in tanks.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Gas at room temperature; liquid when stored under pressure., Liquefied compressed gas.
Colour	colourless
Odour	Propane is an odourless gas. Odourized propane will contain up to 30 g Ethyl Mercaptan per 1000 L of propane.

GHS Classification

Flammable gases	:	Category 1
Gases under pressure	:	Liquefied gas
Simple Asphyxiant	:	Category 1

GHS label elements

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Hazard pictograms	:	
Signal word	:	Danger
Hazard statements	:	Extremely flammable gas. Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.
Precautionary statements	:	**Prevention:** Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. **Response:** Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources. **Storage:** Protect from sunlight. Store in a well-ventilated place.

Potential Health Effects

Primary Routes of Entry	:	Eye contact Inhalation Skin contact
Inhalation	:	Inhalation may cause central nervous system effects. May cause respiratory tract irritation. Inhalation of vapours may cause drowsiness, headache, dizziness, and disorientation.
Skin	:	Contact with rapidly expanding gas may cause burns or frostbite.
Eyes	:	Contact with rapidly expanding gas may cause burns or frostbite.
Ingestion	:	Exposure by this route unlikely.
Aggravated Medical Condition	:	Overexposure may lead to cardiac sensitization.

Other hazards

None known.

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
propane	74-98-6	90 - 100 %
propylene	115-07-1	1 - 5 %
butane	106-97-8	1 - 2.5 %
ethane	74-84-0	1 - 1.5 %
methane	74-82-8	0.1 - 0.2 %

SECTION 4. FIRST AID MEASURES

If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.

In case of 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 recognized skin cleanser.
Wash contaminated clothing before reuse.
Seek medical advice.

In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

If swallowed : Not a significant route of exposure.

Most important symptoms and effects, both acute and delayed : First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : No information available.

Specific hazards during firefighting : If the product release cannot be shut off safely, allow the product to burn itself out.
Cool closed containers exposed to fire with water spray.

Hazardous combustion prod- : Carbon oxides (CO, CO2), smoke and irritating vapours as

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ucts		products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus and full protective wear. Wear a positive-pressure supplied-air respirator with full face-piece.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. In case of inadequate ventilation wear respiratory protection. Remove all sources of ignition.
Environmental precautions	:	If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Prevent further leakage or spillage if safe to do so. Ensure adequate ventilation. Use explosion-proof ventilation equipment. Non-sparking tools should be used. Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes and clothing. Avoid breathing gas. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Use only with adequate ventilation. Keep away from heat and sources of ignition. Keep container closed when not in use. Do not use sparking tools. Do not enter areas where used or stored until adequately ventilated.
Conditions for safe storage	:	Store in original container. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep in a dry, cool and well-ventilated place. Keep in properly labelled containers. To maintain product quality, do not store in heat or direct sunlight. Keep away from sources of ignition - No smoking.

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Ensure the storage containers are grounded/bonded.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
propane	74-98-6	TWA	1,000 ppm	CA AB OEL
		TWA	1,000 ppm	CA BC OEL
		TWAEV	1,000 ppm 1,800 mg/m3	CA QC OEL
propylene	115-07-1	TWA	500 ppm 860 mg/m3	CA AB OEL
		TWA	500 ppm	CA BC OEL
		TWA	500 ppm	ACGIH
butane	106-97-8	TWA	1,000 ppm	CA AB OEL
		TWA	600 ppm	CA BC OEL
		STEL	750 ppm	CA BC OEL
		TWAEV	800 ppm 1,900 mg/m3	CA QC OEL
ethane	74-84-0	TWA	1,000 ppm	CA AB OEL
		TWA	1,000 ppm	CA BC OEL

Engineering measures : Use only in well-ventilated areas.
Use explosion-proof ventilation equipment.
Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.

Personal protective equipment

Respiratory protection : 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.

Filter type : Always wear NIOSH-approved self-contained breathing apparatus when handling this material.

Hand protection
Material : Wear insulated gloves to prevent frostbite.

Remarks : 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.

Eye protection : Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

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Protective measures	:	Wash contaminated clothing before re-use. Wear suitable protective equipment.
Hygiene measures	:	Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Gas at room temperature; liquid when stored under pressure., Liquefied compressed gas.
Colour	:	colourless
Odour	:	Propane is an odourless gas. Odourized propane will contain up to 30 g Ethyl Mercaptan per 1000 L of propane.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	No data available
Boiling point/boiling range	:	-42 °C (-44 °F)
Flash point	:	-104 °C (-155 °F) Method: closed cup
Fire Point	:	No data available
Auto-Ignition Temperature	:	450 °C (842 °F)
Evaporation rate	:	No data available
Flammability	:	Extremely 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. Rapid escape of vapour may generate static charge causing ignition. May accumulate in confined spaces.
Upper explosion limit	:	9.5 %(V)
Lower explosion limit	:	2.1 %(V)
Vapour pressure	:	10,763 mmHg (38 °C / 100 °F)
Relative vapour density	:	1.56
Relative density	:	No data available
Density	:	No data available
Solubility(ies)		

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Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	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. Vapour explosion hazard indoors, outdoors or in sewers. Propane may form explosive mixtures with air.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Reactive with oxidising agents and halogenated compounds.
Hazardous decomposition products	:	May release COx, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Eye contact
Inhalation
Skin contact

Acute toxicity

Product:

Acute oral toxicity	:	Remarks: No data available
Acute inhalation toxicity	:	Remarks: No data available
Acute dermal toxicity	:	Remarks: No data available

Components:

butane:

Acute inhalation toxicity	:	LC50 (Rat): 658 mg/l Exposure time: 4 h Test atmosphere: gas

Skin corrosion/irritation

Product:

Remarks: No data available

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Serious eye damage/eye irritation

Product:
Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity
No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure
No data available

STOT - repeated exposure

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish	:	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates	:	Remarks: No data available
Toxicity to algae	:	Remarks: No data available
Toxicity to bacteria	:	Remarks: No data available

Persistence and degradability

Product:

Biodegradability	:	Remarks: No data available

Bioaccumulative potential
No data available

Mobility in soil
No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Offer surplus and non-recyclable solutions to a licensed disposal company. Waste must be classified and labelled prior to recycling or disposal. Send to a licensed waste management company. Dispose of as hazardous waste in compliance with local and national regulations. Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	:	UN 1978
Proper shipping name	:	Propane
Class	:	2.1
Packing group	:	Not assigned by regulation
Labels	:	Class 2 - Gases: Flammable (Division 2.1)
Packing instruction (cargo aircraft)	:	200

IMDG-Code

UN number	:	UN 1978
Proper shipping name	:	PROPANE
Class	:	2.1
Packing group	:	Not assigned by regulation
Labels	:	2.1
EmS Code	:	F-D, S-U
Marine pollutant	:	no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

National Regulations

TDG

UN number	:	UN 1978
Proper shipping name	:	PROPANE
Class	:	2.1
Packing group	:	Not assigned by regulation
Labels	:	2.1
ERG Code	:	115

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Marine pollutant : no

SECTION 15. REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

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: 1 905-804-4752

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