

Appendix L

**Spill Contingency Plan and
MSDS Sheets
Great Bear Lake Sites**

Great Bear Lake Sites Mine Remediation Spill Contingency Plan

October 2008



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1.0 Introduction

The following document describes the Spill Contingency Plan prepared by Indian and Northern Affairs Canada (INAC) for the remediation of the Great Bear Lake sites and adjacent developments.

The purpose of this document is to both: (1) identify and address preventative measures to minimize spill related risk; and (2) in the event of a spill, provide pre-determined and site-specific lines of response and plans of action.

2.0 Responsible Organization

INAC is the custodian of the Great Bear Lake sites and hence the responsible organization. INAC will be hiring a contractor to do the remediation work and the Contractor will be the on-site responsible group for appropriately addressing any spill that may occur during the implementation of the work. INAC will have a Departmental representative on-site at all times to ensure that the contractor is treating spills according to this Spill Contingency Plan.

All Contractor staff will be required to report spills immediately to the Department representative. The contractor Site Supervisor and the Departmental Representative will then assess the situation and classify and carryout the necessary action. See Appendix 1 of this document for spill report form and Appendix 2 of this document for a list of contacts. The MSDS are incorporated in Appendix 3 of this document.

3.0 Hazardous Materials and Wastes

3.1 Definitions

For the purpose of the Great Bear Lake sites remediation project, a hazardous material is defined as:

A Product, substance or organism that is used for its original purpose; and that is either a dangerous good or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

Hazardous wastes are defined as:

Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.

3.2 Audit

Hazardous Materials

Prior to mobilization of equipment and supplies to the work site, the selected Contractor(s) will be required to provide a detailed inventory of all hazardous materials that will be located at the site. The itemized list will identify the hazardous materials, their use, their location, the personal protective equipment requirements and the disposal arrangements for the hazardous materials. Based on previous similar remediation programs conducted by INAC and estimates for the current program, a substantial inventory of hazardous waste materials can be located in the respective Silver Bear, Contact Lake, and El Bonanza/Bonanza Remedial Action Plans. The RAPs also provide descriptions of these wastes, their estimated quantities and selected management approaches are provided in the RAPs. The hazardous materials include batteries, lead paint above leachate criteria, old lime and residual mill reagents, waste fuel oils and waste drums. A list of the hazardous materials at each site is provided on the following pages.

Hazardous Waste

Hazardous wastes that will be located on site during the remediation program will be related primarily to historic mining activities. Examples of the wastes include asbestos and batteries. Refer to the respective Silver Bear, Contact Lake, and El Bonanza Remedial Action Plans for descriptions of these wastes, their estimated quantities and selected management approaches.

Small quantities of hazardous waste may be generated during the remediation of the mine sites. Prior to mobilization to the site, the Contractor(s) will be required to identify and quantify hazardous wastes that may be generated during the remediation program (e.g. used oil from equipment).

Silver Bear

Table 1: Estimated Quantities of Waste from Silver Bear Mines

Material	Quantity (m³)
Demolition Debris	
• Terra	16,250
• Northrim	750
• Norex	950
• Smallwood	150
Subtotal	18,100
Terra Waste Disposal Sites	6,750
Miscellaneous Refuse/Scrap	2,000
Total (to landfill)	26,850

Contact Lake

Table 2: Estimated Quantities of Waste from Contact Lake Mine

Material	Quantity (m³)
DDT Impacted Wood	2
Asbestos-containing materials	5
Wood debris	
• Non-lead impacted (assume no burning)	800
• Non-lead impacted (assume burning, 5% residual)	20
• Lead-impacted (cannot burn)	90
• Dock Wood (cannot burn due to water content)	70
General Debris	200
Metal impacted with lead paint	10
Total	
• Maximum to landfill	1,177
• Minimum to landfill	397

El Bonanza/Bonanza

Table 3: Estimated Quantities of Waste from El Bonanza/Bonanza Mines

Material	Quantity (m³ unless specified)
DDT impacted wood	2
PCB impacted soils	0.1
Asbestos-containing materials	1
Wood debris <ul style="list-style-type: none"> • Non-lead impacted (assume no burning) • Non-lead impacted (assume burning, 5% residual) 	450 20
General Debris	200
Metal impacted with lead paint	9
Total <ul style="list-style-type: none"> • Maximum to landfill • Minimum to landfill 	661 231

Sawmill Bay

Table 4: Estimated Quantities of Waste from Sawmill Bay Site

Material	Quantity (m³ unless specified)
Metal-impacted Soil	~975
Soils with low level radiation	1125
Asbestos-containing materials	170
Wood debris <ul style="list-style-type: none"> • Lead impacted 	657
Metal Debris (trucks, boats, tractors, heavy equipment, engines, sunken barge and airplane fuselage) <ul style="list-style-type: none"> • Non-hazardous 	417
Painted concrete	47
Non-hazardous building contents	2,457
Used fuel drums	~12,700 drums
Contents of drums (fuel/water mixture)	100,000 L
Total (to landfill)	3,044

Note: The total area of all waste dumps identified and investigated to date (i.e. those located near the airstrip, in the main lodge area and near the main barrel cache) is estimated to be 5,137 m². This estimate does not include random debris, barrels, vehicles or equipment scattered around various parts of the site.

Other Wastes

Table 5: Estimated Quantities of Petroleum-Impacted Materials

Product	Quantity (m³ unless specified)
Hydrocarbon Product/Impacted Liquid	
• Silver Bear	139
• Contact Lake	4
• El Bonanza/Bonanza	1.8
• Sawmill Bay	100
Total	245
PHC Impact Soils	
• Contact Lake	180
• El Bonanza/Bonanza	451
• Sawmill Bay	>17,000
Total	>17,000

Note: Hydrocarbon product and impacted liquids will be incinerated as long as criteria are met. Impacted soils will be treated as per discussed in the body of the Land Use Permit application.

3.3 Storage

The Contractor will be required to coordinate storage of hazardous materials with the INAC supervisor and abide by internal requirements for labeling and storage of materials and wastes. The storage and handling of all hazardous materials and wastes will be in accordance with applicable federal and provincial laws, regulations, codes, and guidelines. Requirements will include but are not limited to the following:

- a) Store hazardous materials and wastes in closed and sealed containers which are in good condition.
- b) Label containers of hazardous materials and wastes in accordance with WHMIS.
- c) Store hazardous materials and wastes in containers compatible with that material or waste.
- d) Segregate incompatible materials and wastes.
- e) Ensure that different hazardous materials or hazardous wastes are not mixed.
- f) Store hazardous materials and wastes in a secure storage area with controlled access.
- g) Maintain a clear egress from storage areas.
- h) Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
- i) Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.

- j) Only bring on site the quantity of hazardous materials required to perform work.
- k) Maintain MSDS in proximity to where the materials are being used. Communicate this location to all on-site personnel and any site visitors so the area can be avoided.
- l) Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

Additional requirements specific to fuel storage and handling will include:

- m) Preassemble and maintain emergency spill equipment, including at least two fuel pumps, empty 200 L barrels, and absorbent material sufficient to clean up a 1000 L spill adjacent to the tank farm.
- n) All areas where refueling occurs shall receive secondary containment underneath the area where refueling is most likely to occur.
- o) Hazardous materials, with the exception of a 60,000 L Northern Steel Double wall Environ Tank will be placed within secondary containment.¹
- p) Avoid fuel storage sites that slope toward waterways or other environmentally sensitive areas.
- q) Locate fuel tanks in areas as approved by Engineer.
- r) Inspect fuel storage facilities daily for duration of contract. Make available fire fighting equipment for immediate access at each fuel storage location.
- s) Store all barrels containing fuel and/or hazardous materials in an elevated position, either on their side with bungs facing 9 and 3 o'clock position, or on pallets, upright.
- t) All barrels shall be individually identified. Labels shall be to industry standards and shall provide all information necessary for health and safety and environmental purposes. Labels shall identify INAC as the permit holder.
- u) Treat all waste petroleum products, including used oil filters as hazardous material.
- v) Conduct regular inspections of all machinery, hydraulic, fuel and cooling systems. Repair any leaks immediately.
- w) Remove all barrels, fuel storage facilities and associated materials and equipment, owned by Contractor, from site at conclusion of work.

¹ The diesel tank was designed as a double walled tank and therefore does not require additional secondary containment.

4.0 Sanitary Disposal, Mobile Equipment and Other Point Sources of Waste

4.1 Sanitary Disposal System

Waterless toilets will be used during each phase of remediation. The amount of sanitary and grey water generated from the camp will be minimal. The effluent from the waterless toilets will be incinerated. The grey water from the camp will be tested to ensure that it meets the Sewage Discharge criteria listed below in Table 6 prior to discharge.

Table 6: Parameter Maximum Allowable Concentrations for Sewage Treatment

Parameter	Concentration Limit
pH	6-9
Mineral Oil and Grease	5 mg/L and non visible
Total Suspended Solids	180 mg/L
Biological Oxygen Demand, BOD	120 mg/L
Fecal Coliforms	10,000 CFU/dL

A process water treatment facility will be designed by the Contractor and will be capable of treating all process water generated from camp operations. Process water includes wash water, water from dewatering excavations and water that has come in contact with contaminants. The process water treatment facility will be capable of removing oil, suspended solids, particulates, and asbestos fibres, and filtering water through a 5-micron particulate filter prior to discharge. Treated process water effluent shall meet the following requirements as listed in Table 7.

Table 7: Parameter Maximum Allowable Concentrations for Process Water Treatment

Parameter	Concentration Limit
Volatile Hydrocarbons	15 mg/L
Extractable Hydrocarbons	5 mg/L
Non-Aqueous Phase Liquid / Free Product	Not present
Phenols	20 µg/L
pH	6-9
Arsenic (total)	100 µg/L
Cadmium (dissolved)	10 µg/L
Chromium (total)	100 µg/L
Cobalt (dissolved)	50 µg/L
Copper (dissolved)	200 µg/L
Lead (dissolved)	50 µg/L
Mercury (total)	0.6 µg/L

Nickel (dissolved)	200 µg/L
Zinc (total)	1000 µg/L

4.2 Mobile Equipment

An itemized list of the mobile equipment that will be used during the remediation of the Great Bear Lake sites can be found in Table 6 of Section 10 of the Land Use Permit application. This list will be updated following the contract award.

Spills related to the above listed mobile equipment can be directly attributed to their state of repair. All equipment will be subjected to regular maintenance reviews in a designated maintenance area located on the Terra Mine site.

4.3 Other Point Sources

Any hazardous wastes generated during remediation activities will be stored at the hazardous materials location on the former mine site. These materials will be disposed in accordance with applicable federal and provincial acts, regulations, and guidelines. Specific requirements related to the management and disposal of such wastes include:

- a) Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- b) Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- c) Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited unless otherwise directed by the Department Representative.
- d) The exception is heating fuel and gasoline which may be burned and residual will be sampled and treated accordingly as per the GNWT Waste Fuel guidelines.
- e) Disposal of hazardous materials in waterways, mine shafts, or in municipal solid waste landfill is prohibited.
- f) Hazardous materials are to be disposed in a timely fashion.
- g) In situations where there is a requirement to demolish a site structure, the Contractor is to ensure that any associated hazardous building materials, including but not restricted to, asbestos, and any other non specific hazardous materials, are separated prior to demolition and handled and disposed of in accordance with the regulatory requirements.

5.0 Spill Reporting Procedure

Any reportable spills² will be immediately reported to the NWT/Nunavut 24-hour emergency spill hotline at the following number: 1 (867) 920 8130. The on-site government representative will then be advised immediately. All other spills will be logged internally and available for review by inspectors upon request.

6.0 Spill Response

6.1 First Person at the Spill Scene

The first person at the scene of the spill is to make all necessary efforts to protect human and environmental health. However this person is not to take actions that will endanger his or her safety. Expected staff actions include the following:

- Evacuate persons from the area if the spill is to be considered a direct risk to workers safety;
- Inform the immediate work area supervisor;
- Make an initial assessment of the spill and of the magnitude of the related hazards; and
- Take initial containment actions such as:
 - minimize or control hazards to worker safety;
 - cover of fill drains and drainage paths;
 - construct or place berms; and
 - deploy booms and/or sorbents.

6.2 Secondary Response

The following sections detail how spills will be cleaned up following initial response.

6.2.1 Diesel and Gasoline

Spills of diesel and gasoline are most likely to occur from the refueling of mobile equipment. These spills will be addressed by staff and reported to Contractor and INAC site supervision personnel. Contaminated soils will be excavated and transported to designated short-term lay-down areas with appropriate containment. If free product is present, the material will be collected, placed in a sealed drum and stored in the fuel

² A reportable spill is defined as a release of a substance that poses and imminent environmental or human health hazard (INAC Spill Reporting Protocol For Mining Operations in the Northwest Territories and Nunavut)

management area until an appropriate treatment/disposal method is identified. Booms and/or berms will also be placed as needed. A total of six (6) spill clean containers (spill kit CSK-F45 225 L spill station) will be available with each spill kit containing the following items:

- 5 sorbent socks (3"X4")
- 50 sorbent pads (17"X19");
- 3 sorbent booms (5"X120");
- 1 drain cover (36"X36");
- 5 disposal bags (24"X36");
- 1 spleenkleen adsorbent (25lb bag);
- 2 Tyvek suits;
- 1 pair of goggles;
- 2 pair of nitrile gloves; and
- 1 shovel.

The spill kits will be adjacent to any fuelling stations at the Great Bear Lake sites.

6.2.2 Mobile Equipment

Any spills due to leaking of mobile equipment will be addressed immediately by the operator of the equipment or other suitable site personal by removing and placing the impacted soil into storage buckets. The contents of these buckets will then be placed, along with other impacted soils, within the fuel storage areas until an appropriate treatment/disposal method is identified.

6.2.3 Sewage

In the unlikely event of a sewage spill, any spilled material will be isolated in a secondary containment area. This event is highly unlikely since waterless toilets will be used.

7.0 Transportation

Any spills of hazardous materials or wastes during transportation have the potential to result in environmental impacts. To prevent releases and mitigate potential impacts, the Contractor will be required to transport all hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable territorial regulations. This will include maintaining complete records, including Bills of Lading, Manifests and description of any actions undertaken under handling and transportation of dangerous goods.

8.0 Training and Exercises

The Contractor(s) will be required to provide training to all operational personnel with respect to their responsibilities as first responders to spills. This training is to include:

- a) A description of pre-emergency planning.
- b) Personnel roles, lines of authority and communication, emergency phone numbers.
- c) Emergency alerting and response procedures.
- d) Evacuation routes and procedures, safe distances and places of refuge.
- e) Workplace Hazardous Materials Information System (WHMIS): A Canada-wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and territorial laws.
- f) Directions/methods of getting to the nearest medical facility.
- g) Emergency decontamination procedures.
- h) Emergency Medical treatment and first-aid
- i) Emergency equipment and materials.
- j) Emergency protective equipment.
- k) Procedures for reporting incidents.
- l) Spill response and containment plans for all materials that could potentially be spilled.

9.0 List of Emergency Response Contacts

The following list of Emergency Response Contacts is to be posted in all hazardous materials storage and communications areas (See Appendix 2 for a more detailed list of contacts):

NWT/Nunavut 24 Hour Emergency Spill Line	1-867-920-8130
Yellowknife Fire Department	1-867-873-2222
Poison Control	1-867-669-4100
Air Tindi	1-867-669-8200
Medical Emergency (Hospital)	1-867-669-4111
RCMP	1-867-669-1111
Northern Steel Envirotank	1-888-NSI-TANK
Spillkleen	1-877-455-3336
Northgate (Propane)	1-780-448-9222
INAC Contact (Great Bear Lake Sites Project Manager)	1-867-669-2499
PWGSC Contact (Great Bear Lake Sites Project Engineer)	1-780-497-3876

Appendix 1: Spill Report Form



NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

24 - Hour Report Line
 Phone: (867) 920-8130
 Fax: (867) 873-6924

A Report date and time	B Date and time of spill (if known)	C <input type="checkbox"/> Original report <input type="checkbox"/> Update no. ____	Spill number
D Location and map coordinates (if known) and direction (if moving)			
E Party responsible for spill			
F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)			
G Cause of spill			
H Is spill terminated? <input type="checkbox"/> yes <input type="checkbox"/> no	I If spill is continuing, give estimated rate	J Is further spillage possible? <input type="checkbox"/> yes <input type="checkbox"/> no	K Extent of contaminated area (in square metres if possible)
L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)		M Containment (natural depression, dikes, etc.)	
N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials			
O Do you require assistance? <input type="checkbox"/> no <input type="checkbox"/> yes, describe:		P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife	
Q Comments and/or recommendations			FOR SPILL LINE USE ONLY
			Lead Agency
			Spill significance
			Lead Agency contact and time
			Is this file now closed? <input type="checkbox"/> yes <input type="checkbox"/> no
Reported by	Position, Employer, Location		Telephone
Reported to	Position, Employer, Location		Telephone

Spill Response Organization

**Spill or Release of
Deleterious
Materials**

**First Person
Response**
(Incident is
discovered)

Assess personal safety
Secure the site from a safety standpoint
Stop the flow of the material if possible
Report the spill
Request medical aid
Initiate containment of spill

**On Scene
Coordinator**
(C&M Staff Member)

Direct all clean up & containment
activities
Assign resources
Report spill to NWT 24 Hour Spill Line

**Site Reclamation
Manager**

Liaison with
Government Agencies
& Media

FIGURE 6

Appendix 2: Emergency Contacts

On-Scene Coordinator:

To be filled out by the Contractor(s)

Project Manager:

To be filled out by the Contractor(s)

Emergency:

Fire Yellowknife	873-2222
Fire Deline	589-2222
Ambulance Yellowknife	873-2222
Health Centre Deline	589-3111
Stanton Hospital Yellowknife	920-4111
RCMP Yellowknife	920-8311
RCMP Emergencies	669-1111
24 Hour Spill Line Yellowknife	920-8130
Poison Control	800-267-1373

The emergency contact list will be updated as required by the successful Contractor.

Government of Canada

Indian and Northern Affairs Canada

Land Use Permit Inspector, Norman Wells	587-2011
Renewable Resources and Environment	669-2648
Water Resources	669-2651
Land Administration	669-2671
Arctic Environmental Laboratory	669-2781
Environmental & Conservation	669-2589
N.W.T Water Board Office	669-2772
Water Resources Officer	669-2651

Environment Canada

Environmental Protection Branch, District Office - Yellowknife	669-4700
Fax Line	873-8185

Fisheries & Oceans Canada

Area Manager NWT West 669-4902
NWT Habitat Coordinator 669-4911
Director Conservation & Compliance 669-4903

Canadian Nuclear Safety Commission

Uranium Mines and Lands Evaluation Division (613)995-7107

Government of the Northwest Territories**Resources, Wildlife and Economic Development**

Environmental Protection 873-7654
Fax Line 873-0221

Workers Compensation Board

Prevention Services - Director 873-7078
Mines Inspection Services 669-4408
Mine Accident Report Line (24 Hours) 873-0123

Municipal and Community Affairs

Office of the Fire Marshall 873-7469
Emergency Measures 873-7083

Regulatory Agencies

Sahtu Land and Water Board 598-2413

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: ESSO ANTIFREEZE/COOLANT
Product Description: Glycol
MSDS Number: 8512
Intended Use: Antifreeze/coolant

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
 240 4th Avenue
 Calgary, ALBERTA. T2P 3M9 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
Ethylene Glycol	107-21-1	90 - 100%	Dermal Lethality: LD50 9.53 g/kg (Rabbit); Inhalation Lethality: LC50 4300 ppm (Rat); Oral Lethality: LD50 4.70 g/kg (Rat)

* 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).

HEALTH EFFECTS

May cause harm to the unborn child. Ingestion of ethylene glycol may result in nausea, vomiting, abdominal cramps, blindness, liver damage, irritation, reproductive effects, nerve damage, convulsions, edema of the lung, cardiopulmonary effects (metabolic acidosis), pneumonia and kidney failure which could result in death. The single lethal dose for humans is about 100 ml. Inhalation of high levels of vapour or mists for prolonged periods of time may also result in toxic effects. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

Target Organs: Kidney | Reproductive system |

NFPA Hazard ID: Health: 1 Flammability: 1 Reactivity: 0
HMIS Hazard ID: Health: 2* Flammability: 1 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

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

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

INGESTION

Seek immediate medical attention.

NOTE TO PHYSICIAN

This product contains ethylene and/or diethylene glycol which, if ingested, is metabolised to toxic metabolites by the enzyme alcohol dehydrogenase, for which ethanol and 4-methylpyrazole {US drug name Fomepizole, trade name Antizol} are antagonists. Administration of oral or intravenous ethanol or intravenous 4-methylpyrazole may arrest further metabolism of this material and thereby ameliorate the toxicity. Use of ethanol or 4-methylpyrazole does not affect toxic metabolites that are already present and is not a substitute for haemodialysis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, alcohol-resistant foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water or standard foam

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. 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.

Hazardous Combustion Products: Incomplete combustion products, Oxides of carbon, Smoke, Fume, Aldehydes

FLAMMABILITY PROPERTIES

Flash Point [Method]: 116C (240F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15.3
Autoignition Temperature: 400°C (752°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.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do so without risk. Do not touch or walk through spilled material. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Consult an expert. Warn other shipping. Material will sink. Remove material, as much as possible, using mechanical equipment.

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

Remove debris in path of spill and remove contaminated debris from shoreline and water surface. Dispose of according to local regulations. Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapour. Avoid contact with skin. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard	Note	Source
Ethylene Glycol	Aerosol.	Ceiling 100 mg/m3		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:

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

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 protection is ordinarily required under normal 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 affect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical-resistant 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.

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:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

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: Liquid

Form: clear

Colour: green

Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 16 C): 1.115 - 1.145
Flash Point [Method]: 116C (240F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15.3
Autoignition Temperature: 400°C (752°F)
Boiling Point / Range: 197C (387F)
Vapour Density (Air = 1): 2.1 at 101 kPa
Vapour Pressure: 0.008 kPa (0.06 mm Hg) at 20°C
Evaporation Rate (N-Butyl Acetate = 1): 0.01
pH: 9 - 11
Log Pow (n-Octanol/Water Partition Coefficient): < 2
Solubility in Water: Complete
Viscosity: [N/D at 40°C]
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/D
Pour Point: -13°C (9°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.
CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.
MATERIALS TO AVOID: Strong oxidizers, Acids, Alkalies
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
INHALATION	
Toxicity (Rat): LC50 > 5000 mg/m³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Negligible hazard at ambient/normal handling temperatures. Based on test data for structurally similar materials.
INGESTION	
Toxicity (Human): LDLo 100 ml	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.

Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

Contains:

ETHYLENE GLYCOL (EG): Repeated high oral exposure has caused kidney damage, neurological effects, degeneration of the liver and changes in blood chemistry and circulating blood cells in laboratory animals. Repeated overexposure has the potential to cause similar toxic effects in humans. EG causes developmental and reproductive effects at high dose levels in laboratory animals. The relevance of these findings to humans is uncertain. However, as a precaution, avoid exposure during pregnancy.

Additional information is available by request.

CMR Status: None.

Chemical Name	CAS Number	List Citations
Ethylene Glycol	107-21-1	4

--REGULATORY LISTS SEARCHED--

- | | | |
|-------------|---------------|--------------|
| 1 = IARC 1 | 3 = IARC 2B | 5 = ACGIH A1 |
| 2 = IARC 2A | 4 = ACGIH ALL | 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 -- Expected to remain in water or migrate through soil.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be readily biodegradable.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly 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

Even though this product is readily biodegradable, it must not be indiscriminately discarded into the environment. 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 Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. 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.

SECTION 14	TRANSPORT INFORMATION
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LAND (TDG) : Not Regulated for Land Transport

LAND (DOT)

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. (Ethylene Glycol)

Hazard Class & Division: 9

ID Number: 3082

Packing Group: III

ERG Number: 171

Label(s): 9

Transport Document Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S., 9, UN3082, PG III, RQ (ETHYLENE GLYCOL)

SEA (IMDG) : Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA) : Not Regulated for Air Transport

SECTION 15	REGULATORY INFORMATION
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WHMIS Classification: Class D, Division 2, Subdivision A: Very Toxic Material

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: DSL, TSCA

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

--REGULATORY LISTS SEARCHED--

1 = TSCA 4
2 = TSCA 5a2

3 = TSCA 5e
4 = TSCA 6

5 = TSCA 12b
6 = NPRI

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

Section 05: Fire Fighting Measures - Fire Fighting Instruction was modified.
Section 13: Empty Container Warning was modified.
Section 09: Phys/Chem Properties Note was modified.
Section 09: Boiling Point C(F) was modified.
Section 08: Hand Protection was modified.
Section 11: Oral Lethality Test Data was modified.
Section 06: Accidental Release-Spill Management-Land was modified.
Section 06: Accidental Release- Spill Management- Water was modified.
Section 09: Relative Density - Header was modified.
Section 09: Flash Point C(F) was modified.
Hazard Identification: Health Hazards was modified.
Hazard Identification: Emergency Overview Target Organs was modified.
Section 16: Health Hazards was modified.
Section 16: Target Organs was modified.
Section 16: Land Spill was modified.
Section 16: Fire Fighting Media - Header was added.
Section 16: Fire Fighting Media - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.

Precautionary Label Text:

WHMIS Classification: Class D, Division 2, Subdivision A: Very Toxic Material

HEALTH HAZARDS

Danger of serious damage to health by prolonged exposure. May cause harm to the unborn child.

Target Organs: Kidney | Reproductive system |

PRECAUTIONS

Avoid breathing mists or vapour. Avoid contact with skin.

FIRST AID

INHALATION: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

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

Oral: Seek immediate medical attention.

Skin: Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA

Use water fog, alcohol-resistant foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

SPILL/LEAK

Land Spill: Stop leak if you can do so without risk. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Recover by pumping or with suitable absorbent. Do not touch or walk through spilled material.

Water Spill: Stop leak if you can do so without risk. Report spills as required to appropriate authorities. Material will sink. This product emulsifies, disperses or is miscible in water. Consult an expert.

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Prepared By: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: HIGH FLASH TYPE TURBINE AVIATION FUEL
Product Description: Hydrocarbons and Additives
MSDS Number: 8526
Intended Use: Aviation fuel

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
 240 4th Avenue
 Calgary, ALBERTA. T2P 3M9 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
2-(2-METHOXYETHOXY)-ETHANOL	111-77-3	0 - 0.2%	Dermal Lethality: LD50 > 2.0 g/kg (Rabbit); Oral Lethality: LD50 7.0 g/kg (Rat)
KERSENE	8008-20-6	> 99 %	Dermal Lethality: LD50 > 2000 mg/kg (Rabbit); Inhalation Lethality: LC50 > 5.0 mg/l (Rat); Oral Lethality: LD50 > 5000 mg/kg (Rat)

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicity
Naphthalene	91-20-3	0.1 - 1%	Dermal Lethality: LD50 < 20 g/kg (Rabbit); Oral Lethality: LD50 0.49 g/kg (Rat)

* 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

Combustible. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

HEALTH EFFECTS

Irritating to skin. Danger of serious damage to health by prolonged exposure. May cause harm to the unborn child. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and

lungs. Breathing of high vapour concentrations may cause dizziness, light-headedness, headache, nausea and loss of co-ordination. Continued inhalation may result in unconsciousness. High-pressure injection under skin may cause serious damage.

Target Organs: Reproductive system | Skin |

NFPA Hazard ID:	Health: 2	Flammability: 2	Reactivity: 0
HMIS Hazard ID:	Health: 2	Flammability: 2	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
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INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

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

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Hydrocarbon Solvents/Petroleum Hydrocarbons- Skin contact may aggravate an existing dermatitis.

SECTION 5	FIRE FIGHTING MEASURES
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EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. 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: Combustible. 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: Incomplete combustion products, Oxides of carbon, Smoke, Fume, Aldehydes, Sulphur Oxides

FLAMMABILITY PROPERTIES

Flash Point [Method]: 60°C (140°F) [ASTM D-93]

Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 5.0

Autoignition Temperature: 250°C (482°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. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Eliminate sources of ignition. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Temperature by 10°C, or is less than the Ambient Temperature, use booms as a barrier to protect shorelines and allow the material to evaporate. Seek the advice of a specialist before using dispersants.

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

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7

HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Do not siphon by mouth. Use proper bonding and/or earthing procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Drums must be earthed and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
KERSENE	Stable Aerosol.	TWA	5 mg/m3			Supplier
KERSENE	Total vapour and aerosol.	TWA	500 mg/m3			Supplier
KERSENE [total hydrocarbon vapour]	Non-Aerosol	TWA	200 mg/m3		Skin	ACGIH
Naphthalene		STEL	15 ppm		Skin	ACGIH
Naphthalene		TWA	10 ppm		Skin	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:
Chemical resistant gloves are recommended.

Eye Protection: If contact is likely, safety glasses with side shields are 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:
Chemical / oil resistant clothing if contact with material is likely.

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.

GENERAL INFORMATION

Physical State: Liquid
Colour: pale yellow
Odour: petroleum/solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.82
Flash Point [Method]: 60°C (140°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 5.0
Autoignition Temperature: 250°C (482°F)
Boiling Point / Range: 190°C (374°F) - 300°C (572°F)
Vapour Density (Air = 1): 4.5 at 101 kPa
Vapour Pressure: [N/D at 20°C] | < 1 kPa (7.5 mm Hg) at 38°C
Evaporation Rate (N-Butyl Acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 8.8 cSt (8.8 mm²/sec) at -20°C
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -46°C (-51°F)

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Alkalies, Strong oxidizers

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

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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Acute Toxicity

Route of Exposure	Conclusion / Remarks
INHALATION	
Toxicity (Rat): LC50 > 5000 mg/m ³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
INGESTION	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Moderately irritating to skin with prolonged exposure. Based on test data for structurally similar materials.
Eye	
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:

Vapour/aerosol concentrations above recommended exposure levels are irritating to the eyes and respiratory tract, may cause headaches, dizziness, anaesthesia, drowsiness, unconsciousness and other central nervous system effects including death. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Jet fuel: Some jet fuels have potential in mice to suppress indicators of immune system functionality. The relevance of these effects to humans is uncertain.

Contains:

DIETHYLENE GLYCOL MONOMETHYL ETHER: Oral maternal exposure of animals resulted in teratogenicity. Dermal maternal exposure of animals resulted in slight toxicity to the fetus. Kerosene: Carcinogenic in animal tests. Lifetime skin painting tests produced tumours, but the mechanism is due to repeated cycles of skin damage and restorative hyperplasia. This mechanism is considered unlikely in humans where such prolonged skin irritation would not be tolerated. Did not cause mutations in-vitro. Inhalation of vapours did not result in reproductive or developmental effects in laboratory animals. Inhalation of high concentrations in animals resulted in respiratory tract irritation, lung changes and some reduction in lung

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: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: 3
UN Number: 1863
Packing Group: III
Special Provisions: 17

Footnote: In containers of 454 litres or less this material is exempt from TDG regulations.

LAND (DOT)

Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: COMBUSTIBLE LIQUID
ID Number: 1863
Packing Group: III
ERG Number: 128
Label(s): NONE
Transport Document Name: FUEL, AVIATION, TURBINE ENGINE, COMBUSTIBLE LIQUID, UN1863, PG III

Footnote: The flash point of this material is greater than 38°C/100°F. Regulatory classification of this material varies. DOT: Flammable liquid or combustible liquid. OSHA: Combustible liquid. IATA/IMO: Flammable liquid. This material is not regulated under 49 CFR in a container of 450 litre/119 gallon capacity or less when transported solely by land, as long as the material is not a hazardous waste, a marine pollutant, or specifically listed as a hazardous substance.

SEA (IMDG)

Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1863
Packing Group: III
Label(s): 3
Transport Document Name: FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PG III

AIR (IATA)

Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: 3
UN Number: 1863
Packing Group: III
Label(s): 3
Transport Document Name: FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PG III

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Class B, Division 3: Combustible Liquids Class D, Division 2, Subdivision A: Very Toxic Material Class D, Division 2, Subdivision B: Toxic Material

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:

Chemical Name	CAS Number	List Citations
Naphthalene	91-20-3	1, 5, 6

--REGULATORY LISTS SEARCHED--

1 = TSCA 4
2 = TSCA 5a2

3 = TSCA 5e
4 = TSCA 6

5 = TSCA 12b
6 = NPRI

SECTION 16 OTHER INFORMATION

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes: Not Applicable

THIS MSDS COVERS THE FOLLOWING MATERIALS: 3GP-24M | ESSO JET 5 | ESSO TURBO FUEL 5 | HIGH FLASH TYPE TURBINE AVIATION FUEL | JET 5 | JET 5 (3-GP-24) | TURBO FUEL 5

Precautionary Label Text:

WHMIS Classification: Class B, Division 3: Combustible Liquids Class D, Division 2, Subdivision A: Very Toxic Material Class D, Division 2, Subdivision B: Toxic Material

HEALTH HAZARDS

Irritating to skin. Danger of serious damage to health by prolonged exposure. May cause harm to the unborn child. If swallowed, may be aspirated and cause lung damage. May cause central nervous system depression.

Target Organs: Reproductive system | Skin |

PHYSICAL HAZARDS

In use, may form flammable/explosive vapour-air mixture. Combustible. Material can accumulate static charges which may cause an incendiary electrical discharge.

PRECAUTIONS

Avoid contact with skin. Do not siphon by mouth. Use proper bonding and/or earthing procedures.

FIRST AID

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

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO₂) 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. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Eliminate sources of ignition. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Report spills as required to appropriate authorities. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Temperature by 10°C, or is less than the Ambient Temperature, use booms as a barrier to protect shorelines and allow the material to evaporate. Seek the advice of a specialist before using dispersants.

Use

Not intended or suitable for use in or around a household or dwelling.

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Prepared By: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: (see Section 16 for Synonyms) **MIDDLE DISTILLATE**
Product Description: Hydrocarbons and Additives
MSDS Number: 826
Intended Use: Fuel

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
 240 4th Avenue
 Calgary, ALBERTA. T2P 3M9 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
FUEL OIL NO. 2	68476-30-2	> 99%	None

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicity
Naphthalene	91-20-3	< 1%	Dermal Lethality: LD50 > 20 g/kg (Rabbit); Oral Lethality: LD50 0.49 g/kg (Rat)

* 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

Combustible. In use, may form flammable/explosive vapour-air mixture. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

HEALTH EFFECTS

Irritating to skin. If swallowed, may be aspirated and cause lung damage. Under conditions of poor personal hygiene and prolonged repeated contact, some polycyclic aromatic compounds (PACs) have been suspected as a cause of skin cancer in humans. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID: Health: 1 Flammability: 2 Reactivity: 0
HMIS Hazard ID: Health: 1 Flammability: 2 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

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Skin Contact

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Eye Contact

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

Ingestion

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Hydrocarbon Solvents/Petroleum Hydrocarbons- Skin contact may aggravate an existing dermatitis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. 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: Combustible. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Static discharge: material can accumulate static charges which may cause an incendiary electrical discharge. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulphur Oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >40C (104F) [ASTM D-93]

Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 6.5

Autoignition Temperature: N/D

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 the Hazard Identification Section 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. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Eliminate sources of ignition. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

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

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapour. Avoid contact with skin. Do not siphon by mouth. Use proper bonding and/or earthing procedures. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill

container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Drums must be earthed and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
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Substance Name	Form	Limit/Standard		Note	Source
FUEL OIL NO. 2	Stable Aerosol.	TWA	5 mg/m ³		Supplier
FUEL OIL NO. 2	Vapour.	TWA	200 mg/m ³		Supplier
FUEL OIL NO. 2 [total hydrocarb, vapor&aerosol]	Inhalable fraction and vapour	TWA	100 mg/m ³	Skin	ACGIH
Naphthalene		STEL	15 ppm	Skin	ACGIH
Naphthalene		TWA	10 ppm	Skin	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:

Adequate ventilation should be provided so that exposure limits are not exceeded.

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. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use

conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical-resistant 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.

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:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

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: Liquid
Colour: Clear (May Be Dyed)
Odour: Petroleum/solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15.5 C): 0.82 - 0.9
Flash Point [Method]: >40C (104F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 6.5
Autoignition Temperature: N/D
Boiling Point / Range: 150C (302F) - 370C (698F)
Vapour Density (Air = 1): 4 at 101 kPa
VAPOUR PRESSURE: [N/D at 20°C] | 4 kPa (30 mm Hg) at 38C
Evaporation Rate (N-Butyl Acetate = 1): < 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: 1.3 cSt (1.3 mm²/sec) at 40°C - 11 cSt (11 mm²/sec) at 40°C
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -4°C (25°F) - -39°C (-38°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
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Acute Toxicity

Route of Exposure	Conclusion / Remarks
INHALATION	
Toxicity (Rat): LC50 > 5000 mg/m ³	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Moderately irritating to skin with prolonged exposure.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

For the product itself:

Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Diesel fuel: Carcinogenic in animal tests. Caused mutations in-vitro. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function.

Contains:

NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.

Additional information is available by request.

CMR Status:

Chemical Name	CAS Number	List Citations
FUEL OIL NO. 2	68476-30-2	4
Naphthalene	91-20-3	3, 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 -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

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

High molecular wt. component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Hydrocarbon component -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Hydrocarbon component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

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 Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. 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.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: FUEL OIL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III

LAND (DOT)

Proper Shipping Name: HEATING OIL, LIGHT
Hazard Class & Division: 3
ID Number: 1202
Packing Group: III
ERG Number: 128
Label(s): 3
Transport Document Name: UN1202, HEATING OIL, LIGHT, 3, PG III

Footnote: The flash point of this material is greater than 38°C/100°F. Regulatory classification of this material varies. DOT: Flammable liquid or combustible liquid. OSHA: Combustible liquid. IATA/IMO: Flammable liquid.

SEA (IMDG)

Proper Shipping Name: HEATING OIL, LIGHT
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1202
Packing Group: III
Label(s): 3
Transport Document Name:

AIR (IATA)

Proper Shipping Name: HEATING OIL, LIGHT
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name:

SECTION 15**REGULATORY INFORMATION**

WHMIS Classification: Class B, Division 3: Combustible Liquids Class D, Division 2, Subdivision B: Toxic Material

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: DSL, TSCA

FIRST AID

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

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO₂) 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. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Eliminate sources of ignition. Remove from the surface by skimming or with suitable absorbents. Report spills as required to appropriate authorities. Seek the advice of a specialist before using dispersants.

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Prepared By: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: (see Section 16 for Synonyms) **UNLEADED GASOLINE**
Product Description: Hydrocarbons and Additives
MSDS Number: 8522
Intended Use: Fuel

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
 240 4th Avenue
 Calgary, ALBERTA. T2P 3M9 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
GASOLINE	86290-81-5	> 99%	None
METHYL-TERT-BUTYL ETHER	1634-04-4	0 - 15%	Dermal Lethality: LD50 > 10.0 g/kg (Rabbit); Inhalation Lethality: LC50 23576 ppm (Rat); Oral Lethality: LD50 4.0 g/kg (Rat)

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicity
BENZENE	71-43-2	0 - 1.5%	Dermal Lethality: LD50 > 9.4 g/kg (Rabbit); Inhalation Lethality: LC50 13328 ppm (Rat); Oral Lethality: LD50 0.93 g/kg (Rat)
CUMENE	98-82-8	0 - 1%	Dermal Lethality: LD50 10.6 g/kg (Rabbit); Inhalation Lethality: LC50 8000 ppm (Rat); Oral Lethality: LD50 1.4 g/kg (Rat)
Cyclohexane	110-82-7	0 - 1%	Dermal Lethality: LD50 > 18 g/kg (Rabbit); Oral Lethality: 12 g/kg (Rat)
ETHYL BENZENE	100-41-4	0 - 3%	Dermal Lethality: LD50 15 g/kg (Rabbit); Inhalation Lethality: LC50 4000 ppm (Rat); Oral Lethality: LD50 3.5 g/kg (Rat)
n-Hexane	110-54-3	0 - 3%	Dermal Lethality: LD50 3.295 g/kg (Rabbit); Inhalation Lethality: LC50 97469 ppm (Rat); Oral

			Lethality: LD50 28.7 g/kg (Rat)
Naphthalene	91-20-3	0 - 1%	Dermal Lethality: LD50 > 20 g/kg (Rabbit); Oral Lethality: LD50 0.49 g/kg (Rat)
TOLUENE	108-88-3	0 - 20%	Dermal Lethality: LD50 12.10 g/kg (Rabbit); Inhalation Lethality: LC50 8000 ppm (Rat); Oral Lethality: LD50 5.0 g/kg (Rat)
XYLENES	1330-20-7	0 - 10%	Dermal Lethality: LD50 4.5 g/kg (Rabbit); Inhalation Lethality: LC50 5000 ppm (Rat); Oral Lethality: LD50 4.3 g/kg (Rat)

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

Note: The concentration of the components shown above may vary substantially. In certain countries, benzene content may be limited to lower levels. Oxygenates such as tertiary-amyl-methyl ether, ethanol, di-isopropyl ether, and ethyl-tertiary-butyl ether may be present. Because of volatility considerations, gasoline vapor may have concentrations of components very different from those of liquid gasoline. The major components of gasoline vapor are: butane, isobutane, pentane, and isopentane. The reportable component percentages, shown in the composition/information on ingredients section, are based on API's evaluation of a typical gasoline mixture.

SECTION 3	HAZARDS IDENTIFICATION
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This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

PHYSICAL/CHEMICAL EFFECTS

FLAMMABLE. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

HEALTH EFFECTS

May cause cancer. Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anaemia and to the later development of acute myelogenous leukaemia (AML).

Target Organs: Blood and/or blood-forming organs |

NFPA Hazard ID:	Health: 1	Flammability: 3	Reactivity: 0
HMIS Hazard ID:	Health: 1*	Flammability: 3	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
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INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Skin Contact

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Eye Contact

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

Ingestion

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Benzene- Individuals with liver disease may be more susceptible to toxic effects.

SECTION 5	FIRE FIGHTING MEASURES
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EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: 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: EXTREMELY FLAMMABLE. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulphur Oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: -40C (-40F) [ASTM D-92]

Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6

Autoignition Temperature: >250°C (482°F)

SECTION 6	ACCIDENTAL RELEASE MEASURES
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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 the Hazard Identification Section 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. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

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

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7

HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapour. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or earthing procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. 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. Drums must be earthed and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
BENZENE		STEL	2.5 ppm		Skin	ACGIH
BENZENE		TWA	0.5 ppm			ACGIH
CUMENE		TWA	50 ppm			ACGIH
Cyclohexane		TWA	100 ppm			ACGIH
ETHYL BENZENE		STEL	125 ppm			ACGIH
ETHYL BENZENE		TWA	100 ppm			ACGIH
GASOLINE		STEL	200 ppm			Supplier
GASOLINE		TWA	100 ppm			Supplier
GASOLINE	Vapour.	TWA	300 mg/m ³	100 ppm		Supplier
METHYL-TERT-BUTYL ETHER		TWA	50 ppm			ACGIH
n-Hexane		TWA	50 ppm		Skin	ACGIH
Naphthalene		STEL	15 ppm		Skin	ACGIH
Naphthalene		TWA	10 ppm		Skin	ACGIH
TOLUENE		TWA	20 ppm			ACGIH
XYLENES		STEL	150 ppm			ACGIH
XYLENES		TWA	100 ppm			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:
 Half-face filter respirator

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. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical-resistant 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.

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:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

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

GENERAL INFORMATION

Physical State: Liquid
Colour: Clear (May Be Dyed)
Odour: Petroleum/solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.73
Flash Point [Method]: -40C (-40F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: 35C (95F) - 210C (410F)
Vapour Density (Air = 1): 3.2 at 101 kPa
VAPOUR PRESSURE: > 26.6 kPa (200 mm Hg) at 20°C | 76 kPa (570 mm Hg) at 38 C - 103 kPa (772.5 mm Hg) at 38C
Evaporation Rate (N-Butyl Acetate = 1): > 10
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3
Solubility in Water: Negligible
Viscosity: <1 cSt (1 mm²/sec) at 40°C
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

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

Materials To Avoid: Halogens, Strong Acids, Alkalies, Strong oxidizers

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

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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Acute Toxicity

Route of Exposure	Conclusion / Remarks
INHALATION	
Toxicity (Rat): LC50 > 5000 mg/m ³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Mildly irritating to skin with prolonged exposure. Based on test data for structurally similar materials.
Eye	
Irritation: 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:

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapours in the same boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats, male and female mice, or in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. In 1991, The U.S. EPA determined that the male rat kidney is not useful for assessing human risk. Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Contains:

BENZENE: Caused cancer (leukemia), damage to the blood-producing system, and serious blood disorders from prolonged, high exposure based on human epidemiology studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus in laboratory animal studies.

CUMENE: Repeated inhalation exposure of cumene vapour produced damage in the kidney of male rats only.

These effects are believed to be species specific and are not relevant to humans. **GASOLINE UNLEADED:** Carcinogenic in animal tests. Chronic inhalation studies resulted in liver tumours in female mice and kidney tumours in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations in-vitro or in-vivo. Negative in inhalation developmental studies and reproductive tox studies. Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing). **METHYL TERTIARY BUTYL ETHER (MTBE):** Carcinogenic in animal tests. Inhalation exposure to high concentrations resulted in higher than expected mortality in male mice due to urinary tract obstructions and female mice displayed benign liver tumours. Inhalation exposure to high concentrations resulted in higher than expected mortality in male rats due to progressive kidney damage as well as increased benign and malignant kidney tumours, and benign testicular tumours. Did not cause mutations in-vitro or in-vivo. Rabbits exposed to high vapour concentrations did not have any offspring with adverse developmental effects. Mice exposed to high vapour concentrations (maternally toxic) had offspring with embryo/fetal toxicity and birth defects. Rats exposed to high vapour concentrations did not display any treatment-related effects in a two generation reproduction study. The significance of the animal findings at high exposures are not believed to be directly related to potential human health hazards in the workplace. **NAPHTHALENE:** Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain. **N-HEXANE:** Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown. **TOLUENE :** Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects. **ETHYLBENZENE:** Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain. **XYLENES:** High exposures to xylenes in some animal studies have been reported to cause health effects on the developing embryo/fetus. These effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.

Additional information is available by request.

CMR Status:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 4, 5
CUMENE	98-82-8	4
Cyclohexane	110-82-7	4
ETHYL BENZENE	100-41-4	3, 4
GASOLINE	86290-81-5	3, 4
METHYL-TERT-BUTYL ETHER	1634-04-4	4
n-Hexane	110-54-3	4
Naphthalene	91-20-3	3, 4
TOLUENE	108-88-3	4
XYLENES	1330-20-7	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
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The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

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

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Majority of components -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13	DISPOSAL CONSIDERATIONS
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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 Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **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.**

SECTION 14	TRANSPORT INFORMATION
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LAND (TDG)

Proper Shipping Name: GASOLINE

Hazard Class & Division: 3

UN Number: 1203

Packing Group: II
Marine Pollutant: MP: 100 % weight PP: 0 % weight
Special Provisions: 17

LAND (DOT)

Proper Shipping Name: GASOLINE
Hazard Class & Division: 3
ID Number: 1203
Packing Group: II
ERG Number: 128
Label(s): 3
Transport Document Name: UN1203, GASOLINE, 3, PG II

SEA (IMDG)

Proper Shipping Name: MOTOR SPIRIT or GASOLINE or PETROL
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1203
Packing Group: II
Label(s): 3
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-40°C c.c.)

AIR (IATA)

Proper Shipping Name: GASOLINE
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II
Label(s): 3
Transport Document Name: UN1203, GASOLINE, 3, PG II

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Class B, Division 2: Flammable Liquids Class D, Division 2, Subdivision A: Very Toxic Material

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, DSL, EINECS, ENCS, KECI, PICCS, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	6
CUMENE	98-82-8	6
Cyclohexane	110-82-7	6

ETHYL BENZENE	100-41-4	6
METHYL-TERT-BUTYL ETHER	1634-04-4	6
n-Hexane	110-54-3	6
Naphthalene	91-20-3	1, 6
TOLUENE	108-88-3	6
XYLENES	1330-20-7	1, 6

--REGULATORY LISTS SEARCHED--

1 = TSCA 4
 2 = TSCA 5a2

3 = TSCA 5e
 4 = TSCA 6

5 = TSCA 12b
 6 = NPRI

SECTION 16 OTHER INFORMATION

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

- Section 04: First Aid Skin - Header was modified.
- Section 04: First Aid Eye - Header was modified.
- Section 04: First Aid Ingestion - Header was modified.
- Section 06: Notification Procedures - Header was modified.
- Section 10: Materials To Avoid - Header was modified.
- Section 11: Ingestion Acute Lethality - Header was modified.
- Section 09: Vapour Pressure - Header was modified.
- Section 05: Hazardous Combustion Products was modified.
- Section 14: Sea (IMDG) - Header was modified.
- Section 15: National Chemical Inventory Listing - Header was modified.
- Section 15: National Chemical Inventory Listing was modified.
- Section 16: Synonyms was modified.
- Section 16: Health Hazards - Header was modified.
- Section 16: Physical Hazards - Header was modified.
- Section 11: Chronic Tox - Component - WHMIS was modified.
- Section 08: OEL Table - Substance Name Column - Header was added.
- Section 08: OEL Table - Form Column - Header was added.
- Section 08: OEL Table - Limit Column - Header was added.
- Section 08: OEL Table - Notation Column - Header was added.
- Section 08: OEL Table - Source Column - Header was added.
- Section 13: Regulatory Disposal Information - Header was added.
- Section 13: Regulatory Disposal Information - Header was deleted.
- Section 08: OEL Table - Form Column - Header was deleted.
- Section 08: OEL Table - Limit Column - Header was deleted.
- Section 08: OEL Table - Notation Column - Header was deleted.
- Section 08: OEL Table - Source Column - Header was deleted.
- Section 08: OEL Table - Substance Name Column - Header was deleted.

SYNONYMS: ESSO PREMIUM GASOLINE, GASOLINE REGULAR UNLEADED RUL87 LDCA DYED, ESSO EXTRA MIDGRADE GASOLINE, GASOLINE REGULAR UNLEADED RUL87 LDCA, EXXON MIDGRADE GASOLINE, ESSO MIDGRADE GASOLINE, ESSO REGULAR GASOLINE, GASOLINE MIDGRADE UNLEADED MUL89 DCA, EXXON REGULAR GASOLINE, GASOLINE MIDGRADE UNLEADED MUL89, EXXON PREMIUM GASOLINE, GASOLINE REGULAR UNLEADED RUL87 DYED, GASOLINE MIDGRADE UNLEADED MUL89 DCA DYED, GASOLINE REGULAR UNLEADED RUL87, GASOLINE PREMIUM UNLEADED PUL91, GASOLINE RBOB

BLENDSTOCK P91, GASOLINE RBOB BLENDSTOCK R87, GASOLINE MIDGRADE UNLEADED MUL89 LDCA, GASOLINE MIDGRADE UNLEADED MUL89 LDCA DYED, GASOLINE REGULAR UNLEADED RUL87 DCA, GASOLINE PREMIUM UNLEADED PUL91 LDCA, GASOLINE PREMIUM UNLEADED PUL91 LDCA DYED, GASOLINE PREMIUM UNLEADED PUL91 DCA DYED, GASOLINE REGULAR UNLEADED RUL87 DCA DYED, GASOLINE PREMIUM UNLEADED PUL91 DCA, Isooctane, UNLEADED AUTOMOTIVE GASOLINE

Precautionary Label Text:

WHMIS Classification: Class B, Division 2: Flammable Liquids Class D, Division 2, Subdivision A: Very Toxic Material

Health Hazards

May cause cancer. Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage. May cause central nervous system depression.

Target Organs: Blood and/or blood-forming organs |

Physical Hazards

FLAMMABLE. Material can accumulate static charges which may cause an incendiary electrical discharge. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

PRECAUTIONS

Avoid breathing mists or vapour. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or earthing procedures.

FIRST AID

INHALATION: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

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

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO2) 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. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and

explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

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Prepared By: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: HD-5 PROPANE (NON ODORIZED)
Product Description: Liquefied Hydrocarbon Gas, Gas or Liquefied Gas
MSDS Number: 1622
Intended Use: Fuel gas

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 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

FLAMMABLE GAS. 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

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. High-pressure injection under skin may cause serious damage.

NFPA Hazard ID: Health: 1 Flammability: 4 Reactivity: 0

HMIS Hazard ID: 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. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Not Applicable

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, dry chemical or carbon dioxide (CO₂) 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]: -103C (-153F) [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
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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 the Hazard Identification Section 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
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HANDLING

Use non-sparking tools and explosion-proof equipment. 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
ALKANES, C4		TWA	1000 ppm		ACGIH
Ethane		TWA	1000 ppm		ACGIH
ISOBUTANE		TWA	1000 ppm		ACGIH
Propane		TWA	1000 ppm		ACGIH
Propylene		TWA	500 ppm		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. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If product is hot, 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: Odourless
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.51
Flash Point [Method]: -103C (-153F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 2.4 UEL: 9.5
Autoignition Temperature: 432°C (810°F)
Boiling Point / Range: -42C (-44F)
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: 0.5 cSt (0.5 mm²/sec) at 40°C
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
INHALATION	
Toxicity (Rat): LC50 > 5000 mg/m ³	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.
INGESTION	
Toxicity: No end point data.	Not applicable.
Skin	
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.
Eye	
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
ALKANES, C4	68513-65-5	4
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 Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. 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.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: LIQUEFIED PETROLEUM GASES, not odorized
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: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1

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: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1 (-103°C c.c.)

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: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1

SECTION 15	REGULATORY INFORMATION
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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: KECI, DSL, PICCS, IECSC, ENCS, TSCA, AICS, EINECS

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

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

--REGULATORY LISTS SEARCHED--

1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b
2 = TSCA 5a2	4 = TSCA 6	6 = NPRI

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

- Section 04: First Aid Skin was modified.
- Section 04: First Aid Eye was modified.
- Section 05: Fire Fighting Measures - Fire Fighting Instruction was modified.
- Section 06: Protective Measures was modified.
- Section 06: Notification Procedures - Header was modified.
- Section 13: Empty Container Warning was modified.
- Section 09: Phys/Chem Properties Note was modified.
- Section 09: Boiling Point C(F) was modified.
- Section 08: Hand Protection was modified.
- Section 09: Vapour Pressure was modified.
- Section 07: Handling and Storage-Storage was modified.
- Section 01: Company Mailing Address was modified.
- Section 01: Company Mailing Address was modified.
- Hazard Identification: Health Hazards was modified.
- Hazard Identification: Physical/Chemical Hazard was modified.
- Section 09: Relative Density - Header was modified.
- Section 09: Flash Point C(F) was modified.
- Section 09 Viscosity was modified.
- Section 08: Hand Protection was modified.
- Section 14: Transport Document Name was modified.
- Section 14: Sea (IMDG) - Header was modified.
- Section 14: Transport Document Name was modified.
- Section 14: Transport Document Name was modified.
- Section 15: National Chemical Inventory Listing was modified.
- Section 08: Exposure Limits Table was modified.
- Section 16: First Aid Skin was modified.
- Section 11: Tox List Cited Table was modified.
- Hazard Identification: Physical/Chemical Hazard was added.
- Section 16: Physical Hazards was added.
- Section 16: First Aid Eye was added.
- Section 16: First Aid Eye - Header was added.
- Section 15: Canadian List Citations Table was added.
- Section 15: Chemical Name - Header was added.
- Section 15: CAS Number - Header was added.
- Section 15: List Citations -Header was added.
- Section 11: Chronic Tox - Component - Header was added.
- Section 11: Other Health Effects Header was added.
- Composition: CAS Number was added.
- Composition: Concentration - Header was added.
- Composition: Primary Ingredient Name was added.
- Composition: Substances Table - Header was added.
- Composition: No components was added.
- Composition: Concentration Footnote was added.
- Section 08: OEL Table - Substance Name Column - Header was added.
- Section 08: OEL Table - Form Column - Header was added.
- Section 08: OEL Table - Limit Column - Header was added.
- Section 08: OEL Table - Notation Column - Header was added.
- Section 08: OEL Table - Source Column - Header was added.
- Section 13: Regulatory Disposal Information - Header was added.
- Section 13: Regulatory Disposal Information - Header was deleted.
- Composition: Concentration Footnote was deleted.

Section 11: Other Health Effects Header was deleted.
Composition: Primary Ingredient Name was deleted.
Composition: CAS Number was deleted.
Composition: Concentration - Header was deleted.
Composition: Substances Table - Header was deleted.
Composition: No components was deleted.
Section 11: Chronic Tox - Component - Header was deleted.
Section 08: OEL Table - Form Column - Header was deleted.
Section 08: OEL Table - Limit Column - Header was deleted.
Section 08: OEL Table - Notation Column - Header was deleted.
Section 08: OEL Table - Source Column - Header was deleted.
Section 08: OEL Table - Substance Name Column - Header was deleted.

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

FLAMMABLE GAS. In use, may form flammable/explosive vapour-air mixture. 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.

Eye: Flush thoroughly with water for at least 15 minutes. Get medical assistance.

Skin: If frostbite occurs, immerse involved area in water at body temperature. Keep immersed for 20 to 40 minutes. Seek medical assistance. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO₂) 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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DGN: 5001827 (1010523)

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