

# **SPILL CONTINGENCY PLAN**

## **McGill Arctic Research Station**

Dr. Wayne H. Pollard  
Department of Geography  
McGill University

514-398-4454; [wayne.pollard@mcgill.ca](mailto:wayne.pollard@mcgill.ca)

This plan has been prepared for the Nunavut Water Board in accordance with the NWT Environmental Protection Act, Spill Contingency Planning and Reporting Regulations, July 1998 and A Guide to the Spill Contingency Planning and Reporting Regulations, June 2002.

## **1. INTRODUCTION**

This Spill Contingency Plan outlines a plan of action to be taken in the unlikely event of a hazardous materials spill at the McGill Arctic Research Station (MARS) on Axel Heiberg Island. This field site is operated by Dr. Wayne Pollard and Dr. Chris Omelon of McGill University as well as their graduate students and research partners. The Spill Contingency Plan outlines the procedures for responding to a spill that will minimize potential health and safety hazards and environmental damage, as well as necessary remediation activities.

The objectives of this document are to:

- Identify the types of hazardous materials present at the site;
- Identify specific individuals and their responsibilities in response to a spill;
- Define procedures for safe and effective containment and cleanup/disposal of a spill;
- Define the reporting procedures and communication network to be used in the management of a hazardous materials spill.

The secondary objective of this Spill Contingency Plan is to make all field personnel aware of the seriousness and the ramifications of a hazardous materials spill, which should promote mindfulness whenever handling such materials. Prevention of any type of spill is the ultimate goal at MARS.

### **Company Name**

The McGill Arctic Research Station  
Expedition Fiord, Axel Heiberg Island, Baffin Region, Nunavut  
79°23.308'N; 91°01.415'W  
McGill University  
805 Sherbrooke Street West  
Montréal Québec  
H3A 2K6

Attention: Dr. Wayne Pollard, Professor, Department of Geography

**Effective Date of spill contingency plan: July 1, 2016**

**Revised version from initial plan dated February 1, 2010**

The plan is prepared in support of Nunavut Water Board Licence application 3BC-MGU1015

### **Distribution**

Thomas Kabloona; Chair, Nunavut Water Board, Iqaluit

J. Mercer; INAC Land Administration, Iqaluit

Chris Omelon; MARS Project Manager, McGill University, Montreal

Mike Kristjanson; Base Manager, Polar Continental Shelf Program, Resolute Bay

### **Company environmental policy**

McGill University and the McGill Arctic Research Station are committed to the concept of environmental protection, safety and human health. The McGill Arctic Research Station's

health and environmental safety policy includes:

- protection of researchers and groups using the MARS camp;
- protection of the local environment;
- complicity with applicable legislation, regulation and authorizations;
- working proactively with applicable government departments and agencies
- anticipating spill control requirements and making adequate provisions;
- keeping all interested parties informed of any changes at the site.

The plan is presented to all users of the MARS facility during their on-site orientation and is an explicit component of the MARS “Code of Conduct”. All visitors to the MARS camp are made aware of the locations of the plan. All users of the facility undergo instruction and training in the steps to be undertaken in the event of a spill. All visitors are informed where spill kits are located, are aware of their contents and instructed in the proper procedures of their use.

### **Project description**

The McGill Arctic Research station is used as the base camp for research activities in the Expedition Fiord area of west central Axel Heiberg Island, and as a logistics hub in support of other researchers associated with the Polar Continental Shelf Program (PCSP), based out of Resolute Bay. The majority of research focuses on understanding natural conditions related to climate, permafrost, ground ice, glaciers, geology and groundwater activity. Research involves: (1) monitoring of climate; (2) collection of small sample weights and volumes (< 250 g, < 1 L) of water, soil, ice, or rock for analyses; (3) use of non-invasive geophysical tools like ground penetrating radar for stratigraphic observations; (5) shallow (< 1 m) coring; and (6) testing of green technologies such as solar and wind power. These activities have little to no environmental impact and comply with the requirements of Land Use Permits and Research Licences. The camp operates seasonally; it is open for 2-3 weeks before snowmelt (April-May) and 2-3 weeks again during the summer (July-August).

## **2. SITE DESCRIPTION**

The McGill Arctic Research Station was established at the head of Expedition Fiord on west central Axel Heiberg Island in 1960 as a base camp for researchers involved in basic scientific exploration concerned with various aspects of the polar environment including glaciology, geology, geomorphology and climatology. The original camp consisted of two (2) small cabins and two (2) temporary shelters. The camp was expanded in 2005 with two (2) temporary shelters, and further expansion in 2009 included one (1) permanent building and two (2) temporary shelters. One (1) of the original cabins is no longer in use.

The primary purpose for MARS is to support scientific research for Canadian and international universities as well as territorial and federal government departments. The camp can accommodate 14-16 persons but rarely exceeds 7-8 persons. The primary scientific activities based out of MARS include investigations of climate, permafrost, ground ice, glaciers and groundwater activity.

The camp is located at 79°23.308'N; 91°01.415'W (Figures 1 & 2), roughly 500 km north of the hamlet of Resolute Bay and 400 km northwest of the community of Grise Fiord.



**Figure 1.** Location of MARS on Axel Heiberg Island.

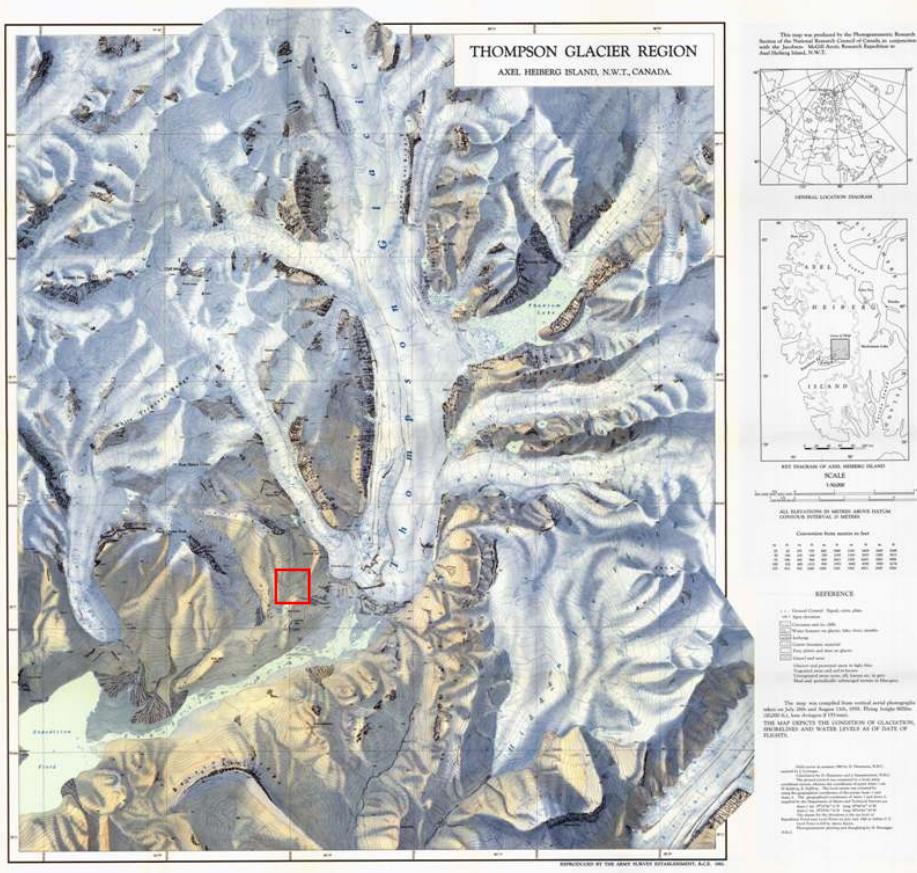
The MARS camp sits on a combination of volcanic bedrock and glacial outwash adjacent to Colour Lake, a naturally-acidic water body with a pH of 3.7. The low pH of the lake water excludes population by fish; the only life in the lake are mosses that grow in shallow-water areas. All other surface waters in the area are sourced from snowmelt or glacial meltwater, which does not support life due to transient discharge or high sediment load.

As a university-based research site MARS relies almost exclusively on PCSP for logistical support, including access to aircraft and fuel.

There are four (4) fuel storage locations for 205 litre fuel drums: these include one adjacent to the runway to store fuel for aircraft (Jet-A, Jet-B), one to store fuel for motorized equipment such as snowmobiles, ATVs, and generators (gasoline),

and three for storing fuel and/or feeder drums to heat buildings (diesel). The fuel storage area next to the runway accommodates 6-12 drums (Jet-A or Jet-B), the fuel storage motorized equipment accommodates 4-8 drums (gasoline), and the fuel storage for buildings accommodates 2-3 drums (diesel) plus 205 litre feeder drums. Excess fuel of one type can be temporarily stored at another storage location.

All fuel storage areas are equipped with 4-barrel Can-Ross Environmental spill berms. Can-Ross spill kits are located at each fuel storage area, and small hand-held general spill kits are kept in adjacent buildings. Small spill berms are used when refueling generators, ATVs and snowmobiles. Grey water is disposed of in a sump constructed from a perforated 205 litre barrel buried 50 cm into gravel, which is located > 50 m from any streams or water bodies. We utilize a SmartAsh Incinerator for processing of combustible wastes and an Incinolet toilet for solid human waste disposal. Liquid human waste is disposed of in a latrine. All glass, metal, non-burnable waste and incinerated ash is packaged in empty 205 litre fuel drums and removed from camp on the first available aircraft for proper disposal.



**Figure 2.** 1:50,000 topographic map of MARS and the Thompson Glacier Region.

### List of Hazardous Materials On-site

Table 1 presents a list of hazardous materials at MARS, the type of storage container and the average/maximum quantities normally stored on site. All structures or storage areas containing hazardous materials are > 100 m from any water body.

Whereas the number of fuel drums stored adjacent to the aircraft runway fluctuates as a result of fuel caching by PCSP, no more than 2-3 drums of fuel are normally maintained at other fuel storage areas. Propane stored in large (45 kg) cylinders used for cooking and cooling (e.g. freezers) are properly secured and stored next to the kitchen building. Propane stored in small (9 kg) cylinders used for cooking and small space heaters for fly camps are stored at the kitchen building. Lubricants for motorized vehicles (e.g. antifreeze, engine oil, brake fluid) are stored in leak-free containers in the temporary structure used to store ATVs and snowmobiles.

Feeder drums installed next to buildings to supply diesel to heating stoves are filled from fuel drums in the same or adjacent spill berms using rotary-style hand pumps. Aircraft are refueled by pilots who use their own pump systems. Waste oil and other liquid waste such as brake fluid or antifreeze is collected, stored in sealed plastic containers and removed from camp on the first available flight for proper disposal.

**Table 1.** List of hazardous materials stored at MARS.

<i><b>Fuel</b></i>	<i><b>Storage Container</b></i>	<i><b>Normally On-site</b></i>	<i><b>Maximum On-site</b></i>	<i><b>Storage Locations and Uses</b></i>
Diesel	205 L	1230 L 6 drums	2460 L 12 drums	Three (3) storage areas with three (3) feeder drums. Fuel for heat.
Gasoline	205 L	615 L 3 drums	1230 L 6 drums	One (1) storage areas near main structures. Fuel for snowmobiles, ATVs, and generators
Jet A/B	205 L	1230 L 6 drums	2460 L 12 drums	One (1) storage area next to aircraft runways. Fuel for aircraft.
Propane	45 kg	90 kg 2 cylinders	270 kg 6 cylinders	One (1) storage area next to kitchen. Fuel for heating (stove) and cooling (freezer).
	9 kg	54 kg 6 cylinders	90 kg 10 cylinders	

### **Existing Preventative Measures**

All fuel arriving at MARS by aircraft is immediately transferred to the appropriate storage area. All fuel is stored on Can-Ross Environmental fuel berms. Feeder drums for heater stoves are also placed within fuel berms. All motorized equipment is stored on impervious floors, or in spill berms. Can-Ross spill kits are located where fuel is stored, small spill berms are used whenever refueling motorized equipment, and hand-held spill kits and are kept in adjacent buildings. The camp manager maintains and monitors fuel inventories and storage and regularly inspects storage facilities and motorized equipment. Grey water is transported by hand to the sump, which is > 50m from the kitchen and sleeping quarters and 1 m of freeboard is maintained at all times. Given the usual low level of camp occupancy grey water wastes averages < 25 L/day.

### **Plan Copies**

Copies of this plan are kept on site and are posted with our code of conduct in each of the main buildings. Copies are issued to scientists using the camp. A copy is also held at McGill University in Montréal. Additional copies are available upon request.

### **Media and Public Inquiries**

All general inquiries are directed to the McGill Arctic Research Station - Research Director, currently Dr. Wayne Pollard. If the Research Director is not available, inquiries should be directed to Dr. Chris Omelon. In the unlikely event of a serious situation, inquiries may be directed to the McGill University Public Relations Office.

## **3. SPILL RESPONSE PROCEDURES**

Based on the INAC Guidelines for Spill Contingency Planning (a copy of which is kept with the Camp Spill Plan for reference to guideline levels), all hazardous materials at MARS are categorized as “flammable liquids”. All fuel at the site is stored in volumes never exceeding 205 litres. Drums

are stored upright to avoid leakage from caps and bungs. The most likely spill involves small (<1L) volumes while refuelling a feeder drum, motorized vehicle, or jerry can. Larger spills would be sourced from a storage drum or feeder line; as a preventative measure, regular inspections are conducted. The unlikely worst case scenario would involve the rupture of a fuel drum and spill of up to 205 L. The following steps outline our response procedure to a spill. Given that these materials are all highly flammable, the potential for ignition of a spill due to a nearby source of heat, spark or flame is one of the highest considerations for safety. As such, fire safety is one of the highest priorities in our safety briefing to visitors and enforcement of safe practices.

**Step 1:** Spill occurs and is identified by staff;

**Step 2:** Individual assesses personal safety;

**Step 3:** Individual identifies product and severity of the spill;

**Step 4:** Individual notifies the camp manager of the nature and level of the spill;

**Step 5a:** If the spill is minor (< 1 L), the individual will effect an immediate clean up (on sill mat or in berm), and any contaminated soil will be dug up, bagged and placed in a spill container. The individual will fill out a minor spill report that is recorded in the field station spill log (NT-NU spill report form Appendix 1).

**Step 5b:** If the spill is larger but still minor according to guideline levels, the camp manager will make sure that the spill is stopped, ensure the spill does not enter any water body, and effect clean up with spill kit materials and put any contaminated soil in spill bags and then place in spill containers. Most spills will be contained in the spill berms so contaminated absorbent pads and materials will be bagged and placed in spill container. The camp manager will file a thorough report for station records as well as a NT-NU spill report form (Appendix 1) which will be sent to McGill University in Montreal. The log on minor spills will be reported to land use and water board inspectors at scheduled visits.

**Step 5c:** In the case of a major spill (exceeding guideline levels which for flammable liquids is 100 L), the following procedures will be executed. If safely possible, the camp manager and support staff will stop and contain the spill, and ensure that it does not enter into any water body. The NWT 24-hour Spill Report Line (867-920-8130) will be notified as well as the MARS Research Director (514-398-4454) if not on site. Since PCSP is our primary logistics partner, we will also contact the PCSP base Manager in Resolute Bay (867-252-3872/3300).

Clean-up of the spill will go into effect, recovering as much fuel as possible and all contaminated materials placed in spill containers, removed to an approved storage facility and the site decontaminated if necessary. A detailed spill report will be filed as well as a NT-NU spill report form (Appendix 1), which will be sent to McGill University in Montréal.

Material Safety Data Sheets for Gasoline, Diesel and Jet B fuels are listed in Appendix 2.

### 3. ACTION PLAN

#### Potential spill sizes and sources for each hazardous material

Table 2 summarizes the potential spill events and potential volumes of contamination and areas likely to be contaminated. Waste fuels and oil are stored in sealed buckets and removed regularly.

**Table 2.** List of hazardous materials and potential contamination.

<i><b>Fuel</b></i>	<i><b>Potential discharge event</b></i>	<i><b>Discharge volume</b></i>	<i><b>Direction of potential discharge</b></i>
Gasoline	1. Over filling	Most likely	Fuel storage areas are all flat ground and on spill berms, underground seepage is unlikely and contamination would be contained on top of the permafrost around the storage area.
	2. Leak from hand pump	< 205 L	
	3. Minor leak from drum in storage area	615 L if all	
	4. Puncture of drum in storage area	drums	
	5. All drums punctured	punctured	
Diesel	1. Over filling feeder drums	Most likely	Fuel storage areas are all flat ground and on spill berms, underground seepage is unlikely and contamination would be contained on top of the permafrost around the storage area.
	2. Leak from hand pump	< 205 L	
	3. Minor leak from feeder hose	615 L if all	
	4. Minor leak from drum in storage area	drums	
	5. Puncture of drum in storage area	punctured	
	6. All drums punctures		
Jet-A/B	1. Over filling aircraft	Most likely	Fuel storage areas are all flat ground, mostly on spill berms, underground seepage is unlikely and contamination would be contained on top of the permafrost around the storage area.
	2. Leak from pump	< 200 L	
	3. Minor leak from drum in storage area	1230 L if all	
	4. Puncture of drum in storage area	drums	
	5. All drums punctures	punctured	
Propane	1. Leak of cylinder in storage area	9-45 kg	Degas into air around storage area or possible confinement inside kitchen building.
	2. Leak from connections	depending on cylinder size	
	3. Puncture or faulty valve	90 kg if 2 cylinders punctured	

## **Potential Environmental Impacts of a Spill**

Our field season is short and divided into 2 parts. During late winter the potential impacts of a spill are much less than during summer because the spilled fuel will be contained by snow, infiltration will be negligible, and cleanup is straight forward.

Gasoline, diesel and Jet A/B fuels are harmful to terrestrial and aquatic life if they come in contact with large quantities. Most of these fuels have limited biodegradation potential in cold climates and will bioaccumulate with repeated spills over time. In all cases, runoff into water would be the most serious situation as containment and cleanup is problematic; for this reason, all of our fuel is stored in spill berms located > 100 m from any water body. Also note that the only significant water body in this area, Colour Lake, is largely barren of life because of its naturally low pH.

The worst case scenario, based on the NT-NU Spill guidelines, is the puncturing of all drums in storage leading to entire fuel spills into the environment. As unlikely as this scenario is, the resulting impact on wildlife (including aquatic life) is limited at MARS. Our total hazardous waste inventory is relatively low, and much would be contained in spill berms and in the soil immediately surrounding storage areas. Active layers on the order of 50-60 cm, permafrost is cold and continuous, and storage areas are on flat ground away from water bodies.

Propane is also environmentally harmful; even though it can accumulate as a heavy gas, the amounts on site are small and the greatest likelihood is that it would diffuse into the atmosphere.

Thus, even in a worst case scenario, the environmental impacts of a spill of the hazardous materials at MARS are unlikely to be significant and clean up would be manageable.

In all of the above cases the greatest hazard of a worst case spill might be fire, thus human safety remains one of our highest priorities.

## **Procedures**

The most important procedure in preparation for a spill is to have an adequate level of training of researchers using the camp. As part of camp orientation, each visitor is briefed on spill procedures (location of fuel storage, spill kits, refueling ...) and provided with copies of the Spill Plan, as well as the camp code of conduct. The spill related procedures fall into 3 levels of action: (1) upon identifying a spill, the first is to assure the safety of everyone in the camp, then assess the spill (type, minor, major) and depending on the nature of the spill inform the camp manager and proceed with appropriate measures to limit and clean up the spill (as set out in Section 2); (2) if the spill is of a major nature, the camp manager with the assistance of individuals in camp will undertake spill containment and clean up, followed by notification of appropriate territorial and company authorities and a spill report made to the NT-NU agencies; (3) maintenance of records of spills of all levels and the action taken. In this case GPS locations and photographs form an important part of the recording process as well as filing out NT-NU Spill Reports.

The telephone numbers for the NWT 24 Spill Line (867 920-8130), the MARS Research Director (514-398-4454) and PCSP (867-252-3872/3300) are stored in each permanent structure and satellite phone case.

Containment procedures for spills will follow the guidelines provided by the NT-NU Guidelines for Spill Contingency Planning based on the spill kit materials available.

### **Spill kit contents**

Located at each fuel storage site

1 Can-Ross SK-SBOP79 – Spill Kit with a Sorbent Capacity = 305 litres / 67.1 gallons

- 1 95 U.S. gallon Polyethylene Overpack Drum
- 4 Oil Only Socks (5" x 10')
- 5 Oil Only Socks (3" x 4')
- 50 Oil Only Pads (17" x 19" x D.W.)
- 5 Oil Only Pillows (12" x 13")
- 1 Oil Only Roll (19" x 115' x D.W.)
- 1 Drain Cover (36" x 36" x 1/16")
- 1 1 lb. Plugging Compound (pre-mixed)
- 1 Caution Tape (3" x 1000')
- 2 Pair Nitrile Gloves
- 2 Pair Safety Goggles
- 2 Protective Coveralls
- 10 Printed Disposal Bags (24" x 48")
- 1 Instruction Book

Located in structures

1 Can-Ross hand held SK-SBOPTRK spill kit with a Sorbent Capacity of  
30 litres / 6.6 gallons

- 1 Nylon Carry Bag
- 1 Oil Only Sock (3" x 10')
- 30 Oil Only Pads (17" x 19" x S.W.)
- 1 Oil Only Pillow (12" x 13")
- 1 1 lb. Plugging Compound (pre-mixed)
- 1 1 lb. Plugging Compound (dry)
- 1 Pair Nitrile Gloves
- 3 Disposal Bags (20"X24")
- 1 Instruction book

APPENDIX 1  
NT-NU Spill Report form



Canada

# 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		<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input type="checkbox"/> UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER _____-_____	
	B OCCURRENCE DATE: MONTH – DAY – YEAR		B OCCURRENCE TIME				
C	LAND USE PERMIT NUMBER (IF APPLICABLE)			WATER LICENCE NUMBER (IF APPLICABLE)			
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION				REGION <input type="checkbox"/> NWT <input type="checkbox"/> NUNAVUT <input type="checkbox"/> 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	EMPLOYER	LOCATION CALLED	REPORT LINE NUMBER
		STATION OPERATOR		YELLOWKNIFE, NT	(867) 920-8130
LEAD AGENCY <input type="checkbox"/> EC <input type="checkbox"/> CCG <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> INAC <input type="checkbox"/> NEB <input type="checkbox"/> TC			SIGNIFICANCE <input type="checkbox"/> MINOR <input type="checkbox"/> MAJOR <input type="checkbox"/> UNKNOWN		FILE STATUS <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED
AGENCY		CONTACT NAME	CONTACT TIME	REMARKS	
LEAD AGENCY					
FIRST SUPPORT AGENCY					
SECOND SUPPORT AGENCY					
THIRD SUPPORT AGENCY					

APPENDIX 2  
NT-NU Spill Report form  
Hazardous Materials Safety Data Sheets

- Gasoline
- Diesel
- Jet-A/B
- Propane



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

### EMERGENCY OVERVIEW

#### DANGER!

**EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT  
- EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF  
SWALLOWED - ASPIRATION HAZARD**



NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

### 1. CHEMICAL PRODUCT and COMPANY INFORMATION

**Hess Corporation**  
**1 Hess Plaza**  
**Woodbridge, NJ 07095-0961**

**EMERGENCY TELEPHONE NUMBER (24 hrs):**  
**COMPANY CONTACT (business hours):**  
**MSDS (Environment, Health, Safety) Internet Website**

**CHEMTREC (800)424-9300**  
Corporate Safety (732)750-6000  
[www.hess.com](http://www.hess.com)

**SYNONYMS:** Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

### 2. COMPOSITION and INFORMATION ON INGREDIENTS \*

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

### 3. HAZARDS IDENTIFICATION

#### **EYES**

Moderate irritant. Contact with liquid or vapor may cause irritation.

#### **SKIN**

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

#### **INGESTION**

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

#### **INHALATION**

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

**WARNING:** the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

#### **CHRONIC EFFECTS and CARCINOGENICITY**

Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

#### **MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE**

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

### 4. FIRST AID MEASURES

#### **EYES**

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

#### **SKIN**

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

#### **INGESTION**



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

### **INHALATION**

Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

## **5. FIRE FIGHTING MEASURES**

### **FLAMMABLE PROPERTIES:**

FLASH POINT:	-45 °F (-43°C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 °F (>280 °C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

### **FIRE AND EXPLOSION HAZARDS**

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

### **EXTINGUISHING MEDIA**

**SMALL FIRES:** Any extinguisher suitable for Class B fires, dry chemical, CO<sub>2</sub>, water spray, fire fighting foam, or Halon.

**LARGE FIRES:** Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 "Low Expansion Foam - 1994 Edition."

### **FIRE FIGHTING INSTRUCTIONS**

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

### **6. ACCIDENTAL RELEASE MEASURES**

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

### **7. HANDLING and STORAGE**

#### **HANDLING PRECAUTIONS**

\*\*\*\*\*USE ONLY AS A MOTOR FUEL\*\*\*\*\*

\*\*\*\*\*DO NOT SIPHON BY MOUTH\*\*\*\*\*

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

#### **STORAGE PRECAUTIONS**

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

#### **WORK/HYGIENIC PRACTICES**

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

### 8. EXPOSURE CONTROLS and PERSONAL PROTECTION

#### **EXPOSURE LIMITS**

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits	Note
Gasoline (86290-81-5)	ACGIH	300	500	A3	
Benzene (71-43-2)	OSHA	1	5	Carcinogen	
	ACGIH	0.5	2.5	A1, skin	
	USCG	1	5		
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)	
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--		
	ACGIH	1000	--	A4	
Ethyl benzene (100-41-4)	OSHA	100	--		
	ACGIH	100	125	A3	
n-Hexane (110-54-3)	OSHA	500	--		
	ACGIH	50	--	Skin	
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3	
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established	
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)	
	ACGIH	20	--	A4	
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--		
Xylene, mixed isomers (1330-20-7)	OSHA	100	--		
	ACGIH	100	150	A4	

#### **ENGINEERING CONTROLS**

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

#### **EYE/FACE PROTECTION**

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

#### **SKIN PROTECTION**

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

#### **RESPIRATORY PROTECTION**

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

### 9. PHYSICAL and CHEMICAL PROPERTIES

#### **APPEARANCE**

A translucent, straw-colored or light yellow liquid



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

### **ODOR**

A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

### **ODOR THRESHOLD**

	<u>Odor Detection</u>	<u>Odor Recognition</u>
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

### **BASIC PHYSICAL PROPERTIES**

BOILING RANGE:	85 to 437 °F (39 to 200 °C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H <sub>2</sub> O = 1):	0.70 - 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H <sub>2</sub> O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 °F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 °F); ethanol is readily soluble in water

## **10. STABILITY and REACTIVITY )**

**STABILITY:** Stable. Hazardous polymerization will not occur.

### **CONDITIONS TO AVOID**

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

### **INCOMPATIBLE MATERIALS**

Keep away from strong oxidizers.

### **HAZARDOUS DECOMPOSITION PRODUCTS**

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitroresols that can decompose violently.

## **11. TOXICOLOGICAL PROPERTIES**

### **ACUTE TOXICITY**

Acute Dermal LD50 (rabbits): > 5 ml/kg	Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating	Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative	

### **CHRONIC EFFECTS AND CARCINOGENICITY**

Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

This product may contain methyl tertiary butyl ether (MTBE ): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

### 12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API ([www.api.org](http://www.api.org)) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

### 13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

### 14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Gasoline  
DOT HAZARD CLASS and PACKING GROUP: 3, PG II  
DOT IDENTIFICATION NUMBER: UN 1203  
DOT SHIPPING LABEL: FLAMMABLE LIQUID

PLACARD:



### 15. REGULATORY INFORMATION

#### U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

#### CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

#### CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

#### SARA SECTION 311/312 - HAZARD CLASSES

<u>ACUTE HEALTH</u>	<u>CHRONIC HEALTH</u>	<u>FIRE</u>	<u>SUDDEN RELEASE OF PRESSURE</u>	<u>REACTIVE</u>
X	X	X	--	--

#### SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

<u>INGREDIENT NAME (CAS NUMBER)</u>	<u>CONCENTRATION WT. PERCENT</u>
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents ([www.epa.gov/tri](http://www.epa.gov/tri)) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

<u>INGREDIENT NAME (CAS NUMBER)</u>	<u>CONCENTRATION - Parts per million (ppm) by weight</u>
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

### **CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS**

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

<u>INGREDIENT NAME (CAS NUMBER)</u>	<u>Date Listed</u>
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

### **CANADIAN REGULATORY INFORMATION (WHMIS)**

Class B, Division 2 (Flammable Liquid)

Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

### **16. OTHER INFORMATION**

<b><u>NFPA® HAZARD RATING</u></b>	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
<b><u>HMIS® HAZARD RATING</u></b>	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

**SUPERSEDES MSDS DATED:** 07/01/06

### **ABBREVIATIONS:**

AP = Approximately      < = Less than      > = Greater than  
N/A = Not Applicable      N/D = Not Determined      ppm = parts per million

### **ACRONYMS:**

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation
ANSI	American National Standards Institute (212)642-4900		[General Info: (800)467-4922]
API	American Petroleum Institute (202)682-8000	EPA	U.S. Environmental Protection Agency
		HMIS	Hazardous Materials Information System



## MATERIAL SAFETY DATA SHEET

**Gasoline, All Grades**

**MSDS No. 9950**

IARC	International Agency For Research On Cancer	REL	Recommended Exposure Limit (NIOSH)
MSHA	Mine Safety and Health Administration	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
NFPA	National Fire Protection Association (617)770-3000	SCBA	Self-Contained Breathing Apparatus
NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	STEL	Short-Term Exposure Limit (generally 15 minutes)
NTP	National Toxicology Program	TLV	Threshold Limit Value (ACGIH)
OPA	Oil Pollution Act of 1990	TSCA	Toxic Substances Control Act
OSHA	U.S. Occupational Safety & Health Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	WEEL	Workplace Environmental Exposure Level (AIHA)
RCRA	Resource Conservation and Recovery Act	WHMIS	Workplace Hazardous Materials Information System (Canada)

### DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.



## MATERIAL SAFETY DATA SHEET

**Diesel Fuel (All Types)**

**MSDS No. 9909**

### EMERGENCY OVERVIEW

#### CAUTION!

**OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT  
EFFECTS CENTRAL NERVOUS SYSTEM  
HARMFUL OR FATAL IF SWALLOWED**

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer. If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).



NFPA 704 (Section 16)

### 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Hess Corporation  
1 Hess Plaza  
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**

COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000

MSDS INTERNET WEBSITE: [www.hess.com](http://www.hess.com) (See Environment, Health, Safety & Social Responsibility)

**SYNONYMS:** Ultra Low Sulfur Diesel (ULSD); Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Diesel Fuel #2; Dyed Diesel Fuel; Non-Road, Locomotive and Marine Diesel Fuel; Tax-exempt Diesel Fuel

See Section 16 for abbreviations and acronyms.

### 2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel (68476-34-6)	100
Naphthalene (91-20-3)	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher. Diesel fuel may be dyed (red) for tax purposes. May contain a multifunctional additive.

### 3. HAZARDS IDENTIFICATION

#### EYES

Contact with liquid or vapor may cause mild irritation.

#### SKIN

May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

#### INGESTION

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.



## MATERIAL SAFETY DATA SHEET

**Diesel Fuel (All Types)**

**MSDS No. 9909**

### **INHALATION**

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

**WARNING:** the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

### **CHRONIC EFFECTS and CARCINOGENICITY**

Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

### **MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE**

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

## **4. FIRST AID MEASURES**

### **EYES**

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

### **SKIN**

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

### **INGESTION**

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

### **INHALATION**

Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

## **5. FIRE FIGHTING MEASURES**

### **FLAMMABLE PROPERTIES:**

FLASH POINT:	> 125 °F (> 52 °C) minimum PMCC
AUTOIGNITION POINT:	494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

### **FIRE AND EXPLOSION HAZARDS**

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

### **EXTINGUISHING MEDIA**

**SMALL FIRES:** Any extinguisher suitable for Class B fires, dry chemical, CO<sub>2</sub>, water spray, fire fighting foam, or Halon.



## MATERIAL SAFETY DATA SHEET

**Diesel Fuel (All Types)**

**MSDS No. 9909**

**LARGE FIRES:** Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

### **FIRE FIGHTING INSTRUCTIONS**

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

## **6. ACCIDENTAL RELEASE MEASURES**

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

## **7. HANDLING and STORAGE**

### **HANDLING PRECAUTIONS**

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions.

Documents such as 29 CFR OSHA 1910.106 "Flammable and Combustible Liquids, NFPA 77 Recommended Practice on Static Electricity, API 2003 "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and ASTM D4865 "Standard Guide for Generation and Dissipation of Static



## MATERIAL SAFETY DATA SHEET

**Diesel Fuel (All Types)**

**MSDS No. 9909**

Electricity in Petroleum Fuel Systems" address special precautions and design requirements involving loading rates, grounding, bonding, filter installation, conductivity additives and especially the hazards associated with "switch loading." ["Switch Loading" is when a higher flash point product (such as diesel) is loaded into tanks previously containing a low flash point product (such as gasoline) and the electrical charge generated during loading of the diesel results in a static ignition of the vapor from the previous cargo (gasoline).]

Note: When conductivity additives are used or are necessary the product should achieve 25 picosiemens/meter or greater at the handling temperature.

### **STORAGE PRECAUTIONS**

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

### **WORK/HYGIENIC PRACTICES**

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

## **8. EXPOSURE CONTROLS and PERSONAL PROTECTION**

### **EXPOSURE LIMITS**

Components (CAS No.)	Source	<u>Exposure Limits</u>		Note
		TWA/STEL		
Diesel Fuel: (68476-34-6)	OSHA	5 mg/m, as mineral oil mist		
	ACGIH	100 mg/m <sup>3</sup> (as totally hydrocarbon vapor) TWA		A3, skin
Naphthalene (91-20-3)	OSHA	10 ppm TWA		
	ACGIH	10 ppm TWA / 15 ppm STEL		A4, Skin

### **ENGINEERING CONTROLS**

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

### **EYE/FACE PROTECTION**

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

### **SKIN PROTECTION**

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.



## MATERIAL SAFETY DATA SHEET

**Diesel Fuel (All Types)**

**MSDS No. 9909**

### **RESPIRATORY PROTECTION**

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

### **9. PHYSICAL and CHEMICAL PROPERTIES**

#### **APPEARANCE**

Clear, straw-yellow liquid. Dyed fuel oil will be red or reddish-colored.

#### **ODOR**

Mild, petroleum distillate odor

#### **BASIC PHYSICAL PROPERTIES**

BOILING RANGE: 320 to 690 oF (160 to 366 °C)  
VAPOR PRESSURE: 0.009 psia @ 70 °F (21 °C)  
VAPOR DENSITY (air = 1): > 1.0  
SPECIFIC GRAVITY (H<sub>2</sub>O = 1): 0.83 to 0.88 @ 60 °F (16 °C)  
PERCENT VOLATILES: 100 %  
EVAPORATION RATE: Slow; varies with conditions  
SOLUBILITY (H<sub>2</sub>O): Negligible

### **10. STABILITY and REACTIVITY**

**STABILITY:** Stable. Hazardous polymerization will not occur.

#### **CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS**

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

#### **HAZARDOUS DECOMPOSITION PRODUCTS**

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

### **11. TOXICOLOGICAL PROPERTIES**

#### **ACUTE TOXICITY**

Acute dermal LD50 (rabbits): > 5 ml/kg      Acute oral LD50 (rats): 9 ml/kg  
Primary dermal irritation: extremely irritating (rabbits)      Draize eye irritation: non-irritating (rabbits)  
Guinea pig sensitization: negative

#### **CHRONIC EFFECTS AND CARCINOGENICITY**

Carcinogenic: OSHA: NO      IARC: NO      NTP: NO      ACGIH: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

#### **MUTAGENICITY (genetic effects)**

This material has been positive in a mutagenicity study.



## MATERIAL SAFETY DATA SHEET

**Diesel Fuel (All Types)**

**MSDS No. 9909**

### 12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

### 13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

### 14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel	Placard (International Only):
HAZARD CLASS and PACKING GROUP:	3, PG III	
DOT IDENTIFICATION NUMBER:	NA 1993 (Domestic)	
	UN 1202 (International)	
DOT SHIPPING LABEL:	None	



Use Combustible Placard if shipping in bulk domestically

### 15. REGULATORY INFORMATION

#### U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

#### CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

#### CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

#### SARA SECTION 311/312 - HAZARD CLASSES

<u>ACUTE HEALTH</u>	<u>CHRONIC HEALTH</u>	<u>FIRE</u>	<u>SUDDEN RELEASE OF PRESSURE</u>	<u>REACTIVE</u>
X	X	X	--	--

#### SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

#### CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

<u>INGREDIENT NAME (CAS NUMBER)</u>	<u>Date Listed</u>
Diesel Engine Exhaust (no CAS Number listed)	10/01/1990

#### CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)



## MATERIAL SAFETY DATA SHEET

**Diesel Fuel (All Types)**

**MSDS No. 9909**

### 16. OTHER INFORMATION

**NFPA® HAZARD RATING**

HEALTH:	0
FIRE:	2
REACTIVITY:	0

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

**HMIS® HAZARD RATING**

HEALTH:	1 *	* Chronic
FIRE:	2	
PHYSICAL:	0	

**SUPERSEDES MSDS DATED:** 02/28/2001

#### **ABBREVIATIONS:**

AP = Approximately      < = Less than      > = Greater than  
N/A = Not Applicable      N/D = Not Determined      ppm = parts per million

#### **ACRONYMS:**

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
AIHA	American Industrial Hygiene Association	OPA	Oil Pollution Act of 1990
ANSI	American National Standards Institute (212) 642-4900	OSHA	U.S. Occupational Safety & Health Administration
API	American Petroleum Institute (202) 682-8000	PEL	Permissible Exposure Limit (OSHA)
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act	RCRA	Resource Conservation and Recovery Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]	REL	Recommended Exposure Limit (NIOSH)
EPA	U.S. Environmental Protection Agency	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
HMIS	Hazardous Materials Information System	SCBA	Self-Contained Breathing Apparatus
IARC	International Agency For Research On Cancer	SPCC	Spill Prevention, Control, and Countermeasures
MSHA	Mine Safety and Health Administration	STEL	Short-Term Exposure Limit (generally 15 minutes)
NFPA	National Fire Protection Association (617)770-3000	TLV	Threshold Limit Value (ACGIH)
NIOSH	National Institute of Occupational Safety and Health	TSCA	Toxic Substances Control Act
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	TWA	Time Weighted Average (8 hr.)
		WEEL	Workplace Environmental Exposure Level (AIHA)
		WHMIS	Canadian Workplace Hazardous Materials Information System







#### **DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES**

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.



# Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
 	<b>B-2, D-2A, D-2B</b>	  	

## Section 1. Chemical Product and Company Identification

<b>Product Name</b>	<b>JET B AVIATION TURBINE FUEL</b>	<b>Code</b>	W219 SAP: 150, 151, 152
<b>Synonym</b>	Jet B; Jet B DI; JP-4; Jet F-40; NATO F-40; Turbine Fuel, Aviation, Wide Cut Type (CAN/CGSB-3.22).	<b>Validated on</b>	2/8/2005.
<b>Manufacturer</b>	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	<b>In case of Emergency</b>	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
<b>Material Uses</b>	Used as aviation turbine fuel. May contain a fuel system icing inhibitor.		

## Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Complex mixture of petroleum hydrocarbons (C6-C14).	64741-41-9	>99	Not established	Not established	Not established
Benzene	71-43-2	<0.5	0.5 ppm	2.5 ppm	Not established
Fuel System Icing Inhibitor (FSII) (if added*): Diethylene Glycol Monomethyl Ether	111-77-3	≤0.15	Not established	Not established	Not established
Anti-static, antioxidant, corrosion inhibitor and metal deactivator additives. * Please note that Jet B DI, JP-4, Jet F-40 and NATO F-40 all contain Fuel System Icing Inhibitor (FSII).corrosion inhibitor	Not applicable	<0.1	Not applicable	Not applicable	Not applicable
<b>Manufacturer Recommendation</b>	Not applicable				
<b>Other Exposure Limits</b>	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

## Section 3. Hazards Identification.

<b>Potential Health Effects</b>	Flammable liquid. Exercise caution when handling this material. Skin and eye contact can cause irritation. Inhalation of vapours can cause irritation of the respiratory tract and CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death. Aspiration into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure. May cause cancer. May cause teratogenicity/embryotoxicity. For more information refer to Section 11 of this MSDS.
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## Section 4. First Aid Measures

<b>Eye Contact</b>	Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
<b>Skin Contact</b>	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 5 minutes or until chemical is removed.
<b>Inhalation</b>	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Immediately transport victim to an emergency care facility.

<b>Ingestion</b>	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water.
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**Note to Physician** Not available

### Section 5. Fire-fighting Measures

<b>Flammability</b>	Flammable liquid (NFPA).	<b>Flammable Limits</b>	LOWER: 1.3% UPPER: 8% (NFPA)
<b>Flash Points</b>	CLOSED CUP: -31°C (-24°F) (NFPA)	<b>Auto-Ignition Temperature</b>	240°C (464°F) (NFPA)
<b>Fire Hazards in Presence of Various Substances</b>	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.	<b>Explosion Hazards in Presence of Various Substances</b>	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
<b>Products of Combustion</b>	Carbon oxides (CO, CO <sub>2</sub> ), nitrogen oxides (NO <sub>x</sub> ), sulphur oxides (SO <sub>x</sub> ), aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.		
<b>Fire Fighting Media and Instructions</b>	<p>NAERG96, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient.</p> <p>If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions.</p> <p>SMALL FIRES: Dry chemical, CO<sub>2</sub>, water spray or regular foam. LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.</p> <p>Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discolouration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.</p>		

### Section 6. Accidental Release Measures

<b>Material Release or Spill</b>	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Evacuate non-essential personnel. Extinguish all ignition sources. Ventilate area. Stop leak if safe to do so. Avoid contact with spilled material. Do not allow spilled material to enter sewer systems as vapours may accumulate and may cause an explosion/fire hazard. If spilled in a confined space, ensure appropriate confined space entry protocols are followed. Ensure clean-up personnel wear appropriate personal protective equipment. Use appropriate inert absorbent material to absorb spilled product. Do not use paper or other flammable materials to absorb product. Collect used absorbent for later disposal. Avoid breathing vapours or mists of material. Notify appropriate authorities immediately.
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### Section 7. Handling and Storage

<b>Handling</b>	FLAMMABLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Wear proper personal protective equipment (See Section 8). Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product.
<b>Storage</b>	Store away from heat and sources of ignition. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded. Keep container tightly closed. Store in dry, cool, well-ventilated area.

**Section 8. Exposure Controls/Personal Protection**

<b>Engineering Controls</b>	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
<b>Personal Protection - <i>The selection of personal protective equipment varies, depending upon conditions of use.</i></b>	
<b>Eyes</b>	As a minimum, safety glasses with side shields should be worn when handling this material.
<b>Body</b>	If this material may come into contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information).
<b>Respiratory</b>	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume of mist filter (R, or P series) 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.
<b>Hands</b>	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): neoprene, polyvinyl alcohol (PVA), and fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
<b>Feet</b>	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

**Section 9. Physical and Chemical Properties**

<b>Physical State and Appearance</b>	Clear liquid.	<b>Viscosity</b>	Not available (similar to gasoline)
<b>Colour</b>	Clear and colourless.	<b>Pour Point</b>	Freezing Point: <-51°C (<-60°F) for Jet B/Jet B DI; <-58°C (<-72°F) for Jet Fuel F-40.
<b>Odour</b>	Gasoline like.	<b>Softening Point</b>	Not applicable.
<b>Odour Threshold</b>	Not available	<b>Dropping Point</b>	Not applicable.
<b>Boiling Point</b>	50 to 270°C (122 to 518°F)	<b>Penetration</b>	Not applicable.
<b>Density</b>	0.75 to 0.80 kg/L @ 15°C (59°F).	<b>Oil / Water Dist. Coefficient</b>	Not available
<b>Vapour Density</b>	3.5 (Air = 1)	<b>Ionicity (in water)</b>	Not available
<b>Vapour Pressure</b>	21 kPa (158 mmHg) @ 37.8°C (100°F).	<b>Dispersion Properties</b>	Not available
<b>Volatility</b>	Volatile.	<b>Solubility</b>	Insoluble in water. Partially miscible in some alcohols. Miscible in other petroleum solvents.

**Section 10. Stability and Reactivity**

<b>Corrosivity</b>	Not available		
<b>Stability</b>	The product is stable under normal handling and storage conditions.	<b>Hazardous Polymerization</b>	Will not occur under normal working conditions.
<b>Incompatible Substances / Conditions to Avoid</b>	Can react with strong oxidizing agents, uranium hexafluoride, diborane. Incompatible with halogens and halogen compounds.	<b>Decomposition Products</b>	May release CO <sub>x</sub> , NO <sub>x</sub> , SO <sub>x</sub> , aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

**Section 11. Toxicological Information**

<b>Routes of Entry</b>	Skin contact, eye contact, inhalation and ingestion.
<b>Acute Lethality</b>	Acute toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below:  <b>Based on toxicity of similar product.</b> Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >5000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >5000 mg/m <sup>3</sup> /4h (rat).

**Benzene**

Acute oral toxicity (LD50): 930 mg/kg (rat).  
 Acute dermal toxicity (LD50): >9400 mg/kg (rabbit).  
 Acute inhalation toxicity (LC50): 13200 ppm/4h (rat).

**Diethylene Glycol Monomethyl Ether**

Acute oral toxicity (LD50): 4140-5180 mg/kg (rat).  
 Acute dermal toxicity (LD50): >2000 mg/kg (rabbit).  
 Acute inhalation toxicity (LC50): >50000 mg/m<sup>3</sup>/4h (rat).

**Chronic or Other Toxic Effects**

Dermal Route:	Skin contact can cause irritation. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	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.
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs).
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	Benzene is tumorigenic by RTECS criteria.
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product contains a component(s) at >= 0.1% that has been shown to cause teratogenicity and/or embryotoxicity in laboratory tests. Therefore, this product is considered to be a teratogen/embryotoxin [Diethylene Glycol Monomethyl Ether].
Carcinogenicity (ACGIH):	ACGIH A1: confirmed human carcinogen. [Benzene]
Carcinogenicity (IARC):	IARC Group 1: carcinogenic to Humans. [Benzene]
Carcinogenicity (NTP):	NTP Group 1: known to be a carcinogen. [Benzene]
Carcinogenicity (IRIS):	EPA/IRIS Class A: human carcinogen.
Carcinogenicity (OSHA):	Benzene is an OSHA known carcinogen.

**Other Considerations** No additional remark.

**Section 12. Ecological Information**

<b>Environmental Fate</b>	Not available	<b>Persistence/Bioaccumulation Potential</b>	Not available
<b>BOD5 and COD</b>	Not available	<b>Products of Biodegradation</b>	Not available
<b>Additional Remarks</b>	No additional remark.		

**Section 13. Disposal Considerations**

<b>Waste Disposal</b>	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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**Section 14. Transport Information**

<b>TDG Classification</b>	FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PGII (CL-TDG)	<b>Special Provisions for Transport</b>	See Transportation of Dangerous Goods Regulations.
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**Section 15. Regulatory Information****Other Regulations**

This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

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

Please contact Product Safety for more information.

**DSD/DPD (Europe)** Not evaluated.

**HCS (U.S.A.)**

CLASS: Contains material which may cause cancer.  
CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F).  
CLASS: Toxic.  
CLASS: Irritating substance.  
CLASS: Target organ effects.

**ADR (Europe) (Pictograms)**

NOT EVALUATED FOR EUROPEAN TRANSPORT

NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.

**DOT (U.S.A) (Pictograms)**



**HMIS (U.S.A.)**

<b>Health Hazard</b>	(2*)
<b>Fire Hazard</b>	(3)
<b>Reactivity</b>	(0)
<b>Personal Protection</b>	(H)

**NFPA (U.S.A.)**

Health



**Fire Hazard**

**Reactivity**

**Specific hazard**

<b>Rating</b>	0 Insignificant
	1 Slight
	2 Moderate
	3 High
	4 Extreme

**Section 16. Other Information****References**

Available upon request.

\* Marque de commerce de Petro-Canada - Trademark

**Glossary**

ACGIH - American Conference of Governmental Industrial Hygienists  
ADR - Agreement on Dangerous goods by Road (Europe)  
ASTM - American Society for Testing and Materials  
BOD5 - Biological Oxygen Demand in 5 days  
CAN/CGA B149.2 Propane Installation Code  
CAS - Chemical Abstract Services  
CEPA - Canadian Environmental Protection Act  
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act  
CFR - Code of Federal Regulations  
CHIP - Chemicals Hazard Information and Packaging Approved Supply List  
CNS - Central Nervous System  
COD5 - Chemical Oxygen Demand in 5 days  
CPR - Controlled Products Regulations  
DOT - Department of Transport  
DSCL - Dangerous Substances Classification and Labeling (Europe)  
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)  
DSL - Domestic Substance List  
EEC/EU - European Economic Community/European Union  
EINECS - European Inventory of Existing Commercial Chemical Substances  
EPA - Environmental Protection Agency  
EPCRA - Emergency Planning and Community Right to Know Act  
FDA - Food and Drug Administration  
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act  
HCS - Hazard Communication Standard  
HMIS - Hazardous Material Information System  
IARC - International Agency for Research on Cancer

IRIS - Integrated Risk Information System  
LD50/LC50 - Lethal Dose/Concentration kill 50%  
LDLo/LCLo - Lowest Published Lethal Dose/Concentration  
NAERG'96 - North American Emergency Response Guide Book (1996)  
NFPA - National Fire Prevention Association  
NIOSH - National Institute for Occupational Safety & Health  
NPRI - National Pollutant Release Inventory  
NSNR - New Substances Notification Regulations (Canada)  
NTP - National Toxicology Program  
OSHA - Occupational Safety & Health Administration  
PEL - Permissible Exposure Limit  
RCRA - Resource Conservation and Recovery Act  
RTECS - Registry of Toxic Effects of Chemical Substances  
SARA - Superfund Amendments and Reorganization Act  
SD - Single Dose  
STEL - Short Term Exposure Limit (15 minutes)  
TDG - Transportation Dangerous Goods (Canada)  
TDLo/TCLo - Lowest Published Toxic Dose/Concentration  
TLm - Median Tolerance Limit  
TLV-TWA - Threshold Limit Value-Time Weighted Average  
TSCA - Toxic Substances Control Act  
USEPA - United States Environmental Protection Agency  
USP - United States Pharmacopoeia  
WHMIS - Workplace Hazardous Material Information System

**For Copy of MSDS**

**Prepared by Product Safety - JDW on 2/8/2005.**

Internet: [www.petro-canada.ca/msds](http://www.petro-canada.ca/msds)

**Fuels & Solvents:**

Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228

Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Data entry by Product Safety - JDW.

*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

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT

**Product Name:** HD-5 PROPANE (ODORIZED)  
**Product Description:** Liquefied Hydrocarbon Gas, Gas or Liquefied Gas  
**MSDS Number:** 13603  
**Intended Use:** Fuel gas

### COMPANY IDENTIFICATION

**Supplier:** Imperial Oil Products Division  
111 St. Clair Avenue West  
Toronto, ONT. M5W 1K3 Canada  
**24 Hour Environmental / Health Emergency Telephone** 519-339-2145  
**Transportation Emergency Phone Number** 519-339-2145  
**Product Technical Information** 1-800-268-3183  
**Supplier General Contact** 1-800-567-3776

## SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

### Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicity
ALKANES, C4	68513-65-5	0 - 2.5%	None
Ethane	74-84-0	0 - 5%	None
ISOBUTANE	75-28-5	0 - 2.5%	Inhalation Lethality: LC50 142,500 ppm (Rat)
Propane	74-98-6	90 - 99%	None
Propylene	115-07-1	1 - 5%	None

\* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

## SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

### PHYSICAL/CHEMICAL EFFECTS

Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Frostbite hazard - rapidly expanding gas or liquid may cause frostbite. Material can accumulate static charges which may cause an incendiary electrical discharge.

### HEALTH EFFECTS

Continued exposure to odorised gas may reduce or eliminate ability to smell the odorant. People with impaired ability to detect odour due to colds, allergies, injuries etc must be especially cautious. Odour must not be used exclusively as a safety measure. Proper respiratory protection and fire/explosion precautions should be utilised when odour is first detected. Inert gas and/or simple asphyxiant. Reduces oxygen available for breathing. Exposure to concentrations above 10% of the LEL may cause a general central nervous system (CNS) depression typical of anesthetic gases or intoxicants. Aliphatic hydrocarbon gases may build up in confined spaces and may cause dizziness, light-headedness, headache, nausea and loss of co-ordination. Continued inhalation may result in narcosis, unconsciousness, and possibly lead to death.

<b>NFPA Hazard ID:</b>	Health: 1	Flammability: 4	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 1	Flammability: 4	Reactivity: 0

**Note:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

#### SECTION 4 FIRST AID MEASURES

##### INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

##### SKIN CONTACT

If frostbite occurs, immerse involved area in water at body temperature. Keep immersed for 20 to 40 minutes. Seek medical assistance.

##### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

##### INGESTION

Not Applicable

#### SECTION 5 FIRE FIGHTING MEASURES

##### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight streams of water

##### FIRE FIGHTING

**Fire Fighting Instructions:** Allow the fire to burn under controlled conditions. Stop leak if you can do so without risk. Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Unusual Fire Hazards:** FLAMMABLE GAS. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

**Hazardous Combustion Products:** Oxides of carbon, Incomplete combustion products

##### FLAMMABILITY PROPERTIES

**Flash Point [Method]:** -103°C (-153°F) [ ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 2.4 UEL: 9.5  
**Autoignition Temperature:** 432°C (810°F)

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

### PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

### SPILL MANAGEMENT

**Land Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning. Allow liquid to evaporate from the surface. All equipment used when handling the product must be grounded. Do not direct water at spill or source of leak. Do not touch or walk through spilled material. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Prevent spreading of vapour through sewers, ventilation systems and confined areas. Use water spray to reduce vapour or divert vapour cloud drift. Avoid allowing water run-off to contact spilled material.

**Water Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Allow liquid to evaporate from the surface. See Land Spill in the section of the SDS for advice on gases.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7 HANDLING AND STORAGE

### HANDLING

Use non-sparking tools and explosion-proof equipment. Ethyl mercaptan is added to gas as an odorant to aid in the detection of the gas in case of leak or accidental discharge. Since ethyl mercaptan is reactive, a reduction in its effectiveness may occur during transport and storage of the odorised gas. Therefore, odour must not be used exclusively as a safety measure. Handle gas with strict adherence to established safety procedures. Use proper bonding and/or earthing procedures. Material can accumulate static charges which may cause an electrical spark (ignition source).

**Static Accumulator:** This material is a static accumulator.

### STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and

bonded.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
Ethane		TWA	1000 ppm			ACGIH
ISOBUTANE		TWA	1000 ppm			ACGIH
Propane		TWA	1000 ppm			ACGIH
Propylene		STEL	3000 ppm			Supplier
Propylene		TWA	1000 ppm			Supplier
Propylene		Limit value not established			Simple asphyxiant.	ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly effect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Thermally protective gloves are recommended. If contact with forearms is likely, wear gauntlet-style gloves.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended. Face shield is recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact. Thermally protective and chemical resistant apron and long sleeves are recommended when volume of material is significant.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

## ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

### GENERAL INFORMATION

**Physical State:** Gas  
**Form:** Liquefied  
**Colour:** Colourless  
**Odour:** Mercaptan  
**Odour Threshold:** N/D

### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.51  
**Flash Point [Method]:** -103°C (-153°F) [ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 2.4 UEL: 9.5  
**Autoignition Temperature:** 432°C (810°F)  
**Boiling Point / Range:** -42°C (-44°F)  
**Vapour Density (Air = 1):** 1.5 at 101 kPa  
**Vapour Pressure:** 850 kPa (6375 mm Hg) at 20°C  
**Evaporation Rate (N-Butyl Acetate = 1):** > 1  
**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** N/A  
**Solubility in Water:** Negligible  
**Viscosity:** N/A  
**Oxidizing properties:** See Sections 3, 15, 16.

### OTHER INFORMATION

**Freezing Point:** N/D  
**Melting Point:** >-187°C (-305°F)

## SECTION 10 STABILITY AND REACTIVITY

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Avoid heat, sparks, open flames and other ignition sources.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**HAZARDOUS POLYMERIZATION:** Will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

### Acute Toxicity

Route of Exposure	Conclusion / Remarks
<b>INHALATION</b>	
Toxicity (Rat): LC50 > 5000 mg/m <sup>3</sup>	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
<b>INGESTION</b>	
Toxicity: No end point data.	Not applicable.
<b>Skin</b>	
Toxicity: No end point data.	Not applicable.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.
<b>Eye</b>	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

### CHRONIC/OTHER EFFECTS

#### For the product itself:

May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite (cold burn). Simple asphyxiant: Acts by displacing oxygen in the lungs thereby diminishing the supply of oxygen available to the blood and tissues. Symptoms include shortness of breath, rapid heart rate, incoordination, lethargy, headaches, nausea, vomiting, and disorientation. Continued lack of oxygen may result in convulsions, loss of consciousness and death. Since exercise increases the tissue need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment. Oxygen in enclosed spaces should be maintained at 21 percent by volume.

Additional information is available by request.

**CMR Status:** None.

Chemical Name	CAS Number	List Citations
Ethane	74-84-0	4
ISOBUTANE	75-28-5	4
Propane	74-98-6	4
Propylene	115-07-1	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1  
2 = IARC 2A

3 = IARC 2B  
4 = ACGIH ALL

5 = ACGIH A1  
6 = ACGIH A2

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

#### **ECOTOXICITY**

Material -- Not expected to be harmful to aquatic organisms.

#### **MOBILITY**

Material -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

#### **PERSISTENCE AND DEGRADABILITY**

##### **Biodegradation:**

Material -- Expected to be inherently biodegradable

##### **Atmospheric Oxidation:**

Material -- Expected to degrade at a moderate rate in air

#### **BIOACCUMULATION POTENTIAL**

Material -- Potential to bioaccumulate is low.

### **SECTION 13**

### **DISPOSAL CONSIDERATIONS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

#### **DISPOSAL RECOMMENDATIONS**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

#### **REGULATORY DISPOSAL INFORMATION**

**Empty Container Warning** (where applicable): Empty containers may retain residue and can be dangerous. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

### **SECTION 14**

### **TRANSPORT INFORMATION**

#### **LAND (TDG)**

**Proper Shipping Name:** LIQUEFIED PETROLEUM GASES

**Hazard Class & Division:** 2.1

**UN Number:** 1075

**Packing Group:** (N/A)

#### **LAND (DOT)**

**Proper Shipping Name:** Petroleum gases, liquified

**Hazard Class & Division:** 2.1

**ID Number:** 1075

**Packing Group:** (N/A)

ERG Number: 115

Label(s): 2.1

Transport Document Name: PETROLEUM GASES, LIQUEFIED, 2.1, UN1075

**SEA (IMDG)**

Proper Shipping Name: Petroleum gases, liquified

Hazard Class & Division: 2.1

EMS Number: F-D, S-U

UN Number: 1075

Packing Group: (N/A)

Label(s): 2.1

Transport Document Name: PETROLEUM GASES, LIQUEFIED, 2.1, UN1075

**AIR (IATA)**

Proper Shipping Name: Petroleum gases, liquified

Hazard Class & Division: 2.1

UN Number: 1075

Packing Group: (N/A)

Label(s): 2.1

Transportation Limitations: CARGO AIRCRAFT ONLY

Transport Document Name: PETROLEUM GASES, LIQUEFIED, 2.1, UN1075

**SECTION 15**

**REGULATORY INFORMATION**

**WHMIS Classification:** Class A: Compressed Gas Class B, Division 1: Flammable Gases

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

**CEPA:** All components of this material are either on the Canadian Domestic Substances List (DSL), exempt, or have been notified under CEPA.

**NATIONAL CHEMICAL INVENTORY LISTING:** AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

**The Following Ingredients are Cited on the Lists Below:** None.

--REGULATORY LISTS SEARCHED--

1 = TSCA 4

3 = TSCA 5e

5 = TSCA 12b

2 = TSCA 5a2

4 = TSCA 6

6 = NPRI

**SECTION 16**

**OTHER INFORMATION**

N/D = Not determined, N/A = Not applicable

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

No revision information is available.

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**Precautionary Label Text:**

WHMIS Classification: Class A: Compressed Gas Class B, Division 1: Flammable Gases

## HEALTH HAZARDS

May cause central nervous system depression.

**PHYSICAL HAZARDS** Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Frostbite hazard - rapidly expanding gas or liquid may cause frostbite. Material can accumulate static charges which may cause an incendiary electrical discharge.

## PRECAUTIONS

Use non-sparking tools and explosion-proof equipment. Use proper bonding and/or earthing procedures.

## FIRST AID

**INHALATION:** Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

**Skin:** If frostbite occurs, immerse involved area in water at body temperature. Keep immersed for 20 to 40 minutes. Seek medical assistance.

## FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

## SPILL/LEAK

**Land Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning. Allow liquid to evaporate from the surface. Do not direct water at spill or source of leak. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Prevent spreading of vapour through sewers, ventilation systems and confined areas. Use water spray to reduce vapour or divert vapour cloud drift. Avoid allowing water run-off to contact spilled material.

**Water Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Allow liquid to evaporate from the surface. Report spills as required to appropriate authorities. See Land Spill in the section of the SDS for advice on gases.

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Prepared By: Imperial Oil Limited, IH and Product Safety