Ikhil-Inuvik
Emergency Response Plan

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ERP REVISION REQUEST FORM

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Introduction

The Ikhil Joint Venture and Inuvik Gas Ltd. operations covered in this manual are controlled by a Board of Directors that includes representatives from parent companies, ATCO, Inuvialuit Petroleum Corporation, and AltaGas. Utility Group Facilities Inc. (UGFI, a subsidiary of AltaGas) and Inuvik Gas Ltd. (IGL) are the licensed operators for Ikhil and Inuvik, respectively. More information on ownership and operations can be found in this section of the manual under *Ikhil-Inuvik Overview*.

Both the owners and operators for the Ikhil-Inuvik area are committed to creating and maintaining an Emergency Response Plan for all company operations. They believe that having policies and procedures in place will lead to more effective response in an emergency.

Operational Standards

Protection of Property:
IGL and UGFI are committed to ensuring all operations are conducted in a manner that protects equipment and property, and prevents property damage and incidents involving equipment, as far as reasonably practicable.

Protection of the Environment:
IGL and UGFI are committed to operating their gas gathering, processing, storage, and pipeline facilities in an environmentally conscientious manner. The operations will be conducted such that the impact on the environment will be minimized. In order to accomplish this, IGL and UGFI commits that employees and contractors performing work at their facilities will conduct the work in accordance with the environmental laws as well as the procedures described herein.

Protection of the Public:
IGL and UGFI will comply with all applicable legal requirements and follow good gas utility work practices to protect the public, using a risk-based approach to incorporate public safety considerations into business practices and decisions. IGL and UGFI will promote public awareness of safety issues related to the gas facilities, encourage and support stakeholder initiatives that address public safety issues, and support community safety initiatives.

Protection of Workers:

IGL and UGFI are committed to taking every reasonable precaution for the protection of all workers, contractors and visitors. To fulfill this commitment IGL and UGFI will make every effort to provide and maintain a safe and healthy workplace by adhering to acceptable industry standards and complying with occupational health and safety legislation.

Planning Standards

The following standards are utilized in Canada for Emergency Preparedness and Emergency Response Planning. Internationally, similar standards should be considered when preparing plans.

i. AER Directive 71, Emergency Preparedness and Response Requirements for the Petroleum Industry – Assessment Matrix for Classifying Emergencies was utilized to develop the emergency classification and communications strategy outlined in this manual.

ii. CSA Z1600, Emergency Management & Business Continuity Programs – this standard is based on the NFPA 1600 Disaster/Emergency Management and Business Continuity Programs standard in the U.S. to be truly North American in scope and application. CSA Z1600 serves as a benchmark allowing evaluation or initiation of an emergency management and business continuity program.

iii. CSA Z-731, Emergency Preparedness & Response – this standard aids organizations in the development of emergency management programs. With the recent introduction of CSA Z1600, CSA Z731-03 will be revised to become a supporting standard under Z1600.

iv. BCI (Business Continuity Institute), Business Continuity Management Good Practice Guidelines; 2008.

Emergency Management Program & Emergency Response Plans

IGL and UGFI shall ensure emergency management and response plans are in place as per the relevant federal, provincial, territory or state regulatory requirements which govern their business.

a. Emergency Management Plans shall reflect the scope and regulatory requirements governing IGL and UGFI, and outline at a minimum:

   i. Corporate chain of command
   ii. Roles, responsibilities and individual competencies
   iii. Response escalation and communication, as outlined in this manual
   iv. Partner notification procedures and processes (including ATCO Crisis Management Committee notification for the Inuvik Gas distribution system)
   v. Response contacts, including internal and external stakeholder consultation and communications
   vi. Support mechanisms, resources and regulations
   vii. Training and exercises
   viii. Documentation
   ix. Change management

b. Emergency Response Plans will be developed to the level of detail commensurate with the risk and regulatory requirements and outline at a minimum:

   i. Notification and activation
   ii. Responder duties and responsibilities
   iii. Hazard / situational assessment
   iv. Stakeholder communications (e.g. public, regulatory)
   v. Response center activation (e.g. Ikhil/Inuvik Emergency Operations Centre)
   vi. Incident action planning and site safety

It is the policy of UGFI and IGL that:

§ An up-to-date Emergency Response Plan (ERP) will be maintained for all company operations;

§ Workers who may be expected to respond to emergencies will be provided with the appropriate training and equipment;

§ Where required by legislation, accidents and incidents be reported to the appropriate federal, provincial, territorial or municipal government agency on a timely basis; and

§ Workers report all work-related injuries, illnesses, environmental damage, property damage, and near-misses to their supervisor as soon as reasonably practicable; the supervisor will conduct an incident investigation for all incidents, with the exception of incidents in which the injury or damage, or potential injury or damage, is minor.

Training and Exercises

IGL and UGFI are responsible for maintaining their knowledge of programs and plans. Identified response personnel must be trained in their role and responsibilities, and ensure resources are provided for the successful implementation of their program or plan.

Conducting emergency response exercises provides validation and identifies areas for potential improvement in response capability without actually going through real-life incidents. IGL and UGFI will carry out an annual tabletop drill.

Plans shall be exercised at least once annually; however, a more frequent schedule may be necessary dependent upon business needs and the environment in which it operates. A full scale exercise should be conducted once every 5 years unless regulated to do so more frequently.

The basis for determining scale and added frequency of exercises are:

§ Procedures;
§ Roles and responsibilities;
§ Hazards;
§ Regulatory requirements; and
§ Lessons learned from previous response activities (real and simulated).

The above includes changes in operations, procedures, site standards, facilities or personnel. As many accidents are the result of uncontrolled change, changes must be evaluated and managed to ensure that safety and environmental risks arising from these changes remain at an acceptable level, which includes changes or updates to Emergency Response Plans and actions. This can be accomplished by:

§ Reviewing and documenting changes to standards, processes, procedures, and/or equipment. Workers involved in operations, maintenance and response activities, whose job tasks will be affected by a change, must be informed of and trained in the change;

§ Reaffirming responsibilities and accountabilities when staff changes occur;

§ Identifying changes in laws and regulations and reflecting those changes in facilities, processes and plans, as required.

a. Training / Exercise Documentation

Training / Exercises must be documented and this documentation will include, but is not limited to:

§ Objectives;
§ Scenario;
§ Personnel in attendance;
§ Participant feedback;
§ An action plan and timeline for addressing the identified opportunities for improvement.

The IGL and UGFI Managers responsible for the Emergency Response Plan will ensure that an annual report summarizes the exercises conducted and lessons learned, and the opportunities for improvement be documented and tracked to completion. This includes any improvements to the ERP, which will be incorporated into the ERP during the next revision date (or sooner, as appropriate).

b. Types of Exercises

The following are some examples of the type and characteristic of exercises which can be conducted. However, in order for response plans to be truly "tested", the scenario selected and type of exercise conducted from year-to-year must vary and "ramp up" as personnel become familiar with their roles and responsibilities within the plan.

i. **Tabletop Exercise** - A tabletop exercise is conducted in a conference room setting. Through a facilitated discussion, participants discuss the responses to various prepared scenarios. Tabletop exercises are very useful when you have a new process, response center, facility, personnel or equipment.

Tabletop characteristics are:

· scenario driven (no physical response)
· small team in a conference room setting
· used for establishing policies, providing input to planning, developing procedures, clarifying roles and confirming knowledge

- least amount of realism, but may include verification of internal / external contact numbers
- used to evaluate performance

ii. **Communication Exercise** – Communication exercises are scenario driven and require responders to play their roles from their assigned locations using the communication equipment that would normally be deployed in a real emergency. However, there is little or no mobilization of resources other than company personnel.

Characteristics of a communication exercise include:

- scenario-driven response activities
- can have a range of scope and participation
- typically involves simulation of non-participating agencies/personnel
- wide range of resource mobilization
- participation of multiple functions and teams in an integrated response management
- typically involves actual notification to required government agencies and support services – but no response
- action or participation from these agencies or outside services
- notification through the ATCO Group 24 hour emergency line
- extensive realism and hands-on training for the subsidiary responders
- actual physical on-site response may be limited to only a drill, then simulated exercise inputs from
- simulators/facilitators on-site
- trained personnel to facilitate and evaluate performance

iii. **Full Scale Exercise** – A full-scale exercise is the type of exercise that enables an organization to come as close to recovering from a disaster as possible and therefore, the closest an organization could come to in verifying its ability to continue operations in a real disaster. These exercises also lend the circumstances for personnel, who might otherwise only meet or work with each other for the first time in an actual disaster, to work together in person, to develop and enhance relations and understand and improve communication styles.

A full-scale exercise includes all the components of a communication exercise and simulates a real event, including activation of an Incident Command Centre (i.e. Corporate Emergency Operations Centre) and actual deployment of response personnel and equipment. A full-scale exercise validates the major aspects of IGL's and UGFI's emergency preparedness programs and the functions and protocols outlined in emergency plans. These exercises involve all members of the organization, and may include invitations to other stakeholders, agencies and regulators to participate.

Records Management and Documentation

IGL and UGFI are responsible for the administration and maintenance of the ERP. Copies shall be distributed and/or accessible to ATCO personnel and other agencies charged with responsibilities under the ERP, as appropriate.

In addition, IGL and UGFI are responsible for maintaining pertinent response and recovery plan documentation. This documentation may include requirements as outlined in governing regulations, and documentation related to plan distribution, training activities and reports, incident records, and reports prepared internally or by external agencies, or other documentation that may be relevant for post-incident investigation and evaluation.

Privacy Acts must be adhered to when personal information is collected and/or utilized in Plan documentation. These laws outline how personal information is to be collected, utilized, stored and destroyed.

IGL and UGFI must be able to furnish ATCO, upon request, with current response and recovery plans and related documentation as outlined above.

Business Continuity Management

Business Continuity Plans (BCPs) deal with the recovery and restoration phases of an emergency event. IGL shall develop a BCP outlining the procedures and contingency plans for recovery of critical business processes necessary to ensure that the corporation can continue to operate and protect shareholder value, until such time as normal operations are restored.

This requires IGL to:

- Conduct a business impact analysis
- Conduct risk assessments
- Determine business continuity strategies
- Develop and implement a business continuity response
- Outline exercise, maintenance and review requirements of the BCP

EMERGENCY CLASSIFICATION SYSTEM

IGL and UGFI have adopted a standardized emergency classification system based on industry standard practices. All incidents are classified as either an Alert, or a Level 1, 2 or 3 Emergency. Incidents that can be handled through normal operating procedures are very low risk and are typically defined as an Alert. Those with low to high risk may require a more difficult complex resolution and are defined as emergencies. The Incident Classification Matrix which follows is provided as a guidance tool for classifying and communicating emergencies. It is recognized that the consequences presented may not meet all scenarios which could be experienced by IGL/UGFI, nor is this document intended to dictate response activities. Rather, the primary intent is to ensure and assist in the effective and appropriate notification, management, and response to occurrences of increasing significance.

Definition of an Emergency

An **Emergency** is defined as any situation that threatens the health or safety of employees, contractors or the general public, or that may cause harm to the environment or major property damage. There are three levels of emergencies based upon the degree of risk to people and the environment.

Definition of an Alert

An **Alert** is defined as a situation in which immediate control of a hazard is obtainable with progressive resolution of the situation. Control and relief systems are functioning correctly and the impact to public/worker safety and the environment is limited to the site only. Notification to the public may be provided as a courtesy if appropriate. If notification of the public takes place, the appropriate government agencies will also be notified.

Events that may be considered Emergencies

- Major sweet gas releases
- Serious NGL, LPG or condensate liquid releases
- Large fuel, produced water or chemical spills
- PAS major operational issues
- Loss of supply from Ikhil
- Serious injuries or fatalities
- Major equipment or property damage
- Vehicle accidents
- Pipeline hits
- Fires and explosions
- Breaches of site security
- Bomb threats
- Missing workers
- Tornadoes, earthquakes and other natural disasters
- Wildlife attacks
- Pandemic
- Any other event that represents a threat to people or the environment

INCIDENT CLASSIFICATION MATRIX

IMPORTANT: Emergency events which have the potential to impact corporate reputation must be reported, even when the event is classified as a Level 1.

LIKELIHOOD (what is the likelihood that the incident will escalate, resulting in an increased exposure to public or employee health & safety, or to the environment?) / **CONSEQUENCE**	**Unlikely (1)** The incident is contained or controlled and unlikely to escalate. No chance of additional hazards. Ongoing monitoring is required.	**Moderate (2)** Control may have deteriorated but imminent control of the hazard is probable. Unlikely that the incident will escalate.	**Likely (3)** Imminent and/or intermittent control of the incident is possible. Capable of using internal and may require external resources to manage and bring hazard under control in the near term. Potential escalation.	**Almost Certain or Currently Occurring (4)** Incident is uncontrolled and escalating; there is little chance to bring hazard under control in the near term. Require assistance from outside parties.
Catastrophic (4) ▪ Fatality ▪ National & international media interest ▪ Spill/release off-site/not contained - potential for, or is, impacting the environment ▪ Public/employee health & safety or environment jeopardized ▪ Corporate reputation impacted	**Low (4-5)** **LEVEL 1 Emergency**	**Medium (6)** **LEVEL 2 Emergency**	**High (7-8)** **LEVEL 3 Emergency**	**High (7-8)** **LEVEL 3 Emergency**
Major (3) ▪ Worker(s) requires hospitalization for serious injuries ▪ Regional & national media interest ▪ Spill/release contained, extends beyond site ▪ Public/employee health & safety or environment could be jeopardized ▪ Corporate reputation impacted	**Low (4-5)** **LEVEL 1 Emergency**	**Low (4-5)** **LEVEL 1 Emergency**	**Medium (6)** **LEVEL 2 Emergency**	**High (7-8)** **LEVEL 3 Emergency**
Moderate (2) ▪ Medical treatment required for worker(s) ▪ Local & possible regional media interest ▪ Spill/release contained on site, but potential to extend beyond site ▪ Public/employee health & safety or environment not threatened, but perception of risk ▪ Local corporate reputation impacted	**Very Low (2-3)** **ALERT**	**Low (4-5)** **LEVEL 1 Emergency**	**Low (4-5)** **LEVEL 1 Emergency**	**Medium (6)** **LEVEL 2 Emergency**
Minor (1) ▪ No worker injuries ▪ Nil or low media interest ▪ Spill/release confined to site ▪ Public/employee health & safety not threatened ▪ Corporate reputation not impacted	**Very Low (2-3)** **ALERT**	**Very Low (2-3)** **ALERT**	**Low (4-5)** **LEVEL 1 Emergency**	**Low (4-5)** **LEVEL 1 Emergency**

IKHIL-INUVIK OVERVIEW

Introduction to the Ikhil-Inuvik Emergency Response Plan

The **Inuvialuit Petroleum Corporation**, **Utility Group Facilities Inc.** (**UGFI,** a subsidiary of AltaGas Utility Group Inc.), and **ATCO Midstream NWT Ltd.** formed the Ikhil Joint Venture and together own the Ikhil Gas Field which can supply natural gas to the town of Inuvik for power generation, and commercial and residential heating. UGFI is the licensed operator of the Ikhil Gas Field; however, **Inuvik Gas Ltd. (IGL)** has been contracted to operate the Ikhil Gas Field facilities.

Inuvik Gas Ltd. (IGL) is the owner and operator of the gas distribution system in the town of Inuvik. IGL is owned equally by Inuvialuit Petroleum Corporation, AltaGas Utility Holdings Inc., and ATCO Midstream NWT Ltd. ATCO is the managing partner of IGL and its gas distribution system.

The Ikhil-Inuvik Emergency Response Plan (ERP) applies to the Ikhil Gas Field, and the Inuvik Gas Distribution System within the town of Inuvik. As the operator of Ikhil and Inuvik, IGL personnel will act as the Response Team for incidents/emergencies in the area, with support from UGFI (AltaGas) and/or ATCO, as needed. However, for larger scale emergencies, incident command may be taken over by UGFI (for Ikhil) or ATCO (for Inuvik).

This ERP was developed in accordance with the *Canada Oil and Gas Operations Act* (COGOA), the Northwest Territories *Oil and Gas Operations Act* (OGOA), and the *Canada Oil and Gas Drilling and Production Regulations* (COGDPR). In addition, the NWT *Safety Act* and *Oil and Gas Occupational Health and Safety Regulations* also apply.

Ikhil Joint Venture

The Ikhil Gas Field is located at 68º 45' North and 134º 10' West in the Caribou Hills, approximately 50 km (30 miles) to the northwest of Inuvik. The natural gas at Ikhil is contained in a sand layer known as the Taglu Delta, at a depth of approximately 1100 meters (3600 Feet) below ground.

Initially natural gas was produced from the original exploration well, K-35, and a second well, J-35, that was drilled in the winter of 1998. Since December of 2010, the K-35 well has been shut-in due to the influx of water into the wellbore. The J-35 well is currently producing natural gas, and the K-35 well remains shut-in and is being utilized for monitoring purposes.

The natural gas is transported in 114.3 mm (four inch) diameter, aboveground pipelines to a small production facility centrally located between the wells. This facility dries and cools the gas so that it can be transported through a buried pipeline to Inuvik. The total length of the aboveground pipelines is approximately one kilometer, and the total area of gravel pads for the wells and the production facility is less than 4000 square meters (one acre).

The operation consists of a 168.3 mm (six inch) diameter pipeline from the production facility at Ikhil to a meter station near the Northwest Territories Power Corporation (NTPC) power plant in Inuvik. The pipeline is buried and parallels the east channel of the Mackenzie River along its entire length of approximately 50 km (30 miles). Where the pipeline crosses Douglas Creek, it is supported above ground to avoid disturbance to the south-facing slope on the north side of the creek. The gas is chilled to below freezing temperatures at the Ikhil production facility. Negligible melting of the permafrost will occur as the gas passes through the pipeline.

The meter station is situated at the Inuvik end of the pipeline to measure and condition the gas to meet the needs of the town and NTPC as a back-up natural gas supply.

Regulatory Jurisdiction:

The Ikhil wells, production facility and pipelines (outside of the Inuvik town boundary) are regulated by the Canadian **National Energy Board (NEB)**. Incidents involving these facilities must be reported to the NEB and other government agencies, as appropriate.

The portion of the Ikhil pipeline within the town of Inuvik and the meter station at Lock 36, Block 36, Water Street, in Inuvik, are regulated by the Northwest Territories **Office of the Regulator of Oil and Gas Operations (OROGO)**. Incidents involving the parts of the Ikhil system within Inuvik must be reported to OROGO and other government agencies, as appropriate.

Control Devices:

Daily mass balancing of the pipeline system is used as a method of leak detection. Automatic control valves are located at the Ikhil well heads and inlet valve. A manual block valve is located on the Ikhil pipeline eight miles north of Inuvik, and an Emergency Shut Down (ESD) valve is located at the meter station (gate station) on the south side of Inuvik. The block valve outside of Inuvik is located 5.4 kilometres from the Inuvik Gas Ltd. shop and approximately 7.7 kilometres from the main office within Inuvik. The block valve is considered the last resort to shut in the town if there is an emergency.

Land:

The Ikhil gathering system, from the two gas wells to the Ikhil facility, is approximately one kilometre in length, all of which is aboveground. The pipelines have been placed on pilings above the permafrost.

The Ikhil pipeline from the facility to the town of Inuvik is buried in the permafrost, except for the small portion at Douglas Creek that runs aboveground for approximately one kilometre. Of the approximately 50 kilometres in the pipeline right-of-way, the first 15 kilometres from the facility is tundra, no trees, and the second half is mostly scrub willow based.

There is tundra vegetation on the last 10 km near the facility of natural grasses and small plants. Other sensitive areas include the McKenzie River, creeks along the pipeline right of way and Douglas Creek. Equipment is hauled by snow machines which contain oil and gasoline.

Inuvik Gas Ltd. (IGL) Distribution System

The IGL Distribution System within the town of Inuvik consists of plastic polyethylene pipelines (4" and 2" diameter) that connect to commercial and residential buildings within Inuvik.

In the Fall of 2011, IGL installed as part of the distribution system a Propane Air System (PAS) at the corner of Navy Road and Muskrat Road in Inuvik for use as back-up should there be a short term disruption of natural gas deliveries (5 days at peak winter rates). A 4" pipeline connects the PAS into the pipeline distribution system within Inuvik. Heat trace and insulation was installed on IGL's customer service lines in the Fall/Winter of 2012. And as of January 2013, the PAS is the main energy supply for IGL, with the Ikhil gas pool operating as a back-up natural gas supply.

Regulatory Jurisdiction:

The IGL Distribution System is regulated by the Northwest Territories **Public Utilities Board (PUB)**. PUB does not require notification of incidents/emergencies. Incidents involving the IGL Distribution System should be reported to all other local and territorial government agencies, as appropriate depending on the type of incident.

Control Devices:

§ Distribution System block valves

§ Propane tank release valves

The IGL Distribution System consists of 27 separate isolation points within the town. Each valve location marker has been painted florescent yellow for ease of identification, and these are cleared during the winter.

IGL Distribution System Valve Locations:

Valve #	Size (inches)	Make	# Turns	Location
601	6	Kerotest Polytec	1 quarter	On Veterans Way between Waters and Franklin
602	6	Kerotest Polytec	1 quarter	On Veterans Way in front of GNWT Office
401	4	Kerotest Polytec	1 quarter	On Mackenzie between Kingmingya and Veterans Way
402	4	Kerotest Polytec	1 quarter	On Mackenzie between Ducklake and Bompas
403	4	Kerotest Polytec	1 quarter	On Gwich'in between Bompas and Breynat (by pool)
404	4	Kerotest Polytec	1 quarter	On Breynat between Kingmingya and Gwich'in (greenhouse)
405	4	Kerotest Polytec	1 quarter	On Firth between Kingmingya and Gwich'in
406	4	Kerotest Polytec	1 quarter	On Reliance between Mackenzie and Kingmingya
407	4	Kerotest Polytec	1 quarter	On Reliance between Kingmingya and Bonnetplume (Seniors)
408	4	Kerotest Polytec	1 quarter	On Centennial between Bonnetplume and Kugmallit
409	4	Kerotest Polytec	1 quarter	On Kugmallit near Adam St.
410	4	Kerotest Polytec	1 quarter	On Navy Road between Bonnetplume and Adam
411	4	Kerotest Polytec	1 quarter	On Navy Road before Marine Bypass Road
412	4	Kerotest Polytec	1 quarter	On Kingmingya between Mackenzie and Breynat
413	4	Kerotest Polytec	1 quarter	On Mackenzie near Hospital Hill
414	4	Kerotest Polytec	1 quarter	On Airport Road near Grubens Yard
415	4	Kerotest Polytec	1 quarter	On Airport Road near Finning
417	4	n/a	1 quarter	At Propane-Air System (PAS) backup Outlet riser
200	2	n/a	1 quarter	On Firth Street behind the school
201	2	Kerotest Polytec	1 quarter	On Gwich'in between Breynat and Firth (near Firth)
202	2	Kerotest Polytec	1 quarter	On Inuit between Carmichael and Firth (near Firth)
203	2	Kerotest Polytec	1 quarter	On Kingmingya between Dolphin and Navy (near Navy)
204	2	Kerotest Polytec	1 quarter	On Bonnetplume between Dolphin and Navy (near Navy)
205	2	n/a	1 quarter	Kingmingya Children First Centre
206	2	n/a	1 quarter	On Mackenzie near Hospital Parking Lot
207	2	Kerotest Polytec	1 quarter	On Mackenzie near Hospital Parking Lot
208	2	Kerotest Polytec	1 quarter	On Carn Street near Airport Road

HAZARD ASSESSMENT

Hazardous Materials within Ikhil-Inuvik

- Natural Gas
- Propane
- Methanol
- Ethylene Glycol
- Varsol
- Diesel Fuel
- Methyl Mercaptan
- Jeffcool P155 (propylene glycol)
- Carbon Monoxide
- Methane
- Light Distillate
- Gasoline
- Glycol/Antifreeze
- Essolube GMA Plus 40 (engine oil)

Safety Data Sheets (SDS) for hazardous materials are available in Section 5 of this manual and in the SDS binders located at the IGL Office, IGL Shop, Ikhil Meter Station and the Ikhil facility.

Natural gas (Ikhil) and propane (Inuvik) are the hazardous materials that pose the greatest risk in the Ikhil-Inuvik area. Natural gas is a simple asphyxiant. Because natural gas displaces oxygen, cartridge respirators provide no protection. A Self-Contained Breathing Apparatus must be used if it is necessary to enter an area with a high concentration of natural gas in the air. The natural gas at Ikhil-Inuvik does not contain hydrogen sulphide.

Natural Gas – Composition

Constituent	Fraction	Exposure Limits	Hazard
Methane	98.8%	TWA – N/A	Asphyxiate
Nitrogen	0.73%	TWA – N/A	Asphyxiate
Carbon Dioxide	0.11%	TWA - 5000ppm	Asphyxiate

Propane is a by-product of petroleum or natural gas refining which is packaged under pressure in cylinders. In its stored state, it is a liquid but is released from the cylinder or tank in a gaseous form. The boiling point of propane, the point at which the liquid converts to a gas, is

-42.2°C. If the surrounding air temperature is above this, gas will form in the upper part of the cylinder. The pressure within the container is variable depending on the temperature to which the container is exposed. The pressure increases as the temperature rises, causing expansion of the liquid. For this reason, containers are never fully charged with liquid but have a vapour space at the top of the tank to allow for normal expansion. Should the pressure rise above safe limits, a relief valve will open to allow release of the gas in a measured amount. This release is generally over in seconds. The valve reseals and remains closed until the pressure builds up again.

Ikhil-Inuvik Hazards Overview

Accidental Damage to the Pipeline:

Accidental damage to the buried pipelines due to agricultural or construction activity is unlikely; however, the route of the pipelines are marked with signs to prevent accidental damage. IGL participates in a **Call Before You Dig** program to encourage residents and businesses to locate pipelines prior to digging into the ground. Accidental damage is most likely at Douglas Creek, where the Ikhil pipeline runs aboveground for approximately one kilometre. Accidental damage may also occur in the Spring from slumping and stress on the line.

Criminal or Terrorist Activity:

Deliberate damage to the Ikhil buried pipeline or the surface facilities is a possibility. However, the Ikhil pipeline and facilities are located in a remote area, making them unlikely targets for criminals or terrorists. Damage due to criminal or terrorist activity is most likely at Douglas Creek, where the Ikhil pipeline runs aboveground for approximately one kilometre. Deliberate damage is also possible at the facility, wellsites, and the block valve near town, which are unmanned at times.

Deliberate damage to the Inuvik buried pipelines or the surface facilities is a possibility, especially at the PAS (Propane Air System) site and the block valve near town.

Fire Hazards:

Potential accidents involving natural gas include fires and explosions due to accidental or intentional release and ignition. The flash point of natural gas is -188°C. Natural gas can be ignited by sparks, open flame, welding, lightning, and hot surfaces.

When packaged under pressure, propane gas is highly flammable and has explosive potential. The boiling point of propane, the point at which the liquid converts to a gas, is -42.2°C, and the flash point is -104°C. Propane gas can be ignited by sparks, open flame, welding, lightning, and hot surfaces.

Health Hazards:

Natural gas has no known toxic effects, but it can kill by displacing the oxygen in an enclosed space.

Packaged under pressure, propane gas presents the following hazards if misused:

1. Displacement of breathable air in confined spaces (also, being heavier than air, propane will collect in low areas)
2. Contact injury from accidental exposure to a substance under high pressure. Exposure Routes for propane include inhalation, skin and/or eye contact (liquid). Symptoms of propane exposure include:
    - dizziness
    - confusion
    - excitation
    - asphyxia
    - frostbite (exposure to liquid)

Hazard Assessment for the Ikhil Pipeline

To provide a basis for emergency response planning for the Ikhil Joint Venture, a hazard evaluation was developed based on an assumed worst case scenario of a pipeline rupture, gas ignition, and resulting jet fire. The evaluation determined the distance to the 10 kW/m^2 intensity for a number of time periods. The flame length of a jet fire and resultant heat hazard zone are time varying quantities. Three times during the blowdown were selected (15 minutes, shut in, 30 minutes and 60 minutes). The above hazard quantities were determined for each one.

Methodology:

The pipeline properties are provided in Table 1, while Table 2 provides a summary of the gas composition. The pipeline has two diameters. The inner diameter of the transmission line is 157.1 mm, and the inner diameter of the gathering lines from the wellsites is 114.3 mm. Since the majority of pipe is 157.1 mm inner diameter, it was assumed that the entire length was 157.1 mm inner diameter. The assessment considered two line pressures, namely 1440 psi (MOP) and 700 psi (initial operating). Current approximate operating pressures range from 650 psi (winter) and 500 psi (summer).

Table 1. Ikhil Pipeline Characteristics

Scenario	Length [km]	Inside Diameter [mm]	Line Pressure [psi]	Line Temp. [ºC]
MOP	50	157.1	1440	0
Initial Operating	50	157.1	700	0

Table 2. Ikhil Pipeline Gas Composition

Symbol	Component	Mole Fraction
H_2	Hydrogen	0
He	Helium	0.0001
N_2	Nitrogen	0.0055
CO_2	Carbon Dioxide	0.0055
C_1	Methane	0.9911
C_2	Ethane	0.0028
C_3	Propane	0
i-C_4	Iso-Butane	0
n-C_4	n-Butane	0

It was assumed that the manual shut in occurred 15 minutes after the initial rupture. The characteristic double exponential fall off is present in both curves and the blowdown duration was predicted to be 277 minutes (4.5 hours) and 181 minutes (3 hours) for the 1440 psi and 700 psi scenarios respectively. The mass flow rates for each of the pressures were determined using the HGSYSTEM modelling package.

Using the mass flow results, the flame length of a jet fire and the dimensions of the 10 kW/m^2 thermal hazard zones were estimated. The jet fire was assumed to be oriented vertically and winds were assumed to be calm (i.e. no wind distortion of the flame). The actual calculations of heat hazard zones and flame dimensions made use of API 521 (API, 1997) and guidelines published by the American Institute of Chemical Engineers (AIChE, 1989; AIChE, 1994). The assessment did not include:

- consideration of wind deformation effects;
- the effects of jet flame tilt; and
- the inclusion of flame frustum length.

The estimated distances to the 10 kW/m^2 contour are presented in Table 3. Public lethality criteria is considered to be 1% at the 10 kW/m^2 contour.

Table 3. Hazard Summary

Scenario	Time Since Rupture [min]	Mass Flow [kg/s]	Residual Pressure [psi]	Flame Length [m]	Distance to 10 kW/m^2 [m]
MOP (1440 psi)	0	565	1440	216	137
	15	418	1026	186	119
	30	250	599	144	93
	60	111	241	96	63
Initial Operating (700 psi)	0	274	700	150	97
	15	203	498	130	84
	30	121	291	100	65
	60	54	117	67	44

The resultant hazard zone for the pipeline of 137 metres is based on a worst case scenario of maximum operating pressure and ignition immediately following rupture.

Hazard Assessment for the Ikhil Well Sites

To provide a basis for emergency response planning for the Ikhil Joint Venture wells, a hazard evaluation was developed based on an assumed worst case scenario of a wellhead failure, gas ignition, and resulting jet fire.

The hazard distance is determined below for both the 10 kW/m^2, human hazard, and 37.5 kW/m^2, equipment hazard, intensities assuming a full blowout of the wellhead casings.

Methodology:

Two wellheads were considered in the assessment. The wellhead properties for the two wells are provided in Table 4.

Table 4. Wellhead Characteristics

Well	Inside Casing Diameter [mm]	Wellhead Pressure [psi]	Flow (WAOF) [m^3/day]	Line Temp. [^oC]
J-35	139.7	400	500x10^3	0
K-35	190.5	1050	510x10^3	0

Adams Pearson Associates Incorporated provided the flow rate at each of the wellheads. The flame length of a jet fire and the horizontal dimensions of both the 37.5 kW/m^2 and 10 kW/m^2 thermal hazard zones were estimated using the above flow rates. The jet fire was assumed to be oriented vertically and winds were assumed to be calm (i.e. no wind distortion of the flame).

As was done in the pipeline hazard assessment, the heat hazard zones and flame dimensions for a wellhead failure made use of API 521 (API, 1997) and guidelines published by the American Institute of Chemical Engineers (AIChE, 1989, AIChE, 1994).

The estimated distances to both the 10 kW/m^2 and 37.5 kW/m^2 contours are presented below in Table 5.

Table 5. Wellhead Failure Hazard Summary

Well	Vertical Flame Length [m]	Distance to 10 kW/m^2 [m]	Distance to 37.5 kW/m^2 [m]
J-35	97	63.4	24
K-35	158	102	38

The resultant human hazard zones at the J-35 and K-35 wellheads are 63 and 102 metres respectively.

The estimated equipment hazard zones at the J-35 and K-35 wellheads are 24 and 38 metres respectively.

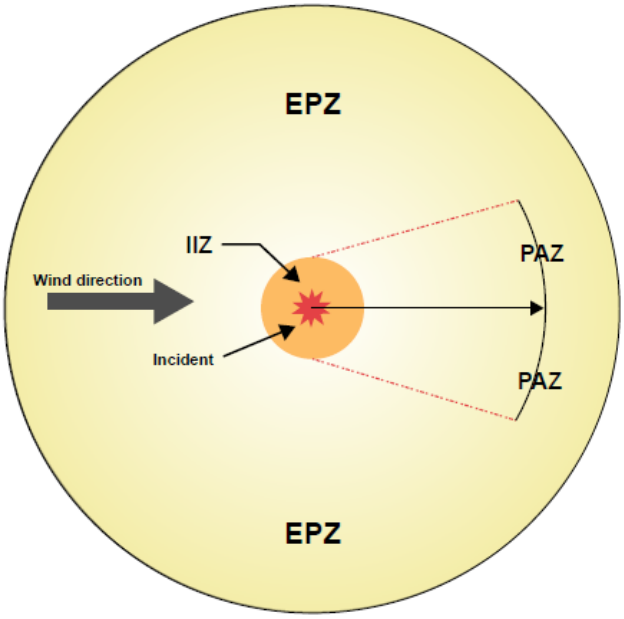
Hazard Assessment for the IGL Distribution System

To provide a basis for emergency response planning for the PAS site and Inuvik Distribution System, a hazard evaluation was developed using RMP*Comp software Version 1.07 (*see green tab - Inuvik Gas Ltd. E2 Plan*).

The worst case scenario release assumes loss of the contents of the single largest vessel containing propane, and models release rates or distances to overpressure points for that propane tank stored at the IGL PAS site. The 1 pound per square inch (psi) overpressure endpoint for this scenario is the threshold for potentially serious injuries to people or property from flying glass, falling debris and other explosion effects. The estimated distance to 1 psi overpressure is 700 metres.

An alternative scenario of BLEVE (Boiling Liquid Expanding Vapour Explosion) was also considered. BLEVE occurs when a vessel containing liquid gas ruptures and the contents ignite and form a fireball, posing heat radiation, and fragment and explosion hazards. The distance to a thermal radiation of 5 kW/m^2, at which exposure may cause second-degree burns, is 800 metres. Tank fragments resulting from a tank being exposed to a fire containing 4.5 - 9.0 tonnes of propane, causing a BLEVE, could reach up to 1600 metres from the source.

EMERGENCY PLANNING AND RESPONSE ZONES



Initial Isolation Zone (IIZ)

The Initial Isolation Zone (IIZ) defines an area in close proximity to an emergency incident, such as a hazardous gas release. Indoor sheltering may provide temporary protection due to the proximity of the release.

Protective Action Zone (PAZ)

The Protective Action Zone (PAZ) is the downwind danger area from an emergency incident. This concept is illustrated in the figure above. Immediately following a spill/release, the approximate size and direction of the PAZ can be determined using conditions at the time. Once monitoring equipment arrives, the actual size of the PAZ can be determined based on monitored conditions.

The *On-Scene Commander* at the incident site will review the details of the emergency with on-duty staff who shall assist in determining the actual size and location of the PAZ using monitored conditions and the information contained in the map provided in Section 8. The size of the PAZ will be related to the type and magnitude of the hazard.

The initiation of public protection measures in the PAZ is a coordinated response from the local authority and IGL. The local authority response in the PAZ may be limited to what is contained in the municipal emergency plan and their response capability.

Isolating the PAZ:

In an emergency that requires the isolation of the PAZ, immediately contact the police to discuss a closure area.

Only authorized personnel may enter the PAZ with the permission of the *On-Scene Commander* or the police/fire officials. If necessary, the area should be isolated with roadblocks to prevent unauthorized entry. An ongoing emergency may require the call out of additional safety personnel.

When contacting the police, the following information should be provided:

- the nature, location, and extent of the PAZ
- suggestions for the location of road blocks (if necessary)
- the number of people currently in the PAZ

If the police, fire, or other emergency services require assistance in finding the incident site, a company representative will meet them at an agreed location and guide them to the site.

Emergency Planning Zone (EPZ)

The Emergency Planning Zone (EPZ) is a geographical area surrounding each facility, including tanks, wells, the processing facility and pipelines, which could become hazardous to people, property or the environment. Ikhil-Inuvik has defined its EPZ based on hazard assessment calculations arrived at through worst case scenarios.

For the Ikhil Gas Field, the largest hazardous zone is calculated as 137 metres. Therefore, the EPZ defined for the entire Ikhil system is 137 metres. For demonstration purposes on the accompanying Ikhil map (*Section 8*), it has been represented as 150 metres. The gas in the Ikhil system is not considered 'sour' and poses no immediate threat to either the environment or the public at large. There are hunting and trapping cabins located along the east channel of the Mackenzie River. The cabin owners within the Ikhil EPZ have been identified in Section 7 of this manual. Their telephone numbers will be checked annually and updated as needed.

An area map showing the location of the facility, wells, pipelines, EPZ, and surrounding area are contained in Section 8 of this manual (UGFI Ikhil Pipeline map).

For the IGL Distribution System, the largest hazardous zone is calculated as 1600 metres. However, due to the spread of pipelines and population density within the town of Inuvik, the IGL Distribution System's EPZ covers the entire town.

A town map showing the location of the PAS site, pipelines, valves, and buildings are contained in Section 8 of this manual (IGL Inuvik Utility Pipelines map).

EMERGENCY EQUIPMENT

The following emergency equipment is available at the Ikhil facility:

- 18 wall-mounted fire extinguishers
- Two CO_2 fire extinguishers in the electrical rooms
- One 150 lb. wheeled fire extinguisher
- Four eyewash stations
- Two first aid kits (one in the tool room and one in the office)
  Three fire blankets (two in the process building and one in MCC)
- Fire and gas detectors in the process buildings
- Two SCBA units and two spare bottles
- An OSCAR spill kit containing tubs, drip trays, absorbent snakes, geotextile matting, and plastic tarps

The following emergency equipment is available in Inuvik:

- OSCAR spill kit containing tubs, drip trays, absorbent snakes, geotextile matting, and plastic tarps (IGL warehouse/shop)
- Two SCBA units and two spare bottles (IGL warehouse/shop)
- Radios (two in the IGL warehouse/shop, one in the IGL office and one in each company vehicle)
- Roadblock kits (cones & stands)

Additional OSCAR units are kept in the Inuvik area by Riverspill Response Canada Ltd. (on behalf of Mackenzie Spill Response Corp.), and IGL has a verbal agreement to access these units during an emergency.

IGL would be able to obtain mutual aid from the Inuvik Fire Department, RCMP, Hospital and NWT Fire based on verbal agreements.

ERP DISTRIBUTION LIST

Name	Title	Location	# of Copies	Manual No.
Inuvik Gas Ltd. (IGL)				
Inuvik Gas Ltd.	IGL Office	Inuvik	1	1
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<name removed>	Supervisor, Production & Gas Distribution	Inuvik	1	3
Library	IGL Office	Inuvik	1	4
Shop	IGL Warehouse	Inuvik	1	5
MCC/Office	IGL Propane Air System Site	Inuvik	1	6
Operators	Ikhil Facility	Ikhil	1	7
ATCO Midstream NWT Ltd. (ATCO Gas & Transmission)				
<name removed>	Dir. HS&E, Quality & Training	Calgary (cc. *Electronic*)	1	8
<name removed>	Sr Manager, Safety, Env., Quality & Training	Edmonton	1	9
<name removed>	Director District Operations	Calgary	1	10
Inuvialuit Petroleum Corporation				
<name removed>	General Counsel	Inuvik	1	11
Utility Group Facilities Inc. (UGFI) (AltaGas)				
Corporate Emergency Operations Centre (CEOC)		Calgary	1	12
Operations	16th Floor	Calgary	1	13
EOH&S	17th Floor	Calgary	1	14
External				
National Energy Board	Emergency Management Compliance	Calgary *(cc. Calgary)*	1	15
NWT OROGO	*<name removed>*, Senior Advisor, Technical	*Electronic*	1	16
RCMP - Inuvik	*<name removed>*	*Electronic*	1	17
Town of Inuvik	*<name removed>*, Dir. of Protective Services	Inuvik	2	18-19
NWT Health Authority	*<name removed>*, COO - Beaufort-Delta	Inuvik	1	20
NWT Public Works	*<name removed>*, Regional Boiler/Gas Inspector	*Electronic*	1	21
NWT MACA - EMO	*<name removed>*	*Electronic*	1	22
Benchmark Safety Inc.	ERP Department	Calgary	1	23

NOTE: Shaded recipients denote those receiving a confidential ERP copy

"*Electronic"* location= electronic copy of manual sent by email

Location in *italics* = electronic copy of manual sent on disc

REVISION LOG

This manual is to be reviewed on an annual basis, or as significant changes occur, by UGFI. When procedures, contacts, or telephone number are changed, UGFI or IGL will initiate corrections and circulate them to all manual holders listed on the ERP Distribution List.

DATE	COMMENTS
December 2015	Combine Ikhil Joint Venture ERP & Inuvik Gas Ltd. ERP
December 2016	Revised

IKHIL-INUVIK PERSONNEL

Name	Position	Telephone Business	Telephone Residence	Telephone Cellular
Inuvik Gas Ltd. (IGL)				
Potential Incident Commanders *(for Inuvik & Ikhil)*:				
<name removed>	General Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Supervisor, Prod. & Gas Distribution	*<# removed>*	*<# removed>*	*<# removed>*
Potential First Responders/On-Scene Commanders *(for Inuvik & Ikhil)*:				
<name removed>	Supervisor, Prod. & Gas Distribution	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Gas Prod./Dist. Operator	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Gas Prod/Dist. Operator	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Gas Prod/Dist. Operator	*<# removed>*	n/a	*<# removed>*
<name removed>	Sr. Production Operator (Contractor)	n/a	n/a	*<# removed>*
Other:				
<name removed>	Office Manager	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Administrative Assistant	*<# removed>*	*<# removed>*	n/a
Emergency #: 867-777-4427				
IGL Satellite Phone: *<# removed>*			**Sat. #:** *<# removed>*	
Board of Directors				
<name removed>	Director HS&E, Quality & Training ATCO Gas & Transmission	*<# removed>*	n/a	*<# removed>*
<name removed>	Sr. VP Utility Business Ops - Canada Utility Group Facilities Inc. (AltaGas)	*<# removed>*	n/a	*<# removed>*
<name removed>	General Counsel Inuvialuit Petroleum Corporation	*<# removed>*	n/a	*<# removed>*

Name	Position	Telephone Business	Telephone Residence	Telephone Cellular
UTILITY GROUP FACILITIES INC. (UGFI) (AltaGas)				
Potential Incident Commanders (*for Ikhil*):				
<name removed>	Director Operations, Gas	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Div VP Operations - Gas	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager (*Turin*)	*<# removed>*	*<# removed>*	*<# removed>*
Media / Communications *(for Ikhil)*:				
<name removed>	VP, Stakeholder Relations	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Advisor, External Comm.	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Advisor, External Comm.	*<# removed>*	n/a	*<# removed>*
Other:				
<name removed>	VP, Env., Health, Safety & Sustain.	*<# removed>*	n/a	*<# removed>*
<name removed>	Process Safety Manager, EHS	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Operations Engineer	*<# removed>*	n/a	*<# removed>*
	AltaGas Calgary Office: 403-691-7575			
ATCO Midstream NWT Ltd.				
<name removed>	Director District Operations ATCO Gas & Transmission	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Manager, Safety, Environment, Quality & Training ATCO Gas & Transmission	*<# removed>*	n/a	*<# removed>*
	ATCO Emergency Number: *<# removed>*			
Inuvialuit Petroleum Corporation				
<name removed>	Chair & CEO, IRC	*<# removed>*	n/a	*<# removed>*
<name removed>	Dir. Operations, Comm. & Culture	*<# removed>*	n/a	*<# removed>*

SITE SPECIFIC INFORMATION

Location	Legal Description	Telephone	Landowner
Ikhil Processing Facility	Lat – 68.45 N Long – 134.09 W	*<# removed>*	Inuvialuit Land Administration
Ikhil J-35	Lat – 68.44.35 N Long – 134.834 W	n/a	Inuvialuit Land Administration
Ikhil K-35	Lat – 68.44.43 N Long – 134.091 W	n/a	Inuvialuit Land Administration
Douglas Creek P/L Crossing	Lat – 68.33 N Long – 133.52 W	n/a	Inuvialuit Land Administration
Block Valve	Lat – 68.25 N Long – 133.43 W	n/a	Town of Inuvik / Inuvialuit Land Administration
Inuvik Meter Station (NTPC Control Room)	Lock 36, Block 36, Water Street Lat – 68.21 N Long – 133.43 W	*<# removed>*	Northwest Territories Power Corp. (NTPC)
IGL Propane Air System (PAS)	Lat – 68.3801 N Long – 133.7524 E	*<# removed>*	Akita Drilling Ltd.

EMERGENCY SERVICES

Service	Telephone	Other
Ambulance		
Advanced Medical Services (AMS)	867-777-4444	
Fire		
Inuvik Fire Department	867-777-2222	867-777-8611 (office)
NWT Forest Fire Reporting	1-877-698-3473	
Hospital		
Inuvik Regional Hospital	867-777-8000	011-8816-316-54822 (ER Satellite phone)
RCMP		
Inuvik	867-777-1111	
Local Authority		
Town of Inuvik - emergency	867-777-2222	
Wildlife		
NWT Wildlife Emergencies	867-678-0289	
Spills		
NT/NU Spill Reporting Line	867-920-8130	spills@gov.nt.ca
ERAC - LPG Emergency	1-800-265-0212	

NWT GOVERNMENT

Agency	Telephone	Other
NWT Office of the Regulator of Oil and Gas Operations (OROGO)		
· OROGO Incident Response Line	867-445-8551	
· NT/NU Spill Reporting Line	867-920-8130	spills@gov.nt.ca
NWT Environment and Natural Resources (ENR)		
· Forest Fire Reporting	1-877-698-3473	
Manager of Forests - *<name removed>* (Inuvik)	*<# removed>*	
· NT/NU Spill Reporting Line	867-920-8130	spills@gov.nt.ca
· Wildlife Emergencies	867-678-0289	
NWT Workers' Safety & Compensation Commission (WSCC)		
· Incident & Injury Reporting	1-800-661-0792	867-873-0262 (fax)
· Yellowknife Head Office	867-920-3888	867-873-4596 (fax)
NWT Municipal & Community Affairs - Emergency Measures Office		
· 24 Hour Emergency Call Line	867-920-2303	
· Beaufort-Delta Regional Office - *<name removed>* (Inuvik)	867-777-7120	
NWT Public Works and Services - Boiler & Pressure Vessel Safety		
· Inuvik Office (*<name removed>*, Regional Boiler/Gas Inspector)	*<# removed>*	*<# removed>*
· Yellowknife Office (*<name removed>*, Manager)	*<# removed>*	*<# removed>*
NWT Health & Social Services Authority		
· Beaufort-Delta Region Emergency # / Switchboard	867-777-8000	
· Beaufort-Delta Region - *<name removed>*, COO	*<# removed>*	

CANADIAN GOVERNMENT

Agency	Telephone	Other
National Energy Board (NEB)		
· Head Office (Calgary)	403-292-4800	
· Online Event Reporting System (OERS)	https://apps.neb-one.gc.ca/ers	
· Non-pipeline Incident Reporting	403-807-9473	
· Pipeline Incident Reporting (TSB)	819-997-7887	
· NT/NU Spill Reporting Line	867-920-8130	
Transport Canada		
· CANUTEC (dangerous goods emergency)	613-996-6666	*666 (via cell)
· CANUTEC (dangerous goods info)	613-992-4624	
· Transportation Safety Board (TSB) - pipeline incidents	819-997-7887	PipelineNotifications@tsb.gc.ca
Environment Canada		
· Prairies & Northern Region	780-951-8951	
Fisheries and Oceans Canada		
· Coast Guard Marine Spill Response (inland NWT)	1-800-889-8852	

LOCAL GOVERNMENTS

Agency	Telephone	Other
Town of Inuvik		
· Office	867-777-8600	867-777-2222 (emergency)
· Director of Protective Services (<*name removed*>)	<*# removed*>	
· Bylaw Officer	867-777-8616	867-678-2196 (after hrs/emergency)
Inuvialuit Regional Corporation (IRC)		
· Inuvik Office	877-777-7000	
Inuvialuit Land Administration (ILA)		
· Tuktoyaktuk Office	867-977-7100	867-977-7101 (fax)
Gwich'in Tribal Council		
· Inuvik Office	867-777-7900	867-777-7919 (fax)

AREA OPERATORS & PUBLIC FACILITIES

Operator	Telephone	Other
Beaufort-Delta Petroleum Ltd.		
· Inuvik	867-777-2311	
Northwest Territories Power Corporation (NTPC)		
· Inuvik Control Room	*<# removed>*	
· Inuvik Office	867-777-7700	
Mackenzie Delta Spill Response Corp.		
· Calgary Office (*<name removed>*)	*<# removed>*	info@mackenziespillresponse.ca
· Riverspill Response Canada Ltd. (*<name removed>*)	*<# removed>*	

Public Facility	Telephone	Other
Schools		
· East Three Secondary School (ESS)	867-777-3030	*<# removed>*
· East Three Elementary School	867-777-3040	*<# removed>*
Recreational Centre		
· Midnight Sun Complex	867-777-8640	
Airport		
· NTM - Notice to Airman - Airport Duty Manager	867-777-2467	

SUPPORT SERVICES

Service	Telephone	Other
Air Monitoring		
· AGAT Laboratories (Calgary)	403-736-2000	
· Maxxam Analytics	1-855-629-9261	
· IMG Golder (Inuvik, no equipment in Inuvik)	867-777-5997	867-777-5992 (fax)
Construction / Maintenance / Engineering		
· IRISNDT Corp (Edmonton)	780-437-4747	
· Northwind Industries Ltd. (Inuvik)	867-777-2426	*<# removed>*
· Inphase Electric & Controls (Brooks) - *<name removed>*	403-501-5557	*<# removed>*
· Status Engineering (Calgary)	403-245-4462	
· Acero Engineering (Calgary) - *<name removed>*	403-237-7388	*<# removed>*
· Canadian Petroleum Engineering Inc. (Calgary) - *<name removed>*	403-781-6381	*<# removed>*
· Alfrey Engineering Ltd. (Edmonton)	780-455-3666	
· North of 60 Engineering - *<name removed>*	250-654-0298	*<# removed>*
· Asher Engineering - *<name removed>*	403-264-2526	*<# removed>*
· McDonald Bros. Electric Ltd. (Inuvik) - *<name removed>*	867-777-2025	*<# removed>*
· Rocky's Plumbing & Heating Ltd. (Inuvik)	867-777-2579	867-678-0012 (24hr)
Environmental		
· Secure Energy	1-877-663-9769	
· IMG Golder (Inuvik)	867-777-5997	867-777-5992 (fax)
· Kavik-AXYS Inc. (Inuvik)	867-777-4548	867-777-4925 (fax)
· IEG Consultants Ltd. (Inuvik)	867-777-8520	
· Newalta Environmental Services (Calgary)	403-806-7000	1-800-774-8466 (emergency)
· Matrix Solutions Inc. (Calgary)	403-237-0606	1-877-774-5525 (spills)
Firefighters – Oilfield Specialists		
· Firemaster Oilfield Services	403-342-7500	
· HSE Integrated	1-888-346-8260	
Helicopters		
· Canadian Helicopters (emergency #)	780-429-6900	867-777-2424 (Invuik)
· Gwich'in Helicopters (Inuvik)	867-678-2270	
· Highland Helicopters (Inuvik)	867-777-5151	
Head Office (Vancouver)	604-273-6161	
OSCAR Units		
· Mackenzie Delta Spill Response Corp. - *<name removed>*	*<# removed>*	
Riverspill Response Canada Ltd. -*<name removed>*	*<# removed>*	*(for technical info)*

Service	Telephone	Other
Safety Services		
· Wotherspoon Environmental Inc. (Calgary)	403-269-4351	
· Benchmark Safety Inc. (Calgary)	403-717-2810	1-800-954-0824 (fax)
Media Contacts		
· NNSL/Inuvik Drum (Editor)	867-777-4545	inuvikdrum@nnsl.com
· CBC North (Yellowknife Office)	867-920-5400	
Inuvik Office	867-777-7615	*<email removed>*

INCIDENT RESPONSE OVERVIEW

INITIAL EMERGENCY LEVEL APPROPRIATE FOR THE MAGNITUDE OF THE INCIDENT		
Emergency Level	**Criteria**	**Action**
1 Low Impact	A **LOWER LEVEL EMERGENCY** forces normal operations to be temporarily suspended or shut down. There is no immediate hazard to the public/environment and the situation can be controlled by on-site personnel and equipment. The following conditions constitute a Level 1 Emergency: § Public concern; § Minor injury or accident; § Small, on-site spill or release; § Small ***contained*** fire or explosion; § Major field office disruption; or § Minor damage to public property. If there is any doubt as to whether a Level 1 Emergency should be declared, consult with the appropriate regulatory agency.	§ Alert the Response Team Members (company, contract, and local authority and government agency personnel) required to implement the plan. § Notify transients, area operators and members of the public within the PAZ by telephone or visitation and inform them of the potential emergency situation. Priority will be directed to those located immediately downwind and those deemed sensitive or requiring assistance. § Alert a mobile air monitoring unit to deploy into area. § Mobilize company personnel to the Reception Centre if applicable. § Alert and mobilize emergency support services as required. **AT THIS LEVEL, EVACUATION OF THE PAZ IS A VOLUNTARY ACTION**.
2 Moderate Impact	A **MEDIUM LEVEL EMERGENCY** causes a potential or limited hazard to the public/environment or has the potential to extend beyond the boundaries of company property. Operational control is maintained but the emergency could worsen and threaten the general public or the environment. The following conditions constitute a Level 2 Emergency: § Controlled gas or liquid hydrocarbon release; § Bomb threat; § Serious fire or explosion; § Serious injury or accident; § Significant damage to public property; or § Significant media interest.	§ Inform the Response Team Members of the change to a Level 2 Emergency condition. § Notify residents and members of the public within the PAZ and request evacuation of the area, providing assistance as required. § Perform surveys of the PAZ and request all persons evacuate the area. § Ensure a mobile air monitoring unit is in the area and has commenced ambient air quality monitoring at the nearest downwind, unevacuated area. § Establish roadblocks to restrict access into the area. § Assemble the ignition equipment and team(s). **EVACUATION OF THE PUBLIC WITHIN THE PAZ MUST BE INITIATED AT THIS LEVEL.**
3 High Impact	A **HIGH LEVEL EMERGENCY** occurs when safe operating control has been lost, cannot be controlled immediately by on-site personnel and equipment, has extended beyond the boundaries of company property or poses an immediate or major hazard to the public/environment. The following criteria constitutes a Level 3 Emergency: § Uncontrolled gas or liquid hydrocarbon release; § Major fire or explosion; § Accident involving a fatality; or § Territorial or national media interest.	§ Inform the Response Team Members previously contacted of the change to a Level 3 Emergency condition. § Perform surveys of the PAZ to verify evacuations have been completed. § Verify roadblocks have been established. § Continue air monitoring downwind of the release. § Ignite the uncontrolled or partially controlled gas flow if the ignition criteria have been met. **EVACUATION AT THIS LEVEL IS MANDATORY.**

Incident Response

Responses	Incident Classification*			
	Alert	**Level 1 emergency**	**Level 2 emergency**	**Level 3 emergency**
Communications				
Internal	Discretionary, depending on IGL policy.	Discretionary notification of off-site management (ATCO), except when Corporate reputation's at risk.	Notification of off-site management (ATCO).	Notification of off-site management (ATCO).
External Public	Courtesy, at IGL discretion.	Notification of affected members to the public as necessary.	Planned and instructive in accordance with the ERP communication plan.	Planned and instructive in accordance with the ERP communication plan.
Media	Reactive, as required.	Reactive, as required.	Proactively work with the media, as required.	Proactively work with the media, as required.
Government	Reactive, as required. Notify lead government agency if public or media is contacted.	Notify lead government agency immediately. Notify local and aboriginal authority (based on planning arrangement) and health authority if public or media is contacted.	Notify lead government agency immediately and local, aboriginal and health authorities.	Notify lead government agency immediately and local, aboriginal and health authorities.
Actions				
Internal	On site, as required by IGL.	On site, as required IGL. Initial response undertaken in accordance with the ERP.	Predetermined public safety actions are under way. Corporate management team alerted and may be appropriately engaged to support on-scene responders.	Full implementation of incident management system.
External	On site, as required by IGL.	Potential for multi-agency (municipal, territorial or federal) response.	Potential for multi-agency (municipal, territorial or federal) response.	Immediate multi-agency (municipal, territorial or federal) response.
Resources				
Internal	Immediate and local. No additional personnel required.	Establish what resources would be required.	Establish additional resources and personnel required.	Significant resources required.
External	None	Begin to establish resources that may be required.	Possible assistance from government agencies and external support services, as required.	Assistance from government agencies and external support services, as required.

* see Section 1 - Incident Classification Matrix

COMMUNICATIONS

IGL has a 24-hour emergency telephone number (867-777-4427). Telephone numbers for IGL, UGFI, and ATCO staff and contractors having emergency response responsibilities for the Ikhil-Inuvik area are listed in Section 2. Other project personnel are available to assist when requested by the *Incident Commander*.

Group Notification

Effective internal and external communication with the public, directly and through the media, and regulatory and/or other government agencies is essential to ensure the effective management of an emergency event. Once the level of emergency has been determined, external and internal emergency notifications and responses will be made following IGL's and UGFI's response plan.

This Policy sets out the following communication process to be followed for emergency events, as per ATCO Policy A-22. Charts outlining the communication flow are also included in this section. Refer to *Figure 1. Emergency Response Team Initial Communications Flowchart,* and *Figure 2. Internal Incident Reporting/Communication Flowchart*

Communication Guidelines:

i. IGL and UGFI shall include in its response plan a process to activate and establish a prompt communication channel to ATCO Corporate Communication.
ii. All individuals who are assigned the responsibility to activate the communication channel shall be familiar with the communication procedure. All Alerts and Emergencies are to be reported as soon as practicable to ATCO and its partners.
iii. ALL Level 2 and 3 incidents are to be communicated, in a timely manner, to ATCO.
iv. All news releases and timelines must be reviewed by ATCO Corporate Communications (for Inuvik), or by the UGFI Communications Team (for Ikhil) prior to being issued.
v. Management of IGL shall assume the lead role in dealing with an emergency. For Inuvik, as per ATCO A-22, members of the ATCO Crisis Management Committee will determine whether a meeting of the Committee is to be convened. The members of the ATCO Crisis Management Committee may act in an advisory and support capacity, or as they determine based on the nature and magnitude of the event. For Ikhil, UGFI will

act in an advisory and support capacity, or as they determine based on the nature and magnitude of the event. ATCO's and UGFI's primary focus in a crisis situation is to manage long term and strategic outcomes, identifying and dealing with corporate issues such as policy guidance, business interruption, insurance, funding, investor, partner and client relations, legal review and other corporate matters.

vi. ATCO has the authority at any point in time to take "full control" of any crisis situation related to Inuvik, and UGFI may take control of any crisis situation related to Ikhil.

Communication Centres

If the ERP is activated, various company communication centres shall be established:

§ **On-Site Command Post (OSCP)**: An operations centre established at the incident site by the *On-Scene Commander* to manage control procedures and coordinate air monitoring, evacuation and roadblock procedures within the PAZ.

§ **Regional Emergency Operations Centre (REOC)**: Should conditions at the emergency site warrant, an REOC will be established at a more appropriate location to support personnel at the OSCP. Depending on the severity of the emergency, UGFI corporate personnel and representatives from the NEB, OROGO and other government agencies may be present at the REOC to support IGL personnel.

§ **Corporate Emergency Operations Centre (CEOC):** A CEOC will be established at the IGL head office for most emergencies (or offsite at UGFI or ATCO offices) to accommodate the corporate emergency response team including the *Incident Commander* and other essential response personnel.

§ **Reception Centre**: A reception centre will be established by company representatives. It will be established to receive evacuees should evacuation procedures be implemented. The reception centre will be located at a site determined by the *On-Scene Commander* should it be deemed necessary.

§ In addition to the above company communication centres, the municipal government may establish a **Municipal Emergency Coordination Centre (MECC)** and the NEB or Government of the Northwest Territories (GNWT) may establish their own **Emergency Coordination Centre(s) (ECC)**. The ECCs are government control centres set up at suitable locations to manage the larger aspects of the emergency including public relations and the provision of information and advice to affected citizens, agencies and the media. IGL, UGFI and/or ATCO may provide representatives to the ECCs to liaise

between the company and government officials and to assist with public and media communications.

Figure 1. Emergency Response Team Initial Communications Flowchart shows the sequence of initial emergency communications to notify response personnel, government agencies and emergency support services when activating the ERP.

All odour complaints, public concerns or abnormal operating situations reported to, or observed by, company/contract personnel shall be documented on the Initial Notification Report (Section 6) and investigated and acted upon without delay. The most senior on-site personnel will investigate the initial report. They must follow safe work practices and procedures and record all pertinent information on an Incident Log (Section 6).

Approach a hazardous condition with a second person and with the proper Personal Protective Equipment (e.g. SCBA unit). Always employ the buddy system, and, if necessary, await the arrival of additional personnel and equipment.

Once the location and magnitude of the incident has been determined, the most senior on-site IGL representative will assume the duties of the *On-Scene Commander*. They will contact an *Incident Commander* and activate the ERP if the situation warrants. Additional contacts are then made to fully implement the ERP.

IGL will supply the communication systems and equipment required to provide effective communications between the OSCP and:

- Evacuation Personnel/Rover(s) and Roadblock Personnel
- Mobile Air Monitoring Unit(s)
- REOC
- CEOC
- MECC
- ECC
- Reception Centre

Cellular telephones will be located in key on-site personnel vehicles. Base radio stations will be located at the OSCP and REOC (if established). Portable radios with long range capabilities

and on a common frequency with the base stations will be available for use by roadblock, evacuation and air monitoring personnel.

The emergency communications structure is designed for a Level 2 or 3 Emergency, or a Level 1 Emergency that risks reputational damage to the owners. The goal is to enable local communication response to the community, media and other stakeholders with communications support from UGFI and/or ATCO.

It is the responsibility of the *Incident Commander* to keep all owners (Inuvialuit Petroleum Corporation, UGFI, and ATCO) briefed.

Company and contract employees and sub-contractors must not volunteer information or opinions regarding any emergency situation. If approached by the public or media, refer individuals to the designated *Media & Communications Coordinator*. The media should be advised that a statement will be issued once all information has been received, reviewed and verified. Prior to any media release, IGL, ATCO, and/or UGFI will coordinate with government agencies in order to provide consistent and accurate information to the public.

If an ECC is established by the lead regulatory agency, all public and media inquiries are to be directed to the IGL, UGFI or ATCO representatives and government personnel located at the ECC.

Figure 1. Emergency Response Team Initial Communications Flowchart

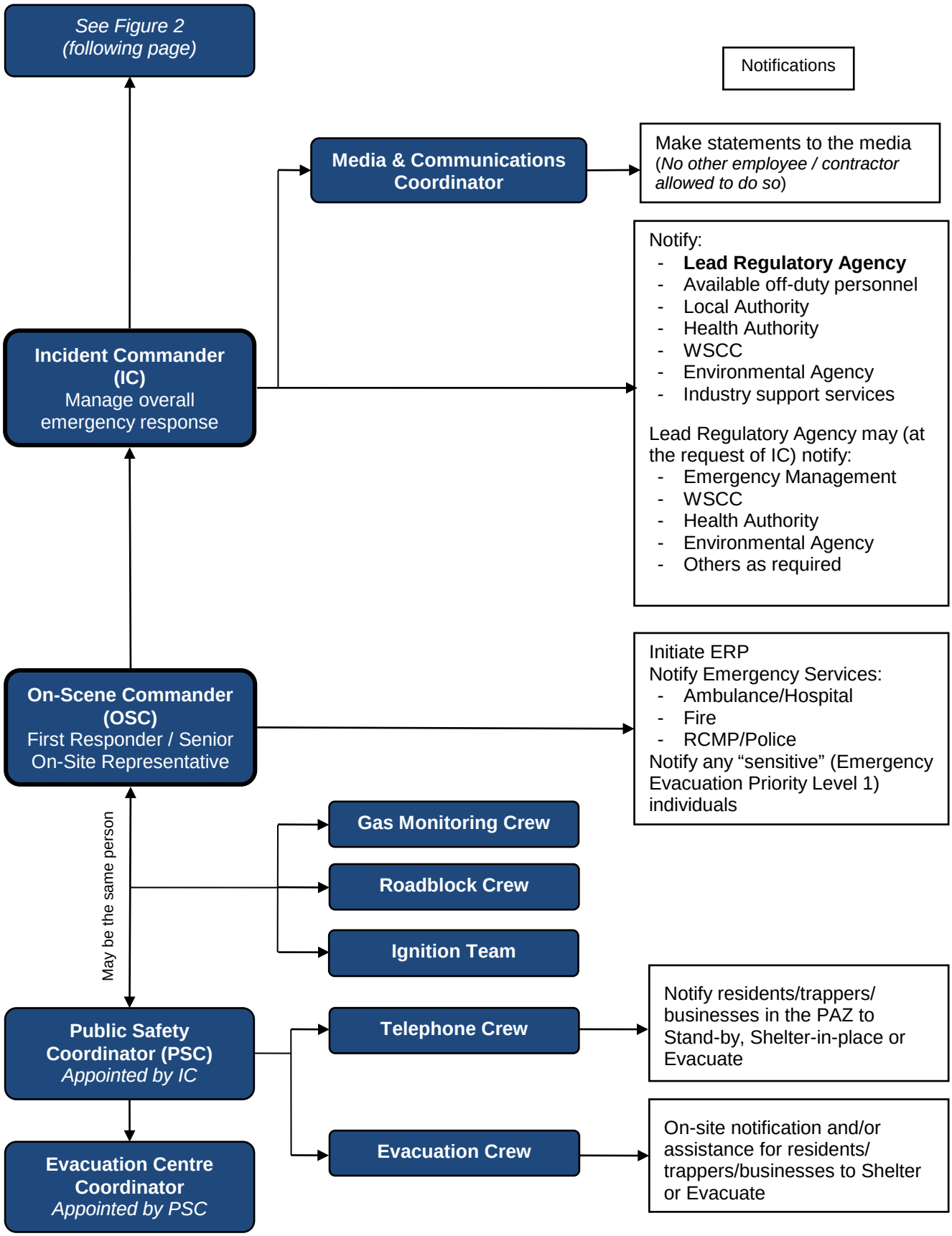
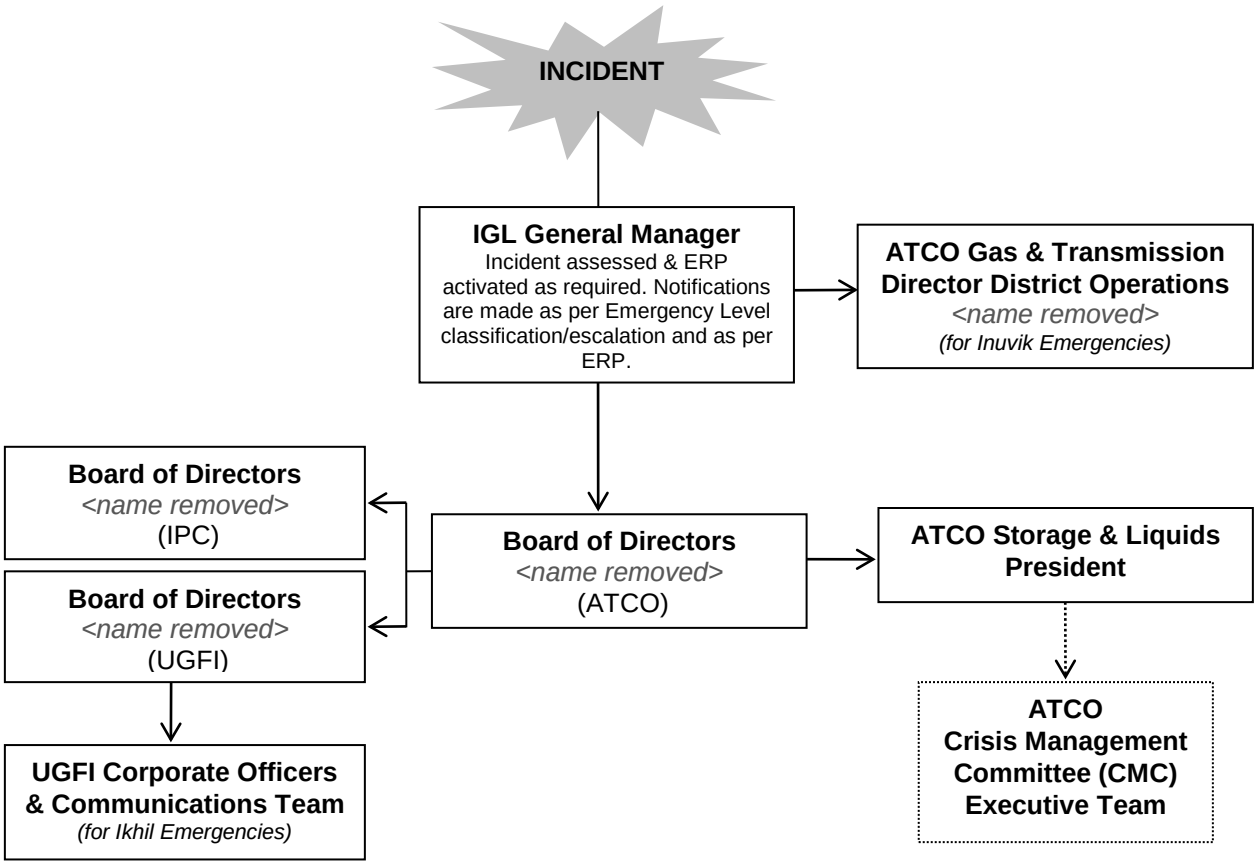


Figure 2. Internal Incident Reporting / Communication Flowchart



As per ATCO Policy A-22:
Discretionary notification by IGL to the Board of Directors at Level 1 EXCEPT when emergencies have the potential to impact corporate reputation. Notify on ALL Level 2 & 3 Emergencies.
If after hours or an official cannot be reached directly, contact ATCO 24-hour emergency number *<# removed>*

INJURIES

§ The first responder is the *On-Scene Commander* until relieved by a more senior IGL employee.

§ Secure the area to prevent further injuries.

§ If the injuries are serious, the *On-Scene Commander* will contact an *Incident Commander* from the personnel list in Section 2.

§ If necessary, the *On-Scene Commander* or *Incident Commander* will contact local emergency services, such as EMS or the RCMP, and request assistance.

§ The *On-Scene Commander* is authorized to contact the police and emergency services before an *Incident Commander* is established if circumstances require immediate action.

§ Do not move a seriously injured person unless it is necessary to prevent further injury. Administer first aid and wait for medical assistance to arrive.

§ Do not leave an injured person alone.

§ In serious cases, the *Incident Commander* will notify the appropriate government agencies, including the lead regulatory agency. In the NWT, accidents causing serious bodily injury (worker admitted to hospital for >24 hours) must be reported to the NWT Workers' Safety & Compensation Commission (WSCC) as soon as possible.

§ The next-of-kin should be notified in person when someone is seriously injured. If possible, two people should handle the notification.

§ The Supervisor will conduct an incident investigation and submit a written report to the IGL General Manager.

FATALITIES

Fatalities will be treated as serious injuries until a medical doctor has declared the victim to be deceased. The police and other government agencies will investigate workplace fatalities. IGL employees will cooperate fully with these investigations. It is essential that the accident scene be left undisturbed until the investigation is complete unless it is necessary to move something in order to rescue an accident victim or prevent further injuries.

§ The first responder is the *On-Scene Commander* until relieved by a more senior employee. The *On-Scene Commander* is authorized to contact the police and emergency services before an *Incident Commander* is established if circumstances require immediate action.

§ The *On-Scene Commander* will contact an *Incident Commander* from the personnel list in Section 2.

§ Do not move a seriously injured person unless it is necessary to prevent further injury. Administer first aid and wait for medical aid to arrive.

§ Do not leave an injured person alone.

§ In serious cases, the *Incident Commander* will notify the appropriate government agencies, including the lead regulatory agency. In the NWT, accidents causing serious bodily injury (including death) must be reported to the NWT Workers' Safety & Compensation Commission (WSCC) as soon as possible.

§ The next-of-kin must be notified in person and this must be coordinated with the *Media & Communications Coordinator* and the police. The *Incident Commander* will notify the appropriate government agencies.

§ Notification in cases where the victim is a member of the general public will be referred to the local police.

§ If the victim is an employee of a contractor, the contractor should handle notification.

FIRES & EXPLOSIONS

Natural gas and propane are highly flammable. Sparks, open flame, welding, lightning and hot surfaces can ignite them. Depending on the circumstances, fires may be considered **Level 1, Level 2 or Level 3** emergencies. The Emergency Response Plan must be activated for **Level 2 or Level 3** emergencies:

§ The senior person on-site becomes the *On-Scene Commander*.

§ Contact an IGL supervisor or the General Manager, who then becomes the *Incident Commander*. For larger scale emergencies, the *Incident Commander* may be a UGFI representative (for Ikhil), or an ATCO representative (for Inuvik).

§ The *On-Scene Commander* is authorized to contact the police and emergency services before an *Incident Commander* is established if circumstances require immediate action.

§ DO NOT attempt to fight a fire that cannot be managed with the available equipment.

NATURAL DISASTERS

Natural disasters are events that threaten lives, property, and other assets. Often, natural disasters can be predicted. They tend to occur repeatedly in the same geographical locations because they are related to weather patterns or physical characteristics of an area. Natural disasters can take the form of floods, earthquakes, tornadoes, blizzards, hail, lightning, windstorms, forest fires and grass fires, etc. Depending on the damage after the disaster has occurred at the facility, natural disasters may be considered **Level 1, Level 2 or Level 3** emergencies. The Emergency Response Plan must be activated for **Level 2 or Level 3** emergencies:

§ The senior person on-site becomes the *On-Scene Commander*.

§ Contact an IGL supervisor or the General Manager, who then becomes the *Incident Commander*. For larger scale emergencies, the *Incident Commander* may be a UGFI representative (for Ikhil), or an ATCO representative (for Inuvik).

§ The *On-Scene Commander* is authorized to contact the police and emergency services before an *Incident Commander* is established if circumstances require immediate action.

§ Depending on the circumstances after the natural disaster, other response guidelines may come into effect (i.e. Fires & Explosions, Injuries, Environmental Damage, and Gas Releases etc.). In the event of a second emergency at the facility, personnel will follow the applicable procedure found in this section.

§ Proactive planning will help to minimize the damage due to a natural disaster. IGL and UGFI employees and contractors conduct planning sessions as part of their safety meetings to discuss the relevant natural disasters that may affect the facilities and surrounding area and the proper procedures to follow for each scenario.

ENVIRONMENTAL DAMAGE

Depending on the circumstances, environmental spills and releases may be considered **Level 1, Level 2 or Level 3** emergencies. The Emergency Response Plan must be activated for **Level 2 and Level 3** environmental emergencies.

§ The senior person on-site becomes the *On-Scene Commander*.

§ Contact an IGL supervisor or the General Manager, who then becomes the *Incident Commander*. For larger scale emergencies, the *Incident Commander* may be a UGFI representative (for Ikhil), or an ATCO representative (for Inuvik).

§ The *On-Scene Commander* is authorized to contact regulatory agencies and support services before an *Incident Commander* is established if circumstances require immediate action.

§ Spills, both on and off lease must be recorded and reported to the NT/NU Spill Reporting line as per the *Reportable Quantities for NWT Spills* table below. The NT/NU Spill Reporting contractor will then forward the report to the appropriate government agencies, including the lead regulatory agency.

§ Immediately reportable spills are defined as a release of a substance that is likely to be an imminent environmental or human health hazard or meets or exceeds the volumes in the table below. All other releases, for which there is no loss of control, are not considered immediately reportable spills and can be handled as part of ongoing operations and maintenance.

§ All releases of harmful substances, regardless of quantity, are immediately reportable where the release is near or into a water body, is near or into a designated sensitive environment or sensitive wildlife habitat, poses an imminent threat to human health or safety, or poses an imminent threat to a listed species at risk or its critical habitat.

Reportable Quantities for NWT Spills

TDG Class	Substance	Immediately Reportable Quantities for NT/NU 24-Hour Spill Reporting
1.0 2.3 2.4 6.2 6.2 7 None	Explosives Compressed gas (toxic) Compressed gas (corrosive) Infectious substances, Sewage/Wastewater Radioactive Unknown substance	Any amount
2.1 2.2	Compressed gas (flammable) Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
3.1 3.2 3.3	Flammable liquid	≥ 100 L
4.1 4.2 4.3	Flammable solid Spontaneously combustible substances Water reactant	≥ 25 kg
5.1	Oxidizing substances	≥ 50 L or 50 kg
5.2 9.0	Organic peroxides Environmentally hazardous	≥ 1 L or 1 kg
6.1 8.0 9.0	Toxic substances Corrosive substances Misc. products, substances or organisms	≥ 5 L or 5 kg
9.0	PCB mixtures of 5 or more parts per million	≥ 0.5 L or 0.5 kg
None	Other contaminants, e.g., crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater, etc.	≥ 100 L or 100 kg
None	Sour natural gas (i.e., contains H_2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more

Note: It is policy that <u>all spills</u> will be immediately reported to the IGL General Manager, and then affected landowners, and the Board of Directors. A record of all spills will be kept on site should an inspector request it.

MOTOR VEHICLE ACCIDENTS

Depending on the circumstances, motor vehicle accidents may be considered **Level 1, Level 2 or Level 3** emergencies. The police must be contacted and the Emergency Response Plan activated for serious accidents involving company employees or vehicles.

§ The first responder is the *On-Scene Commander* until relieved by a more senior employee. If there are serious injuries, the *On-Scene Commander* will contact an *Incident Commander* from the list in Section 2.

§ If necessary, the *On-Scene Commander* or *Incident Commander* will contact local emergency services, such as EMS or the RCMP, and request assistance.

§ The *On-Scene Commander* is authorized to contact the police and emergency services before an *Incident Commander* is established if circumstances require immediate action.

§ All accidents where there is an injury, fatality or damage that appears to be in excess of $1,000 must be reported to the police.

§ Ask for and record the following information for non-company vehicles involved in the accident:

- driver's name;
- telephone number;
- address;
- driver's license number;
- insurance company and insurance policy number;
- year, make and model of vehicle; and
- vehicle license number.

§ Record the name, address and telephone number of witnesses.

§ Injuries resulting from company vehicle accidents must be reported to the WSCC if the worker requires medical attention. This does not apply if the worker was using the vehicle for personal business.

§ An Incident Investigation Report must be completed for all motor vehicle accidents.

THREATS

Although many threats have proven to be hoaxes, it is company policy that if a threat is received at any of its operations it will be assumed that the threat is real until the police have investigated and determined otherwise. Depending on the circumstances, threats will be considered **Level 2 or Level 3** emergencies. The RCMP must be contacted and the Emergency Response Plan activated if a threat is received. If a threat is received by telephone:

- Remain calm.
- Be courteous to the caller.
- Listen carefully to everything you are told.
- Do not interrupt the caller.
- Obtain as much information as possible from the caller.
- Record the information on the Threat Report (Section 6).
- The senior person on site becomes the *On-Scene Commander*.
- Contact a senior management representative, who becomes the *Incident Commander*.
- The *On-Scene Commander* is authorized to evacuate the site or contact the local police before contacting an *Incident Commander* if he or she believes that circumstances require immediate action.

Bomb Threats

- Never try to move or disarm an object that may be a bomb. This is a job for experts.
- Workers may be asked to assist the police if a bomb threat is received. Generally, this assistance would be limited to searching the site for suspicious objects and unlocking doors and cabinets. The decision to assist the police in the search for a bomb is voluntary. IGL does not expect its employees to assist if they prefer not to do so.

WILDLIFE

While in areas where there may be wildlife, take the following precautions to avoid contact:

- Be aware of your surroundings. Ensure that natural sounds, like flowing water, do not mask the sound of your approach. Make plenty of noise when approaching blind corners, dense shrubs and streams, and when walking into the wind.
- Leave the area immediately if you come across any type of animal kill.
- Keep fences closed to prevent wildlife from entering a site.
- Ensure all food refuse is in an animal-proof container if not fenced-in.
- Do not feed wildlife.
- While outdoors, consider having available insect repellant, sunscreen, bear spray and an EpiPen.

During a wildlife encounter:

- Stay calm. DO NOT RUN. Back away slowly. If your vehicle is nearby, get in as quickly as possible.
- For predatory animals (such as cougars, wolves or coyotes), make yourself appear as large as possible, yell, stomp your feet and throw objects at it (not food). If the animal makes contact, fight back and use bear spray if available.
- For bear encounters, back away slowly, talk softly and don't look it in the eye. If there are cubs in the area, move away from them. Make every effort to leave the bear an escape route. Climbing a tree is an option but offers no guarantee of safety (black bears are excellent climbers, and grizzlies have also been known to climb trees).
- During a bear charge, stand your ground and identify yourself as human by speaking in a calm voice. Avert your eyes – a direct stare is perceived as a threat. If the bear continues its charge and gets closer, you can try to intimidate it by making direct eye contact, jumping up and down and shouting. Use bear spray if available.
- While driving, pay attention to all wildlife warning signs and drive accordingly. Scan the road and ditches ahead for animals, especially when travelling at dawn or dusk. Follow the response guidelines for motor vehicle accidents, found in this section, if you hit an animal with your vehicle.
- Follow the response guidelines for injuries or fatalities, found in this section, if an encounter with wildlife leads to either.
- Contact the appropriate wildlife office if you encounter an aggressive animal.

PANDEMIC PLAN

By preparing for and managing a possible outbreak of influenza or other pandemic, Inuvik Gas Ltd. can ensure the continuity of the business and the health of their employees. This document is a tool designed for all IGL staff to continue to provide customers and shareholders with the service they expect and also maintain the wellbeing of themselves and their families.

Risk Assessment

Inuvik Gas Ltd. performs their business in a variety of locations within the town of Inuvik. The major areas of business are as follows:

- Inuvik Gas Ltd. Office – located in the Inuvialuit Regional Corporation (IRC) building
- Meter Station – located at the Northwest Territories Power Corp. power plant
- Warehouse – located on NT road in Inuvik
- Customer properties – various locations
- Propane Air System facility (PAS)
- Ikhil Facility – located in the Caribou Foothills

The Meter Station, PAS and Warehouse can be "closed" to the general public. This would mean that no one other than the IGL staff would have access to our facilities and even that would be on a "as need basis." The Ikhil Facility is located 50 km north of Inuvik; therefore, its very location provides isolation from any possible pandemic.

The two areas which pose the most risk to IGL staff during a pandemic are the office and customer properties.

Preventative Maintenance

Viruses can live up to 8 hours on soft surfaces and 2 days on hard surfaces. Basic rules of hygiene are best followed in the prevention of a pandemic. This would include washing your hands with soap and/or hand sanitizer frequently, and cough into your elbow instead of your hand. Each IGL vehicle has tissues and hand sanitizers - use them!

Plan to Keep the Business Running

Office

Should the IRC building be shut down or IGL office staff be unavailable, the office functions would be postponed until such time as everyone is healthy and back to work. This would include things like customer payments, processing of invoices and customer on/offs. IGL office staff will be able to access their files and work via laptop computers. This would allow staff to remain at home but still have the ability to perform some office functions.

Distribution Operations

Distribution functions that could be affected during a pandemic would include meter readings, customer on/offs, emergency calls and hotline responding. Emergency calls and hotline response would still need to be performed. If IGL distribution becomes short staffed, then one of the mechanical contractors in town or an ATCO Gas Distribution Foreman from Alberta will be contacted.

Production Operations

Production functions that could be affected during a pandemic would include daily reads at the Meter Station or an emergency at Ikhil. Production staff would be able to sled out to Ikhil should the need arise, or perform whatever functions are required from the IGL office. Additional staff is available from Alberta in an emergency situation.

Line of Communication

If the IGL office was shut down, maintaining a line of communication between all staff would be a priority. All staff should have an up to date phone list. A daily phone call to the supervisor would ensure that all of the staff are doing okay. Staff members who live by themselves are especially vulnerable as they have no outside help. Requesting co-workers to pick up medication or groceries would help these employees out.

Supervisors would be expected to pass along any concerns from employees to the General Manager and give regular updates of operation status and employee statuses. This information could then be passed along to the Board of Directors.

IGL Staff Wellness

IGL recognizes the importance of healthy employees and their families; therefore they have adopted a get well policy. This means if you are sick, please stay home! Most functions of the IGL business will either run just fine while employees are recuperating at home or will wait until their return to work. Paperwork required for things like payroll, invoicing or reports can either be done from your home or simply wait until your return. That being said, IGL would also like to know that should something come up and IGL needs to contact you that you do everything possible to help out. This could mean something as simple as sending an email to someone while you are at home sick, or pick up medicine for a sick co-worker. With everyone cooperating during a pandemic, IGL can ensure that our employees and their families get healthy and also ensure that IGL continues to provide its essential service to the people of Inuvik.

GAS RELEASES

The senior on-site person is the *On-Scene Commander*. If a release of gas occurs from a pipeline or the plant the following actions should be taken:

§ Account for all personnel on site at the time.

§ Determine the nature of the release:

- What is the source of the release?
- What is the volume of the release?
- Have any on-site personnel been injured?
- Are the on-site personnel at risk?
- Is the public at risk?
- Can the available personnel control the release or is assistance required?
- Is it necessary to begin evacuation of residents?

§ If the emergency is a **Level 1, 2 or 3** emergency, activate the Emergency Response Plan. Immediately notify senior IGL management to establish an *Incident Commander* and report the release via the NT/NU Spill Reporting Line. The *On-Scene Commander* is authorized to contact the police and emergency services before an *Incident Commander* is established if circumstances require immediate action.

§ Begin corrective action to control the release. The flow of gas to the release area must be shut off. If necessary, the gas line should be shut down, well owners contacted to shut in their wells and customers contacted.

§ Determine the extent of the Protective Action Zone (PAZ). **Evacuation must begin when a Level 2 emergency is declared.** Evacuation should begin with residents nearest or downwind of the release site.

§ Contact a service company to conduct continuous air monitoring for **Level 1, Level 2 and Level 3** gas releases.

§ Secure the incident site. For **Level 2 and 3** emergencies, begin establishing roadblocks to prevent public access to the area. Contact the RCMP immediately if there is a gas release in the town or near a public road.

§ If the release is gas that may need to be ignited, refer to the following sections: *Ignition Criteria*, *Ignition Decision Flowchart* and *Ignition Procedure Flowchart*.

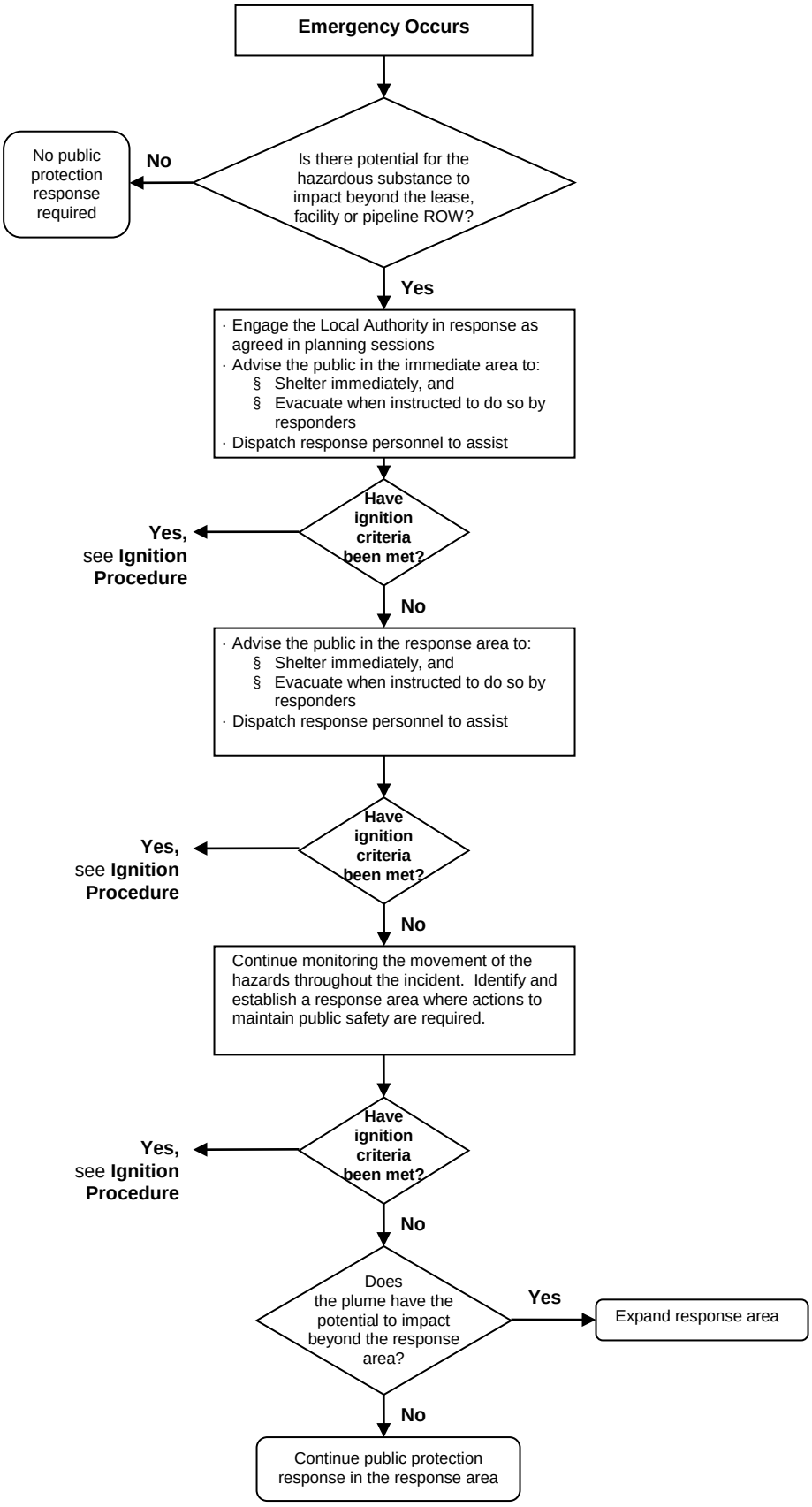
§ At a **Level 1** emergency, begin notifying any residents deemed "sensitive" (Emergency Evacuation Priority Level 1) within the PAZ n the event they wish to evacuate. IGL must provide transportation and temporary accommodation where needed. EVACUATION IS VOLUNTARY – company personnel do not have the authority to order people to evacuate. The lead government agency or the RCMP should be notified immediately if any residents are unwilling to evacuate.

§ At a **Level 2** emergency, personnel, under the direction of the *Incident Commander*, will begin to make contact with residents in the PAZ to alert them to the gas release and the potential need for evacuation or shelter (see *Shelter Procedure* and *Evacuation Procedure*). If circumstances do not justify immediate evacuation, residents should be asked to remain indoors and close doors and windows. It is the responsibility of the *Incident Commander* to ensure the residents are provided with updates as the emergency situation changes.

§ On the following page is a schematic of the public safety measures for a hazardous gas release in the form of a decision tree.

NOTE: Significant incidents must be reported immediately by phone to the lead regulatory agency. And gas releases of reportable quantities (*see Section 3 - Environmental Damage*) are to be reported through the NT/NU Spill Reporting Line.

Public Safety Measures for Hazardous Gas Releases



IGNITION CRITERIA

Ignition of gas may be necessary if people or the environment are at risk due to an uncontrolled release. If ignition is necessary because there is insufficient time to evacuate the PAZ, the *On-Scene Commander* is authorized to ignite the gas release and his decision will be fully supported by IGL. Ignition must occur within 15 minutes if any of the ignition criteria are met.

Sweet Gas or Condensate Ignition Criteria

If time permits, the decision to ignite a gas release will be made by the senior manager in consultation with the *Incident Commander* and the *On-Scene Commander*. It is recommended that the regulatory agency with jurisdiction be consulted prior to ignition. Ignition is mandatory if any of the following conditions exist:

§ An immediate threat to human life exists and there is insufficient time to evacuate the PAZ.

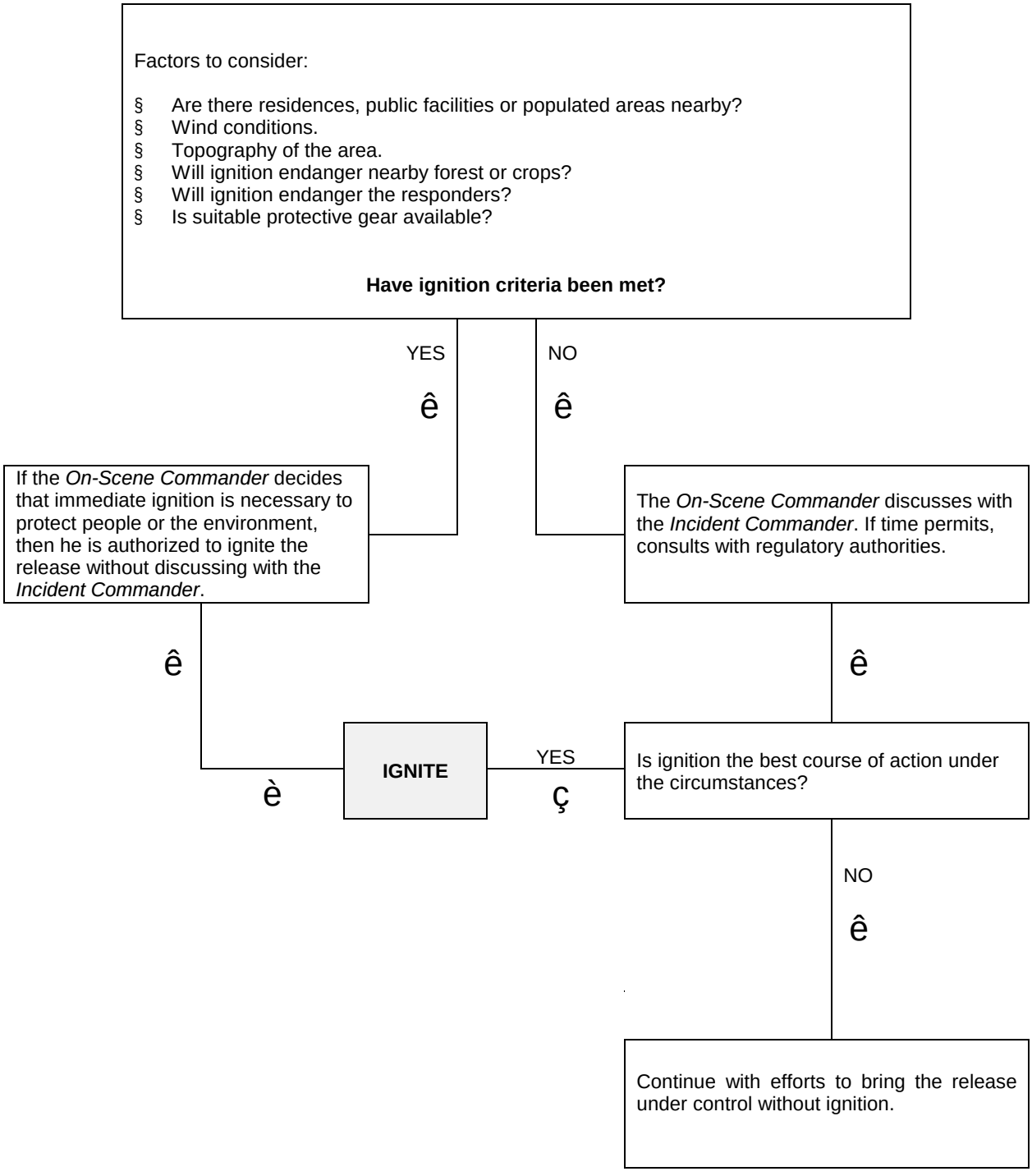
§ An immediate and serious threat to the environment exists.

Ignition Equipment

The ignition team should have the following equipment available before attempting to ignite a gas release:

- flare pistols and flares
- flame-retardant coveralls
- hearing protection
- hard hats with face shields and flame-retardant liners
- positive pressure self-contained breathing apparatus with 30 minute air supply
- safety harnesses (front D-Ring) or safety belts (rear D-Ring) with 30 metres of flame-retardant ropes
- flammable gas detector
- communications (radios and/or cellular phones) - cell phones cannot be used within 100m of the vapour plume

IGNITION DECISION FLOWCHART



IGNITION PROCEDURE FLOWCHART

If the decision is made to ignite a gas release, the *On-Scene Commander* will coordinate and supervise the ignition.

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Prior to the ignition:
- § Install manned roadblocks to prevent access to the hazard area.
- § Evacuate all non-essential personnel.
- § Designate an ignition team of two qualified people.
- § Ensure the ignition team has the appropriate protective gear.
- § The *Incident Commander* will discuss the ignition procedure with the ignition team.
- § Select a position from which the ignition will be attempted.
- § Selection of the ignition position should ensure a safe escape route.
- § Monitor the ignition position for the presence of combustible gas.
- § If time permits erect a windsock and streamers.

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The ignition position must:
- § Allow for a safe escape route.
- § Be free of combustible gas.
- § Be upwind of the vapour plume.
- § Be a minimum of 300 metres from the outer edge of the vapour plume.

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Attempt the ignition with a flare pistol. Aim for the ground at the outer edge of the vapour plume where the gas/air mixture is most likely to be in the combustible range.

Ignition Successful?

YES ê

Advise the *Incident Commander* that the ignition has been successful. Continue to maintain roadblocks and monitor downwind for combustible gas. Assist the fire crews.

NO ê

Attempt ignition again – move closer if necessary, but no nearer to the vapour plume than 100 metres. Monitor for combustible gas at the new position before attempting ignition.

SHELTER PROCEDURE

If an emergency exists that threatens the general public it may be necessary to advise residents in the PAZ to shelter themselves in their homes. The decision to advise residents to shelter themselves will be made by the *On-Scene Commander* in consultation with the *Incident Commander*. If the situation requires immediate action the *On-Scene Commander* is authorized to begin notifying the general public without consulting the *Incident Commander*. Sheltering should be considered the primary protective measure in limited circumstances when:

- There is not enough time or warning to safely evacuate the public who may be at risk;
- Residents are waiting for evacuation assistance;
- During a gas release of limited duration (i.e. pipeline rupture);
- The location of the release has not been identified; or
- The public would be at higher risk if evacuated.

The *Public Safety Coordinator* is responsible for organizing the notification of residents in the PAZ. The *Public Safety Coordinator* will advise residents to:

- Remain indoors and close all doors and windows;
- Plug all air intakes into the building;
- Extinguish all ignition sources (pilot lights on water heaters, stoves, etc.);
- Refrain from smoking or operating electrical appliances;
- Stay away from windows;
- Shut off gas riser;
- Await further instruction from IGL personnel.

EVACUATION PROCEDURE

If an emergency exists that threatens personnel or the general public, it may be necessary to evacuate the PAZ. The decision to evacuate the PAZ will be made by the *On-Scene Commander* in consultation with the *Incident Commander*. Evacuation assembly areas shall be established upwind and at a safe distance from the EPZ. The *On-Scene Commander* will ensure that all personnel are accounted for. Area roads that may be used for evacuation purposes are shown on the map in Section 8, MAPS. The route taken will depend upon the location of the gas release and wind direction.

Evacuation begins in the IIZ and expands outward into the PAZ downwind of the release so that members of the public are not exposed to potential hazards.

At a **Level 2** emergency, the company will notify all persons who may be in the affected area and the public in the surrounding area by:

- Notification through telephone contact.
- Radio announcements.
- Acquiring helicopters to perform fly-overs to visually inspect for persons in the vicinity.
- Dispatching rovers to locate persons and respond to sightings by the helicopter(s).

Evacuation of the general public may be necessary if an emergency occurs in close proximity to residences or public facilities. **Evacuation must begin when a Level 2 emergency is declared.** Persons deemed "sensitive" (Emergency Evacuation Priority Level 1) may be evacuated sooner. Evacuation should begin with residents nearest or downwind of the release site. The *Public Safety Coordinator* is responsible for organizing the notification and evacuation of everyone in the PAZ.

To ensure personnel and public safety outside the PAZ, actions will be performed by IGL staff with the following priority guidelines:

- Anyone located directly downwind or adjacent to the site;
- Anyone located within the PAZ requiring assistance; and
- Anyone who cannot be contacted by telephone.

Evacuation of residents is on a voluntary basis – **company personnel do not have authority to order residents to evacuate their homes**. If a resident chooses not to evacuate, the police

should be notified. If the situation requires immediate action, the *On-Scene Commander* is authorized to begin notifying and evacuating the general public without consulting the *Incident Commander*. A sample evacuation notification statement is included in Section 6. This evacuation notification statement is to be used for both **Level 1** (voluntary notification) and **Level 2 and 3** emergencies as appropriate.

The company shall provide suitable transportation and accommodations if evacuation is necessary. The *Public Safety Coordinator* is authorized to establish a Reception Centre at a suitable location should evacuation of personnel be required.

In the unlikely event that sheltering and/or evacuation are required beyond the EPZ, IGL will work with the local authority to notify the affected residents. The notification mechanisms outlined in the Municipal Emergency Response Plan response framework may be used by the local authority to notify residents, based upon the monitored air quality and other information provided.

Inuvialuit Corporate Centre Building Evacuation Procedure

In the event of an emergency in the IGL office building, the following procedures shall apply:

- IGL employees are to close all office doors and calmly proceed to the closest fire exit. *See the Inuvialuit Corporation Center Building Evacuation Plan (Section 8 - Maps).*
- Exit the building and congregate in the parking lot located across from the Library (the Muster Point).
- DO NOT USE THE ELEVATOR. Take the stairs and close all stairwell doors.
- Before leaving the floor, Floor Wardens will check their assigned office areas to confirm if everyone has left and all doors are closed.
- At the Muster Point, Floor Wardens shall report their findings to the CHRO or designate who will report to the Inuvialuit Regional Corporation senior management team and the Inuvik Town Fire Chief.
- In the event of a situation where no alarms are ringing, follow the above procedures, designating one person to pull the fire alarm.
- No personnel shall re-enter the building until the Fire Chief has indicated it is safe to do so.

Inuvik Gas Ltd. Shop Evacuation Procedure

§ Employees and occupants are to exit the building immediately and call the Inuvik Fire Department.

§ Gather at the designated Muster Point and complete a head count to ensure everyone is accounted for.

§ Notify the IGL Supervisor or General Manager.

§ For fire exits and routes, refer to the Inuvik Gas Ltd. Shop Evacuation Plan (*see Section 8 - Maps*).

EXTENDED GAS OUTAGE

In the event of an extended, unplanned loss of fuel supply from both the PAS site and Ikhil well, the senior IGL employee will activate the Emergency Response Plan. They must also contact the Town of Inuvik SAO.

IGL will operate under the Town's Emergency Response Plan in these events.

External assistance from IGL's Board of Directors may be needed, and it will be the responsibility of the senior IGL staff to determine when to call these resources.

Critical Community Infrastructure:

- Midnight Sun Recreation Complex
- East Three Schools
- Hospital
- Seniors Housing
- Aurora College

DOWNGRADING AN EMERGENCY

The emergency response may be downgraded once conditions have been stabilized; when there is no longer a threat to people, property or the environment. The decision to downgrade response activities must be based upon the specific circumstances of each emergency. The *Incident Commander* will consult with the lead regulatory agency and other involved government agencies to determine whether to downgrade or terminate an emergency. The lead regulatory agency will consult with other agencies as applicable and confirm with IGL that the emergency downgrade or termination is appropriate. It is the responsibility of the *Incident Commander* to coordinate the post-emergency activities which may include:

§ Ensuring that all affected parties are notified that the emergency is over.

- In consultation with the *On-Scene Commander*, the *Incident Commander* will (1) inform company of external resources that were needed to safely handle the emergency, (2) notify affected or evacuated area residents, (3) notify government agencies and (4) inform the *Media & Communications Coordinator* to issue a media statement.

§ Ensuring that residences in the PAZ are clear of gas before the residents return.

§ Providing transportation to residents who were evacuated.

§ If the emergency has resulted in serious injuries or fatalities, it may be necessary to organize critical incident stress management assistance for the affected people.

§ Reimbursing costs incurred by residents due to the emergency.

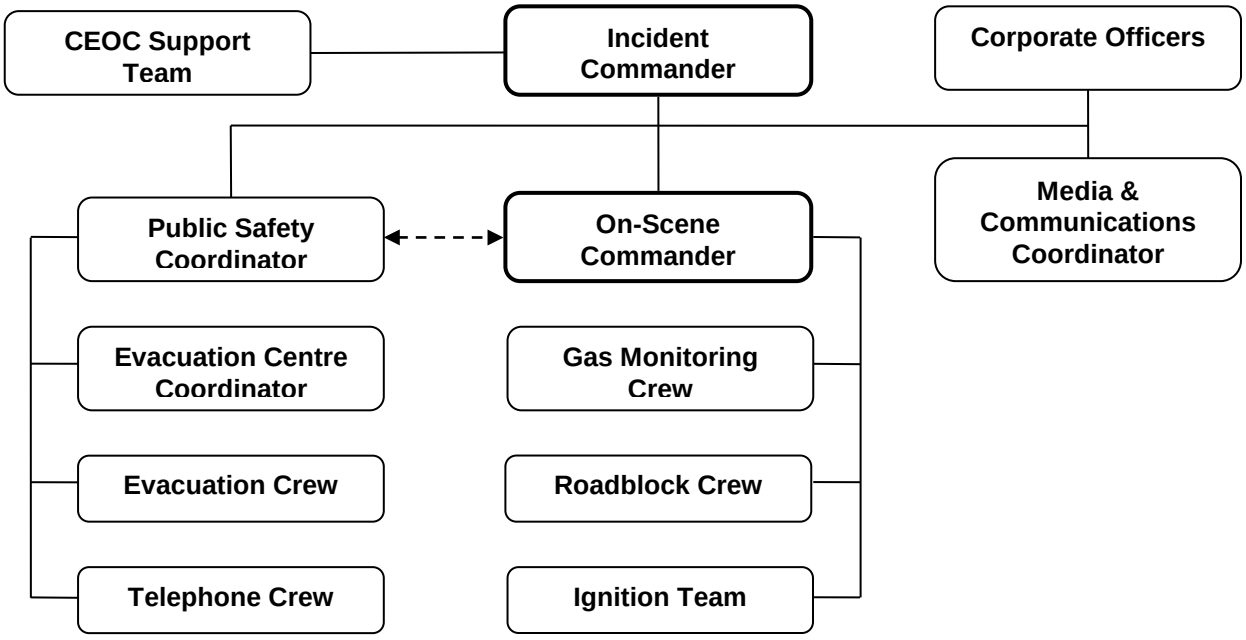
§ Submitting incident reports to government agencies and other applicable parties.

§ Conducting a post-emergency debriefing to assess the effectiveness of the emergency response. Post-incident debriefings must be held within 30 days for all **Level 2 and 3** emergencies. A debriefing report must be submitted to the lead regulatory agency within 30 days following the incident. The debriefing report must address the following:

- The source and cause of the incident.
- Adequacy of the resources available during the incident.
- Whether personnel were properly trained and responded effectively and timely according to pre-defined procedures.
- Whether the equipment was effective and adequate.
- The response and recovery efforts including public protection measures taken.
- The incident site rehabilitation program and timing.
- Recommendations for preventive or mitigative measures to ensure non-recurrence.
- Any changes to ERP to improve future responses.
- Any additional training required for personnel to improve response capability.
- A monitoring report.

IKHIL-INUVIK PERSONNEL

Incident Command Structure



Potential On-Scene Commanders

<*name removed*>	IGL Supervisor, Production & Gas Distribution
<*name removed*>	IGL Gas Production/Distribution Operator
<*name removed*>	IGL Gas Production/Distribution Operator
<*name removed*>	IGL Gas Production/Distribution Operator
<*name removed*>	IGL Senior Production Operator (Contractor)

Potential Incident Commanders

<*name removed*>	IGL General Manager
<*name removed*>	IGL Supervisor, Production & Gas Distribution

For Ikhil Only:

<*name removed*>	UGFI - AltaGas Director Operations, Gas
<*name removed*>	UGFI - AltaGas Operations Manager
<*name removed*>	UGFI - AltaGas Operations Manager
<*name removed*>	UGFI - AltaGas Operations Manager
<*name removed*>	UGFI - AltaGas Divisional Vice President Operations - Gas
<*name removed*>	UGFI - AltaGas Operations Manager

Public Safety Coordinator

Appointed by the *Incident Commander.*

The *On-Scene Commander* may also assume the role of *Public Safety Coordinator.*

Evacuation Centre Coordinator

Appointed by the *Public Safety Coordinator*.

On-Scene Commander

The *On-Scene Commander (OSC)* is the senior person on-site during the emergency and coordinates all emergency activities at the site. The *OSC* reports directly to the *Incident Commander.*

The *OSC's* responsibilities include:

§ Ensuring the safety of employees, contractors and the general public.

§ Logging all actions and responses.

§ Assessing the incident scene (assume First Responder role or dispatch as appropriate).

§ Establishing the location of the On-Site Command Post (OSCP) where appropriate (i.e. facility office, operator's truck, trailer).

The *OSC* may be relieved at any time if a more senior person arrives at the scene of the emergency. The *OSC* may also assume the role of *Public Safety Coordinator*.

Level 1 Emergency

§ Coordinate on-site response actions to immediately gain control of the emergency. Shut down/isolate gas or spill source, contain fluids and prevent entry into watercourse.

§ Ensure safety of all on-site personnel. Attend to medical requirements.

§ Immediately assess the level of emergency. **The *OSC* is authorized to evacuate the site and activate the ERP before contacting anyone if he/she believes the circumstances require immediate action.**

§ The *On-Scene Commander* must assess the Level of the emergency. **Level 1** emergencies may be dealt with by on-site personnel and then reported to the IGL Supervisor and Manager.

§ Contact a senior IGL representative to assume the *Incident Commander* role, as necessary.

§ Obtain and/or request response personnel, equipment and other emergency services (i.e. RCMP, ambulance, fire department, etc.) as needed from the *Incident Commander*.

§ Notify mobile air monitoring unit and place on standby if necessary.

§ Begin evacuation procedures for those persons in the PAZ deemed "sensitive" (Emergency Evacuation Priority Level 1), dependent upon the nature of the emergency.

§ Direct control and/or containment procedures.

Level 2 or 3 Emergency

§ Complete all actions required at a **Level 1** emergency.

§ Contact a senior IGL representative to assume the *Incident Commander* role. If there is no time to attempt to locate an *Incident Commander*, call the IGL 24-hour emergency telephone number instead (867-777-4427).

§ Notify personnel of the change to a **Level 2 or 3** emergency.

§ Consult with the *Incident Commander* on public safety actions (sheltering, evacuation, ignition, etc.).

§ Determine the need for and appoint *Gas Monitoring Crews* and *Roadblock Crews.*

§ Assemble and place on standby well control personnel and equipment, as necessary.

§ Liaise with government on-site representatives as they arrive.

§ Proceed with ignition of a gas release if ignition criteria has been achieved (see *Ignition Procedure* in Section 3). The decision to ignite a gas flow will be made by the *Incident Commander* in consultation with the appropriate government agencies and UGFI and/or ATCO personnel. However, the *OSC* is authorized to ignite a gas flow if the situation requires immediate action to protect employees, contractors, the public or the environment.

§ Assess the impact of hydrocarbon or chemical spills and consult with the *Incident Commander*.

§ Designate an individual to establish a “staging area” at a location removed from the OSCP to receive and direct contract equipment and personnel, if necessary.

§ Assist with the deployment of a helicopter (equipped with a siren and loud-hailer) to assess the EPZ, if required, to:

- survey the hazards/damages
- identify the magnitude of any spill
- identify residents/transients/recreational users in the PAZ

§ Request a Fire Hazard Closure Order from the *Incident Commander* if area isolation is required.

§ Maintain an Incident Log (Section 6 – FORMS) of the actions taken during the emergency.

§ Debrief all personnel once emergency is over.

Incident Commander

The *Incident Commander (IC)* is responsible for and manages the overall emergency response. The *IC* is the first person contacted by the *OSC* from the pre-determined list of potential *Incident Commanders*. They are the *IC* until relieved by a more senior IGL, UGFI, or ATCO representative.

The *IC,* in consultation with the *OSC*, will assess the severity of the emergency and determine:

- what company and external resources are needed to safely handle the emergency
- whether it is necessary to begin notifying or evacuating area residents
- which government agencies should be notified
- whether the *Media & Communications Coordinator* should be activated

For all **Level 2** and **Level 3** emergencies, the *Incident Commander* will at the earliest opportunity notify the Board of Directors that an emergency exists. The Board of Directors' ATCO Representative will notify the other members of the board, and further corporate communication will flow through them.

Level 1 Emergency

§ Acknowledge appointment by the *OSC* and provide response personnel and equipment as required.

§ Declare the Level of Emergency, in conjunction with the *OSC.*

§ Establish the location of the Corporate Emergency Operations Centre (CEOC). The CEOC will be at the IGL office in Inuvik, or possibly at the UGFI or ATCO head office.

§ Notify the lead government agency and the Local Authority should their assistance be required to contain the emergency or aid with evacuation of those individuals within the PAZ deemed "sensitive" (Emergency Evacuation Priority Level 1).

§ Log actions and responses.

Level 2 or 3 Emergency

§ Complete all actions required at a **Level 1** emergency.

§ Define the PAZ from data supplied from *Gas Monitoring Crews* and in conjunction with the lead government agency.

§ Designate the *Public Safety Coordinator* and activate the *Media & Communications Coordinator* through the Board of Directors.

- Proceed with the following public safety actions, in consultation with the *OSC*:
  - **SHELTER** public inside the PAZ until the area is safe.
  - **EVACUATE** public inside the PAZ if the area is not safe.
  - **IGNITE** gas release source if the ignition criteria have been met. See *Ignition Procedure* in Section 3.
- Ensure appropriate government agencies have been notified and liaise with them.
- Obtain additional response personnel and equipment necessary to assist the *OSC* and all other responders.
- Establish the location of the Regional Emergency Operations Centre (REOC), if required, and request appropriate personnel to assemble at the REOC to assist the *OSC*.
- Assist the *OSC* with the procurement of a Fire Hazard Order, if requested.
- Prepare initial statements for a press/media release at the local level. Refer media inquiries to the *Media & Communications Coordinator*. Issue any required statements carefully, and make no reference to deceased victims until the next-of-kin have been notified. Document any statements made to the media (see Section 6 - FORMS).
- Notify the contractor's head office to apprise them of the situation regarding any contract personnel.
- Consult with the government agencies that participated before downgrading or terminating emergency response activities.
- Coordinate the post-emergency activities (see Section 3 – *Downgrading an Emergency*).

Public Safety Coordinator

The *Public Safety Coordinator (PSC)* coordinates all aspects of the shelter/evacuation process whenever public safety is in jeopardy. The *Incident Commander* appoints the *PSC*. The *PSC* may also be the *On-Scene Commander*.

Level 1, 2 or 3 Emergency

§ Assist the *IC* and *OSC* with:
  - Organizing *Roadblock Crews* (includes requesting assistance from the RCMP);
  - Organizing *Telephone Crews (Telephoners)* to contact residents;
  - Organizing *Evacuation Crews*; and
  - Procuring additional staff, equipment or resources as required.

§ Establish a prioritized resident list, beginning with anyone located downwind and closest to the emergency site (including homes and businesses).

§ Organize the *Telephoner(s*) to contact area users with the applicable public safety message (no more than 7 residents per *Telephoner)*.

§ Assemble and dispatch the *Evacuation Crews* to help residents requiring assistance with evacuation.

§ Direct *Evacuation Crews/Telephoners* to proceed with one of the following safety actions (in consultation with the *IC*):
  - **SHELTER** residents inside the PAZ until gas levels indicate the area is safe.
  - **EVACUATE** residents inside the PAZ if the area is not safe.

§ Appoint an *Evacuation Centre Coordinator* to establish a Reception Centre.

§ Maintain a record of the public's status, and communicate that status to the *IC*.

§ Liaise with the officials from government agencies if they are called upon to assist with the public safety actions.

§ Establish an air-to-ground communication link if a helicopter is dispatched to assist with the public safety actions,

Evacuation Centre Coordinator

In consultation with the *Incident Commander*, the *Public Safety Coordinator (PSC)* appoints the *Evacuation Centre Coordinator*. The *Evacuation Centre Coordinator* assists the *PSC* with public safety actions from the Reception Centre.

Level 1, 2 or 3 Emergency

- Obtain an evacuation centre kit and a copy of the ERP manual.
- Coordinate travel requirements for evacuees with the *PSC.*
- Proceed to designated Reception Centre to receive evacuees.
- Set up Reception Centre (tables/chairs) as needed.
- Record the arrival of all members of the public on the Reception Centre Check-in Sheet (see Section 6).
- Report status of evacuees to the *PSC* and record status on the Reception Centre Check-in Sheet.
- Provide shelter and food to evacuees.
- Contact additional personnel to assist as required (utilize *PSC* if necessary).
- Liaise with the *PSC* to ensure resident concerns are addressed and answered promptly.
- Assist evacuees with compensation issues.
- Assist with post-emergency actions.

Telephone Crew

The *Telephone Crew* (*Telephoners*), under the direction of the *Public Safety Coordinator (PSC),* conducts resident call down when public safety actions are required.

Level 1, 2 or 3 Emergency

§ Prioritize resident call down according to the *PSC's* directions.

§ Confirm with the *PSC* which message is to be delivered to area residences/businesses (shelter or evacuate).

§ Fill in appropriate information on message form.

§ Proceed to contact residences/businesses deemed "sensitive" (Emergency Evacuation Priority Level 1) and deliver selected message (for a Level 1 Emergency). **No more than 7 residents per *Telephoner*.**

§ Proceed to contact all remaining residences/businesses within the designated PAZ and deliver selected message (for a Level 2 or 3 Emergency).

§ Maintain an accurate log of all telephone conversations, times, etc. on the Resident Contact Log (see Section 6).

§ Establish communication with the *Evacuation Centre Coordinator*, relaying resident and/or business statuses as they change.

§ Notify the *PSC* of any problems, issues or requirements arising from the contact process (i.e. no contact made, need for assistance, only children at home, etc.).

§ Assist with the post-emergency notifications when the emergency is downgraded by the *Incident Commander*.

Evacuation Crew

The *Evacuation Crew* is made up of field personnel who assist the *Public Safety Coordinator (PSC)* with evacuation of the PAZ as required.

Level 1, 2 or 3 Emergency

§ Proceed, in designated evacuation vehicles, to residents/businesses deemed "sensitive" (Emergency Evacuation Priority Level 1) to assist with evacuation (for a Level 1 Emergency).

§ Proceed, in designated evacuation vehicles, to all remaining residents/businesses to assist, as necessary, with evacuation (for a Level 2 or 3 Emergency).

§ Ensure the following information is delivered to evacuees:
  - the type of emergency and related dangers
  - directions for proceeding out of the area safely

§ Provide assistance to individuals requesting help.

§ Record all evacuation data on the Resident Contact Log (Section 6).

§ Report evacuation status to the *PSC.*

§ Assist the *Roadblock Crews* with securing the PAZ and manning roadblocks after evacuation procedures have been completed.

No one will take unnecessary risks or perform any task for which they have not been trained and properly equipped. The *Evacuation Crew* will be staffed with operating personnel. Where necessary, outside personnel may be required to perform some of these duties.

Roadblock Crew

The *Roadblock Crew* is made up of field personnel who establish and maintain roadblocks to isolate the designated PAZ, under the supervision of the *On-Scene Commander (OSC)*. The *Roadblock Crew* will attempt to correct the conditions that are threatening the safety of workers, the general public or the environment.

Level 1, 2 or 3 Emergency

Prior to Dispatch:

§ Assemble at designated site for a briefing by the *OSC* (if possible).
§ Obtain roadblock kits and establish roadblocks at the designated locations.
§ Establish schedule of report-in times to the *OSC*.

To Isolate the Protective Action Zone:

§ Establish a safe route to get to the roadblock location(s) and an escape route, should conditions warrant.
§ Record the vehicle information for vehicles stopping at the roadblock(s) on the Roadblock Log (see Section 6).
§ Monitor gas levels and relay that information to the *OSC*.
§ Be prepared to move the position of the roadblock(s) as conditions change.
§ Maintain the roadblock(s) until relieved or informed by the *OSC* to stand down.
§ Complete a final report.

No one will take unnecessary risks or perform any task for which they have not been trained and properly equipped. The *Roadblock Crew* will be staffed with operating personnel. Where necessary, outside personnel may be required to perform some of these duties. The *Roadblock Crew* may receive assistance from the RCMP or transportation officials.

Gas Monitoring Crew

It is the responsibility of the *On-Scene Commander* to determine the need for and appoint a *Gas Monitoring Crew.*

Level 1, 2 or 3 Emergency

Locating the PAZ for a Gas Release:

§ Take a position downwind of the gas release at the nearest un-evacuated residence (c/w SCBA/gas detection and communication equipment).

§ Record readings on the Ambient Air Monitoring Log (see Section 6) and relay that information to the *On-Scene Commander* or *Incident Commander*.

§ Advance towards or retreat from the release according to the readings obtained. **Crews should always maintain their own safety.**

§ Expand or retract the PAZ based on air quality monitoring or other pertinent data.

Isolating the PAZ:

§ Under the instruction of the *On-Scene Commader*, dispatch *Roadblock Crews* (with applicable safety equipment) to selected locations outside the PAZ.

No one will take unnecessary risks or perform any task for which they have not been trained and properly equipped. The *Gas Monitoring Crew* will be staffed with operating personnel. Where necessary, outside personnel may be required to perform some of these duties.

Media & Communications Coordinator

IGL and UGFI recognize the need for effective and timely communication between the companies, all partners and the general public if an emergency occurs. To facilitate the flow of information during an emergency, they will designate a *Media & Communications Coordinator*.

The *Media & Communications Coordinator* is either the IGL General Manager (for IGL led emergencies), the AltaGas Corporate Communications Team designate (for UGFI led emergencies, or at the request of IGL), or an ATCO representative (to assist IGL). Only the *Media & Communications Coordinator*, or their designate, will make statements to the news media. No other employee, contract employee or employee of a contractor shall provide any comments to the news media. If approached by the news media, provide them with the telephone number of the *Media & Communications Coordinator*.

The *Media & Communications Coordinator* will:

§ Lead strategic communications efforts in conjunction with the *Incident Commander*.
§ Direct the Communications Team to assist the *Incident Commander*, as required.
§ Create initial messaging framework and key messages.
§ Act as a liaison between the *Incident Commander* and the other owners, if required.
§ Develop and update communications strategies.
§ Co-ordinate and manage media issues.

Only the *Media & Communications Coordinator* will respond to requests for information from the news media, and all information releases will be provided in cooperation with involved government agencies.

The Communications Team will assist the *Media & Communications Coordinator* and *Incident Commander* by performing the following tasks, as required:

§ Triage media inquiries.
§ Coordinate interviews with the approved spokesperson.
§ Ensure spokespeople and subject-matter experts are prepared for media interviews (messaging, background information, etc.).
§ Prepare news releases and other media collateral.
§ Post material on the Internet.
§ Log response actions (it is essential to keep accurate records and continuously track the order of responses).

§ Monitor media coverage and report developments, as well as all notification statuses, to the *Media & Communications Coordinator*.

Emergency Information Disseminated to the Public

The following information is to be provided, and updated regularly, by the *Media & Communications Coordinator* and the *Incident Commander* to the public and others who have been asked to shelter-in-place or evacuate:

- type and status of the emergency
- location and proximity of the emergency to those who are sheltering-in-place or have been evacuated
- the public safety response to follow and the shelter/evacuation instructions
- any other emergency response actions to consider
- actions being taken to respond to the situation, including the anticipated time required
- contacts for additional information
- reception centre locations

The following information is to be provided to any interested members of the general public:

- type and status of the emergency
- location of the emergency
- areas affected by the emergency
- description of the products involved
- contacts for additional information
- actions being taken to respond to the situation, including the anticipated time required

Media Contact

If an employee, contract employee or employee of a contractor is approached by the media:

§ Respond with: “I can’t answer your questions, but I will find someone who can.”

§ Record their contact information (see Section 6 - Media Inquiry Record)

§ Alert the *Media & Communications Coordinator*

§ Do:

- be courteous
- assure them a company spokesperson will follow up
- pass along their contact information
- remain positive

§ Don’t:

- say “no comment”
- go off the ‘record’
- speculate or be hypothetical
- offer a personal opinion
- lose your patience

Communications Team Response

Team Member	Tasks
FIRST TWO HOURS	
Media & Communications Coordinator	**Provide *Incident Commander* with immediate evaluation** - identify media and audience perception issues - recommend strategy and course of action - confirm spokesperson - identify additional support staff/resources needed **Draft holding statement from pre-approved template** (*see Section 6 - Preliminary Standby Statement*) - a holding statement that acknowledges situation and advises when further information will be available - gain approvals from *Incident Commander* - ensure spokesperson is briefed **Triage immediate media** - manage responses to media
Communications Team	**Inform receptionist** - provide communications team contact number/information to direct media calls **Post information on company website** - as it becomes available and is approved

Team Member	Tasks
FIRST THREE to FIVE HOURS	
Media & Communications Coordinator	**Provide direction to develop first official communication** - determine need for media advisory or news release **Draft communications** - key messages, media advisory, news release, Q&A and other material as appropriate - gain approvals **Distribute communications materials** **Continue to manage media calls and update communication materials as events develop**
Communications Team	**Internet posting and monitoring** - post media advisory on Internet or send news release for distribution - post other required material on Internet - continue monitoring media
END OF DAY 1	
Media & Communications Coordinator	**Day 1 Summary** - provide media analysis, summary, observations and recommendations to *Incident Commander* **Debrief and re-assess** - with *Incident Commander* and owners - re-assess communications strategy and next steps **Continue to manage media calls**

Emergency Response Plan Administrator

The UGFI *Emergency Response Plan (ERP) Administrator* is required to review and update the Ikhil-Inuvik ERP on an ongoing basis. The ERP must be reviewed at least annually, and the results of the review must be reported to external parties, as determined.

GOVERNMENT OF THE NWT

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

OROGO regulates oil and gas operations in the Northwest Territories, outside federal areas and the Inuvialuit Settlement Region, for the primary purposes of ensuring human safety, environmental protection, and the conservation of oil and gas resources. OROGO ensures compliance with the NWT *Oil and Gas Operations Act* and regulations.

OROGO's responsibilities include application reviews, pipeline and well regulation, inspection and compliance, and emergency response and investigation. Incidents and near misses resulting from oil and gas activities regulated by OROGO must be reported to them as soon as possible using their incident response line.

OROGO regulates the portions of the Ikhil Gas Field that fall within the town of Inuvik (a portion of the Ikhil pipeline and the meter station - *see Section 8 - Maps*).

The NT/NU *Spills Working Agreement* between the Governments of Canada, the Northwest Territories and Nunavut provides a single window approach to hazardous materials spill reporting and the dissemination of information pertaining to spills, throughout the Northwest Territories and Nunavut. All spills of reportable quantities (*see Section 3*) are to be reported to the NT/NU Spill Reporting line, and that information will be passed along to all relevant government agencies, including the appropriate lead regulatory agency.

An investigation report must be submitted to OROGO within 21 days for a near miss or incident that involved:

- a death
- an injury that required time off
- a fire or explosion
- a leak
- an immediate threat to safety
- a significant pollution event

OROGO Incident Response Line: 867-445-8551

NT/NU Spill Reporting Line: 867-920-8130

Public Utilities Board (PUB)

The NWT Public Utilities Board (PUB) is an independent, quasi-judicial agency of the Government of the Northwest Territories. It is responsible for the regulation of public utilities in the NWT. PUB obtains its authority from the *Public Utilities Act*.

PUB regulates Inuvik Gas Ltd.'s Distribution System in the town of Inuvik; however, emergency incidents are not reportable to PUB, and they would not be involved in emergency response.

NWT Municipal & Community Affairs (MACA)

The Department of Municipal and Community Affairs (MACA) safeguards the health and wellbeing of Northwest Territories residents by ensuring compliance with safety standards and coordinating emergency services. MACA strives to meet its goals by delivering frontline services to community governments through their headquarters in Yellowknife and five regional offices. The Department's functions are as follows:

- Office of the Fire Marshal: MACA is responsible for delivering several programs relating to fire and life safety as identified in the *Fire Prevention Act*.
- Emergency Management: MACA is responsible for NWT emergency preparedness and response activities.
- Community governance support and advice.

Emergency Measures Office 24 Hour Emergency Line: 867-920-2303

Public Works and Services - Boilers and Pressure Vessels

The Government of the Northwest Territories has appointed inspectors to administer the *Boilers and Pressure Vessels Act*. Serious accidents involving pressure equipment must be reported to the Boiler/Gas Inspector at the Department of Public Works and Services in Inuvik (**867-777-7347**).

Environment and Natural Resources

The Department of Environment and Natural Resources (ENR) administers *The Environmental Protection Act*, among others. They work to promote and support the sustainable use and development of natural resources and to protect, conserve and enhance the Northwest Territories environment for the social and economic benefit of all residents. They share this responsibility with Aboriginal and municipal governments, federal and territorial departments, boards and agencies and every resident of the Northwest Territories.

ENR is responsible for:

- Wildland fire management, prevention and protection in the NWT;
- The implementation and enforcement of the *Wildlife Act*;
- Along with NWT Lands and OROGO, coordinating Government of the Northwest Territories regulatory oversight and investigation of hazardous material spills in NWT under their respective jurisdictions. Several other federal agencies, including the Inuvialuit Land Administration and the NEB, are also responsible for conducting spill investigations and monitoring cleanup in their jurisdictions.

The NT/NU *Spills Working Agreement* between the Governments of Canada, the Northwest Territories and Nunavut provides a single window approach to hazardous materials spill reporting and the dissemination of information pertaining to spills, throughout the Northwest Territories and Nunavut. All spills of reportable quantities (*see Section 3*) are to be reported to the NT/NU Spill Reporting line, and that information will be passed along to all relevant government agencies.

NT/NU Spill Reporting Line: 867-920-8130

Forest Fire Reporting: 1-877-698-3473

Wildlife Reporting: 867-678-0289

Workers' Safety & Compensation Commission (WSCC)

The *Safety Act* and *OHS Regulations* regulate workplace health and safety in the Northwest Territories. The Chief Safety Officer administers the legislation. Accidents causing serious bodily injury or death, and dangerous occurrences (i.e. near misses) must be reported to the Chief Safety Officer (CSO) using the WSCC Incident & Injury Reporting Line (**1-800-661-0792**).

NWT Health and Social Services Authority

The NWT Health and Social Services Authority serves the 6,700 residents of the Beaufort-Delta Region in the Northwest Territories. They operate the Inuvik Regional Hospital, eight health centres and community based health and social services programs throughout the Beaufort Delta region. Public health matters are the responsibility of the Medical Officer of Health who will:

- Provide advice on public health matters;
- Arrange for dissemination of special instructions to the population on matters concerning public health;
- Arrange for testing of water supplies and, when warranted, make recommendations for arranging alternate supplies;
- Notify other agencies and senior levels of government about health related matters.

Beaufort-Delta Region: 867-777-8000

GOVERNMENT OF CANADA

National Energy Board (NEB)

The main responsibilities of the NEB are established in the *National Energy Board Act* (*NEB Act*) and include ensuring compliance with the Northwest Territories *Oil and Gas Operations Act* (OGOA) for oil and gas exploration and production activities in the Northwest Territories' Inuvialuit Settlement Region.

The NEB regulates the portions of the Ikhil Gas Field (processing facility, wells and pipeline) that fall outside of the Town of Inuvik. When lead regulatory agency, the NEB:

- Monitors, observes and assesses the overall effectiveness of the company's emergency response in terms of:
  - emergency management
  - safety
  - security
  - environment
  - integrity of operations and facilities
  - energy supply
- Investigates the incident, either in cooperation with the Transportation Safety Board of Canada, under the *Canada Labour Code*, or as per the *NEB Act*, *Canada Oil & Gas Operations Act* or *OGOA* (whichever is applicable).
- Inspects the pipeline or facility.
- Examines the integrity of the pipeline or facility.
- Requires appropriate repair methods be used.
- Requires appropriate environmental remediation of contaminated areas be conducted.
- Coordinates stakeholder and Aboriginal community feedback regarding environmental clean-up and remediation.
- Confirms that all operators are following their ERP commitments, plans, procedures and regulations, and identifies non-compliances.
- Initiates enforcement actions as required.
- Approves the restart of the pipeline.

All significant incidents involving NEB-regulated facilities and pipelines should be reported immediately (within 3 hours) through the NEB/TSB single-window notification process – initial notification must be made to the TSB Reporting Hotline and then subsequently to the NEB's Online Event Reporting System (OERS). Significant incidents include the following:

- Death or serious injury (i.e. major bone fracture, amputation, loss of sight, internal hemorrhage, third degree burns, unconsciousness or loss of body function)
- A missing person
- A fire or explosion that causes a pipeline or facility to be inoperative
- An LVP hydrocarbon release in excess of 1.5 m^3 that extends beyond the lease
- A pipeline rupture (an instantaneous release where the pressure of the pipeline segment cannot be maintained)
- A toxic plume as defined in CSA Z662

All other incidents involving areas under NEB jurisdiction must be reported within 24 hours to the OERS, including:

- All incidents under the *NEB Onshore Pipeline Regulations* (OPR), *NEB Processing Plant Regulations* (PPR), and *Canada Oil and Gas Drilling and Production Regulations* (DPR)
- Unauthorized activities under the *National Energy Board Pipeline Crossing Regulations Part II*
- Emergency burning or flaring under the PPR
- Hazard identification under the PPR
- Suspension of operations under the PPR
- Near-misses under the DPR
- Serious accidents or incidents under the *Canada Oil and Gas Geophysical Operations Regulations*
- Emergencies or accidents under the *Canada Oil and Gas Installation Regulations*
- Accidents, illnesses, and incidents under the *Canada Oil and Gas Diving Regulations*

If the OERS is unavailable, these incidents must be reported to the TSB Reporting Hotline.

For all other incidents, the NEB can be contacted at their 24/7 Incident Line.

NOTE: The NT/NU *Spills Working Agreement* between the Governments of Canada, the Northwest Territories and Nunavut provides a single window approach to hazardous materials spill reporting and the dissemination of information pertaining to spills, throughout the Northwest Territories and Nunavut. All spills of reportable quantities are to be reported to the

NT/NU Spill Reporting line, and that information will be passed along to all relevant government agencies, including the appropriate lead regulatory agency.

TSB Reporting Hotline: 819-997-7887

OERS: https://apps.neb-one.gc.ca/ERS

NEB Incident Line: 403-807-9473

NT/NU Spill Reporting Line: 867-920-8130

Transportation Safety Board (TSB)

The Transportation Safety Board of Canada is an independent agency that investigates marine, pipeline, railway and aviation transportation occurrences. When notified of an occurrence, the TSB will assess the circumstances to determine if an investigation is warranted; this assessment may involve the deployment of an investigation team to the occurrence site.

The TSB requires the following incidents resulting directly from operation of a pipeline to be reported to them:

- A person is killed or sustains a serious injury.
- The safe operation of the pipeline is affected by:
  - damage sustained when another object came into contact with it; or
  - a fire or explosion or an ignition that is not associated with normal pipeline operations.
- An event or an operational malfunction results in:
  - an unintended or uncontrolled release of gas;
  - an unintended or uncontrolled release of HVP hydrocarbons;
  - an unintended or uncontained release of LVP hydrocarbons in excess of 1.5 m^3; or
  - an unintended or uncontrolled release of a commodity other than gas, HVP hydrocarbons or LVP hydrocarbons.
- A release of a commodity from the line pipe body.
- Pipeline operations beyond design limits or any operating restrictions imposed by the NEB.
- When a pipeline restricts the safe operation of any mode of transportation.
- An unauthorized third party activity within the EPZ poses a threat to the safe operation of the pipeline.
- A geotechnical, hydraulic or environmental activity posing a threat to the safe operation of the pipeline.

§ The operation of a portion of the pipeline is interrupted as a result of a situation or condition that poses a threat to any person, property or the environment.

§ An unintended fire or explosion has occurred that poses a threat to any person, property or the environment.

The OERS must be used to report all pipeline incidents. Significant incidents (as defined above under the NEB), however, must be reported immediately by phone to the TSB Reporting Hotline, and then subsequently reported online through the OERS.

TSB Reporting Hotline: 819-997-7887

OERS: https://apps.neb-one.gc.ca/ERS/Home/Index/

Fax: 819-953-7876

Email: PipelineNotifications@tsb.gc.ca

RCMP

§ Will assume responsibility for traffic control, evacuation, and residence security if required.

§ In the event of an incident concerning the primary or secondary highways within the PAZ, Inuvik Gas Ltd. will inform the RCMP who will assume responsibility for roadblocks.

§ The RCMP will clarify responsibilities in the event of fatalities.

Transport Canada - CANUTEC

CANUTEC is the Canadian Transport Emergency Centre operated by the Transportation of Dangerous Goods (TDG) Directorate of Transport Canada. CANUTEC is a national advisory service that assists emergency response personnel in handling dangerous goods emergencies on a 24/7 basis. The emergency centre is staffed by bilingual scientists specializing in chemistry or a related field and trained in emergency response. The emergency response advisors are experienced in interpreting technical information from various scientific sources including Safety Data Sheets (SDS) in order to provide pertinent and timely advice. The centre also offers a free 24-hour emergency telephone service for Canadian consignors who wish to use CANUTEC's 24-hour number on their dangerous goods shipping documents. A consignor must first register

with CANUTEC and submit pertinent contacts and Safety Data Sheets before receiving authorization to use CANUTEC's number.

Emergency Response Services:

- chemical, physical and toxicological properties of dangerous goods;
- possible product incompatibilities and stabilities;
- health hazards and first aid measures;
- fire, explosion, spill or leak mitigation techniques;
- remedial actions for the protection of life, property and the environment;
- isolation and evacuation distances;
- donning of personal protective clothing and equipment and their decontamination procedures;
- coordination of communications with consignor, government or medical specialists;
- quick access to a vast national and international resource network which includes the industrial sector, emergency response teams, private response contractors, mutual aid groups, federal and provincial response specialists and other emergency centres;
- and over 2 million Safety Data Sheets (SDS).

Federal Transportation of Dangerous Goods Regulations require that CANUTEC be contacted in the event of a dangerous goods incident involving the rail, marine and aviation transportation modes as well as for dangerous goods included in class 1 (explosives), class 6.2 (infectious substances) and any accidental release from a cylinder that has suffered a catastrophic failure.

TOWN OF INUVIK

The town of Inuvik is located in the Mackenzie Delta area, latitude 68 degrees 18 minutes north and 133 degrees 29 minutes west. The Minister of Transport operated airport is located 13 kilometres east of the town. The town has its own volunteer Fire Department and is policed by an RCMP detachment. Medical services are provided by the Inuvik Regional Hospital and includes two ambulances operated by Advanced Medical Solutions. The town of Inuvik is responsible for emergencies or disasters that could adversely affect the lives and property of its residents.

The Ikhil-Inuvik *Incident Commander* will coordinate emergency response with the town of Inuvik whenever the town is participating in emergency response. Although an emergency involving the Ikhil Gas Field might not fall within the town's responsibility, the assistance of its emergency services may be utilized.

Inuvik Emergency Measures Agency

Emergencies within the town of Inuvik are directed and controlled by a group of officials known as the Inuvik Emergency Measures Agency (IEMA). This agency is responsible for providing the essential services needed to minimize the effects of emergencies. The IEMA is made up of the following members:

Mayor
Deputy Mayor
SAO
Director of Protective Services/CEMC
Director of Public Services
Director of Finance
Emergency Information Officer
Security Officer
Reception Centre Manager
Recording Secretary
RCMP Detachment Commander
Regional Emergency Measures Representative
Health and Social Services Representative
Ambulance
IT Coordinator

If required, a support group may be called upon to offer assistance to the IEMA. Members of support group may include:

Registration and Inquiry
Water & Sewer Superintendent
NWT Housing Corporation
Inuvik Housing Authority
Others as required

The Mayor, Deputy Mayor, SAO, and Director of Protective Services have the authority to declare that a municipal emergency exists within the town boundaries and activate the Emergency Notification System. When the resources of the municipality are deemed insufficient to control the emergency, the Mayor may request that the Regional Superintendent or the Regional Emergency Management Coordinator activate the Government of the Northwest Territories (GNWT) Emergency Response Plan.

In an emergency, the IEMA assembles at the designated emergency operations centre (MECC) in the Town Hall or in an alternate location as indicated at the time of call out.

Inuvik Gas Ltd. meets with the IEMA when requested and works within the relevant municipal ERP. Inuvik Gas Ltd. provides input for situations that could involve the Ikhil wells, plant, pipeline and gate station as well as the town of Inuvik gas distribution system.

EMERGENCY RESPONSE ASSISTANCE CANADA

Emergency Response Assistance Canada (ERAC) - *formerly LPGERC*

The Ikhil-Inuvik ERP is supplemented by the ERAC's Emergency Response Assistance Plan (ERAP). This plan is designed to assist IGL staff in responding to transportation and stationary tank emergencies.

ERAC has a mission to provide a level of service to Plan Participants that will encompass well trained and qualified people, quality equipment, knowledgeable advice and timely assistance to allow responders to deal effectively with an LPG Emergency.

As a private plan, they provide emergency response to Plan Participants who transport specific products, including propane, by road or rail, or those who store these products in tanks with capacities of 450 litres or greater.

In the event that IGL needs assistance in responding to a transportation or stationary tank emergency related to Inuvik Gas Ltd.'s liquids, the ERAP can be activated by calling:

1-800-265-0212

SAFETY DATA SHEET

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

Product identifier:

Natural Gas
Chemical names: Aliphatic hydrocarbon mixture (Alkanes C_1 - C_4); primarily Methane (C_1)

Product uses:

Raw material. Compressed gas or liquefied gas. Aliphatic hydrocarbon mixture (Alkanes C_1 - C_4); primarily Methane (C_1)

Supplier of the Safety Data Sheet:

AltaGas Ltd.
1700, 355 4th Avenue SW
Calgary, AB
T2P 0J1

Emergency telephone number:

1-866-826-3830

Section 2: Hazards Identification

Classification of the substance according to GHS:

Flammable Gases Cat. 1; H220
Gases Under Pressure, Compressed Gas or Liquefied Gas; H280

GHS Label elements:

Danger!
Extremely flammable gas.
Contains gas under pressure; may explode if heated.

Prevention:
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Response:
Leaking gas fire: do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources of safe to do so.
Storage:
Protect from sunlight. Store in a well ventilated place.

WHMIS:

Controlled product by WHMIS criteria.

- A – Compressed Gas
- B1– Flammable Gas

Potential Health Effects

Acute Health Effects:

Relevant Route(s) of Exposure: Skin contact, Eye contact, Inhalation.

Skin contact: Contact with liquefied gas escaping from its cylinder may cause frostbite. The skin may become waxy white or yellow.

Eye contact: Contact with liquefied gas escaping from its cylinder may cause freezing of the eye. Permanent eye damage or blindness could result.

Ingestion: Not an applicable route of exposure.

Inhalation: Natural gas in high concentrations in the air displaces oxygen and can cause symptoms of oxygen deprivation (asphyxiation). Symptoms of oxygen deficiency include increased breathing and pulse rate, slight loss of muscular coordination, emotional upsets, abnormal fatigue from exertion, disturbed respiration, nausea and vomiting, inability to move freely, collapse, possible loss of consciousness; extreme oxygen deficiency below 6% can induce convulsive movements, gasping, possible respiratory collapse and death. Exercise increases the body's need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment.

SAFETY DATA SHEET

Section 2: Hazards Identification, continued

High concentrations of Natural gas in air may cause central nervous system depression.
Propane in air (>1 000 ppm), **c**an cause CNS depression with symptoms such as headache, nausea, dizziness, drowsiness and confusion. Higher concentrations (>100 000 ppm) may cause unconsciousness, narcosis and CNS depression.
1% butane in air, 10 minute exposure, **c**an cause CNS depression with symptoms such as headache, nausea, dizziness, drowsiness and confusion. High concentrations (1.7% butane in air) may cause unconsciousness, narcosis and CNS depression.
Some components of Natural gas e.g. propane and butane are a weak cardiac sensitizers. Exposures by inhalation to high concentrations of these components may lead to cardiac sensitization; may cause the sudden onset of an irregular heartbeat. Sudden deaths have been reported in cases of substance abuse involving propane and butane. The asphyxiant effects of high concentrations of aliphatic gases in air may enhance cardiac sensitization.

Chronic Health Effects:

No human or animal information was located.

Medical Conditions Aggravated by Exposure:

None known

Interactions With Other Chemicals:

May be explosive in contact with oxygen, halogen gases and strong oxidizing agents. (Section 10)

Potential Environmental Effects:

Natural gas is not expected to result in any ecological damage to water, land. Regulated as a VOC in air.

Section 3: Composition/Information on Ingredients

Hazardous Substances:

Natural gas is a naturally occurring gas mixture of aliphatic hydrocarbons, consisting mainly of methane. Natural gas is expected to have a typical composition reported in the table below. As a naturally occurring complex mixture, the composition will vary.

Other trace components may include pentanes, hexanes, nitrogen, carbon dioxide, oxygen, hydrogen sulfide and hydrogen.

Chemical Name	CAS No.	Wt.%
Natural Gas	8006-14-2	100
Typical composition:		
Methane	74-82-8	70 - 90
Ethane	74-84-0	1 - 20
Propane	74-98-6	Not available
Butane	106-97-8	Not available

Section 4: First Aid Measures

Description of first aid measures:

Skin Contact: For liquefied / compressed gas: Quickly remove victim from source of contamination. Immediately and briefly flush with lukewarm, gently flowing water until the chemical is removed. DO NOT attempt to rewarm the affected area on site. DO NOT rub area or apply dry heat. Gently remove clothing or jewellery that may restrict circulation. Carefully cut around clothing that sticks to the skin and remove rest of the garment. DO NOT allow victim to drink alcohol or smoke. Quickly transport victim to an emergency care facility.

Eye Contact: For liquefied / compressed gas: Quickly remove victim from source of contamination. Immediately and briefly flush with lukewarm, gently flowing water until the chemical is removed. DO NOT attempt to rewarm. Cover both eyes with a sterile dressing. Do NOT allow victim to drink alcohol or smoke. Quickly transport victim to an emergency care facility.

Inhalation: This material is extremely flammable. Take proper precautions (e.g. remove any sources of ignition, wear appropriate protective equipment). Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel. If breathing has stopped, begin artificial respiration or, if the heart has stopped, give CPR immediately. Immediately transport victim to an emergency care facility.
Ensure that first aid providers are aware of the material involved and take precautions to protect themselves.

Ingestion: Not an applicable route of exposure.

Most important symptoms and effects, both acute and delayed:

Skin Contact: Frostbite.

Eye Contact: Freezing of eye tissue.

Inhalation: Nausea, dizziness, drowsiness and confusion, unconsciousness.

Ingestion: Not applicable

Section 5: Fire Fighting Measures

Flammable properties:

Extremely flammable gas.
Readily forms explosive mixtures with air, which are easily ignited by heat, sparks or flame. Liquefied gas accumulates static charge. Liquefied Natural gas can accumulate electrostatic charge by flow, friction in pipes, splashing or agitation. Natural gas in the flammable range can be easily ignited by an electrostatic discharge of sufficient energy (e.g. brush discharge). Minimum Ignition Energy= 0.21 mJ for 8.5% by volume (for methane).
Liquefied gas rapidly vapourizes under normal conditions. Ignition of a large volume of gas vapour mixed with air causes sudden expansion and turbulence resulting in an explosion known as vapour cloud explosion.
Natural gas can accumulate in confined spaces and low areas, resulting in an explosion or asphyxiation hazard.

Extinguishing media:

Leaking gas fire: Do not extinguish unless leak can be stopped safely.
Dry chemical powder and high-expansion foam. Foam manufacturers should be consulted for recommendations regarding types of foams and application rates.
Unsuitable extinguishing media: Carbon dioxide, low expansion foams, and direct application of water on liquefied gas. Under certain conditions, discharge of carbon dioxide produces electrostatic charges that could create a spark and ignite flammable gas.

Special hazards arising from the substance or mixture:

Natural gas can travel over long distances creating a flash back hazard.
Containers may rupture and explode if heated.
Material will readily ignite at normal temperatures.
The gas can accumulate in confined spaces, resulting in explosion and asphyxiation hazards.
Direct addition of water (or any other room temperature liquid) to the liquefied gas will cause flash vaporization resulting in an explosion (either immediately or delayed) known as a "boiling liquid, expanding vapour explosion."
During a fire, toxic gases may be generated.
Cylinders exposed to heat and/or fire may vent and release flammable gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket.

Section 5: Fire Fighting Measures, continued

Advice for firefighters:

Evacuate the area and fight fire from a safe distance or protected location. Approach fire from upwind to avoid hazardous gas and toxic decomposition products. Stop flow of gas before attempting to extinguish fire. If flow cannot be stopped, let the fire burn while protecting the surrounding area. Cool exposed containers with water.
Fires involving tanks:
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
Cool containers with flooding quantities of water until well after fire is out.
Do not direct water at source of leak or safety devices; icing may occur.
Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
Always stay away from tanks engulfed in fire.
For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
If a tank or rail car is involved in a fire, isolate for 1600 m in all directions; also consider initial evacuation for 1600 m in all directions.

Section 6: Accidental Release Measures

Personal precautions, protective equipment and emergency procedures:

For a large spill or gas release, contact Fire/ Emergency Services immediately.
Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).
All equipment used when handling the product must be grounded.
Do not touch or walk through spilled material.
Stop leak if you can do it without risk.
If possible, turn leaking containers so that gas escapes rather than liquid.
Use water spray to reduce vapours or divert vapour cloud drift. Avoid allowing water runoff to contact spilled material.
Do not direct water at spill or source of leak.
Prevent spreading of vapours through sewers, ventilation systems and confined areas. Isolate area until gas has dispersed.

Environmental precautions:

Prevent releases to drains, sewers and natural waterways.

Methods and material for containment and cleaning up:

Isolate the area until the gas has dispersed. Monitor workplace air for levels of oxygen and flammable gas before anyone is allowed into area. Pay special attention to low-lying areas where the gas may have accumulated.

Reference to other sections:

See Section 8 for information on selection of personal protective equipment.

Section 7: Handling and Storage

Handling:

This material is an extremely flammable gas. Before handling, it is very important that engineering controls are operating and that protective equipment requirements are being followed. Eliminate all ignition sources (e.g., sparks, open flames, hot surfaces). Keep away from heat and welding operations. During transfer operations, cylinders and vessels should be electrically grounded and bonded to prevent the build up of a static charge. Post NO SMOKING signs. It is very important to keep areas where this material is used clear of other materials which can burn. If flammable gas is released in a confined space, immediately evacuate the area.
Compressed or liquefied gas cylinders, piping and fittings must be protected from damage during handling, filling, transportation and storage.
Ensure that compressed or liquefied gas cylinders are secured, preferably upright, and cannot fall or roll.

Storage

Store in a cool, dry, well-ventilated area out of direct sunlight and away from all ignition and heat sources. No part of a cylinder should be subjected to temperature exceeding 52°C (125°F).
Keep quantity stored as small as possible. Store away from incompatible materials, such as oxygen and strong oxidizing agents.
Storage of compressed gas cylinders must be in accordance with the appropriate provincial or regional Fire Code.

SAFETY DATA SHEET

Section 8: Exposure Controls / Personal Protection

Exposure guidelines:

Consult regional/local authorities for acceptable exposure limits.

Ingredient	ACGIH TLV (8-hr. TWA)	Alberta (8-hr. TWA)	Ontario TWAEV	U.S. OSHA PEL (8-hr. TWA)
Alkanes C_1 - C_4 (except Butane)	Asphyxia See Appendix F- Minimal Oxygen Content	1000 ppm	1000 ppm	1000 ppm
Butane-all isomers	1000 ppm	1000 ppm	800 ppm	800 ppm

Exposure controls:

Engineering Controls: Methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions, and process modification. Provide sufficient local exhaust and general (dilution) ventilation to maintain the gas concentration below one tenth of the lower explosive limit. Use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Administrative controls and personal protective equipment may also be required.
For large-scale operations and those handling liquefied gas, consider a closed handling system and the installation of leak and fire detection equipment and a suitable automatic fire suppression system.

Personal Protection: Workers must comply with the Personal Protective Equipment requirements of the workplace in which this product is handled.

Eye/Face Protection: Wear laboratory safety goggles or other appropriate eye protection. Wear a face shield when handling refrigerated liquefied gas.

Skin Protection: Wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear fire-resistant long-sleeved clothing and trousers worn outside boots or over top of shoes. Remove protective clothing immediately if it becomes wet with refrigerated liquefied gas. Wear appropriate foot protection when handling cylinders.

Respiratory Protection: In workplaces where engineering controls and work practices are not effective in controlling exposure to this material, or where occupational exposure limits are exceeded then respiratory protection is required.
If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Consult with respirator manufacturer to determine respirator selection, use and limitations. Wear a positive pressure air supplied respirator for uncontrolled releases.

A respiratory protection program that meets Canadian Standards Association (CSA) Standard Z94.4-2002 must be followed whenever workplace conditions warrant a respirator's use.

Other: Workplaces should have a frostbite wash readily available in the work area. Any clothing which becomes wet with liquid or saturated with gas should be removed immediately.

Section 9: Physical and Chemical Properties

Information on basic physical and chemical properties:	
Appearance:	Gas, colourless
Odour:	Odourless when pure, may have mercaptan odourant added.
Odour threshold:	Not available
pH:	Not applicable
Melting point/freezing point:	-182°C (-296°F) for methane
Initial boiling point and boiling range:	-162°C (-259°F) for methane
Flash point:	Flammable gas
Auto-ignition temperature:	537°C (999°F) for methane
Upper/lower flammability or explosive limits:	LEL: 5% for methane UEL: 15.4% for methane
Explosive properties:	Readily forms explosive vapour mixtures with air. Risk of vapour cloud explosion.
Oxidizing properties:	Not applicable
Sensitivity to mechanical impact:	Not applicable

SAFETY DATA SHEET

Section 9: Physical and Chemical Properties, continued

Sensitivity to static discharge:	Sensitive, Minimum Ignition Energy methane=0.21 mJ for 8.5% by volume.
Evaporation rate:	Liquefied methane evaporates rapidly at room temperature.
Vapour pressure:	Not available
Vapour density:	Not available
Relative density:	Not applicable
Solubility:	Insoluble in water
Partition coefficient (n-octanol/water):	Log P_{oct} = 1.09 for methane
Critical temperature:	-82°C (-116°F) for methane
Critical pressure:	4640 kPa (45.9 atm) for methane
Decomposition temperature:	Not available
Viscosity:	Not applicable

Section 10: Stability and Reactivity

Reactivity:

Not classified as dangerously reactive.

Chemical Stability:

Normally stable. Releases of gas are extremely flammable and/or explosive in the presence of an ignition source.

Possibility of Hazardous Reactions:

Forms an explosive mixture with air. Direct addition of water, or any other room temperature liquid, to the liquefied gas will cause flash vaporization resulting in an explosion.
Hot containers may explode.

Conditions to Avoid:

Avoid heat, flame, static discharge, sparks and other ignition sources.
Avoid unintended contact with incompatible materials.

Incompatible Materials:

Avoid contact with oxygen and strong oxidizing agents (e.g. chlorine, fluorine, peroxides, nitrates and perchlorates) which can increase risk of fire and explosion. Incompatible with halogen compounds (e.g. chlorine gas), contact may cause an explosion.

Pure Methane gas is corrosive to acrylonitrile butadiene styrene (ABS) and high density polyethylene (HDPE). Slightly corrosive to polypropylene.

Hazardous Decomposition Products:

Not applicable

SAFETY DATA SHEET

Section 11: Toxicological Information

Acute Toxicity Data:

Chemical	LD_{50} Oral (mg/kg)	LD_{50} Dermal (mg/kg)	LC_{50} Inhalation (4 hrs.)
Methane	Not applicable	Not applicable	>800000 ppm (80%) (mice) axphyxiant duration not reported

Chronic Toxicity Data:

No data available.

Sensitization:

Natural gas component propane, and some other closely related aliphatic hydrocarbons (isobutane and butane), are weak cardiac sensitizers in humans following inhalation exposures to high concentrations. Cardiac sensitizers may cause the sudden onset of an irregular heartbeat (arrhythmia) and, in some cases, sudden death, particularly when under stress.

Neurological Effects:

At high concentrations, the components of Natural gas can cause depression of the central nervous system (CNS) based on animal and human information. Unconsciousness (narcosis) from inhalation of ethane has been observed due to CNS depression at approximately 130000 ppm (13%).
Unconsciousness (narcosis) from inhalation of butane has been observed due to CNS depression at approximately 17000 ppm (1.7%). Note that butane is extremely flammable, lower explosive limit: 1.8-1.9%.

Genetic Effects:

Not available

Reproductive Effects:

None reported.

Developmental Effects:

None reported.

Target Organ Effects:

Central nervous system.

Other Adverse Effects:

Natural Gas in high concentrations in the air displaces oxygen and can cause symptoms of oxygen deprivation (asphyxiation). Natural gas concentration of greater than 14% (140 000 ppm) will displace oxygen (O_2) to 18% in air and cause oxygen deprivation.
Symptoms of oxygen deficiency are:
O_2=12-16% - breathing and pulse rate are increased, with slight loss of muscular coordination;
O_2=10-14% - emotional upsets, abnormal fatigue from exertion, disturbed respiration;
O_2=6-10% - nausea and vomiting, inability to move freely, collapse, possible loss of consciousness;
O_2=below 6% - convulsive movements, gasping, possible respiratory collapse and death.

Exercise increases the body's need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment.

Carcinogenicity:

This product does not contain any component at a concentration of greater than 0.1% that is considered a human carcinogen by IARC (International Agency for Research on Cancer), ACGIH (American Conference of Governmental Industrial Hygienists, OSHA (Occupational Safety and Health Administration) or NTP (National Toxicology Program).

Section 12: Ecological Information

Toxicity:

Natural gas is not expected to result in any ecological damage to water or land. VOC gases are reportable to the National Pollutant Release Inventory, Environment Canada. Methane is regulated as a greenhouse gas.

Persistence and degradability:

Not available

Bioaccumulative potential:

Not applicable

Mobility in soil:

Not applicable

SAFETY DATA SHEET

Section 13: Disposal Considerations

Waste treatment methods:

Dispose of material in accordance with applicable regulations. Empty containers retain product residue, adhere to warnings after container has been emptied.

Section 14: Transport Information

Transport symbol:

UN Number: UN1971

UN proper shipping name: METHANE, compressed or NATURAL GAS, compressed

Or

UN1972, LIQUEFIED NATURAL GAS or LNG (cryogenic liquid) or NATURAL GAS, refrigerated liquid

Transport hazard class(es): 2.1

Packing group: Not applicable

Emergency response guide: 115

Section 15: Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture:

USA

Toxic Substances Control Act 8(b) Inventory: Substance listed on the TSCA inventory.

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

Canada

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

WHMIS Classification: A - Compressed gas
B1 - Flammable and combustible material - Flammable gas.

New Substances Notification Regulations: Substances listed on the Domestic Substances List (DSL).

National Pollutant Release Inventory: VOC gases are NPRI reportable substances.

Methane is regulated as a greenhouse gas.

SAFETY DATA SHEET

Section 16: Other Information

Issue date: October 25, 2013

Revision summary: Previous version: December 1, 2010
Revised Sections 2, 4, 5, 6, 7, 8, 16

References and sources for data:

HSDB – Hazardous Substances Data Bank ; US National Library of Medicine
Cheminfo – Canadian Centre for Occupational Health and Safety
RTECS – Registry of Toxic Effects of Chemical Substances

Manufacturer disclaimer

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Prepared by: LEHDER Environmental Services Limited (519) 336-4101
www.lehder.com
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MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

Intended Use: Fuel gas

COMPANY IDENTIFICATION

Supplier: **Imperial Oil Downstream**
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada

24 Hour Environmental / Health Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
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%	None
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 ignition.

HEALTH EFFECTS

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

confined spaces and may cause dizziness, light-headedness, headache, nausea and loss of co-ordination. Continued inhalation may result in narcosis, unconsciousness, and possibly lead to death. 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 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. If frostbite occurs, immerse involved area in water at body temperature. Keep immersed for 20 to 40 minutes. Seek medical assistance.

EYE CONTACT

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

INGESTION

Not Applicable

NOTE TO PHYSICIAN

This light hydrocarbon material, or a component, may be associated with cardiac sensitisation following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

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

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

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

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of the spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that provide chemical resistance and, when necessary, heat-resistance and/or thermal insulation are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Small spills: normal work clothes are usually adequate. Large spills: full body suit of chemical and thermal resistant material is recommended. Chemical goggles and face shield are recommended if contact with liquefied gas is possible.

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 section of the SDS for advice on gases.

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

consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

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

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Ethyl mercaptan is added to gas as an odorant to aid in the detection of the gas in case of leak or accidental discharge. Since ethyl mercaptan is reactive, a reduction in its effectiveness may occur during transport and storage of the odorised gas. Therefore, odour must not be used exclusively as a safety measure. Handle gas with strict adherence to established safety procedures. Use proper bonding and/or earthing procedures.However, bonding and earthing may not eliminate the hazard from static accumulation. Material can accumulate static charges which may cause an electrical spark (ignition source). Material may contain trace amounts of naturally occurring radioactive material (NORM), which will accumulate in process equipment and storage vessels. Auto-refrigeration. Drains can be plugged and valves may become inoperable because of the formation of ice when expanding vapors or vaporizing liquids cause temperatures below the freezing point of water.

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The container choice, for example storage vessel, may effect static accumulation and dissipation. 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
ISOBUTANE		STEL	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:

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

Eye Protection: 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:

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

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications.

GENERAL INFORMATION

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

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.51
Flash Point [Method]: -103°C (-153°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 2.4 UEL: 9.5

Autoignition Temperature: 432°C (810°F)
Boiling Point / Range: -42°C (-44°F)
Vapour Density (Air = 1): 1.5 at 101 kPa
Vapour Pressure: 850 kPa (6375 mm Hg) at 20ºC
Evaporation Rate (n-butyl acetate = 1): > 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/A
Solubility in Water: Negligible
Viscosity: N/A
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

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

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 > 1443 mg/l	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Toxicity: No end point data for material.	Not applicable.
Skin	
Toxicity: No end point data for material.	Not applicable.
Irritation (Rabbit): No end point data for material.	Negligible irritation to skin at ambient temperatures.
Eye	
Irritation (Rabbit): No end point data for material.	May cause mild, short-lasting discomfort to eyes.

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). Very high exposure (confined spaces / abuse) to light hydrocarbons may result in abnormal heart rhythm (arrhythmias). Concurrent high stress levels and/or co-exposure to high levels of hydrocarbons (above occupational exposure limits), and to heart-stimulating substances like epinephrine, nasal decongestants, asthma drugs, or cardiovascular drugs may initiate arrhythmias. 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.

CMR Status: None.

Chemical Name	CAS Number	List Citations
ISOBUTANE	75-28-5	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 readily 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
Hazard Class & Division: 2.1
UN Number: 1075
Packing Group: (N/A)

LAND (DOT)

Proper Shipping Name: PETROLEUM GASES, LIQUEFIED
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, LIQUEFIED
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, LIQUEFIED
Hazard Class & Division: 2.1
UN Number: 1075
Packing Group: (N/A)
Label(s) / Mark(s): 2.1
Transportation Limitations: CARGO AIRCRAFT ONLY
Transport Document Name: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1

SECTION 15 REGULATORY INFORMATION

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

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

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

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

The Following Ingredients are Cited on the Lists Below:

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
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 01: Company Mailing Address information was modified.
Section 09: Phys/Chem Properties Note information was modified.
Section 16: Not determined, Not applicable information was modified.
Section 07: Handling and Storage-Handling information was modified.
Section 11: Inhalation Lethality Test Data information was modified.
Section 11: Dermal Irritation Test Data information was modified.
Section 11: Eye Irritation Test Data information was modified.
Section 11: Dermal Irritation Test Comment information was modified.
Section 11: Eye Irritation Test Comment information was modified.
Section 05: Hazardous Combustion Products information was modified.
Section 08: Hand Protection information was modified.
Section 08: Eye Protection information was modified.
Section 08: Skin and Body Protection information was modified.
Section 11: Inhalation Lethality Test Comment information was modified.
Section 15: National Chemical Inventory Listing - Header information was modified.

Composition: Component table information was modified.
Section 16: CA Contains information was modified.
Section 12: Ecological Information - Biodegradation information was added.
Section 12: Ecological Information - Biodegradation information was added.
Section 09: Decomposition Temperature information was added.
Section 09: Decomposition Temp - Header information was added.
Section 12: Ecological Information - Biodegradation information was deleted.
Section 12: Ecological Information - Biodegradation information was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: ALKANES, C4; PROPYLENE; ETHANE; ISOBUTANE; PROPANE
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 ignition.

PRECAUTIONS
Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Use proper bonding and/or earthing procedures.However, bonding and earthing may not eliminate the hazard from static accumulation.

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

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (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 section of the SDS for advice on gases.

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DGN: 5011698 (1010476)

Prepared by: Imperial Oil Limited, IH and Product Safety

Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

METHANOL

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http://www.brenntag.ca

WHMIS#: 00060463
Index: GCD0167/14A
Effective Date: 2014 January 10
Date of Revision: 2014 January 10

EMERGENCY TELEPHONE NUMBER (For Emergencies Involving Chemical Spills or Releases)

1 855 273 6824

PRODUCT IDENTIFICATION

Product Name:	Methanol.
Chemical Name:	Methyl Alcohol.
Synonyms:	Methyl Hydrate; Wood Spirit; Carbinol; Colonial Spirit; Columbian Spirit; Methyl Hydroxide; Wood Naphtha; Wood Alcohol; Methanol with Additive; CCS 973 Solvent.
Chemical Family:	Alcohol.
Molecular Formula:	CH3-OH.
Product Use:	Industrial solvent, cleaner, degreaser. Fuel for heaters and wick lamps. Automotive coolant/antifreeze. Chemical intermediate. Lacquer thinner.

WHMIS Classification / Symbol:

B-2: Flammable Liquid
D-1B: Toxic (acute effects)
D-2A: Very Toxic (teratogen)
D-2B: Toxic (skin and eye irritant)

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV (TWA)*	*% Concentration*
Methanol	67-56-1	200 ppm (Skin)	60 - 100

Skin Notation: Contact with skin, eyes and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Poison. May be fatal or cause blindness if swallowed. Can cause teratogenic effects. Causes eye irritation. Can cause skin irritation. Mists or sprays are irritating to eyes and respiratory tract. At elevated temperatures may cause irritation of the eyes and respiratory tract. See "Other Health Effects" Section. Flammable liquid and vapour. May cause flash fire or explosion. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation: Contact with mist or spray will cause irritation of mucous membranes, coughing and difficulty in breathing. See "Other Health Effects" Section.

Skin Contact:	Prolonged and repeated contact may lead to dermatitis. May cause defatting, drying and cracking of the skin. Skin contact can cause irritation, especially under the finger nails (and other confined spaces such as under rings or watch bands).
Skin Absorption:	May be absorbed through intact skin.
Eye Contact:	Vapours from this product are irritating to the eyes. Splashes to the eye may cause irritation, redness and pain. Product residues on fingers, hands or gloves may contact the eyes and cause eye irritation, redness and pain.
Ingestion:	This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.
Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. May cause visual disturbances, blindness, photophobia, central nervous system (CNS) depression, liver damage, kidney damage, metabolic acidosis, endocrine effects, systemic poisoning and death. Mild blurring of vision to complete blindness may occur, including changes in colour perception and photophobia. Symptoms usually develop 12-18 hours after exposure. Abnormal sensitivity to light is termed photophobia. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Liver damage is characterized by the loss of appetite, jaundice (yellowish skin colour), and occasional pain in the upper left-hand side of the abdomen. Signs and symptoms of kidney damage generally progress from oliguria, to blood in the urine, to total renal failure. Metabolic acidosis is a condition that describes a decreased pH and bicarbonate concentration in the body fluids.

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.
Skin Contact:	Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, obtain medical advice.
Eye Contact:	Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. When plasma methanol concentrations are higher than 20 mg/dL, when ingested doses are greater than 30 mL, and when there is evidence of acidosis or visual abnormalities, a 10% solution of ethanol in 5% aqueous dextrose, administered intravenously, is a safe, effective antidote. (3) Medical conditions that may be aggravated by exposure to this product include neurological and cardiovascular disorders, diseases of the skin, eyes or respiratory tract, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

		Flammability Limits in Air (%):	
Flashpoint (°C)	***AutoIgnition Temperature (°C)***	***LEL***	***UEL***
11 (3)	464 (3)	6 (3, 4)	36.5 (3)

Flammability Class (WHMIS):	B-2: Flammable Liquid
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include formaldehyde and oxides of carbon.

Unusual Fire or Explosion Hazards:	Vapours from this product are heavier than air, and may "travel" to a source of ignition (eg. pilot lights, heaters, electric motors) some distance away, and then "flash back" to the point of product discharge causing an explosion and fire. Closed containers exposed to heat may explode. Spilled material may cause floors and contact surfaces to become slippery.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Expected to be sensitive to static discharge when vapours are present between the lower and upper explosive limits.
EXTINGUISHING MEDIA	
Fire Extinguishing Media:	Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. This material may produce a floating fire hazard in extreme fire conditions.
FIRE FIGHTING INSTRUCTIONS	
Instructions to the Fire Fighters:	Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours; re-ignition is possible.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Do not use combustible materials such as sawdust as an absorbent. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING	
Handling Practices:	Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools and avoid "splash-filling" of containers. Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure. Absorption via contact with skin, eyes and mucous membranes can contribute to the overall exposure. Consider measures to prevent absorption by these routes.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing vapours and aerosols. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Do not use cutting or welding torches on empty drums that contained this material/product. Store wiping rags and similar material in metal cans with tight fitting lids. Enforce NO SMOKING rules in area of use.
STORAGE	
Storage Temperature (°C):	See below.
Ventilation Requirements:	Ventilation should be explosion proof.
Storage Requirements:	Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C. Avoid moisture contamination. Protect from direct sunlight. Protect against physical damage.
Special Materials to be Used for Packaging or Containers:	Equipment for storage, handling or transport should NOT be made from the following material, or, where applicable, its alloys: lead, nickel, cast iron, copper, zinc, galvanized steel or aluminum. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	Local exhaust ventilation required. Ventilation should be explosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (6)
PERSONAL PROTECTIVE EQUIPMENT (PPE)	
Eye Protection:	Safety glasses with side shields are recommended to prevent eye contact. Use chemical safety goggles when there is potential for eye contact. Contact lenses should not be worn when working with this material.
Skin Protection:	Gloves and protective clothing made from butyl rubber or viton should be impervious under conditions of use. Prior to use, user should confirm impermeability. Do not use gloves or protective clothing made from natural rubber, neoprene, nitrile rubber or polyvinyl alcohol (PVA). Discard contaminated gloves.
Respiratory Protection:	A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 200 ppm. A NIOSH/MSHA-approved full facepiece air-supplied respirator if concentrations are higher or unknown. If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (6) Methanol: Immediately Dangerous to Life and Health (IDLH) value: 6 000 ppm. The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory equipment. In the event of failure of respiratory protective equipment, every effort should be made to exit immediately. (4)
Other Personal Protective Equipment:	Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact. Clothing and footwear that is fire retardant and dissipates static electrical charges should be worn when handling flammable materials. Natural fibers (cotton, wool, leather and linen) should be selected in favour of synthetic materials (rayon, nylon and polyester). Skin Notation: Contact with skin, eyes and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

EXPOSURE GUIDELINES

SUBSTANCE	***ACGIH TLV***	***OSHA PEL***		***NIOSH REL***	
	(STEL)	***(TWA)***	***(STEL)***	***(TWA)***	***(STEL)***
Methanol	250 ppm (Skin)	200 ppm	---	200 ppm (Skin)	250 ppm (Skin)

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Clear, colourless liquid.
Odour:	Mild alcohol odour.
Odour Threshold (ppm):	4.2 - 5 960. (3)
Boiling Range (°C):	64.7. (3)
Melting/Freezing Point (°C):	- 97.8. (3)
Vapour Pressure (mm Hg at 20° C):	96. (3)
Vapour Density (Air = 1.0):	1.11. (3)
Relative Density (g/cc):	0.791 - 0.793. (3)

Bulk Density:	Not available.
Viscosity:	Not available.
Evaporation Rate (Butyl Acetate = 1.0):	4.1. (3)
Solubility:	Soluble in water. Hygroscopic (readily absorbs water).
% Volatile by Volume:	100.
pH:	Not applicable.
Coefficient of Water/Oil Distribution:	< 0. (3)
Volatile Organic Compounds (VOC):	100.
Flashpoint (°C):	11 (3)

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	Flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition.
Materials to Avoid:	Strong oxidizers. Lewis or mineral acids. Sulphuric Acid. Hydrogen Peroxide. Lead. Aluminum and its alloys. Magnesium. Platinum. Nickel. Cast Iron. Copper and its alloys. Zinc and its alloys. Galvanized Steel. Mixtures or reactions of alcohols with the following materials may cause explosions: barium perchlorate, chlorine, hypochlorous acid, ethylene oxide, hexamethylene diisocyanate and other isocyanates, nitrogen tetroxide, permonosulfuric acid and tri-isobutyl aluminum. (4)
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include formaldehyde and oxides of carbon.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	***LD50 (Oral, Rat)***	***LD50 (Dermal, Rabbit)***	***LC50 (Inhalation, Rat, 4h)***
Methanol	5 600 mg/kg (1)	15 800 mg/kg (1)	64 000 ppm (1)

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data:	No adverse reproductive effects are anticipated.
Mutagenicity Data:	No adverse mutagenic effects are anticipated.
Teratogenicity Data:	Methanol may cause teratogenic/embryotoxic effects based on studies in laboratory animals. See "Other Studies Relevant to Material".
Respiratory / Skin Sensitization Data:	None known.
Synergistic Materials:	Alcohols may interact synergistically with chlorinated solvents (example - carbon tetrachloride, chloroform, bromotrichloromethane), dithiocarbamates (example - disulfiram), dimethylnitrosamine and thioacetamide. (6)

Other Studies Relevant to Material:

Methanol caused moderate skin and eye irritation in animal tests. A well-conducted oral study using rats suggests that methanol may be carcinogenic, but further studies are required before firm conclusions can be drawn. Limited inhalation studies using mice, rats and monkeys have not shown carcinogenicity. (4)

Methanol has produced fetotoxicity in rats and teratogenicity in mice exposed by inhalation to high concentrations that did no produce significant maternal toxicity. Mice were exposed by inhalation to 1000, 2000, 5000, 7500, 10000, or 15000 ppm of days 6-15 of pregnancy (7 hr/d). No visible signs of maternal toxicity were noted, but 1/30-40 mothers died in each group exposed to 7500 ppm and above. There was a dose-related significant decrease in the number of live pups/litter (post implantation mortality) at 7500 ppm and above. A significant increase in malformations (e.g. cleft palate, exencephaly, skeletal anomalies) was observed at 5000 ppm and above. Fetal body weights were significantly reduced at 10000 ppm and higher. (4)

The pathologic changes found in the tissues of animals exposed by inhalation to Methyl Alcohol are quite similar to those observed in animals following ingestion of this compound. In the eyes of dogs, hyperemia (increased amount of blood) of the choroid and edema of the ocular tissue with early signs of degeneration of the ganglionic cells of the retina and nerve fibers were found. The blood vessels of the choroid in poisoned animals were markedly congested, the entire retina was edematous and the ganglion cells were degenerated. Hemorrhage, edema, congestion and pneumonia were observed in the lungs of the various species that were exposed to vapours containing Methyl Alcohol. The livers and kidneys showed congestion, albuminous and fatty acid degeneration and fatty infiltration. Cardiac dilation and myocardial degeneration were observed in the hearts of the animals. (4)

The effects of alcohol on hearing were studied in the rat by examining the modification of the acoustic startle reflexes by pure tone pulses and by gaps in white noise. Groups of rats received four injections of 0. 0.25, 1 and 2 g/Kg of Methyl Alcohol or Ethyl Alcohol in increasing order at one hour intervals, loudness perception or temporal acuity was tested after 30 minutes. Both alcohols produced a dose dependent reduction in baseline startle amplitude that was greater during exposure Ethanol than in Methanol. Loudness functions associated with pulse intensity were not diminished by the alcohols, however inhibition produced by gap in noise reduced following the highest dose of either alcohol. (4)

Mature male rats were examined for alterations in circulating free testosterone, luteinizing hormone and follicle stimulating hormone after inhalation of Methanol vapour for six weeks at doses ranging from 200 ppm to 10,000 ppm. The most extensive effects were noticed after exposure to 200 ppm Methanol for six weeks, with serum levels of testosterone being 32 % of the controls. A significant change in luteinizing hormone concentration after exposure to 10,000 ppm of methanol for six weeks was also demonstrated while follicle stimulating and the elimination of testosterone from the blood remained unchanged throughout the experiment. (4)

The result of skin absorption experiments were described by stating that all animals subjected to the action of any amount of Methanol by skin absorption has died. The lowest lethal does was 0.5 ml / Kg for one monkey. It was reported that rabbits were far less susceptible to Methyl Alcohol poisoning by this route than monkeys or rats. In a study of the effects of continuous exposure to methanol, a known amount was dropped onto or injected into the gauze pads 4 times / day. All such treated monkeys displayed dilated pupils within 2 hours after one such administration of 1.3 mg / Kg Methanol. The minimum lethal dose was a total of four administrations of 0.5 ml / Kg of Methanol in one day. It was concluded that sufficient amounts of Methanol can be absorbed through the skin and that the threshold for immediate danger to monkeys was below the minimum lethal dose. (4)

A negative consensus resulted from all sister chromatid exchange tests when no exogenous metabolic activation system was used. A negative consensus resulted from both cell transformation in primary cells using limited lifetime strains and cell transformation via viral enhancement tests when no exogenous activation system was used. A negative consensus resulted from all Neurospera crassa tests when no exogenous metabolic activation system was used. (4)

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Methanol:
96-hour LC50 (Pimephales promelas) = 28 g/L. (3)
96-hour LC50 (Lepomis macrochirus) = 15.4 g/L. (3)
48-hour EC50 (Daphnia magna) = 24.5 g/L. (3)

Environmental Fate:

If released to the atmosphere, methanol degrades via reactions with photochemically produced hydroxyl radicals with an approximate half-life of 17.8 days. Physical removal from air can occur via rainfall. If released to water, decomposition via biodegradation is expected to occur. If released to soil, methanol is expected to degrade via biodegradation and be susceptible to leaching. (4)

Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	None required.
Waste Disposal Methods:	Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. Do not dispose of package until thoroughly washed out.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

METHANOL, Class 3(6.1), UN1230, PG II.

Label(s): Flammable Liquids, Toxic Substances. Placard: Flammable Liquids.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

METHANOL, Class 3(6.1), UN1230, PG II.

Label(s): Flammable Liquid, Poison. Placard: Flammable Liquid.

CERCLA-RQ: Methanol: 5 000 lb / 2 270 Kg. Exemptions: Not applicable.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: This material is included on the DSL under the CEPA.

CEPA - NPRI: Methanol.

Controlled Products Regulations Classification (WHMIS):

B-2: Flammable Liquid
D-1B: Toxic (acute effects)
D-2A: Very Toxic (teratogen)
D-2B: Toxic (skin and eye irritant)

USA

Environmental Protection Act: This material is included on the TSCA Inventory.

OSHA HCS (29CFR 1910.1200): Flammable Liquid. Toxic. Teratogenic and Embryotoxic. Skin and Eye Irritant.

NFPA: 1 Health, 3 Fire, 0 Reactivity (3)

HMIS: 2 Health, 3 Fire, 0 Reactivity (3)

INTERNATIONAL

This product or its components are on the European inventory of existing commercial chemicals (EINECS).

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.

3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2011, American Conference of Governmental Industrial Hygienists, Cincinnati, 2011.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

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Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

Brenntag Canada Inc.

MATERIAL SAFETY DATA SHEET

ETHYLENE GLYCOL (ALL GRADES)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http://www.brenntag.ca

WHMIS#: 00060325
Index: GCD0087/16B
Effective Date: 2016 May 06
Date of Revision: 2016 May 06

EMERGENCY TELEPHONE NUMBER (For Emergencies Involving Chemical Spills or Releases)

1 855 273 6824

PRODUCT IDENTIFICATION

Product Name:	Ethylene Glycol (All Grades).
Chemical Name:	1,2-Ethanediol.
Synonyms:	Ethylene Glycol (EG); Monoethylene Glycol (MEG); Ethylene Glycol (60%) Blue;
Chemical Family:	Glycols.
Molecular Formula:	C2H6O2.
Product Use:	Industrial solvent, cleaner, degreaser. Automotive coolant/antifreeze. Chemical intermediate. Heat transfer fluid. Do not use in the manufacture or preparation of foods or pharmaceuticals. Do not use in aircraft de-icing applications. Glycols are not intended for the production of theatrical fog or artificial smoke. The normal use of glycols in the workplace usually includes preventative measures to reduce or minimize personnel contact. Such measures may not be consistent with theatrical or entertainment settings where these special effects may be produced. Do not use in theatrical fogs or other artificial smoke generator applications.

WHMIS Classification / Symbol:

D-2A: Very Toxic (teratogen)
D-2B: Toxic (skin and eye irritant)

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV (TWA)*		*% Concentration*
Ethylene Glycol	107-21-1	—	*A4	25 - 100
May also contain:				
Food Blue 1	Not available.	---		Trace

A4 = Not classifiable as a human carcinogen. (ACGIH-A4).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:	Harmful if inhaled, absorbed through skin, or swallowed. High vapour concentrations may cause drowsiness. Can cause skin and eye irritation. Can cause teratogenic effects. See "Other Health Effects" Section. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation:	This product has a low vapour pressure and is not expected to present an inhalation hazard at ambient conditions. Caution should be taken to prevent aerosolization or misting of this product. (3) Excessive contact with mist or spray may cause irritation of mucous membranes, coughing and difficulty in breathing. See "Other Health Effects" Section.
Skin Contact:	Prolonged, confined (especially under the finger nails, under rings or watch bands) or repeated exposure may cause skin irritation. May cause defatting, drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis. May cause skin sensitization or other allergic responses. See Section 11, "Toxicological Information".
Skin Absorption:	May be readily absorbed through broken or damaged skin. (4)
Eye Contact:	Splashes to the eye may cause irritation, redness and pain.
Ingestion:	Ingestion of large amounts may cause nausea, gastrointestinal upset and abdominal pain.
Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. May cause metabolic acidosis, liver damage, kidney damage, systemic poisoning and death. Ethylene Glycol poisoning occurs in three stages: central nervous system (CNS) depression, cardiopulmonary failure and kidney failure. The severity of those stages, and advancement from one stage to another depends upon the dose ingested. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Survival of CNS depression may be followed by cardiopulmonary failure, which is initiated by the onset of coma and is characterized by quick, shallow breathing, excessively fast heart beat, mild hypertension and cyanosis. Survival of cardiopulmonary failure may be followed by kidney damage, which may range from a mild increase in blood urea nitrogen to complete kidney failure and possible death. In severe cases of overexposure, pulmonary oedema, bronchopneumonia, cardiac enlargement and possible death may occur. Pulmonary oedema is the exposure to high concentrations of a substance causing the build-up of fluid in the lungs that might be fatal. Symptoms of pulmonary oedema, such as shortness of breath, may not appear until several hours after exposure and are aggravated by physical exertion. There may be cranial nerve involvement in the late stages of toxicity from swallowed Ethylene Glycol. In particular, effects have been reported from the seventh, eighth and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing and difficulty in swallowing (dysphagia). (3) Liver damage is characterized by the loss of appetite, jaundice (yellowish skin colour), and occasional pain in the upper left-hand side of the abdomen. Signs and symptoms of kidney damage generally progress from oliguria, to blood in the urine, to total renal failure. Metabolic acidosis is a condition that describes a decreased pH and bicarbonate concentration in the body fluids.

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	If respiratory problems arise, move the victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.
Skin Contact:	Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, obtain medical advice.
Eye Contact:	Immediately flush eyes with running water for a minimum of 15 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.

Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Ethylene Glycol is metabolized by alcohol dehydrogenase to various metabolites including glycoaldehyde, glycolic acid, and oxalic acid which cause an elevated anion-gap metabolic acidosis and renal tubular injury. Urinalysis may show albuminuria, hematuria and oxaluria. Clinical chemistry may reveal anion-gap metabolic acidosis and uremia. (3) The currently recommended medical management of Ethylene Glycol poisoning includes elimination of Ethylene Glycol and metabolites, correction of metabolic acidosis and prevention of kidney injury. It is essential to have immediate and follow-up urinalysis and clinical chemistry. There should be particular emphasis on acid-base balance and renal function tests. A continuous infusion of 5% Sodium Bicarbonate with frequent monitoring of electrolytes and fluid balance is used to achieve correction of metabolic acidosis and forced diuresis. (3) Pulmonary oedmea with low arterial oxygen levels (hypoxemia) has been described in a number of patients following poisoning with Ethylene Glycol. The mechanism of production has not been elucidated, but it appears to be not carcinogenic in origin in several cases. Respiratory support with mechanical ventilation and positive end-expiratory pressure may be required. Maintain adequate ventilation and oxygenation of the patient. (3) As a competitive substrate for alcohol dehydrogenase, Ethyl Alcohol is antidotal. Given in the early stages of intoxication, it blocks the formation of nephrotoxic metabolites. A therapeutically effective blood concentration of ethanol is in the range of 100-150 mg/dL, and should be achieved by a rapid loading dose and maintained by intravenous infusion. (3) For severe and/or deteriorating cases, hemodialysis may be required. Dialysis should be considered for patients who are symptomatic, have severe metabolic acidosis, a blood Ethylene Glycol concentration greater than 25 mg/dL, or compromise of renal function. (3) 4-Methylpyrazole, a potent inhibitor of alcohol dehydrogenase, has been effectively used to decrease the metabolic consequences of Ethylene Glycol poisoning before metabolic acidosis, coma, seizures and renal failure have occurred. (3) Additional therapeutic measures may include the administration of cofactors involved in the metabolism of Ethylene Glycol. Thiamine (100 mg) and pyridoxine (50 mg) should be given every six hours. (3) Medical conditions that may be aggravated by exposure to this product include neurological and cardiovascular disorders, diseases of the skin, eyes or respiratory tract, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	***AutoIgnition Temperature (°C)***	**Flammability Limits in Air (%):** ***LEL***	***UEL***
111. (3)	398. (3)	3.2. (3)	15.3. (3)

Flammability Class (WHMIS):	Not regulated.
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon.
Unusual Fire or Explosion Hazards:	Not normally a fire hazard. Water content of product prevents ignition. Do not direct a solid stream of foam into hot, burning pools. This may cause spattering and increase fire intensity. Closed containers exposed to heat may explode. Spilled material may cause floors and contact surfaces to become slippery.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Not expected to be sensitive to static discharge.
EXTINGUISHING MEDIA	
Fire Extinguishing Media:	Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. Use media appropriate for surrounding fire and/or materials.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters:	Fire-exposed containers should be kept cool by spraying with water to reduce pressure. This should be done from a safe distance since containers may rupture. Isolate materials that are not involved in the fire and protect personnel. The heat from a fire can cause a build-up of pressure inside the containers which may explode. No part of a container should be exposed to temperatures above 50° Celsius. Cool containers with flooding quantities of water until well after the fire is out.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Recover spilled material on non-combustible absorbents, such as sand or vermiculite, and place in covered containers for disposal. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dikes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Use normal "good" industrial hygiene and housekeeping practices. Drums which have been exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing vapours and aerosols. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Do not use cutting or welding torches on empty drums that contained this material/product. Sudden release of hot organic chemical vapours or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions.

STORAGE

Storage Temperature (°C):	See below.
Ventilation Requirements:	General exhaust is acceptable. Local exhaust ventilation preferred.
Storage Requirements:	Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C. Protect from direct sunlight. Protect against physical damage. Avoid moisture contamination. Hygroscopic.
Special Materials to be Used for Packaging or Containers:	Materials of construction for storing the product include: steel. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	Local exhaust ventilation required. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (6)
PERSONAL PROTECTIVE EQUIPMENT (PPE)	
Eye Protection:	Use full face-shield or chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.
Skin Protection:	Gloves and protective clothing made from PVC, butyl rubber, natural rubber, viton, neoprene or nitrile rubber should be impervious under conditions of use. Prior to use, user should confirm impermeability. Discard contaminated gloves.
Respiratory Protection:	No specific guidelines available. A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 1 000 ppm. An air-supplied respirator if concentrations are higher or unknown. If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (6)
Other Personal Protective Equipment:	Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

EXPOSURE GUIDELINES

SUBSTANCE	***ACGIH TLV***	***OSHA PEL***		***NIOSH REL***	
	(STEL)	***(TWA)***	***(STEL)***	***(TWA)***	***(STEL)***
Ethylene Glycol	100 mg/m³ (Ceiling, Aerosol only)	---	---	---	---

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Colourless or blue liquid.
Odour:	Mild, sweet odour.
Odour Threshold (ppm):	Not available.
Boiling Range (°C):	193 - 204. (3, 4)
Melting/Freezing Point (°C):	-13. (3, 4)
Vapour Pressure (mm Hg at 20° C):	0.05 - 0.09. (3, 4)
Vapour Density (Air = 1.0):	2.1 - 2.2. (3, 4)
Relative Density (g/cc):	1.1135 - 1.12. (3, 4)
Bulk Density:	Not available.
Viscosity:	Not available.
Evaporation Rate (Butyl Acetate = 1.0):	< 0.01. (3, 4)
Solubility:	Soluble in water.
% Volatile by Volume:	Not available.
pH:	9. (3)
Coefficient of Water/Oil Distribution:	Not available.
Volatile Organic Compounds (VOC):	Not available.
Flashpoint (°C):	111. (3)

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	Not normally a fire hazard. Water content of product prevents ignition.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition. Keep tightly closed to protect quality. Temperatures above 165 °C. (3) Avoid moisture contamination. Hygroscopic.
Materials to Avoid:	Strong oxidizers. Strong acids. Strong bases.
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	***LD50 (Oral, Rat)***	***LD50 (Dermal, Rabbit)***	***LC50 (Inhalation, Rat, 4h)***
Ethylene Glycol	4 700 mg/kg (1)	9 530 mg/kg (1)	>200 (1)

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data:	Ingestion of large amounts of Ethylene Glycol has been shown to interfere with reproduction in animals. Specifically, growth retardation, decreased litter size in rats and mice, and decrease in mating frequency in mice were observed. (3) See "Other Studies Relevant to Material".
Mutagenicity Data:	In vitro mutagenicity studies were negative. Animal mutagenicity studies were negative. (3)
Teratogenicity Data:	Based on animal studies, ingestion of very large amounts of Ethylene Glycol appears to be the major and possibly the only route of exposure to produce birth defects. (3) See "Other Studies Relevant to Material".
Respiratory / Skin Sensitization Data:	Repeated skin contact with Ethylene Glycol may, in a very small proportion of cases, cause skin sensitization with the development of allergic contact dermatitis. The incidence is significantly less than 1% with the undiluted material. (3) Sensitization is the process whereby a biological change occurs in the individual because of previous exposure to a substance and, as a result, the individual reacts more strongly when subsequently exposed to the substance. Once sensitized, an individual can react to extremely low airborne levels, even below the TLV, or to skin contact.
Synergistic Materials:	Alcohols/Glycols: Alcohols may interact synergistically with chlorinated solvents (example - carbon tetrachloride, chloroform, bromotrichloromethane), dithiocarbamates (example - disulfiram), dimethylnitrosamine and thioacetamide. (6)
Other Studies Relevant to Material:	Ethylene Glycol poisoning occurs in three stages: central nervous system (CNS) depression, cardiopulmonary failure and kidney failure. The severity of those stages, and advancement from one stage to another depends upon the dose ingested. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Survival of CNS depression may be followed by cardiopulmonary failure, which is initiated by the onset of coma and is characterized by quick, shallow breathing, excessively fast heart beat, mild hypertension and cyanosis. Survival of cardiopulmonary failure may be followed by kidney damage, which may range from a mild increase in blood urea nitrogen to complete kidney failure and possible death. In severe cases of overexposure, pulmonary oedema, bronchopneumonia, cardiac enlargement and possible death may occur. Pulmonary oedema is the exposure to high concentrations of a substance causing the build-up of fluid in the lungs that might be fatal. Symptoms of pulmonary oedema, such as shortness of breath, may not appear until several hours after exposure and are aggravated by physical exertion. There may be cranial nerve involvement in the late stages of toxicity from swallowed Ethylene Glycol. In particular, effects have been reported from the seventh, eighth and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing and difficulty in swallowing (dysphagia). (3)

12. ECOLOGICAL INFORMATION

Ecotoxicity:	May be harmful to aquatic life. Ethylene Glycol: LC50 Pimephales promelas (Fathead Minnow), static test, 96 h = 72,860 mg/L (3) LC50 (Bluegill) = 27,549 mg/L (3) LC50 (Rainbow Trout) = 18,000 - 46,000 mg/L (3) LC50 (Guppy) = 49,000 mg/L. (3) LC50 (brine Shrimp) = 20,000 mg/L (3) LC50 (Goldfish) = Above 5,000 mg/L (3)

Environmental Fate:	Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers. Ethylene Glycol: Bioconcentration potential is low. Biodegradation under aerobic static laboratory conditions is high. Biodegradation may occur under both aerobic and anaerobic conditions (in either the presence or absence of oxygen). Degradation is expected in the atmospheric environment within days to weeks. (3) Biochemical Oxygen Demand (BOD): 8 to 82 % at 5 days; 58 to 75 % at 10 days; 81 to 94 % at 20 days. (3) Chemical Oxygen Demand (COD): 1. 29 mg/mg. (3)

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	None required.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue and can be hazardous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Dispose of waste material at an approved landfill site.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

This product is not regulated by TDG.

Label(s): Not applicable. Placard: Not applicable.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

This product is not regulated by DOT.

Label(s): Not applicable. Placard: Not applicable.

CERCLA-RQ: 5 000 lbs / 2 270 kg. Exemptions: None known.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All components of this product are included on the DSL.

CEPA - NPRI: Ethylene Glycol.

Controlled Products Regulations Classification (WHMIS):

D-2A: Very Toxic (teratogen)

D-2B: Toxic (skin and eye irritant)

USA

Environmental Protection Act: All components of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Teratogenic and Embryotoxic, Skin and Eye Irritant.

NFPA: 1 Health, 1 Fire, 0 Reactivity (3)

HMIS: 1 Health, 1 Fire, 0 Reactivity (3)

INTERNATIONAL

The following component or components of this product appear on the European Inventory of Existing Commercial Chemical Substances: Ethylene Glycol.

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2011, American Conference of Governmental Industrial Hygienists, Cincinnati, 2011.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

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Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **VARSOL™ 3139 SOLVENT**
Product Description: Petroleum Hydrocarbons
MSDS Number: 9074
Product Code: 201560B05660
Intended Use: Solvent

COMPANY IDENTIFICATION

Supplier: **IMPERIAL OIL CHEMICAL**
240 4th Avenue S.W.
CALGARY, ALBERTA. T2P 3M9 Canada
24 Hour Environmental / Health Emergency Telephone 1-866-232-9563
Transportation Emergency Phone Number 1-866-232-9563
Product Technical Information 1-800-663-4109

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

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

Name	CAS#	Concentration*	Acute Toxicity
STODDARD SOLVENT	8052-41-3	100 %	None

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

Name	CAS#	Concentration*	Acute Toxicity
ETHYL BENZENE	100-41-4	0.1 - 0.5%	Inhalation Lethality: LC50 17.8 mg/l (Rat); Oral Lethality: LD50 3.5 g/kg (Rat)
NAPHTHALENE	91-20-3	0.1 - 0.5%	Inhalation Lethality: LC50 > 0.4 mg/l (Rat); Oral Lethality: LD50 710 mg/kg (Mouse); Oral Lethality: LD50 533 mg/kg (Mouse)
NONANE	111-84-2	1.0 - < 5.0%	None
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1.0 - < 5.0%	None
XYLENES	1330-20-7	0.1 - 0.9%	None

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

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 ignition.

HEALTH EFFECTS

Irritating to skin. May cause cancer. 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.

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

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

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.

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: 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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 43°C (109°F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.8 UEL: 5.6
Autoignition Temperature: 260°C (500°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 the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

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: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. 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 Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow 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. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Loading/Unloading Temperature: [Ambient]

Transport Temperature: [Ambient]
Transport Pressure: [Ambient]

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. 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. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.
Storage Temperature: [Ambient]
Storage Pressure: [Ambient]

Suitable Containers/Packing: Drums; Barges; Tank Cars; Tank Trucks
Suitable Materials and Coatings (Chemical Compatibility): Carbon Steel; Polyethylene; Polypropylene; Teflon; Stainless Steel; Polyester
Unsuitable Materials and Coatings: Polystyrene; Natural Rubber; Butyl Rubber; Ethylene-proplyene-diene monomer (EPDM)

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
ETHYL BENZENE		TWA	20 ppm			ACGIH
NAPHTHALENE		TWA	10 ppm		Skin	ACGIH
NONANE		TWA	200 ppm			ACGIH
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)		TWA	25 ppm			ACGIH

STODDARD SOLVENT		TWA	100 ppm			ACGIH
VARSOL 3139 SOLVENT	Vapour.	TWA	73 ppm	400 mg/m3	Total Hydrocarbons	Supplier
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:

Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

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:

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 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

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Form: Clear
Colour: Colourless
Odour: Petroleum/Solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15.6 °C): 0.788
Flash Point [Method]: 43°C (109°F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.8 UEL: 5.6
Autoignition Temperature: 260°C (500°F)
Boiling Point / Range: 159°C (318°F) - 195°C (383°F)
Vapour Density (Air = 1): 4.9 at 101 kPa
Vapour Pressure: 0.285 kPa (2.14 mm Hg) at 20ºC | 0.9 kPa (6.75 mm Hg) at 38°C
Evaporation Rate (n-butyl acetate = 1): 0.14
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 1.21 cSt (1.21 mm2/sec) at 25°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: -76°C (-105°F)
Melting Point: N/D
Pour Point: < -51°C (-60°F)
Molecular Weight: 140
Coefficient of Thermal Expansion: 0.00074 V/V/DEG C
Decomposition Temperature: N/D

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: Data available.	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: LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity: LD50 > 3160 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Irritating to the skin. 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:

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. Prolonged and/or repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

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.

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.

CMR Status:

Chemical Name	CAS Number	List Citations
ETHYL BENZENE	100-41-4	3, 4
NAPHTHALENE	91-20-3	3, 4
NONANE	111-84-2	4
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	4
STODDARD SOLVENT	8052-41-3	4
XYLENES	1330-20-7	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 -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

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

Hydrolysis:

Material -- Transformation due to hydrolysis not expected to be significant.

Photolysis:

Material -- Transformation due to photolysis not expected to be significant.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly in air

OTHER ECOLOGICAL INFORMATION

VOC (EPA Method 24): 6.593 lbs/gal

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: PETROLEUM DISTILLATES, N.O.S
Hazard Class & Division: 3
UN Number: 1268
Packing Group: III
Marine Pollutant: Yes

Footnote: Marine Pollutant designation is applicable only if shipped over water.

LAND (DOT)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S (1,2,4-Trimethylbenzene, Naphthalene)
Hazard Class & Division: 3
ID Number: 1268
Packing Group: III
Marine Pollutant: Yes
ERG Number: 128
Label(s): 3
Transport Document Name: UN1268, PETROLEUM DISTILLATES, N.O.S. (1,2,4-Trimethylbenzene, Naphthalene), 3, PG III, MARINE POLLUTANT

SEA (IMDG)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S (Naphthalene, 1,2,4-Trimethylbenzene)
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1268
Packing Group: III
Marine Pollutant: Yes
Label(s): 3
Transport Document Name: UN1268, PETROLEUM DISTILLATES, N.O.S. (1,2,4-Trimethylbenzene, Naphthalene), 3, PG III, (43°C c.c.), MARINE POLLUTANT

AIR (IATA)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S
Hazard Class & Division: 3
UN Number: 1268
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name: UN1268, PETROLEUM DISTILLATES, N.O.S., 3, PG III

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.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TCSI, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
NONANE	111-84-2	1, 5
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	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 14: Proper Shipping Name information was modified.
Section 14: Proper Shipping Name information was modified.
Section 14: Hazard Class information was modified.
Section 14: Label(s) information was modified.
Section 14: Transport Document Name information was modified.
Section 16: CA Contains information was modified.
Section 14: DOT Footnote information was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: XYLENES
WHMIS Classification: Class B, Division 3: Combustible Liquids Class D, Division 2, Subdivision B: Toxic Material

HEALTH HAZARDS
Irritating to skin. May cause cancer. May cause harm to the unborn child. If swallowed, may be aspirated and cause lung damage.

Target Organs: Skin |

PHYSICAL HAZARDS
Combustible. Material can accumulate static charges which may cause an ignition.

PRECAUTIONS
Avoid contact with skin. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Use proper bonding and/or earthing procedures.However, bonding and earthing may not eliminate the hazard from static accumulation.

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.

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: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. 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 Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

DGN: 5007510 (1013969)

Prepared by: Imperial Oil Limited, Solvents

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: (see Section 16 for Synonyms) **LIGHT DISTILLATE**
Product Description: Petroleum Distillates
MSDS Number: 8529
Product Code: 10102015
Intended Use: Fuel/solvent/blend stock

COMPANY IDENTIFICATION

Supplier: **Imperial Oil Downstream**
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada

24 Hour Environmental / Health Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
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
KEROSENE, STRAIGHT RUN	8008-20-6	0 - 100%	None
LIGHT ATMOSPHERIC GAS OIL	64741-44-2	0 - 100%	None
LIGHT HYDROCRACKED DISTILLATE (PETROLEUM)	64741-77-1	0 - 100%	None

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

Name	CAS#	Concentration*	Acute Toxicity
NAPHTHALENE	91-20-3	< 1%	Inhalation Lethality: LC50 > 0.4 mg/l (Rat); Oral Lethality: LD50 533 mg/kg (Mouse); Oral Lethality: LD50 710 mg/kg (Mouse)

* 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 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 ignition.

HEALTH EFFECTS

Irritating to skin. 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: 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

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

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

Contains hydrocarbon solvent/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. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 40°C (104°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
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 advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

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. Eliminate sources of ignition. Warn other shipping. 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 Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow 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 breathing mists or vapour. Avoid all personal contact. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Loading/Unloading Temperature: N/D

Transport Temperature: N/D
Transport Pressure: N/D

Static Accumulator: This material is a static accumulator.

STORAGE

The type of container used to store the material may affect static accumulation and dissipation. 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. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.
Storage Temperature: N/D
Storage Pressure: N/D

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
KEROSENE, STRAIGHT RUN	Stable Aerosol.	TWA	5 mg/m3			Supplier
KEROSENE, STRAIGHT RUN	Vapour.	TWA	200 mg/m3			Supplier
KEROSENE, STRAIGHT RUN [as total hydrocarbon vapor]	Non-Aerosol	TWA	200 mg/m3		Skin	ACGIH
LIGHT ATMOSPHERIC GAS OIL	Stable Aerosol.	TWA	5 mg/m3			Supplier
LIGHT ATMOSPHERIC GAS OIL	Vapour.	TWA	200 mg/m3			Supplier
LIGHT HYDROCRACKED DISTILLATE (PETROLEUM)	Stable Aerosol.	TWA	5 mg/m3			Supplier
LIGHT HYDROCRACKED DISTILLATE (PETROLEUM)	Vapour.	TWA	200 mg/m3			Supplier
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:

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:

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 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

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

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): 0.85
Flash Point [Method]: 40°C (104°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: 180°C (356°F) - 320°C (608°F) [Estimated]
Vapour Density (Air = 1): N/D
Vapour Pressure: [N/D at 20°C] | < 1 kPa (7.5 mm Hg) at 38°C
Evaporation Rate (n-butyl acetate = 1): < 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: 1.7 cSt (1.7 mm2/sec) at 40ºC
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -39°C (-38°F)
Decomposition Temperature: N/D

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: No end point data for material.	Moderately toxic. Based on assessment of the components.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Moderately irritating to skin with prolonged exposure. Based on assessment of the components.

Eye	
Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

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.

Contains:

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 function. Non-sensitizing in animal tests. MIDDLE DISTILLATES WITH CRACKED STOCKS: 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. 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.

CMR Status:

Chemical Name	CAS Number	List Citations
KEROSENE, STRAIGHT RUN	8008-20-6	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:

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

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: DIESEL FUEL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Marine Pollutant: Yes

Footnote: Marine Pollutant designation is applicable only if shipped over water.

LAND (DOT)

Proper Shipping Name: DIESEL FUEL
Hazard Class & Division: 3
ID Number: 1993
Packing Group: III

ERG Number: 128
Label(s): None
Transport Document Name: UN1993, DIESEL FUEL, 3, PG III

Footnote: The flash point of this material is greater than 38ºC/100ºF. 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: HEATING OIL, LIGHT
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1202
Packing Group: III
Marine Pollutant: Yes
Label(s): 3
Transport Document Name: UN1202, HEATING OIL, LIGHT, 3, PG III, (40°C c.c.), MARINE POLLUTANT

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: UN1202, HEATING OIL, LIGHT, 3, PG III

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.

Listed or exempt from listing/notification on the following chemical inventories: DSL, TSCA

Special Cases:

Inventory	Status
AICS	Not determined
ENCS	Not determined
IECSC	Not determined
KECI	Not determined
PICCS	Not determined

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

--REGULATORY LISTS SEARCHED--

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

SECTION 16 OTHER INFORMATION

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Composition: Component table information was modified.
Hazard Identification: CA - Hazards Statement information was modified.
Hazard Identification: Physical/Chemical Hazard information was modified.
Section 05: Fire Fighting Measures - Fire Fighting Instruction information was modified.
Section 05: Hazardous Combustion Products information was modified.
Section 07: Handling and Storage-Handling information was modified.
Section 07: Handling and Storage-Storage Phrases information was modified.
Section 13: Regulatory Disposal Information - Header information was modified.
Section 14: Proper Shipping Name information was modified.
Section 14: TDG Technical Name - All information was deleted.
Section 14: TDG Technical Name - Close parenthesis information was deleted.
Section 14: TDG Technical Name - Open parenthesis information was deleted.
Section 16: Synonyms information was modified.
Section 16: Target Organs information was modified.
SYNONYMS: DIESEL ARCTIC, AUTOMOTIVE (ON-ROAD) DIESEL FUEL, DIESEL FUEL, DIESEL LOW SULPHUR LIGHT, DIESEL LOW SULPHUR LIGHT DYED, DIESEL LOW SULPHUR LIGHT RAIL, DIESEL REGULAR SULPHUR LIGHT DYED, FURNACE FUEL LIGHT, FURNACE FUEL LIGHT DYED, MC SOLVENT, STOVE OIL, STOVE OIL DYED

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

HEALTH HAZARDS
Irritating to skin. If swallowed, may be aspirated and cause lung damage.

Target Organs: Skin |

PHYSICAL HAZARDS
Combustible. In use, may form flammable/explosive vapour-air mixture. Material can accumulate static charges which may cause an ignition.

PRECAUTIONS
Avoid breathing mists or vapour. Avoid all personal contact. Use proper bonding and/or earthing procedures.However, bonding and earthing may not eliminate the hazard from static accumulation.

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.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. 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 Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

DGN: 5007490 (552455)

Prepared by: Imperial Oil Limited, IH and Product Safety

SPOTLEAK® 1007

1. PRODUCT AND COMPANY IDENTIFICATION

Company

Arkema Canada Inc.
1100 Burloak Drive, Suite 107
Burlington, Ontario, L7L 6B2

Thio and Fine Chemicals

Customer Service Telephone Number: (800) 567-5726
(Monday through Friday, 8:30 AM to 4:30 PM EST)

Emergency Information

Transportation: CANUTEC: (613) 996-6666
(24 hrs., 7 days a week)
Medical: Rocky Mountain Poison Center: (866) 767-5089
(24 hrs., 7 days a week)

Product Information

Product name: SPOTLEAK® 1007
Synonyms: Not available
Molecular formula: Mixture
Chemical family: mercaptans
Product use: Odour agents

2. HAZARDS IDENTIFICATION

Emergency Overview

DANGER!
EXTREMELY FLAMMABLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FLASH FIRE.
HARMFUL OR FATAL IF SWALLOWED.
CAN ENTER LUNGS AND CAUSE DAMAGE.
MAY CAUSE SKIN IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.
OBJECTIONABLE ODOR MAY CAUSE NAUSEA, HEADACHE OR DIZZINESS.

Potential Health Effects

Primary routes of exposure:
Inhalation and skin contact.

Signs and symptoms of acute exposure:
Objectionable odor may cause nausea, headache or dizziness. May cause skin irritation. Prolonged or repeated skin contact may cause: Allergic skin reaction: redness, rash. Aspiration hazard if swallowed - can enter lungs and cause damage. Symptoms of aspiration may include increased breathing and heart rate, coughing and related signs of respiratory distress.

Skin:

No more than slightly toxic. (based on animal studies) Moderately irritating. May cause allergic skin reaction. (based on components)

Inhalation:
Practically nontoxic. (based on animal studies)

Eyes:
Slightly irritating. (based on animal studies)

Ingestion:
Practically nontoxic. (based on animal studies)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	CAS-No.	Wt/Wt	WHMIS Controlled
2-Propanethiol, 2-methyl-	75-66-1	>= 60 - <= 100 %	Y
Ethane, (methylthio)-	624-89-5	>= 10 - < 30 %	Y

The substance(s) marked with a "Y" in the above WHMIS Controlled column are those identified as hazardous chemicals under the Controlled Products Regulation.

4. FIRST AID MEASURES

Inhalation:
If inhaled, remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Skin:
In case of contact, immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes:
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Ingestion:
If swallowed, DO NOT induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.

5. FIREFIGHTING MEASURES

Flash point: < 0 °F (< -18 °C) (Tag closed cup)

Auto-ignition temperature: 460 °F (238 °C)

Lower flammable limit (LFL): Not determined

Upper flammable limit (UFL): Not determined

Extinguishing media (suitable):
Carbon dioxide (CO2), Foam, Dry chemical

Extinguishing media (unsuitable):
High volume water jet

Protective equipment:
Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

Further firefighting advice:
Cool closed containers exposed to fire with water spray.
Do not use a solid water stream as it may scatter and spread fire.
Closed containers of this material may explode when subjected to heat from surrounding fire.
After a fire, wait until the material has cooled to room temperature before initiating clean-up activities.
Do not allow run-off from fire fighting to enter drains or water courses.
Fire fighting equipment should be thoroughly decontaminated after use.

Hazardous combustion products:

Vapors are heavier than air and may travel along the ground or be moved by ventilation and ignited by heat, pilot lights, and other flames and ignition sources at locations distant from material handling point.
Vapours may form explosive mixture with air.
When burned, the following hazardous products of combustion can occur:
Carbon oxides
sulfur oxides
hydrogen sulfide

Explosion Data:

Sensitivity to Mechanical Impact: No

Sensitivity to Static Discharge Yes

6. ACCIDENTAL RELEASE MEASURES

In case of spill or leak:
Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel. Eliminate all ignition sources. Ventilate area only if odor control is not an issue. Cover spill area with closed-cell foam to reduce odors (use of Aqueous Film Forming Foam (AFFF) with polymeric layer is acceptable). If foam is unavailable, absorb spill with liquid-binding material (e.g. diatomaceous earth, saw dust universal binder) and deodorize residue on ground with 3-10% hydrogen peroxide. Wash with water and recover it. If spill is contained within a large containment area, add 5% bleach solution (sodium hypochlorite) in a 50 parts bleach solution to one part product dilution ratio. Swimming pool chemicals (hypochlorite compounds) work effectively in deodorizing product. If these are applied to product, the crystals must be accompanied by sufficient water of dilution so that the considerable heat of reaction will be absorbed. Enzyme or bacteria based deodorizers are also acceptable for use. Sweep or scoop up using non-sparking tools and place into suitable properly labeled containers for prompt disposal. Place waste materials into Department of Transportation (DOT)-approved drums for disposal. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Consult a regulatory specialist to

determine appropriate provincial or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7. HANDLING AND STORAGE

Handling

General information on handling:
Avoid breathing vapor or mist.
Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Keep away from heat, sparks and flames.
No smoking.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Check that all equipment is properly grounded and installed to satisfy electrical classification requirements.
Container hazardous when empty.
Emptied container retains vapor and product residue.
Follow label warnings even after container is emptied.
Do not enter confined spaces unless adequately ventilated.
RESIDUAL VAPORS MAY EXPLODE ON IGNITION.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
Improper disposal or reuse of this container may be dangerous and/or illegal.

Storage

General information on storage conditions:
Keep in a dry, cool place. Keep away from direct sunlight. Keep container closed when not in use. Store in closed containers, in a secure area to prevent container damage and subsequent spillage. Store in well ventilated area away from heat and sources of ignition such as flame, sparks and static electricity. Ensure that all storage and handling equipment is properly grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate when transferring material. All metal and groundable storage containers, including but not limited to drums, cylinders, Returnable Intermodal Bulk Containers (RIBCs) and Class C Flexible Intermodal Bulk Containers (FIBCs) must be bonded and grounded during filling and emptying operations.

Storage incompatibility – General:
Store separate from: Strong oxidizing agents

Acids (concentrated solutions)

Alkaline earth metals

Bases

Reducing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Engineering controls:

Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above).If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Monitor carbon monoxide and oxygen levels in tanks and enclosed spaces.Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

Respiratory protection:
Avoid breathing vapor or mist. Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

Skin protection:
Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear chemical goggles, a face shield, and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Remove contaminated clothing immediately and wash before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

Eye protection:
Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment immediately available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	colourless
Physical state:	liquid
Odor:	strong, stinging
Odour Threshold:	0.1 ppb
pH:	not determined
Density:	not determined
Specific Gravity (Relative density):	0.815 68 °F(20 °C)
Vapor pressure:	294 mmHg (100 °F (38 °C))
Relative vapor density:	3 (Air = 1.0)
Vapor density:	not determined

Boiling point/boiling range:	63 - 70 °C
Freezing point:	< -51 °F (< -46 °C)
Melting point/range:	not determined
Evaporation rate:	No data available
Solubility in water:	68 °F (20 °C) insoluble
Solubility in other solvents: [qualitative and quantative]	Soluble in: Alcohols Ethyl ether
Refractive index:	1.427 68 °F (20 °C)
Viscosity, dynamic:	0.55 mPa.s 68 °F (20 °C)
Oil/water partition coefficient:	No data available
Thermal decomposition	No data available

10. STABILITY AND REACTIVITY

Stability:
This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Hazardous reactions:
None known.

Materials to avoid:
- Reacts violently with :

Strong oxidizing agents
Acids (concentrated solutions)
Bases
Reducing agents
Alkaline earth metals

Conditions / hazards to avoid:
Keep away from heat and sources of ignition. To avoid thermal decomposition, do not overheat.

Hazardous decomposition products:

Thermal decomposition giving flammable and toxic products
Carbon oxides
sulfur oxides
hydrogen sulfide

11. TOXICOLOGICAL INFORMATION

Data on this material and/or its components are summarized below.

Data for SPOTLEAK® 1007

Acute toxicity

Oral:
Practically nontoxic. (rat) LD50 > 5,000 mg/kg.

Dermal:
No more than slightly toxic. (rat) LD50 > 2,000 mg/kg.

Inhalation:
Practically nontoxic. (rat) 1 h LC50 > 20 mg/l.

Skin Irritation:
No data available.

Eye Irritation:
Slightly irritating. (rabbit)

Sensitization:
No data available.

Skin Sensitization:
No data available.

Repeated dose toxicity
No data available.

Carcinogenicity
No data available.

Genotoxicity

Assessment in Vitro:
No data available.

Assessment in Vivo:
No data available.

Developmental toxicity
No data available.

Reproductive effects No data available.

Other information
Aspiration hazard

Data for 2-Propanethiol, 2-methyl- (75-66-1)

Acute toxicity

Oral:
Slightly toxic. (rat) LD50 = 4,729 mg/kg.

Dermal:
No deaths occurred. (rabbit) LD0 > 2,000 mg/kg.

Inhalation:
Practically nontoxic. (rat) 4 h LC50 = 82 - 98 mg/l. (vapor)

Skin Irritation:
Non-irritating. (rabbit) Irritation Index: 0/8. (4 h) (occluded exposure)

Eye Irritation:
Slightly irritating. (rabbit)

Sensitization:
No data available.

Skin Sensitization:
Skin sensitizer. Buehler method. (guinea pig) Skin allergy was observed.
Sensitising. LLNA: Local Lymph Node Assay. (mouse) Produced an allergic reaction.

Repeated dose toxicity
Subchronic inhalation administration to rat / affected organ(s): kidney / signs: inflammation, degeneration, increased organ weight / (not considered relevant to humans)
Repeated oral administration to rat / affected organ(s): kidney / signs: hyaline droplet nephropathy / (not considered relevant to humans)

Carcinogenicity
No data available.

Genotoxicity

Assessment in Vitro:
No genetic changes were observed in laboratory tests using: bacteria, animal cells
Assessment in Vivo:
No genetic changes were observed in laboratory tests using: mice

Developmental toxicity
Exposure during pregnancy. inhalation (rat and mouse) / No birth defects were observed.
Reproductive/Developmental Effects Screening Assay. oral (rat) / No birth defects were observed.

Reproductive effects
Reproductive/Developmental Effects Screening Assay. oral (rat) / No toxicity to reproduction.

Other information
(Due to the viscosity, this substance may present an aspiration hazard.)
(Symptoms of aspiration may include increased breathing and heart rate, coughing and related signs of respiratory distress.)

Data for Ethane, (methylthio)- (624-89-5)

Acute toxicity

Oral:
Practically nontoxic. (rat) LD50 > 5,000 mg/kg.

Dermal:
No more than slightly toxic. (rat) LD0 > 2,000 mg/kg.

Inhalation:
Practically nontoxic. (rat) 4 h LC0 > 21.7 mg/l. (vapor)

Skin Irritation:
Moderately irritating. (rabbit) Irritation Index: 3,4/8,0. (4 h)

Eye Irritation:
Moderately irritating. (rabbit) Irritation Index: 16/110. (24 h)

Sensitization:
No data available.

Skin Sensitization:
Not a sensitizer. Guinea pig maximization test. No skin allergy was observed

Repeated dose toxicity
No data available.

Carcinogenicity
No data available.

Genotoxicity

Assessment in Vitro:
No genetic changes were observed in laboratory tests using: bacteria, human cells

Assessment in Vivo:
No data available.

Developmental toxicity
No data available.

Reproductive effects
No data available.

Other information
(Due to the viscosity, this substance may present an aspiration hazard.)
(Symptoms of aspiration may include increased breathing and heart rate, coughing and related signs of respiratory distress.)

12. ECOLOGICAL INFORMATION

Chemical Fate and Pathway
Data on this material and/or its components are summarized below.

Data for 2-Propanethiol, 2-methyl- (75-66-1)

Biodegradation:
Not readily biodegradable. (63 d) biodegradation 6 %

Data for Ethane, (methylthio)- (624-89-5)

Biodegradation:
Not readily biodegradable. (28 d) biodegradation 41 %

Octanol Water Partition Coefficient:
log Pow = 1.54

Photodegradation:
air Half-life direct photolysis: estimated 1.9 d

Ecotoxicology
Data on this material and/or its components are summarized below.

Data for 2-Propanethiol, 2-methyl- (75-66-1)

Aquatic toxicity data:
Slightly toxic. Oncorhynchus mykiss (rainbow trout) 96 h LC50 = 34 mg/l

Aquatic invertebrates:
Moderately toxic. Daphnia magna (Water flea) 48 h EC50 = 6.7 mg/l

Algae:
Slightly toxic. Pseudokirchneriella subcapitata (green algae) 72 h EC50 = 24 mg/l

Data for Ethane, (methylthio)- (624-89-5)

Aquatic toxicity data:
No more than slightly toxic. Danio rerio (zebra fish) 96 h LC0 > 49.8 mg/l

Aquatic invertebrates:
Slightly toxic. Daphnia magna (Water flea) 48 h EC50 = 16 mg/l

Algae:
Practically nontoxic. Pseudokirchneriella subcapitata (green algae) 72 h ErC50 > 500 mg/l

Microorganisms:
Respiration inhibition / Activated sludge 3 h EC50 > 1,000 mg/l

Chronic toxicity to aquatic plants:
Pseudokirchneriella subcapitata (green algae) 72 d NOEC (growth rate) = 76 mg/l

13. DISPOSAL CONSIDERATIONS

Waste disposal:
Disposal via incineration is recommended. Dispose of in accordance with federal, provincial and local regulations. Consult a regulatory specialist to determine appropriate provincial or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, provincial and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14. TRANSPORT INFORMATION

Canadian Transportation of Dangerous Good (TDG)

UN Number	:	3336
Proper shipping name	:	Mercaptan, liquid, flammable, n.o.s.
Technical name	:	(tert-Butylmercaptan, Methylethyl sulfide)
Class	:	3
Packaging group	:	II
Marine pollutant	:	yes

International Maritime Dangerous Goods Code (IMDG)

UN Number	:	3336
Proper shipping name	:	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S.
Technical name	:	(t-BUTYLMERCAPTAN, METHYL ETHYL SULPHIDE)
Class	:	3
Packaging group	:	II
Marine pollutant	:	yes
Flash point	:	< 0 °F (< -18 °C) Tag closed cup

15. REGULATORY INFORMATION

Chemical Inventory Status

EU. EINECS	EINECS	Conforms to
United States TSCA Inventory	TSCA	The components of this product are all on the TSCA Inventory.
Canadian Domestic Substances List (DSL)	DSL	All components of this product are on the Canadian DSL
China. Inventory of Existing Chemical Substances in China (IECSC)	IECSC (CN)	Conforms to
Japan. ENCS - Existing and New Chemical Substances Inventory	ENCS (JP)	Conforms to
Japan. ISHL - Inventory of Chemical Substances	ISHL (JP)	Conforms to
Korea. Korean Existing Chemicals Inventory (KECI)	KECI (KR)	Conforms to
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	PICCS (PH)	Conforms to
Australia Inventory of Chemical Substances (AICS)	AICS	Conforms to
New Zealand. Inventory of Chemical Substances	NZIOC	Conforms to

Canada - Federal Regulations

Workplace Hazardous Materials Information System (WHMIS)

B2: Flammable liquid
D2B: Toxic material causing other toxic effects

Ingredient Disclosure List (IDL)

WHMIS Ingredient Disclosure List IDL: No component is listed on the WHMIS ingredients disclosure list.

WHMIS Regulated Carcinogens (IARC, ACGIH Listed):
IARC:
No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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

National Pollution Release Inventory (NPRI)

Canadian National Pollutant Release Inventory (NPRI): No component is listed on NPRI.

16. OTHER INFORMATION

Miscellaneous:

Other information:	Refer to National Fire Protection Association (NFPA) Codes 30, 70, 77, and 497 for safe handling.

Latest Revision(s):

Reference number:	000000035652
Date of Revision:	06/15/2016
Date Printed:	06/15/2016

PREPARED BY:	TECHNICAL DEPARTMENT
PHONE NUMBER OF PREPARER:	(800) 567-5726
PREPARATION DATE:	06/15/2016

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THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.

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Material Safety Data Sheet

Quadra

JEFFCOOL® P155

WHMIS	Protective Clothing	TDG
		

1. Product and company identification

Product name : JEFFCOOL® P155

Supplier : QUADRA CHEMICALS LTD.
3901 F.X. Tessier
Vaudreuil-Dorion, Quebec
Canada J7V 5V5
Tel: 1-800-665-6553

Material uses : Industrial applications

Code : M01067

Validation date : 6/26/2014.

Responsible name : Regulatory Affairs / Affaires réglementaires

In case of emergency : **TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK**
IN CANADA - CALL 1-800-567-7455

2. Hazards identification

Physical state : Liquid. [Hazy.]

Odor : Slight.

Emergency overview :

HARMFUL OR FATAL IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE.

Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not ingest. Wash thoroughly after handling.

Routes of entry : Inhalation. Ingestion.

Potential acute health effects

Inhalation : No known significant effects or critical hazards.

Ingestion : Aspiration hazard if swallowed. Can enter lungs and cause damage.

Skin : No known significant effects or critical hazards.

Eyes : No known significant effects or critical hazards.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : Not available.

Over-exposure signs/symptoms

Inhalation : No specific data.

Ingestion : Adverse symptoms may include the following:
nausea or vomiting

Skin : No specific data.

Eyes : No specific data.

2 . Hazards identification

Medical conditions aggravated by over-exposure : None known.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
No hazardous ingredient		

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

4 . First aid measures

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

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

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

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

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

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Flash point : Closed cup: >100°C (>212°F)

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : carbon oxides
phosphorous oxides
metal oxide/oxides

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

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

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

Methods for cleaning up

6 . Accidental release measures

Spill or leak : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Product name **Exposure limits**

No exposure limit value known.

Consult local authorities for acceptable exposure limits.

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

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

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

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

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

9 . Physical and chemical properties

Physical state : Liquid. [Hazy.]
Flash point : Closed cup: >100°C (>212°F)
Color : Red.
Odor : Slight.
pH : 9.9
Melting/freezing point : -94.4°C (-137.9°F)
Relative density : 1
Vapor density : >1 [Air = 1]
Viscosity : Kinematic: <0.2 cm^2/s (<20 cSt)
Solubility : Soluble in the following materials: cold water.

10 . Stability and reactivity

Stability : The product is stable.
Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid : Do not swallow.
Materials to avoid : Not available.
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

13 . Disposal considerations

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

Waste and empty packaging must be disposed of in accordance with federal, provincial, and municipal environmental control regulations.

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

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-

14 . Transport information

PG* : Packing group

15 . Regulatory information

WHMIS (Canada) : Not controlled under WHMIS (Canada).

Canada inventory : This product is listed or exempted.

16 . Other information

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

Other special considerations : No additional remark.

Regulatory Affairs Department : 1 800 665-6553

Notice to reader

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

* * * Section 1 - PRODUCT AND COMPANY IDENTIFICATION* * *

Material Name: CARBON MONOXIDE

Manufacturer Information

MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920

General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Chemical Family

inorganic, gas

Synonyms

MTG MSDS 18; CARBON OXIDE; CARBONIC OXIDE; CARBON OXIDE (CO); FLUE GAS; UN 1016; CO; RTECS: FG3500000

Product Use

industrial

Usage Restrictions

None known.

* * * Section 2 - HAZARDS IDENTIFICATION* * *

EMERGENCY OVERVIEW

Color: colorless
Physical Form: gas
Odor: odorless
Health Hazards: harmful if inhaled, blood damage, difficulty breathing
Physical Hazards: Flammable gas. May cause flash fire.

POTENTIAL HEALTH EFFECTS

Inhalation

Short Term: changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, bluish skin color, suffocation, blood disorders, convulsions, coma
Long Term: nausea, vomiting, loss of appetite, headache, dizziness, visual disturbances, blood disorders, heart disorders, heart damage, nerve damage, reproductive effects, birth defects, brain damage

Skin

Short Term: blisters, frostbite
Long Term: no information is available

Eye

Short Term: frostbite, blurred vision
Long Term: no information is available

Ingestion

Short Term: ingestion of a gas is unlikely

Long Term: ingestion of a gas is unlikely

* * * Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS* * *

CAS	Component	Percent
630-08-0	CARBON MONOXIDE	100

* * * Section 4 - FIRST AID MEASURES* * *

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

Eyes

Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Ingestion

If a large amount is swallowed, get medical attention.

Note to Physicians

For inhalation, consider oxygen.

* * * Section 5 - FIRE FIGHTING MEASURES* * *

See Section 9 for Flammability Properties

NFPA Ratings: Health: 3 **Fire:** 4 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Flammable Properties

Severe fire hazard. Vapor/air mixtures are explosive. Containers may rupture or explode if exposed to heat.

Extinguishing Media

carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

Unsuitable Extinguishing Media

None known.

Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

* * * Section 6 - ACCIDENTAL RELEASE MEASURES* * *

Water Release

Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

Occupational spill/release

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition.

* * * Section 7 - HANDLING AND STORAGE* * *

Handling Procedures

Wash thoroughly after handling.

Storage Procedures

Store in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid direct sunlight. Avoid heat, flames, sparks and other sources of ignition. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

* * * Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION* * *

Component Analysis

CARBON MONOXIDE (630-08-0)

ACGIH:	25 ppm TWA
OSHA (final):	50 ppm TWA; 55 mg/m3 TWA
OSHA (vacated):	35 ppm TWA; 40 mg/m3 TWA
	200 ppm Ceiling; 229 mg/m3 Ceiling
NIOSH:	35 ppm TWA; 40 mg/m3 TWA
	200 ppm Ceiling; 229 mg/m3 Ceiling

Component Biological Limit Values

CARBON MONOXIDE (630-08-0)

ACGIH: 3.5 % of hemoglobin Medium: blood Time: end of shift Parameter: Carboxyhemoglobin (background, nonspecific); 20 ppm Medium: end-exhaled air Time: end of shift Parameter: Carbon monoxide (background, nonspecific)

IDLH

1200 ppm

Ventilation

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Eyes/Face

For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Protective Clothing

For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

Glove Recommendations

Wear insulated gloves.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
350 ppm
Any supplied-air respirator.
875 ppm
Any supplied-air respirator operated in a continuous-flow mode.
1200 ppm
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.
End of service life indicator required (ESLI).
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
Emergency or planned entry into unknown concentrations or IDLH conditions -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.
End of service life indicator required (ESLI).
Any appropriate escape-type, self-contained breathing apparatus.

* * * Section 9 - PHYSICAL AND CHEMICAL PROPERTIES* * *

Physical State:	Gas	**Appearance:**	Not available
Color:	colorless	**Physical Form:**	gas
Odor:	odorless	**Odor Threshold:**	Not available
Taste:	tasteless	**pH:**	Not available
Melting/Freezing Point:	-205 °C	**Boiling Point:**	-191.5 °C
Decomposition:	Not available	**Evaporation Rate:**	Not available
LEL:	>=12.5 % by volume	**UEL:**	74 % by volume
Vapor Pressure:	760 mmHg @ -191 °C	**Vapor Density (air = 1):**	0.968
Density:	1.250 g/L @ 0 °C	**Water Solubility:**	2.3 % @ 20 °C
Log KOW:	Not available	**Auto Ignition:**	700 °C
Viscosity:	0.01657 cP @0 °C	**Molecular Weight:**	28.01
Molecular Formula:	C-O		

Solvent Solubility

Soluble: alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions

* * * Section 10 - STABILITY AND REACTIVITY* * *

Chemical Stability

Stable at normal temperatures and pressure.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

Materials to Avoid

oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium

Decomposition Products

oxides of carbon

Possibility of Hazardous Reactions

Will not polymerize.

* * * Section 11 - TOXICOLOGICAL INFORMATION* * *

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

CARBON MONOXIDE (630-08-0)

Inhalation LC50 Rat 1807 ppm 4 h

Acute Toxicity Level

CARBON MONOXIDE (630-08-0)

Toxic: inhalation

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, NTP, OSHA or DFG.

Irritation

No animal testing data available for skin or eyes.

Target Organs

CARBON MONOXIDE (630-08-0)

blood

Medical Conditions Aggravated by Exposure

blood system disorders, heart or cardiovascular disorders, hormonal disorders, respiratory disorders

Mutagenic

Limited mutagenic data available, however carbon monoxide is generally not considered to be mutagenic.

Reproductive Effects

Available data characterizes this substance as a reproductive hazard.

Additional Data

Alcohol may enhance the toxic effects. May cross the placenta. Smoking may enhance the toxic effects.

* * * Section 12 - ECOLOGICAL INFORMATION* * *

Component Analysis - Aquatic Toxicity

No LOLI ecotoxicity data are available for this product's components.

* * * Section 13 - DISPOSAL CONSIDERATIONS* * *

Disposal Methods

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

* * * Section 14 - TRANSPORT INFORMATION* * *

US DOT Information

Shipping Name: Carbon monoxide, compressed
UN/NA #: UN1016 **Hazard Class:** 2.3
Required Label(s): 2.3, 2.1
Additional Info.: Toxic-Inhalation Hazard Zone D

TDG Information

Shipping Name: Carbon monoxide, compressed
UN #: UN1016 **Hazard Class:** 2.3
Required Label(s): 2.3, (2.1)

* * * Section 15 - REGULATORY INFORMATION* * *

U.S. Federal Regulations

None of this products components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA 311/312

Acute Health: Yes **Chronic Health:** Yes **Fire:** Yes **Pressure:** Yes **Reactive:** No

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
CARBON MONOXIDE	630-08-0	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Canada WHMIS

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List
CARBON MONOXIDE (630-08-0)
0.1 %

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
CARBON MONOXIDE	630-08-0	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

* * * Section 16 - OTHER INFORMATION* * *

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information

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End of Sheet MAT04290

MATHESON

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Safety Data Sheet

Material Name: METHANE, COMPRESSED GAS **SDS ID: MAT14160**

* * * Section 1 - PRODUCT AND COMPANY IDENTIFICATION* * *

Product Identifier: METHANE, COMPRESSED GAS

Manufacturer Information

MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920

General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Chemical Family

hydrocarbons, gas

Synonyms

MTG MSDS 58; FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH4; RTECS: PA1490000

* * * Section 2 - HAZARDS IDENTIFICATION* * *

EMERGENCY OVERVIEW

Color: colorless
Physical Form: gas
Odor: odorless
Health Hazards: difficulty breathing
Physical Hazards: Flammable gas. May cause flash fire. Electrostatic charges may be generated by flow, agitation, etc.

POTENTIAL HEALTH EFFECTS

Inhalation

Short Term: nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
Long Term: no information is available

Skin

Short Term: no information on significant adverse effects
Long Term: no information is available

Eye

Short Term: no information on significant adverse effects
Long Term: no information is available

Ingestion

Short Term: ingestion of a gas is unlikely
Long Term: no information is available

* * * Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS* * *

CAS	Component	Percent
74-82-8	METHANE	100.0

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Aliphatic hydrocarbon gases (Alkane [C1-C4]).

* * * Section 4 - FIRST AID MEASURES* * *

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

Wash exposed skin with soap and water.

Eyes

Flush eyes with plenty of water.

Ingestion

If a large amount is swallowed, get medical attention.

Note to Physicians

For inhalation, consider oxygen.

* * * Section 5 - FIRE FIGHTING MEASURES* * *

See Section 9 for Flammability Properties

NFPA Ratings: Health: 1 **Fire:** 4 **Reactivity:** 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Flammable Properties

Severe fire hazard. Severe explosion hazard. Pressurized containers may rupture or explode if exposed to sufficient heat. Vapor/air mixtures are explosive above flash point. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

Extinguishing Media

carbon dioxide, regular dry chemical
Large fires: Use regular foam or flood with fine water spray.

Fire Fighting Measures

Move container from fire area if it can be done without risk. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. For smaller tanks or cylinders, extinguish and isolate from other flammables. Evacuation radius: 800 meters (1/2 mile). Stop flow of gas.

* * * Section 6 - ACCIDENTAL RELEASE MEASURES* * *

Occupational spill/release

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering.

* * * Section 7 - HANDLING AND STORAGE* * *

Storage Procedures

Store and handle in accordance with all current regulations and standards. Grounding and bonding required.
Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

* * * Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION* * *

Component Analysis

METHANE (74-82-8)

ACGIH: 1000 ppm TWA

Component Biological Limit Values

There are no biological limit values for any of this product's components.

Ventilation

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Eyes/Face

Eye protection not required, but recommended.

Protective Clothing

Protective clothing is not required.

Glove Recommendations

Wear appropriate chemical resistant gloves.

Respiratory Protection

Under conditions of frequent use or heavy exposure, respiratory protection may be needed.
Respiratory protection is ranked in order from minimum to maximum.
Consider warning properties before use.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

* * * Section 9 - PHYSICAL AND CHEMICAL PROPERTIES* * *

Physical State:	Gas	**Appearance:**	Not available
Color:	colorless	**Physical Form:**	gas
Odor:	odorless	**Odor Threshold:**	Not available
Taste:	tasteless	**pH:**	Not available
Melting/Freezing Point:	-183 °C	**Boiling Point:**	-162 °C
Flash Point:	-223 °C	**Decomposition:**	Not available
Evaporation Rate:	Not available	**LEL:**	5.0 %
UEL:	15 %	**Vapor Pressure:**	760 mmHg @ -161 °C
Henry's Law Constant:	0.00045830 atm-m3/mol	**Vapor Density (air = 1):**	0.555
Density:	0.717 g/L @ 0 °C	**Water Solubility:**	3.5 % @ 17 °C
KOW:	724.44 estimated from water solubility, estimated from water solubility	**Log KOW:**	Not available
KOC:	2192.80 estimated from water solubility, estimated from water solubility	**Auto Ignition:**	537 °C
Viscosity:	0.01118 cP @27 °C	**Molecular Weight:**	16.04
Molecular Formula:	C-H4		

Solvent Solubility

Soluble: alcohol, ether, benzene, organic solvents

* * * Section 10 - STABILITY AND REACTIVITY* * *

Chemical Stability

Stable at normal temperatures and pressure.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

Materials to Avoid

halogens, oxidizing materials, combustible materials

Decomposition Products

oxides of carbon

Possibility of Hazardous Reactions

Will not polymerize.

* * * Section 11 - TOXICOLOGICAL INFORMATION* * *

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and no selected endpoints have been identified.

Acute Toxicity Level

METHANE (74-82-8)

Slightly Toxic: inhalation

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, NTP, OSHA or DFG.

* * * Section 12 - ECOLOGICAL INFORMATION* * *

Component Analysis - Aquatic Toxicity

No LOLI ecotoxicity data are available for this product's components.

* * * Section 13 - DISPOSAL CONSIDERATIONS* * *

Disposal Methods

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

* * * Section 14 - TRANSPORT INFORMATION* * *

US DOT Information

Shipping Name: Methane, compressed
UN/NA #: UN1971 **Hazard Class:** 2.1
Required Label(s): 2.1

TDG Information

Shipping Name: Methane, compressed
UN #: UN1971 **Hazard Class:** 2.1
Required Label(s): 2.1

* * * Section 15 - REGULATORY INFORMATION* * *

U.S. Federal Regulations

None of this products components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA 311/312

Acute Health: Yes **Chronic Health:** No **Fire:** Yes **Pressure:** Yes **Reactive:** No

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
METHANE	74-82-8	No	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
METHANE	74-82-8	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

* * * Section 16 - OTHER INFORMATION* * *

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information

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End of Sheet MAT14160

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: (see Section 16 for Synonyms) **LIGHT DISTILLATE**
Product Description: Petroleum Distillates
MSDS Number: 8529
Product Code: 10102015
Intended Use: Fuel/solvent/blend stock

COMPANY IDENTIFICATION

Supplier: **Imperial Oil Downstream**
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada

24 Hour Environmental / Health Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
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
KEROSENE, STRAIGHT RUN	8008-20-6	0 - 100%	None
LIGHT ATMOSPHERIC GAS OIL	64741-44-2	0 - 100%	None
LIGHT HYDROCRACKED DISTILLATE (PETROLEUM)	64741-77-1	0 - 100%	None

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

Name	CAS#	Concentration*	Acute Toxicity
NAPHTHALENE	91-20-3	< 1%	Inhalation Lethality: LC50 > 0.4 mg/l (Rat); Oral Lethality: LD50 533 mg/kg (Mouse); Oral Lethality: LD50 710 mg/kg (Mouse)

* 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 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 ignition.

HEALTH EFFECTS

Irritating to skin. 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: 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

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

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

Contains hydrocarbon solvent/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. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 40°C (104°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
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 advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

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. Eliminate sources of ignition. Warn other shipping. 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 Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow 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 breathing mists or vapour. Avoid all personal contact. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Loading/Unloading Temperature: N/D

Transport Temperature: N/D
Transport Pressure: N/D

Static Accumulator: This material is a static accumulator.

STORAGE

The type of container used to store the material may affect static accumulation and dissipation. 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. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.
Storage Temperature: N/D
Storage Pressure: N/D

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
KEROSENE, STRAIGHT RUN	Stable Aerosol.	TWA	5 mg/m3			Supplier
KEROSENE, STRAIGHT RUN	Vapour.	TWA	200 mg/m3			Supplier
KEROSENE, STRAIGHT RUN [as total hydrocarbon vapor]	Non-Aerosol	TWA	200 mg/m3		Skin	ACGIH
LIGHT ATMOSPHERIC GAS OIL	Stable Aerosol.	TWA	5 mg/m3			Supplier
LIGHT ATMOSPHERIC GAS OIL	Vapour.	TWA	200 mg/m3			Supplier
LIGHT HYDROCRACKED DISTILLATE (PETROLEUM)	Stable Aerosol.	TWA	5 mg/m3			Supplier
LIGHT HYDROCRACKED DISTILLATE (PETROLEUM)	Vapour.	TWA	200 mg/m3			Supplier
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:

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:

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 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

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

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): 0.85
Flash Point [Method]: 40°C (104°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: 180°C (356°F) - 320°C (608°F) [Estimated]
Vapour Density (Air = 1): N/D
Vapour Pressure: [N/D at 20°C] | < 1 kPa (7.5 mm Hg) at 38°C
Evaporation Rate (n-butyl acetate = 1): < 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: 1.7 cSt (1.7 mm2/sec) at 40ºC
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -39°C (-38°F)
Decomposition Temperature: N/D

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: No end point data for material.	Moderately toxic. Based on assessment of the components.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Moderately irritating to skin with prolonged exposure. Based on assessment of the components.

Eye	
Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

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.

Contains:

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 function. Non-sensitizing in animal tests. MIDDLE DISTILLATES WITH CRACKED STOCKS: 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. 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.

CMR Status:

Chemical Name	CAS Number	List Citations
KEROSENE, STRAIGHT RUN	8008-20-6	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:

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

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: DIESEL FUEL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Marine Pollutant: Yes

Footnote: Marine Pollutant designation is applicable only if shipped over water.

LAND (DOT)

Proper Shipping Name: DIESEL FUEL
Hazard Class & Division: 3
ID Number: 1993
Packing Group: III

ERG Number: 128
Label(s): None
Transport Document Name: UN1993, DIESEL FUEL, 3, PG III

Footnote: The flash point of this material is greater than 38ºC/100ºF. 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: HEATING OIL, LIGHT
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1202
Packing Group: III
Marine Pollutant: Yes
Label(s): 3
Transport Document Name: UN1202, HEATING OIL, LIGHT, 3, PG III, (40°C c.c.), MARINE POLLUTANT

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: UN1202, HEATING OIL, LIGHT, 3, PG III

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.

Listed or exempt from listing/notification on the following chemical inventories: DSL, TSCA

Special Cases:

Inventory	Status
AICS	Not determined
ENCS	Not determined
IECSC	Not determined
KECI	Not determined
PICCS	Not determined

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

--REGULATORY LISTS SEARCHED--

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

SECTION 16 OTHER INFORMATION

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Composition: Component table information was modified.
Hazard Identification: CA - Hazards Statement information was modified.
Hazard Identification: Physical/Chemical Hazard information was modified.
Section 05: Fire Fighting Measures - Fire Fighting Instruction information was modified.
Section 05: Hazardous Combustion Products information was modified.
Section 07: Handling and Storage-Handling information was modified.
Section 07: Handling and Storage-Storage Phrases information was modified.
Section 13: Regulatory Disposal Information - Header information was modified.
Section 14: Proper Shipping Name information was modified.
Section 14: TDG Technical Name - All information was deleted.
Section 14: TDG Technical Name - Close parenthesis information was deleted.
Section 14: TDG Technical Name - Open parenthesis information was deleted.
Section 16: Synonyms information was modified.
Section 16: Target Organs information was modified.
SYNONYMS: DIESEL ARCTIC, AUTOMOTIVE (ON-ROAD) DIESEL FUEL, DIESEL FUEL, DIESEL LOW SULPHUR LIGHT, DIESEL LOW SULPHUR LIGHT DYED, DIESEL LOW SULPHUR LIGHT RAIL, DIESEL REGULAR SULPHUR LIGHT DYED, FURNACE FUEL LIGHT, FURNACE FUEL LIGHT DYED, MC SOLVENT, STOVE OIL, STOVE OIL DYED

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

HEALTH HAZARDS
Irritating to skin. If swallowed, may be aspirated and cause lung damage.

Target Organs: Skin |

PHYSICAL HAZARDS
Combustible. In use, may form flammable/explosive vapour-air mixture. Material can accumulate static charges which may cause an ignition.

PRECAUTIONS
Avoid breathing mists or vapour. Avoid all personal contact. Use proper bonding and/or earthing procedures.However, bonding and earthing may not eliminate the hazard from static accumulation.

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.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. 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 Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

DGN: 5007490 (552455)

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 Downstream**
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada

24 Hour Environmental / Health Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
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
ETHYL ALCOHOL	64-17-5	0 - 1%	None
GASOLINE	86290-81-5	> 99 %	None
METHYL-TERT-BUTYL ETHER	1634-04-4	0 - 1%	Oral Lethality: LD50 4000 mg/kg (Rat)

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

Name	CAS#	Concentration*	Acute Toxicity
BENZENE	71-43-2	0 - 1.5%	None
CUMENE	98-82-8	0 - 1%	None
CYCLOHEXANE	110-82-7	0 - 1.5%	None
ETHYL BENZENE	100-41-4	0 - 3.5%	Inhalation Lethality: LC50 17.8 mg/l (Rat); Oral Lethality: LD50 3.5 g/kg (Rat)
n-Hexane	110-54-3	0 - 5%	None
NAPHTHALENE	91-20-3	0 - 1%	Inhalation Lethality: LC50 > 0.4 mg/l (Rat); Oral Lethality: LD50 710 mg/kg (Mouse); Oral Lethality: LD50 533 mg/kg (Mouse)
TOLUENE	108-88-3	0 - 20%	None
XYLENES	1330-20-7	0 - 20%	None

* 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

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 ignition.

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. Exposure to benzene is associated with cancer (acute myeloid leukaemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders (see Section 11).

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

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.

This light hydrocarbon material, or a component, may be associated with cardiac sensitisation following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

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. 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: Sulphur oxides, Aldehydes, Oxides of carbon, Incomplete combustion products, Smoke, Fume

FLAMMABILITY PROPERTIES

Flash Point [Method]: -40°C (-40°F) [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

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 advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills:

full body suit of chemical resistant, antistatic material is recommended.

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: 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 all personal contact. Prevent exposure to ignition sources, for example 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. 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). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The container

choice, for example storage vessel, may effect static accumulation and dissipation. 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. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
BENZENE		STEL	1 ppm			Supplier
BENZENE		TWA	0.5 ppm			Supplier
BENZENE		STEL	2.5 ppm		Skin	ACGIH
BENZENE		TWA	0.5 ppm		Skin	ACGIH
CUMENE		TWA	50 ppm			ACGIH
CYCLOHEXANE		TWA	100 ppm			ACGIH
ETHYL ALCOHOL		STEL	1000 ppm			ACGIH
ETHYL BENZENE		TWA	20 ppm			ACGIH
GASOLINE		STEL	200 ppm			Supplier
GASOLINE		TWA	100 ppm			Supplier
GASOLINE	Vapour.	TWA	300 mg/m3	100 ppm		Supplier
GASOLINE		STEL	500 ppm			ACGIH
GASOLINE		TWA	300 ppm			ACGIH
METHYL-TERT-BUTYL ETHER		TWA	50 ppm			ACGIH
n-Hexane		TWA	50 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:

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. 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:

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 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

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

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): 0.74
Flash Point [Method]: -40°C (-40°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 20°C (68°F) - 225°C (437°F)
Vapour Density (Air = 1): 3.2 at 101 kPa
Vapour Pressure: > 26.6 kPa (200 mm Hg) at 20ºC | 76 kPa (570 mm Hg) at 38 °C - 103 kPa (772.5 mm Hg) at 38°C
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 40ºC
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

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

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: 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

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Mildly irritating to skin with prolonged exposure. Based on assessment of the components.
Eye	
Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

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. Very high exposure (confined spaces / abuse) to light hydrocarbons may result in abnormal heart rhythm (arrhythmias). Concurrent high stress levels and/or co-exposure to high levels of hydrocarbons (above occupational exposure limits), and to

heart-stimulating substances like epinephrine, nasal decongestants, asthma drugs, or cardiovascular drugs may initiate arrhythmias.

Contains:

BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer 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. ETHANOL: Prolonged or repeated exposure to high concentrations of ethanol vapour or overexposure by ingestion may produce adverse effects to brain, kidney, liver, and reproductive organs, birth defects in offspring, and developmental toxicity in offspring. 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.

CMR Status:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 4, 5
CUMENE	98-82-8	3, 4
CYCLOHEXANE	110-82-7	4
ETHYL ALCOHOL	64-17-5	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

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

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: GASOLINE
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II
Marine Pollutant: Yes
Special Provisions: 17

Footnote: Marine Pollutant designation is applicable only if shipped over water.

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: MOTOR SPIRIT or GASOLINE or PETROL
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II
Label(s) / Mark(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.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, 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	6
TOLUENE	108-88-3	6
XYLENES	1330-20-7	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 05: Hazardous Combustion Products information was modified.
Section 15: National Chemical Inventory Listing - Header information was modified.
Composition: Component table information was modified.
Composition: Component table information was modified.
Section 08: Exposure Limits Table information was modified.
SYNONYMS: GASOLINE REGULAR UNLEADED RUL87 DCA DYED, GASOLINE PREMIUM UNLEADED PUL91 DCA, GASOLINE PREMIUM UNLEADED PUL91 LDCA, GASOLINE PREMIUM UNLEADED PUL91 LDCA DYED, ISOOCTANE, AUTOMOTIVE GASOLINE, ESSO SUPREME GASOLINE, GASOLINE REGULAR UNLEADED RUL87 LDCA DYED, ESSO EXTRA GASOLINE, GASOLINE REGULAR UNLEADED RUL87 LDCA, EXXON MIDGRADE GASOLINE, ESSO PREMIUM 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 DCA DYED

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.

PHYSICAL HAZARDS

FLAMMABLE. Material can accumulate static charges which may cause an ignition. 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 all personal contact. Prevent exposure to ignition sources, for example 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.However, bonding and earthing may not eliminate the hazard from static accumulation.

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.

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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DGN: 5007481 (1006754)

Prepared by: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: HEAVY DUTY ANTIFREEZE/COOLANT
Product Description: Glycol
MSDS Number: 17763
Product Code: 351010101019
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	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
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 - 99%	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 may cause serious adverse effects and may be fatal. May cause kidney failure and central nervous system effects. Prolonged exposure to elevated concentrations of mist or liquid may cause irritation of the skin, eyes, and respiratory tract. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

Target Organs: Kidney |

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 glycol and/or diethylene glycol which, if ingested, are metabolized to toxic metabolites by the enzyme alcohol dehydrogenase, for which ethanol and 4-methylpyrazole {U.S. 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 hemodialysis.

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.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 116°C (240°F) [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.

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 advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

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. 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. 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

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Form: Clear
Colour: Violet
Odour: Odourless
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 1.115 - 1.145
Flash Point [Method]: 116°C (240°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15.3
Autoignition Temperature: 400°C (752°F)
Boiling Point / Range: 197°C (387°F)
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 Hazards Identification Section.

OTHER INFORMATION

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

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, Alkalies, Acids

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 (Rat): LD50< 5000 ml	Moderately 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
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 -- 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

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
Product RQ: 5050.51 LBS - ETHYLENE GLYCOL
ERG Number: 171
Label(s): 9
Transport Document Name: UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. (Ethylene Glycol), 9, PG III, RQ

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

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

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.

Complies with the following national/regional chemical inventory requirements: DSL, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
ETHYLENE GLYCOL	107-21-1	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 Eye - Header was modified.
Section 01: Product Code - Header was added.
Section 06: Protective Measures was modified.
Section 06: Notification Procedures - Header was modified.
Section 11: Acute Toxicity Table Header was modified.
Section 09: Phys/Chem Properties Note was modified.
Section 09: Form - Header was added.
Section 09: Physical State was added.
Section 09: Colour was modified.
Section 11: Inhalation - Header was modified.
Section 09: Boiling Point C(F) was modified.
Section 09: Evaporation Rate - Header was modified.
Section 08: Comply with applicable regulations phrase was modified.
Section 09: Vapour Pressure - Header was modified.
Section 09: Vapour Pressure was modified.
Hazard Identification: Health Hazards was modified.
Section 11: Inhalation Lethality Test Data was modified.

Section 06: Accidental Release-Spill Management-Land was modified.
Section 09: Relative Density - Header was modified.
Section 09: Flash Point C(F) was modified.
Section 14: Sea (IMDG) - Header was modified.
Section 14: Air (IATA) - Header was modified.
Section 14: LAND (TDG) - Header was modified.
Section 14: Product RQ was modified.
Section 14: LAND (TDG) Default was modified.
Section 14: Sea (IMDG) - Default was modified.
Section 14: Air (IATA) - Default was modified.
Section 15: National Chemical Inventory Listing - Header was modified.
Hazard Identification: Hazards Note was modified.
Hazard Identification: Emergency Overview Target Organs was modified.
Composition: Component table was modified.
Section 16: Health Hazards was modified.
Section 16: Health Hazards - Header was modified.
Section 16: Target Organs was modified.
Section 16: CA Prepared by - Header was modified.
Section 08: Exposure Limits Table was modified.
Section 16: Land Spill was modified.
Section 16: First Aid Inhalation - Header was modified.
Section 16: Precautionary Label Text - Header was modified.
Section 09: Oxidizing Properties was modified.
Section 15: Canadian List Citations Table was modified.
Section 01: Company Contact Methods Sorted by Priority was modified.
Section 11: Tox List Cited Table was modified.
Section 09: Form - Header was deleted.
Section 09: Physical State was deleted.
Section 13: Regulatory Disposal Information - Header was modified.
Section 01: Product Code was added.
Section 04: First Aid Ingestion - Header was modified.

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

HEALTH HAZARDS
May cause harm to the unborn child.

Target Organs: Kidney |

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.

DGN: 5016335 (1012880)

Prepared by: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: ESSOLUBE GMA PLUS 40
Product Description: Base Oil and Additives
MSDS Number: 17678
Intended Use: Engine oil

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

No Reportable Hazardous Substance(s) or Complex Substance(s).

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines see Section 15.

HEALTH EFFECTS

Low order of toxicity. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

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

First aid is normally not required. Seek medical attention if discomfort occurs.

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.

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 260C (500F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
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.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do so without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Warn other shipping. 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

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product:
When mists / aerosols can occur, the following are recommended: 5 mg/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL.

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 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:

No protection is ordinarily required under normal conditions of use.

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:

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.

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: Orange
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.875
Flash Point [Method]: 260C (500F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 288C (550F)
Vapour Density (Air = 1): > 2 at 101 kPa
Vapour Pressure: < 0.013 kPa (0.1 mm Hg) at 20°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] | 13.2 cSt (13.2 mm2/sec) at 100C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -21°C (-6°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

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

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: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 5000 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:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitising in test animals.

Additional information is available by request.

CMR Status: None.

Chemical Name	CAS Number	List Citations
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	6
SOVENT REFINED HEAVY PARAFFINIC DISTILLATE (PETROLEUM)	64741-88-4	6

--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

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil 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): Not Regulated for Land Transport

LAND (DOT): Not Regulated for Land Transport

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

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Not controlled

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, ENCS, KECI, PICCS, TSCA

Special Cases:

Inventory	Status
ELINCS	Restrictions Apply

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
CARBONIC ACID, CALCIUM SALT (1:1)	471-34-1	6
PHOSPHORODITHIOIC ACID,O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP)	68649-42-3	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 Eye - Header was modified.
Section 04: First Aid Ingestion - Header was modified.
Section 06: Notification Procedures - Header was modified.
Section 11: Acute Toxicity Table Header was modified.
Section 09: Colour was modified.
Section 11: Inhalation - Header was modified.
Section 09: Evaporation Rate - Header was modified.
Section 09: Vapour Pressure - Header was modified.
Section 07: Handling and Storage-Handling was modified.
Section 07: Handling and Storage-Storage Phrases was modified.
Section 11: Inhalation Lethality Test Data was modified.
Section 05: Hazardous Combustion Products was modified.
Section 06: Accidental Release- Spill Management- Water was modified.
Section 09 Viscosity was modified.
Section 14: Sea (IMDG) - Header was modified.
Section 14: Air (IATA) - Header was modified.
Section 14: LAND (TDG) - Header was modified.
Section 14: LAND (DOT) - Header was modified.
Section 14: LAND (DOT) - Default was modified.
Section 14: LAND (TDG) Default was modified.
Section 14: Sea (IMDG) - Default was modified.
Section 14: Air (IATA) - Default was modified.
Section 15: National Chemical Inventory Listing - Header was modified.
Section 15: National Chemical Inventory Listing was modified.
Hazard Identification: Hazards Note was modified.
Section 15: Special Cases Table was modified.
Section 16: CA Prepared by - Header was modified.
Section 09: Oxidizing Properties was modified.

Section 15: List Citation Table - Header was modified.
Section 13: Regulatory Disposal Information - Header was modified.
Section 15: Canadian List Citations Table was added.
Section 11: Chemical Name - Header was added.
Section 11: CAS Number - Header was added.
Section 11: List Citation - Header was added.
Section 11: Tox List Cited Table was added.
Section 15: Chemical Name - Header was added.
Section 15: CAS Number - Header was added.
Section 15: List Citations -Header was added.

WHMIS Classification: Not controlled

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DGN: 5016258 (1016796)

Prepared by: Imperial Oil Limited, IH and Product Safety

INITIAL NOTIFICATION REPORT

Caller Information

Date: _____ Time: _____ ☐ .am . ☐ pm.

Caller's Name: _____ Caller's Phone Number: _____

Location of Incident

Location of Incident:	Section	Township	Range	West	Meridian
	_____	_____	_____	_____	_____

Type of Incident

Sweet Gas Release ☐ Liquid Spill ☐ Explosion/Fire ☐

Sour Gas Release ☐ Vehicle Accident ☐ Chemical Spill ☐

Other (describe) ☐ _____

Victim Information

Has anyone been injured ? Yes ☐ No ☐ Fatalities? Yes ☐ No ☐

To which hospital were the victims taken ? _____

Has anyone been evacuated ? Yes ☐ No ☐

If yes, how many people have been evacuated ? _____

Where have they been evacuated to ? _____

Weather Conditions

Clear ☐ Cloudy ☐ Fog ☐ Rain ☐ Snow ☐ Windy ☐ Temperature: _____ ^{0}C

Strong Wind ☐ Light Wind ☐ Gusts ☐ Steady Wind ☐

Estimated Wind Speed: _____ km/hr

Wind Direction: _____

Who Has Been Notified ?

IGL 24-Hour Emergency Telephone #	☐	Town of Inuvik	☐
UGFI	☐	NWT EMO	☐
ATCO	☐	Other _____	☐
Inuvialuit Petroleum Corp.	☐	Other _____	☐
OROGO	☐	Other _____	☐
NWT WCSS	☐	Other _____	☐
NWT Environment & Natural Resources	☐	Other _____	☐
Environment Canada	☐	Other _____	☐
National Energy Board (NEB)	☐	Other _____	☐
Transportation Safety Board (TSB)	☐	Other _____	☐
Local Police	☐	Other _____	☐
Fire Department	☐	Other _____	☐
Ambulance	☐	Other _____	☐

KEY RESPONDER ROLE LOG

Incident Name _____ **Date** _____

Role	Name	Contact No.
Corporate Emergency Operations Center (CEOC)		
Incident Commander (IC)		
Initial IC:		
Final IC:		
Media/Communications Coordinator:		
Public Safety Coordinator (PSC)*:		
Additional CEOC Support Staff** (list Observers/Trainees on reverse):		
On-Site Command Post (OSCP)		
First Responder (1):		
First Responder (2):		
On-Scene Commander (OSC)		
Initial OSC:		
Final OSC:		
Roadblock Crew		
Location 1:		
Location 2:		
Location 3:		
Location 4:		
Gas Monitoring Crew		
Location 1:		
Location 2:		
Evacuation Crew		
Area 1:		
Area 2:		
Evacuation Center Coordinator		
Location 1:		
Location 2:		
Operations Supervisor/Foreman:		
Remedial Measures Advisor (LPGERC):		
[ ] REOC [ ] MECC [ ] ECC (List location, attendees & phone numbers for activated Centres on reverse)		

*May be the On-Scene Commander and may be located at the OSCP

**Additional CEOC Roles may include:

-Engineering - Internal Resource (Name) - Telephoner/Contactor - Legal Scribe
-Event Log - Logistics/IT Support - Executive Management (Title) - Communication

INCIDENT LOG

Date	Time	Action Taken	Result of Action Taken	Initials

AMBIENT AIR MONITORING LOG

Date: _____

Time	Location	LEL	H_2S Content	Wind	
				Speed	Direction

THREAT REPORT

Date:	**Time:**	**Site:**
Threat received by:		
1. *What did the caller say when making the threat (use the exact words if possible)?*		
2. *Did you notice anything else that might help the police identify the caller?*		
3. *Describe any background noises heard over the telephone.*		

Other information:										
4. Sex:	Male	☐	Female	☐						
5. Voice:	Loud	☐	Soft	☐	Accent	☐	Other	———————		
6. Manner:	Nervous	☐	Calm	☐	Angry	☐	Vulgar	☐	Joking	☐
7. *Did you recognize the caller's voice?*							Yes	☐	No	☐
8. *Did the caller seem to be familiar with the site and company?*							Yes	☐	No	☐

Questions to ask the caller if a bomb threat is received:
2. *What time will the bomb explode?*
3. *Where is the bomb?*
4. *What does the bomb look like?*
5. *Why did you place the bomb?*
6. *Where are you calling from?*
7. *What is your name?*

PRELIMINARY MEDIA ANNOUNCEMENT

Date: _____	Time: _____ ☐ a.m. ☐ p.m.
My Name Is: _____	
My Job Title Is: _____	

This is the information I can give you at this time:

At approximately_____☐ a.m. ☐ p.m. on _____(date) there was a _____(fire, explosion, spill, release of gas, etc.) involving the Ikhil and/or Inuvik Gas system approximately _____kilometres ☐ east ☐ west ☐ north ☐ south of _____. This system is operated by Inuvik Gas Ltd.

At this time _____ people are being treated for injuries. The *Media & Communications Coordinator*, through the police, can only release the names and condition of the injured.

The facility/pipeline ☐ has been shut down ☐ has not been shut down.

Emergency response procedures have been activated and our first priority is to protect the public and the environment.

The cause of the _____(fire, explosion, spill, release of gas, etc.) is not yet known and no estimate of damage is available.

Any further inquiries should be directed to the *Media & Communications Coordinator* at _____. Media releases will be issued whenever new information becomes available.

PRELIMINARY STANDBY STATEMENT

Date: _____ Time: _____

My name is _____

My Position at Inuvik Gas _____ is _____

Let me tell you what I know …

Describe the situation:

At_____ **[time, am/pm]** on _____ **[date]**, a _____ **[fire/explosion/gas release]** occurred at Inuvik Gas' _____**[pipeline/facility]** located _____ **[east/west/south/north]** of _____**[nearest town/city]**.

What is happening now:

The _____ **[pipeline/facility/etc.]** has been/is being isolated and shut down. Inuvik Gas' Emergency Response Plan has been activated and the response team is currently directing response procedures.

At this time, _____ **[number]** of persons are _____ **[injured/ unaccounted for]** and are being _____ **[attended to by medical personnel/taken to hospital]**. The names and conditions of these individuals are not currently known.

Our main priority now & what to expect next:

Our main priority now is to **[people]** and to _____ **[equipment/situation]**.
Our next steps will be to _____.
The cause of/reason for the _____ **[fire/explosion/gas release]** is not known at this time and there is no estimate of damages yet.

We will issue further information as it becomes available.

NEWS RELEASE TEMPLATE - INUVIK GAS OUTAGE

Month XX, 201**X**

Inuvik Gas crew works to restore natural gas service in Inuvik

Inuvik, Northwest Territories — Damage to an Inuvik Gas Ltd. gas line has resulted in an interruption of gas service for approximately **[number]** customers in Inuvik.

The gas line, located at **[location]** was **[what happened, e.g., struck by an excavator]** at approximately **[time]** today. Inuvik Gas is working to restore service to customers as safely and quickly as possible. Repairs are expected to be completed by **[time]** today.

Once repairs are complete, Inuvik Gas employees, wearing company issued photo identification, will be knocking on the doors of customers whose gas service may have been affected to relight their furnaces and appliances and ensure they are working properly.

[Optional: Inuvik Gas has requested assistance from [community/company] to assist with relighting customers' furnaces and appliances. It is expected that most customers will have their furnaces and appliances relit by [time].

Customers concerned about their gas service or the relighting of furnaces and appliances can call Inuvik Gas at 867-777-3422.

Inuvik Gas reminds customers about the importance of having underground utilities located prior to excavation. Call 867-777-3422 at least 48 hours before digging. There is no charge for the call or for the service to have underground utility lines marked.

Inuvik Gas thanks customers and appreciates their patience during this temporary interruption.

XXX XXXXX
General Manager
Inuvik Gas Ltd.
XXX-XXX-XXXX

MEDIA INQUIRY RECORD

OPENING STATEMENT: *"We have a spokesperson to answer your questions. I'd like to get some information from you, and I will make sure that they get this message immediately so that you can be called as soon as information is available."*

Record of Contact

Subject of Contact _____

Media Outlet _____

Reporter's Name _____

Reporter's Contact Info _____

(phone/fax/email) _____

Inquiry Method

- ☐ Telephone
- ☐ In-person Interview
- ☐ Email
- ☐ Other (describe)

Date and Time of Contact _____

Summary of Inquiry _____

_____

_____

Contact notes/questions asked _____

_____

_____

Follow-up required, if any _____

_____

Reporter's Deadline _____

Status of Company's relationship with reporter/media outlet

_____

COMMUNICATIONS TEAM
TELEPHONE CALL RECORD

(One page per call)

Call Taken/Made By:	Call In:	Call Out:

Call Details:	Date:	Time:
Phone Number:	Extension: #	
Name:		
Title:		
Organization:		
Mobile:	Fax Number:	
Message For:	Return Call By:	
Call Source ○ Local Government ○ Federal Government ○ External Agency ○ Mutual Aid ○ Employee ○ Employees Family – Relationship: _____ ○ Public ○ Other: _____ ○ Media (complete Media Inquiry Form)		
Message/Response:		
Comments:		

Action Required	Call Them back ☐	Send Fax ☐	Meeting Req'd ☐	Will Call Back ☐
Other				
Completed By:		Date:		Time:
Response By:		Date:		Time:

ROADBLOCK LOG

Date	Time	Name of Driver	License Plate #	Province	Time Entered Hazard Area	Time Left Hazard Area	Resident of EPZ ?
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐
							Yes ☐ No ☐

RESIDENT CONTACT LOG

Name	Date	Time	Successfully Contacted?	Reason For Contact	Contacted By
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		
			Yes ☐ No ☐		

EVACUATION NOTIFICATION

(Note: Evacuation is voluntary for Level 1 emergencies and required for Levels 2 and 3.

Hello Mr./Mrs./Ms. _____	
This is _____ of Inuvik Gas Ltd. calling to inform you that we have encountered problems at our Ikhil-Inuvik gas system approximately _____ kilometres from _____. You are in no immediate danger, but as a safety precaution we are asking everyone to evacuate the area until we are able to correct the problem.	
Do you have any children now in school?	Yes ☐ No ☐
Do you require transportation or other assistance?	Yes ☐ No ☐
If yes, then.....	
Please remain indoors and the company will send someone to pick you up and transport you to a safe area.	
How many people will require transportation? _____	
The company is establishing a reception centre at _____. You will be provided with meals and accommodations until the area is safe for return.	
If no, then.....	
The company is establishing a reception centre at _____. Please check in at the reception centre and you will be provided with meals and accommodations if necessary.	
If you are evacuating the area on your own, please avoid _____ as this is the hazard area. We recommend you leave the area by the following route: _____	
If you are not going to the designated reception centre, do you have a telephone number where we can reach you to let you know when the emergency is over? _____	
Thank you very much for your cooperation and we do apologize for the inconvenience.	

SHELTER NOTIFICATION

Hello Mr./Mrs./Ms. _____		
This is _____ of Inuvik Gas Ltd. calling to inform you that we have encountered a problem at our Ikhil-Inuvik gas system approximately _____ kilometres from _____. You are in no immediate danger, but as a safety precaution we are asking everyone to remain indoors until we are able to correct the problem.		
How many people are at your residence? _____		
Do you have any children now in school?	Yes ☐	No ☐
Is there anyone outside that you cannot contact easily?	Yes ☐	No ☐
Is there another telephone number where we can contact you? _____		

For your safety, we recommend the following precautions.....

§ Gather everyone in the residence and close the doors and windows.

§ Shut down the furnace and exhaust fans (not possible in extremely cold weather).

§ Plug any air intakes into your home.

§ Extinguish all ignition sources (pilot lights on water heater, stove, etc.)

§ Do not smoke or operate electrical appliances.

§ Move to the upper floors of your home and stay away from windows.

Do not leave your home or start a motor vehicle. A company representative or the police will contact you when the emergency is over. If you wish to contact us our telephone number is _____.

Thank you very much for your cooperation and we do apologize for the inconvenience.

RECEPTION CENTRE CHECK-IN SHEET

Name	Date	Arrival Time	Evacuation Centre	Number of People	Is Return Transportation Required?	Any Special Needs?	Date Resident Able To Return Home
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		
					Yes ☐ No ☐		

EVACUATION EXPENSES COMPENSATION REQUEST

Resident's name:	Resident's Telephone Number:
Date(s) Of Evacuation:	Resident's Address:

EXPENSES						
Hotel/Motel	Transportation	Meals	Telephone	Other	**TOTAL**	**Description of Expense**
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
$	$	$	$	$	$	
				TOTAL		

Note: Please attach receipts for expenses.

NT-NU SPILL REPORT

Go to http://www.enr.gov.nt.ca/programs/hazardous-materials-spills/reporting-spills to find the following form:

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND
OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca

REPORT LINE USE ONLY

A	Report Date: MM / DD / YY	Report Time:	☐ Original Spill Report OR ☐ Update # _____ to the Original Spill Report	**Report Number:**
B	Occurrence Date: MM / DD / YY	Occurrence Time:		
C	Land Use Permit Number (if applicable):		Water Licence Number (if applicable):	
D	Geographic Place Name or Distance and Direction from the Named Location:		Region: ☐ NT ☐ Nunavut ☐ Adjacent Jurisdiction or Ocean	
E	Latitude: _____ Degrees _____ Minutes _____ Seconds		Longitude: _____ Degrees _____ Minutes _____ Seconds	
F	Responsible Party or Vessel Name:		Responsible Party Address or Office Location:	
G	Any Contractor Involved:		Contractor Address or Office Location:	
H	Product Spilled: ☐ Potential Spill	Quantity in Litres, Kilograms or Cubic Metres:	U.N. Number:	
I	Spill Source:	Spill Cause:	Area of Contamination in Square Metres:	
J	Factors Affecting Spill or Recovery:	Describe Any Assistance Required:	Hazards to Persons, Property or Environment:	
K	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:			

L	Reported to Spill Line by:	Position:	Employer:	Location Calling From:	Telephone:
M	Any Alternate Contact:	Position:	Employer:	Alternate Contact Location:	Alternate Telephone:

REPORT LINE USE ONLY

N	Received at Spill Line by:	Position:	Employer:	Location Called:	Report Line Number:

Lead Agency: ☐ EC ☐ CCG/TCMSS ☐ GNWT ☐ GN ☐ ILA ☐ AANDC ☐ NEB ☐ Other: _____

Significance: ☐ Minor ☐ Major ☐ Unknown

File Status: ☐ Open ☐ Closed

Agency:	Contact Name:	Contact Time:	Remarks:
Lead Agency:			
First Support Agency:			
Second Support Agency:			
Third Support Agency:			

WSCC DANGEROUS OCCURRENCE REPORT

WSCC Workers' Safety & Compensation Commission | ᐃᖃᓗᓇᐃᖅᑎᑐᓄᑦ ᐊᑦᑕᓇᖅᑐᓂᒃ ᐊᒻᒪᓗ ᓇᓕᓕᒫᓂᒃ ᖃᐅᔨᓴᖅᑎᑦ

To report a dangerous occurrence call the 24-hour Incident Reporting Line at **1-800-661-0792** and complete this form.

DANGEROUS OCCURRENCE

NOTICE TO THE CHIEF SAFETY OFFICER

OHS Regulations: Part 2 Reporting - Section 9 (1-3)			Date (dd/mm/yyyy):
Employer name:	Phone number:	Ext.:	Fax number:
WSCC employer number:	Employer mailing address:		
Contact person name:	Position:		
Contact person mailing address *(if different from employer mailing address)*	Contact person phone number:		
Please indicate best contact method:	☐ email	☐ fax	☐ mail

email or fax:

Name of each employer, principal contractor, and owner at the worksite

Nature of the Dangerous Occurrence

Date (dd/mm/yyyy):	Time:	Time zone:	Location:

Clearly describe the circumstances. *(Attach additional pages if required):*

☐ Submit a copy of this report **without the names of the workers involved** to your Joint OHS committee or OHS representatives.

Submit completed form to the **Chief Safety Officer** with subject line **Notice of Dangerous Occurrence**:

Northwest Territories
E-mail: **noticetoCSO@wscc.nt.ca**
Toll Free Fax: 1 (866) 277-3677
Mail: WSCC - Chief Safety Officer Box 8888, Yellowknife, NT X1A 2R3
Drop-off: Yellowknife: Centre Square Mall, 5th Floor, 5022 49 Street
Inuvik: Blackstone Building, Unit 87, 85 Kingmingya Road

Nunavut
E-mail: **noticetoCSO@wscc.nt.ca**
Fax: 1 (866) 277-3677
Mail: WSCC - Chief Safety Officer
630 Queen Elizabeth Way, Box 669, Iqaluit, NU X0A 0H0
Drop-off: Qamutiq Building, 2nd Floor

OFFICE USE ONLY

Date *Notice* received by the Chief Safety Officer (dd/mm/yyyy):	Confirmation of *Receipt of Notice* sent by: ☐ email ☐ fax ☐ mail	WSCC Tracking Number:
Chief Safety Officer signature:	Sent (dd/mm/yyyy):	

NORTHWEST TERRITORIES AND NUNAVUT

SAFETY ACT

OCCUPATIONAL HEALTH AND SAFETY REGULATIONS

INTERPRETATION

1. In these regulations, "dangerous occurrence" means an occurrence that does not result in, but could have resulted in an accident causing serious bodily injury, such as

(a) structural failure or collapse of

(i) a structure, scaffold, temporary falsework or concrete formwork, or

(ii) a tunnel, caisson, coffer dam, trench, excavated shaft or excavation,

(b) failure of a crane or hoist or the overturning of a crane or powered mobile equipment,

(c) accidental contact with an energized conductor,

(d) bursting of a grinding wheel,

(e) uncontrolled spill or escape of a toxic, corrosive or explosive substance,

(f) premature or accidental detonation of explosives,

(g) failure of an elevated or suspended platform, or

(h) failure of an atmosphere-supplying respirator; (événement dangereux)

PART 1

PRELIMINARY MATTERS

Giving Notice to Chief Safety Officer

3. (1) Where these regulations require a notice to be given to the Chief Safety Officer, the notice must be in a form approved by the Chief Safety Officer

(2) Notice is deemed to have been given under subsection (1) when the notice is actually received by the Chief Safety Officer.

(3) In the case of a notice required by subsection 7(1) or (2), an employer shall give notice by telephoning a safety officer and, in addition, give notice in the manner set out in subsection (1).

PART 2

Dangerous Occurrences

9. (1) An employer shall, as soon as is reasonably possible, give notice to the Chief Safety Officer of a dangerous occurrence that takes place at a work site, whether or not a worker sustains injury.

(2) The notice given under subsection (1) must include

(a) the name of each employer, principal contractor and owner at the work site;

(b) the date, time and location of the dangerous occurrence;

(c) the circumstances related to the dangerous occurrence; and

(d) the name, telephone number and facsimile number of the employer or a person designated by the employer to be contacted for additional information.

(3) An employer shall provide a copy of the notice required by subsection (1), without the names of the workers involved, to the Committee or representative.

PART 3

GENERAL DUTIES

Investigation of Certain Accidents

28. (1) Subject to section 29, an employer shall ensure that an accident causing serious bodily injury or a dangerous occurrence is investigated as soon as is reasonably possible

(a) by the Committee and employer or by the representative and the employer; or

(b) if no Committee or representative is available, by the employer.

(2) After the investigation of an accident causing serious bodily injury or a dangerous occurrence, an employer shall, in consultation with the Committee or representative or, if no Committee or representative is available, the workers, prepare a written report that includes

(a) a description of the accident or occurrence;

(b) graphics, photographs, video or other evidence that could assist in determining the causes of the accident or occurrence;

(c) identification of unsafe conditions, acts, omissions or procedures that contributed to the accident or occurrence;

(d) an explanation of the causes of the accident or occurrence;

(e) a description of the immediate corrective action taken; and

(f) a description of long-term actions that will be taken to prevent the happening of a similar accident or dangerous occurrence, or the reasons for not taking action.

May 2016

WSCC ACCIDENT CAUSING BODILY INJURY REPORT

WSCC Workers' Safety & Compensation Commission | ᐃᖅᑲᐃᖅᑎᒋᐅᑉ ᐊᑦᑕᓇᖅᑐᓂᒃ ᐊᒻᒪ ᓇᖏᕐᓯᒪᓂᕐᒧᑦ ᖃᑦᑎᖅᓯᒪᓂᖓ

To report an accident causing serious bodily injury; call the 24-hour Incident Reporting Line **1-800-661-0792** and complete and submit this form.

ACCIDENT CAUSING SERIOUS BODILY INJURY

NOTICE TO THE CHIEF SAFETY OFFICER

OHS Regulations: Part 2 Reporting; Section 8 (1-3)			Date (dd/mm/yyyy):
Employer name:	Phone number:	Ext.:	Fax number:
WSCC employer number:	Employer mailing address:		
Contact person name:	Position:		
Contact person mailing address *(if different from employer mailing address)*	Contact person phone number:		
Please indicate best contact method:	☐ email	☐ fax	☐ mail	email or fax:

Nature of the accident

Date (dd/mm/yyyy):	Time:	Time zone:	Location:

Clearly describe the circumstances of the accident causing serious bodily injury. (*Attach additional pages if required*):

Name of injured or deceased person(s)	Apparent injuries	Employer

☐ Submit a copy of this report **without the names of the workers involved** to your Joint OHS committee or OHS representatives.

Submit completed form to the **Chief Safety Officer** with a subject line **Notice of Accident Causing Serious Bodily Injury.**

Northwest Territories

E-mail: **noticetoCSO@wscc.nt.ca**

Toll-Free Fax: 1 (866) 277-3677

Mail: WSCC - Chief Safety Officer Box 8888, Yellowknife, NT X1A 2R3

Drop-off: Yellowknife: Centre Square Mall, 5th Floor, 5022 49 Street
Inuvik: Blackstone Building, Unit 87, 85 Kingmingya Road

Nunavut

E-mail: **noticetoCSO@wscc.nu.ca**

Toll-Free Fax: 1 (866) 277-3677

Mail: WSCC - Chief Safety Officer
630 Queen Elizabeth Way, Box 669, Iqaluit, NU X0A 0H0

Drop-off: Qamutiq Building, 2nd Floor

OFFICE USE ONLY

Date *Notice* received by the Chief Safety Officer: (dd/mm/yyyy)	Chief Safety Officer signature :	WSCC Tracking Number:
CSO Receipt of Notice Sent (dd/mm/yyyy):	Sent by: ☐ email ☐ fax ☐ mail	

NORTHWEST TERRITORIES AND NUNAVUT

SAFETY ACT

OCCUPATIONAL HEALTH AND SAFETY

REGULATIONS

INTERPRETATION

1. In these regulations, "accident causing serious bodily injury" means an accident at a work site that

(a) causes or could reasonably be expected to cause the death of an individual, or

(b) requires an individual to be admitted to a hospital as an in-patient for a period of 24 hours or more;

PART 1

PRELIMINARY MATTERS

Giving Notice to Chief Safety Officer

3. (1) Where these regulations require a notice to be given to the Chief Safety Officer, the notice must be in a form approved by the Chief Safety Officer

(2) Notice is deemed to have been given under subsection (1) when the notice is actually received by the Chief Safety Officer.

(3) In the case of a notice required by subsection 7(1) or (2), an employer shall give notice by telephoning a safety officer and, in addition, give notice in the manner set out in subsection (1).

PART 2REPORTING

Accidents Causing Serious Bodily Injury

8. (1) An employer shall, as soon as is reasonably possible, give notice to the Chief Safety Officer of an accident causing serious bodily injury.

(2) A notice given under subsection (1) must include

(a) the name of each injured or deceased individual;

(b) the name of the employer of each injured or deceased worker;

(c) the date, time and location of the accident;

(d) the circumstances of the accident;

(e) the apparent injuries; and

(f) the name, telephone number and facsimile number of the employer or a individual designated by the employer to be contacted for additional information

(3) An employer shall provide a copy of the notice required by subsection (1), without names of the injured or deceased individuals, to the Committee or representative.

PART 3

GENERAL DUTIES

Investigation of Certain Accidents

28. (1) Subject to section 29, an employer shall ensure that an accident causing serious bodily injury or a dangerous occurrence is investigated as soon as is reasonably possible

(a) by the Committee and employer or by the representative and the employer; or

(b) if no Committee or representative is available, by the employer.

(2) After the investigation of an accident causing serious bodily injury or a dangerous occurrence, an employer shall, in consultation with the Committee or representative or, if no Committee or representative is available, the workers, prepare a written report that includes

(a) a description of the accident or occurrence;

(b) graphics, photographs, video or other evidence that could assist in determining the causes of the accident or occurrence;

(c) identification of unsafe conditions, acts, omissions or procedures that contributed to the accident or occurrence;

(d) an explanation of the causes of the accident or occurrence;

(e) a description of the immediate corrective action taken; and

(f) a description of long-term actions that will be taken to prevent the happening of a similar accident or dangerous occurrence, or the reasons for not taking action.

May 2016

INCIDENT INVESTIGATION REPORT

ACCIDENT/INCIDENT PARTICULARS

EXACT LOCATION:	
DATE AND TIME:	
REPORTED TO:	DATE AND TIME:

TYPE OF ACCIDENT/INCIDENT

LOST TIME	INJURY OR ILLNESS	PROPERTY DAMAGE
MEDICAL AID	PRODUCTION LOSS	OTHER

PERSONAL INJURY

NAME OF PERSON INJURED:	OCCUPATION:
DESCRIPTION OF INJURY:	

PROPERTY DAMAGE OR PRODUCTION LOSS

DESCRIPTION OF DAMAGE OR LOSS:
COST OR AMOUNT OF LOSS:
OBJECT/EQUIPMENT/SUBSTANCE INFLICTING DAMAGES:

DESCRIPTION

DESCRIBE CLEARLY HOW ACCIDENT/INCIDENT OCCURRED:

ANALYSIS

WHAT ACTS, FAILURES OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS ACCIDENT/INCIDENT:

PREVENTION

WHAT ACTION(S) WILL BE TAKEN OR RECOMMENDED TO PREVENT RECURRENCE:

POST INCIDENT REVIEW

PERSON RESPONSIBLE FOR FOLLOW-UP:	
INVESTIGATED BY:	DATE AND TIME:
REVIEWED BY MANAGEMENT:	DATE AND TIME:

COMMENTS

MANAGEMENT COMMENTS:
ADDITIONAL COMMENTS:

RESIDENT CONTACT INFORMATION

Several trapper cabins have been identified in the area surrounding the Ikhil pipeline and are shown on the UGFI Ikhil Pipeline map (Section 8). Only one of those cabins is within the Emergency Planning Zone, and information for that trapper is shown below.

Map #	Name	Address	Latitude	Longitude	Km Post	Telephone
1	*<name removed>*	*<info removed>*	68.250	133.460	KP 42.1	*<# removed>*

Due to the population density, notification and evacuation of residences and public facilities within the town of Inuvik will be accomplished by:

- Telephone contact to local emergency services and directly affected landowners (see list below)
- Radio announcements
- Dispatching rovers to buildings within the PAZ to check for occupants
- Acquiring helicopters to perform fly-overs to visually inspect for persons in the vicinity (as necessary)

Directly Affected Landowners:

Landowner	Telephone	Location
Inuvialuit Land Administration (ILA)	867-977-7100	Tuktoyaktuk
Town of Inuvik	867-777-8600	Inuvik
Northern Transportation Company Ltd.	867-777-2442	Inuvik
Northwest Territories Power Corporation (NTPC)	867-777-7700	Inuvik
GNWT Department of Lands (Beaufort-Delta Region)	867-777-8900	Inuvik

RECEPTION CENTRE

If an emergency occurs that poses a threat to the residents in the vicinity of the Ikhil-Inuvik system it may be necessary to begin evacuating residents to safety. Evacuation of the general public may also be necessary if an emergency occurs in close proximity to residences or public facilities. The *Public Safety Coordinator* is responsible for organizing the notification and evacuation of those in the EPZ. Evacuation is on a voluntary basis – **personnel do not have authority to order residents to evacuate their homes**. If a resident chooses not to evacuate, the police should be notified.

A Reception Centre will be designated under the authority of the *On-Scene Commander* should it be deemed necessary. Possible reception centres include:

Reception Centre	Location	Phone	Alternate
East Three School	116 Kingmingya Road, Inuvik, NT	867-777-3030 867-777-3040	*<name & # removed>*
Midnight Sun Rec. Complex	95 Gwich'in Road Inuvik, NT	867-777-8640	

Should it be necessary to evacuate area residents, IGL and UGFI will provide accommodation for the evacuees at the following hotels:

Hotel	Location	Phone
Nova Inn	300 Mackenzie Road, Invuik, NT	867-777-6682
Mackenzie Hotel	185 Mackenzie Road Inuvik, NT	867-777-2861
Capital Suites	198 Mackenzie Road, Inuvik, NT	867-678-6300

Dependent upon the location of the emergency incident, the *On-Scene Commander* may designate a Reception Centre and/or accommodations outside of the town of Inuvik.

134° 15' W | 134° 00' | 133° 45' | 133° 30' W

68° 40' | 68° 30' | 68° 20'

IKHIL N-26 | OGEOQEOQ J-06 | IKHIL K-35 | IKHIL J-35 | ORIGINAL OVERLAND ACCESS ROAD | BLUEBERRY HILL OVERLAND ACCESS ROAD (ALTERNATE) | WILLIAMS ISLAND | REINDEER STATION | CARIBOU HILLS | ONIGAT D-52 | IKHIL A-01 | SHOLOKPAQQAK P-60 | SHAKGATLATACHIG D-50 | HARRISON ISLAND | CARIBOU HILLS | AKLAVIK ACCESS ROAD ICE ROAD | DOUGLAS CREEK CROSSING | NOELL LAKE | MACKENZIE DELTA | AURORA TRAINING WELL INUVIK G-04 | INUVIK D-54 | LAGOON | INUVIK | TWIN LAKES | INUVIK TOWNSITE AIRFIELD | DEMPSTER HIGHWAY | INUVIK AIRPORT

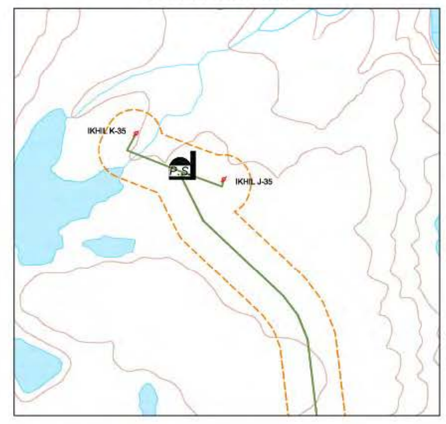
MACKENZIE RIVER | EAST CHANNEL | MIDDLE CHANNEL | ORAK CHANNEL | GULLEY CHANNEL | NAPOIAK CHANNEL

WX01 | WX02 | WX03 | WX04 | WX05 | WX06 | WX07 | WX08 | WX09 | WX10

MS

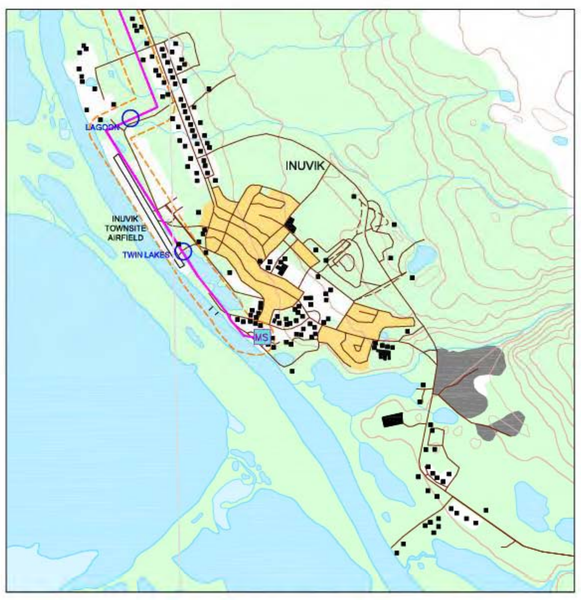
SITE DETAIL

SCALE 1:15 000

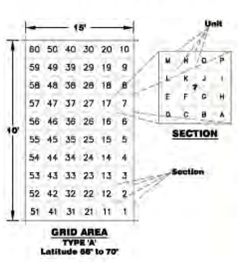


INUVIK DETAIL

SCALE 1:25 000



GRID DETAILS



LEGEND

- PIPELINE (OROGO-REGULATED)
- PIPELINE (NEB-REGULATED)
- EMERGENCY PLANNING ZONE(150 Meters)
- PLANT SITE (NEB-REGULATED)
- BUILDING
- TRAPPERS CABIN
- PIPELINE BLOCK VALVE
- METER STATION (OROGO-REGULATED)
- CREEK CROSSING
- CONTOUR LINES
- ROADS
- TRAILS
- WATER COURSE
- WATER BODY
- MINING AREA

Datum: North American Datum 1983 (NAD 83) Zone 8
Projection: Universal Transverse Mercator (UTM)

1000 500 0 1000 2000 3000 4000 Metres

SCALE 1 : 50 000

REFERENCES

- NATIONAL TOPOGRAPHIC DATA BASE (NTDB) SUPPLIED BY NRCAN
- WELL DATA PROVIDED BY THE NATIONAL ENERGY BOARD (March 17, 2010)

Inukshuk Geomatics Inc. endeavours to present information as accurate and as current as possible however since we are sourcing several agencies for information and also since some of this information is subject to interpretation we can not guarantee the accuracy of the information presented.

WELL LEGEND

- DRY OR ABANDONED
- SUSPENDED

REVISION TABLE

NO.	NAME	DESCRIPTION	DATE
0	RT	Preliminary Map Issued	JUL. 08, 09
1	SR	Additional Trapper's Cabins	AUG. 29, 12
2	LM	Additional Trapper's Cabins & Revise Title	NOV. 24, 15
3	LM	Revise Legend	NOV. 21, 16

INUKSHUK Geomatics Inc.
460-6940 FISHER ROAD S.E.
CALGARY, ALBERTA T2H 0W3
PH (403) 253-8101
FAX (403) 253-1985
Email inquiries@inukshukgeomatics.com

DRAWN:	DATE:
RT	Nov. 21, 2016
ACAD No.:	REVISION:
35055-ERP	3

UTILITY GROUP FACILITIES INC.
IKHIL JOINT VENTURE

MAP SHOWING

IKHIL PIPELINE EMERGENCY PLANNING ZONE

AND

SIGNIFICANT ENVIROMENTAL FEATURES

WITHIN

NORTHWEST TERRITORIES

REVISION TABLE

No.	NAME	DESCRIPTION	DATE
1.	LBC	ADDED VALVES	NOV. 19, 2010
2.	LBC	REVISED VALVES	NOV. 30, 2010
3.	LM	ADD PROPANE / AIR BACKUP SYSTEM	SEPT. 16, 2011
4.	LM	REVISE VALVES, PIPELINES & PHOTO	OCT. 29, 2015
5.	LM	REVISE PIPELINE LEGEND	NOV. 21, 2016

LEGEND

- IKHIL GAS PIPEINE (NEB–REGULATED)
- IKHIL GAS PIPEINE (OROGO–REGULATED)
- IGL DISTRIBUTION SYSTEM GAS PIPELINE
- TRAPPER'S CABIN
- EMERGENCY SHUT DOWN VALVE
- EMERGENCY SHUT DOWN VALVE – SERVICE
- EMERGENCY SHUT DOWN VALVE – NORMALLY CLOSED
- PIPELINE BLOCK VALVE
- IKHIL METER STATION (OROGO–REGULATED) (MS)
- PROPANE AIR SYSTEM

WELL LEGEND

DRY OR ABANDONED SUSPENDED

Datum: North American Datum 1983 (NAD 83) Zone 8
Projection: Universal Transverse Mercator (UTM)

SCALE 1 : 5000

0 50 125 250 500m

INUVIK GAS LTD.

MAP SHOWING

INUVIK UTILITY PIPELINES EMERGENCY RESPONSE PLAN

WITHIN

NORTHWEST TERRITORIES

DRAWN:	DATE:	ACAD No.:	REVISION:
LBC	Nov. 21/16	35055-ERP	5

REFERENCES

- ORTHOPHOTO DATED JULY 2012
- CADASTRAL DATA SUPPLIED BY NRCAN
- WELL DATA PROVIDED BY THE NATIONAL ENERGY BOARD (March 17, 2010)

Inukshuk Geomatics Inc. endeavours to present information as accurate and as current as possible however since we are sourcing several agencies for information and also since some of this information is subject to interpretation we can not guarantee the accuracy of the information presented.

INUKSHUK Geomatics Inc.
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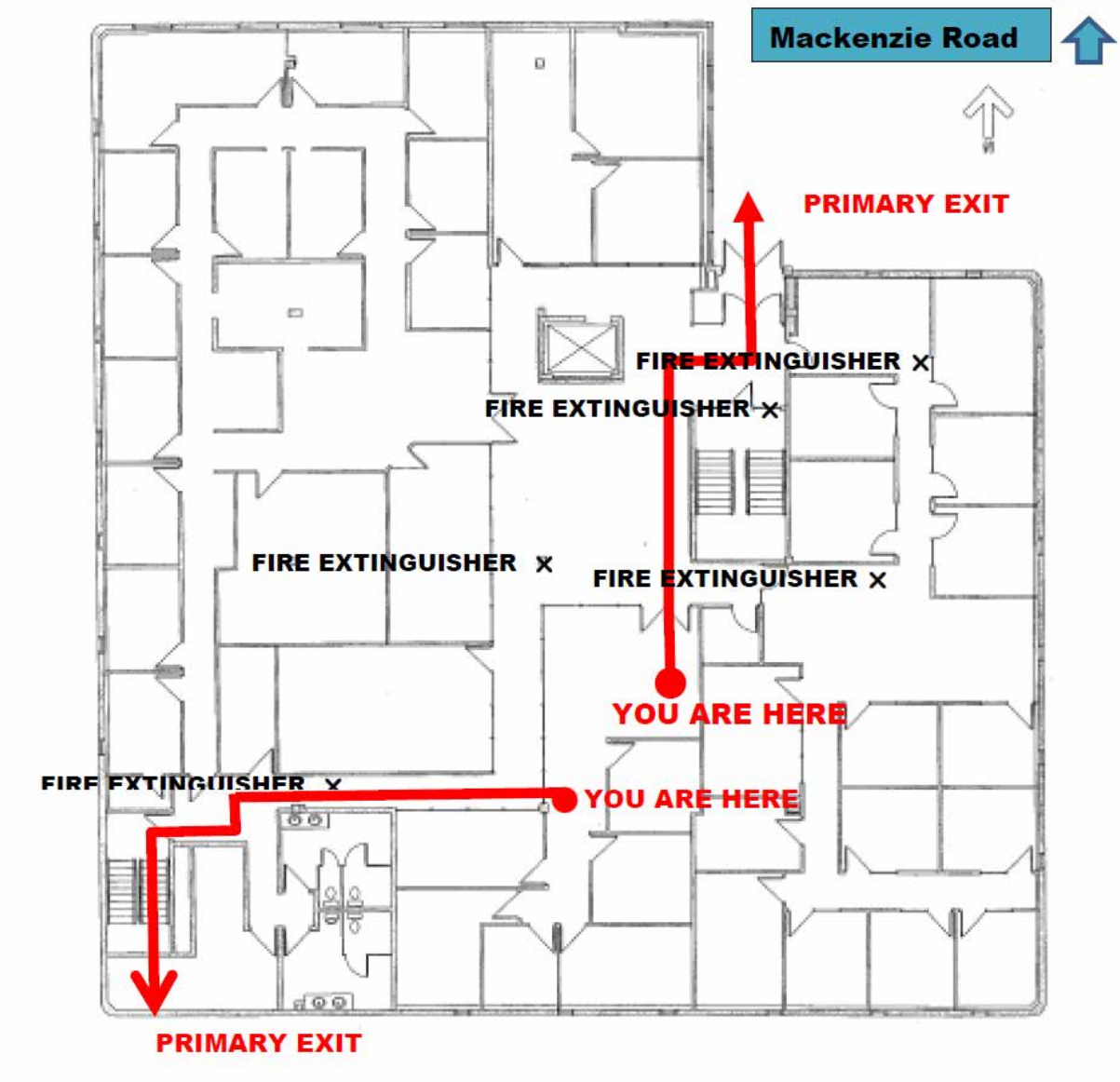
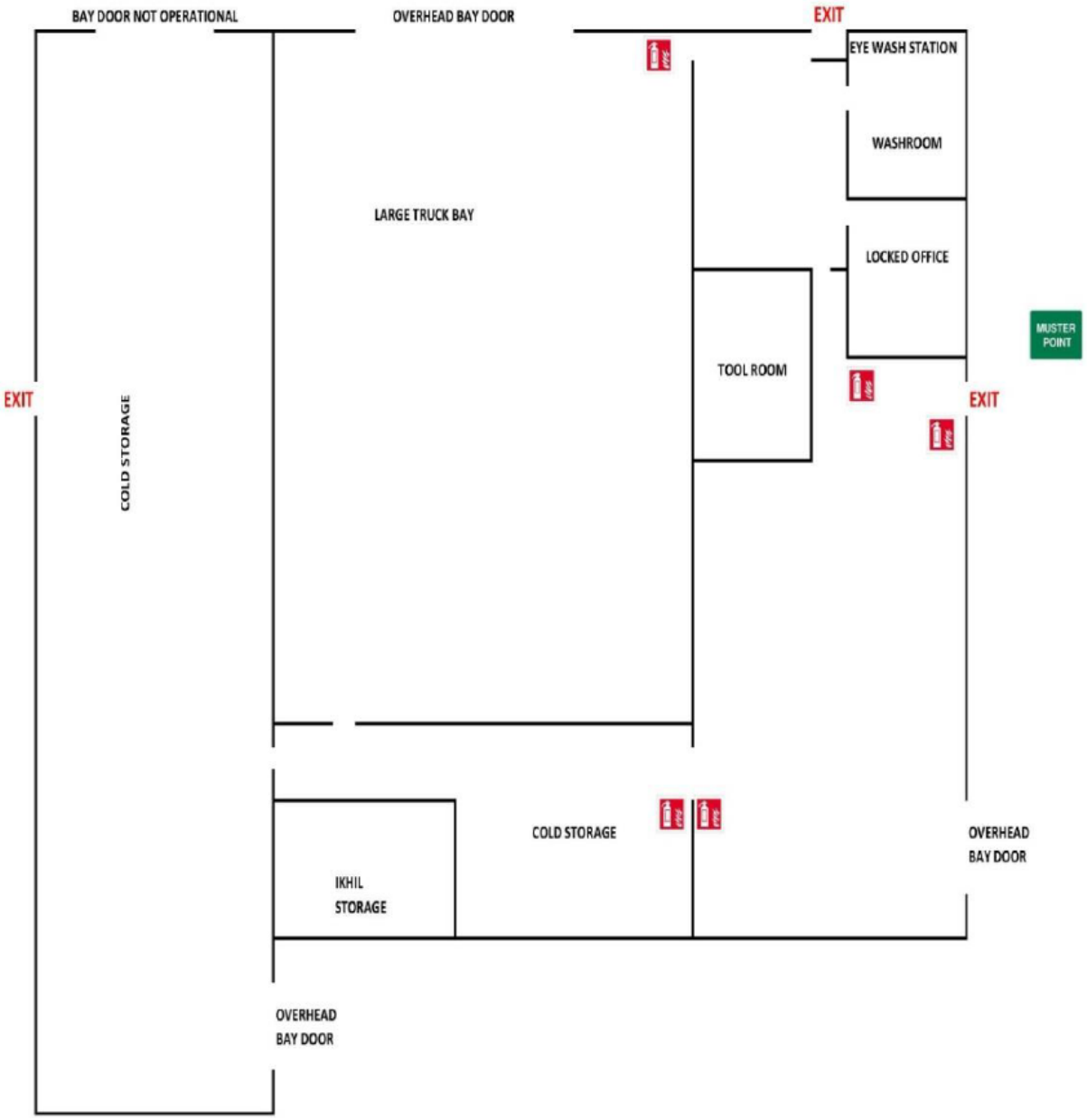
FAX (403) 253–1985
Email inquiries@inukshukgeomatics.com

INUVIALUIT CORPORATION CENTER BUILDING EVACUATION PLAN

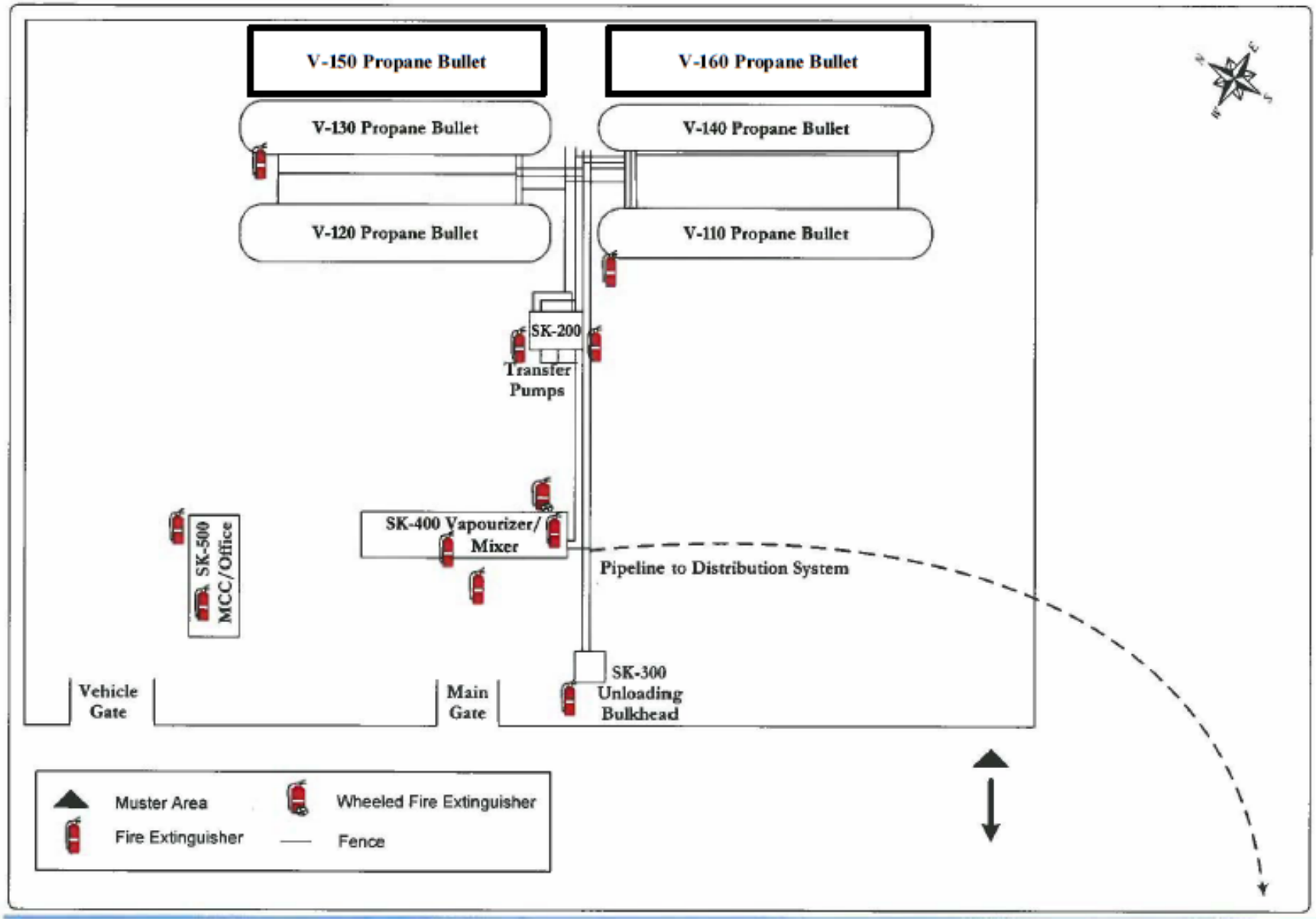
All staff is expected to meet in the lower parking lot by the **MUSTER POINT** in the event of a building evacuation.



INUVIK GAS LTD. SHOP EVACUATION PLAN



INUVIK GAS LTD. PROPANE AIR SYSTEM SITE PLOT PLAN



INITIAL RESPONSE

Key Responders – Log all actions as appropriate

Step 1 The ***First Responder*** assesses the incident scene to determine the immediate impact.
Ensure personal protection by:
- Utilizing "buddy" system and/or following "Work Alone" protocol
- Approaching with extreme caution from upwind direction
- Having all necessary PPE (Gas detection, SCBA, FRC etc.)

§ For incoming calls, record information on the Initial Notification Report or Threat Report

The ***First Responder*** becomes the ***On-Scene Commander*** until or unless relieved by a more senior Company representative.

Step 2 The ***On-Scene Commander*** assesses the emergency to determine the immediate and potential actions required. First response actions may include:
§ Establishing the Initial Isolation Zone (IIZ) and ensuring the safety of all personnel within
§ Securing the incident scene
§ Contacting and sheltering/evacuating residents if immediate danger exists
§ Determining the initial Level of Emergency
§ Establishing a field On-Site Command Post (OSCP) at or near the emergency site

Step 3 The ***On-Scene Commander*** immediately contacts an ***Incident Commander*** (see list of potential *Incident Commanders* on the next page).
The ***Incident Commander*** assumes overall command of the incident.

Step 4 The ***Incident Commander*** and ***On-Scene Commander*** affirm the Level of Emergency and develop and implement an action plan for responding to the emergency.
§ Review the Emergency Planning Zone (EPZ), if applicable, and establish the Protective Action Zone (PAZ) – Downwind Danger Area
§ Begin public safety response actions, as appropriate, which may include:
  - Establishing perimeter roadblocks
  - Notifying sensitive residents (those classified at Emergency Evacuation Priority Level 1)
  - Evacuating/Sheltering residents
  - Igniting gas release
§ Delineate the PAZ on an on-going basis through air monitoring
§ Identify and contact all internal and external personnel (including Emergency Services) needed to respond to the emergency

Step 5 The ***Incident Commander*** is responsible for establishing the Corporate Emergency Operations Centre (CEOC) and assembling the appropriate corporate support staff including senior management.
The ***Incident Commander*** is also responsible for notifying regulatory agencies, including:
§ Regional Health Authority / Local Hospital
§ Oil & Gas Regulatory Authority
§ Environment Regulatory Authority
§ Occupational Health & Safety Authority
§ Emergency Management Agency

Should the incident warrant, the ***Incident Commander*** is also responsible for establishing a Regional Emergency Operations Centre (REOC) – usually at the nearest urban centre.

Step 6 The ***Incident Commander***, in consultation with the ***On-Scene Commander*** and appropriate regulatory agencies, determines when the emergency response is to be terminated and notifies company, regulatory and emergency services personnel.

For a comprehensive list of potential emergency response actions refer to the
Emergency Response Checklist
at the end of this section.

EMERGENCY CONTACTS

Name	Position	Telephone Business	Telephone Residence	Telephone Cellular
Inuvik Gas Ltd. (IGL)				
Potential Incident Commanders *(for Inuvik & Ikhil)*:				
<name removed>	General Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Supervisor, Prod. & Gas Distribution	*<# removed>*	*<# removed>*	*<# removed>*
Potential First Responders/On-Scene Commanders *(for Inuvik & Ikhil)*:				
<name removed>	Supervisor, Prod. & Gas Distribution	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Gas Prod./Dist. Operator	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Gas Prod/Dist. Operator	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Gas Prod/Dist. Operator	*<# removed>*	n/a	*<# removed>*
<name removed>	Sr. Production Operator (Contractor)	n/a	n/a	*<# removed>*
Other:				
<name removed>	Office Manager	*<# removed>*	*<# removed>*	*<# removed>*
<name removed>	Administrative Assistant	*<# removed>*	*<# removed>*	n/a
	Emergency #: 867-777-4427			
IGL Satellite Phone: *<# removed>*			**Sat. #:** *<# removed>*	
Board of Directors				
<name removed>	Director HS&E, Quality & Training ATCO Gas & Transmission	*<# removed>*	n/a	*<# removed>*
<name removed>	Sr. VP Utility Business Ops - Canada Utility Group Facilities Inc. (AltaGas)	*<# removed>*	n/a	*<# removed>*
<name removed>	General Counsel Inuvialuit Petroleum Corporation	*<# removed>*	n/a	*<# removed>*

Name	Position	Telephone Business	Telephone Residence	Telephone Cellular
UTILITY GROUP FACILITIES INC. (UGFI) (AltaGas)				
Potential Incident Commanders (*for Ikhil*):				
<name removed>	Director Operations, Gas	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager	*<# removed>*	n/a	*<# removed>*
<name removed>	Div VP Operations - Gas	*<# removed>*	n/a	*<# removed>*
<name removed>	Operations Manager (*Turin*)	*<# removed>*	*<# removed>*	*<# removed>*
Media / Communications *(for Ikhil)*:				
<name removed>	VP, Stakeholder Relations	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Advisor, External Comm.	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Advisor, External Comm.	*<# removed>*	n/a	*<# removed>*
Other:				
<name removed>	VP, Env., Health, Safety & Sustain.	*<# removed>*	n/a	*<# removed>*
<name removed>	Process Safety Manager, EHS	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Operations Engineer	*<# removed>*	n/a	*<# removed>*
	AltaGas Calgary Office: 403-691-7575			
ATCO Midstream NWT Ltd.				
<name removed>	Director District Operations ATCO Gas & Transmission	*<# removed>*	n/a	*<# removed>*
<name removed>	Senior Manager, Safety, Environment, Quality & Training ATCO Gas & Transmission	*<# removed>*	n/a	*<# removed>*
	ATCO Emergency Number: *<# removed>*			
Inuvialuit Petroleum Corporation				
<name removed>	Chair & CEO, IRC	*<# removed>*	n/a	*<# removed>*
<name removed>	Dir. Operations, Comm. & Culture	*<# removed>*	n/a	*<# removed>*

Emergency Service	Telephone
Government Agencies - Incident Reporting	
National Energy Board (NEB) - Ikhil pipeline incident reporting (outside of Inuvik)	819-997-7887
- Ikhil non-pipeline incident reporting	403-807-9473
NWT OROGO - Ikhil pipeline & Meter Station incident reporting (in Inuvik)	867-445-8551
NWT Municipal & Community Affairs - Emergency Call Line	867-920-2303
Spills/Releases	
NT/NU Spill Reporting Line	867-920-8130
ERAC (LPG Emergency)	1-800-265-0212
Fisheries & Oceans Canada – Marine Spill Response (inland NWT)	1-800-889-8852
Fire	
NWT Forest Fire Reporting	1-877-698-3473
Inuvik Fire Department	867-777-2222
Firefighters – Oilfield Specialists:	
HSE Integrated	1-888-346-8260
Firemaster Oilfield Services	403-342-7500
Transportation Emergency	
ERAC (LPG Emergency)	1-800-265-0212
Transport Canada - CANUTEC (dangerous goods emergency)	613-996-6666
Ambulance	
Advanced Medical Services	867-777-4444
RCMP	
Inuvik Detachment	867-777-1111
Local Government	
Town of Inuvik - emergency	867-777-2222
NWT Health & Social Services Authority	
Beaufort-Delta Region Emergency #	867-777-8000
Wildlife	
NWT Wildlife Emergencies	867-678-0289
Workers' Safety & Compensation Commission (WSCC)	
Incident & Injury Reporting	1-800-661-0792
Boiler & Pressure Vessel Safety	
Inuvik (*<name removed>*)	*<# removed>*
OSCAR Units	
Mackenzie Delta Spill Response Corp. (Calgary) - *<name removed>*	*<# removed>*
Northwest Territories Power Corporation (NTPC)	
Inuvik Control Room	*<# removed>*

RESIDENT CONTACT INFORMATION

Several trapper cabins have been identified in the area surrounding the Ikhil pipeline and are shown on the UGFI Ikhil Pipeline map (Section 8). Only one of those cabins is within the Emergency Planning Zone, and information for that trapper is shown below.

Map #	Name	Address	Latitude	Longitude	Km Post	Telephone
1	*<name removed>*	*<info removed>*	68.250	133.460	KP 42.1	*<# removed>*

Due to the population density, notification and evacuation of residences and public facilities within the town of Inuvik will be accomplished by:

- Telephone contact to local emergency services and directly affected landowners (see list below)
- Radio announcements
- Dispatching rovers to buildings within the PAZ to check for occupants
- Acquiring helicopters to perform fly-overs to visually inspect for persons in the vicinity (as necessary)

Directly Affected Landowners:

Landowner	Telephone	Location
Inuvialuit Land Administration (ILA)	867-977-7100	Tuktoyaktuk
Town of Inuvik	867-777-8600	Inuvik
Northern Transportation Company Ltd.	867-777-2442	Inuvik
Northwest Territories Power Corporation (NTPC)	867-777-7700	Inuvik
GNWT Department of Lands (Beaufort-Delta Region)	867-777-8900	Inuvik

EMERGENCY RESPONSE CHECKLIST

Rev. 2

ON-SCENE COMMANDER (OSC)
(Senior On-Site Company Representative)

Coordinates all On-Site response actions from the On-Site Command Post (OSCP)

- ❑ Log actions & responses.
- ❑ Assume **First Responder** role or designate as appropriate
  - Ensure First Responder personal safety (conduct hazard assessment)
  - Proper PPE: SCBA / Gas Monitor / FRC etc.
  - Work Alone protocol and/or "buddy" system (communication)
- ❑ Dispatch First Responder to assess incident scene.
  - Establish **Initial Isolation Zone** (**IIZ**) and ensure safety of all personnel within.
  - Attend to medical requirements.
- ❑ Establish location of On-Site Command Post (OSCP) (i.e. facility office, operator's truck, trailer). Restrict access to essential personnel if necessary.
- ❑ Coordinate on-site response actions to immediately gain control of the emergency. Shut down/isolate release source, contain fluids & prevent entry into water course.
- ❑ Contact a senior company representative to assume the Incident Commander role.
- ❑ Discuss response actions with the Incident Commander.
- ❑ Determine "Level of Emergency." Re-assess with the Incident Commander.
- ❑ Obtain and/or request response personnel, equipment and other emergency services (RCMP, ambulance, fire department, etc.) as needed from the Incident Commander.
- ❑ Assemble and dispatch a **Gas Monitoring Crew** to delineate the **Protective Action Zone** (**PAZ**) – downwind danger area.
- ❑ Request/Procure a Mobile Air Monitoring Unit (as necessary)
- ❑ Consult with Incident Commander on public safety actions (sheltering, evacuation, ignition, etc.). If ignition criteria has been achieved, proceed with ignition if deemed to be the best public safety action. See Ignition Procedure.
- ❑ Assume role of **Public Safety Coordinator**, if required (*see PSC, side 2*).
- ❑ Assemble and dispatch **Roadblock Crew**(s) to isolate PAZ.
- ❑ Assess the impact of a hydrocarbon or chemical spill and consult with the Incident Commander.
- ❑ If applicable, designate an individual to establish a "staging area" at a location removed from the OSCP to receive and direct contract equipment and personnel (will require radio contact with OSCP).
- ❑ If required, assist with the deployment of a helicopter (equipped with a siren and loud-hailer) to assess the **Emergency Planning Zone** (**EPZ**) to:
  - survey the hazards/damages
  - identify magnitude of the spill
  - identify residents/transients/recreational users in the PAZ
- ❑ Place on standby/assemble well control company and/or equipment
- ❑ Liaise with government on-site representatives as they arrive.
- ❑ Request a fire hazard closure order from the Incident Commander if area isolation is required.
- ❑ Debrief all personnel once emergency is over.

INCIDENT COMMANDER (IC)
(Senior Company Representative)

Manages overall aspects of the Emergency Response Process from the Corporate Emergency Operations Centre (CEOC)

- ❑ Log actions & responses.
- ❑ Establish the Corporate Emergency Operations Center (CEOC) if required.
- ❑ Apprise Reception to direct incoming emergency calls to the CEOC.
- ❑ Acknowledge appointment by On-Scene Commander and provide response personnel and equipment as required.
- ❑ In conjunction with the On-Scene Commander, declare the "Level of Emergency."
- ❑ Notify the appropriate Oil & Gas regulatory authority.
- ❑ Define the Protective Action Zone (PAZ) from data supplied from Gas Monitoring Crew.
- ❑ Appoint **Public Safety Coordinator**, if needed (*see PSC, side 2*).
- ❑ Contact Police and Local Authority.
- ❑ Activate Media & Communications Coordinator at Corporate Head Office.
- ❑ In consultation with the On-Scene Commander proceed with the following public safety actions:
  - "**SHELTER**" residents/businesses inside the PAZ until gas levels indicate the area is safe.
  - "**EVACUATION**" of residents/business inside the PAZ if conditions indicate it is safe to proceed.
  - "**IGNITION**" of source if ignition criteria has been met. Refer to Ignition Procedure on this Checklist or in Section 3.
- ❑ Contact Board of Directors as appropriate and report situation. Request assistance as required (e.g.: Media / Legal / Executive Management).
- ❑ Ensure appropriate gov't agencies are notified and continue to liaise with them.
- ❑ For a major propane emergency (Level 3), consider notifying/activating the ERAC (*see EERP – green tab*).
- ❑ If necessary, establish a Regional Emergency Operations Centre (REOC) and request assembly of appropriate personnel.
- ❑ Obtain additional response personnel and equipment to assist the OSC and all other responders.
- ❑ Assist the OSC with the procurement of a fire hazard order from Regulatory Authorities.
- ❑ Prepare an initial statement for press/media release to the local level (see Preliminary Media Announcement in Section 6). Issue any needed statements carefully, making no reference to deceased victims until next-of-kin have been notified. Refer all subsequent media inquiries to Media & Communications Coordinator.
- ❑ Notify contractor's head office(s) to apprise them of the situation regarding contract personnel.
- ❑ Consult with government agencies that participated in the response before downgrading activities.

IGNITION PROCEDURES

On-Scene Commander
- ❑ Ensure complete evacuation of non-essential personnel.
- ❑ Isolate PAZ using manned roadblocks.
- ❑ Assemble Ignition Team (2 people) and backup personnel.
- ❑ Ensure safety equipment in place (PPE – FRC/SCBA/lifelines, etc.).
- ❑ Erect wind sock/streamers (if time permits).
- ❑ Monitor area for combustible gas.
- ❑ Fully discuss ignition procedure with Incident Commander.
- ❑ Check radio communications.

Ignition Team:
- ❑ Allow for a safe retreat.
- ❑ Be upwind of the gas leak (100m minimum from edge of identified vapour plume).
- ❑ Be in a zone where NO combustible gas is detected.

Procedure:
- ❑ Fire flare to hit vapour cloud where air/fuel mixtures are correct for ignition (near outer edge and at ground level).

If Plume Ignited:
- ❑ Advise Incident Commander and monitor continuously (fire/security).

If Plume Not Ignited:
- ❑ Continue approach and repeat (ensure team is not in danger).

GOVERNMENT AGENCIES

Oil & Gas Regulatory Authorities:
- ❑ Office of the Regulator of Oil and Gas Operations – Northwest Territories
- ❑ National Energy Board (NEB) – Federal and Northwest Territories

- ❑ **Royal Canadian Mounted Police (RCMP)/Local Police**

Territorial Public Safety Organization:
- ❑ Emergency Measures Office (EMO) – Northwest Territories

- ❑ Local Government - Disaster Services
- ❑ Occupational Health & Safety (WCSS)
- ❑ Workers' Compensation Board (WCSS)
- ❑ Transportation Department
- ❑ Territorial Environmental Agency
- ❑ Territorial Fish & Wildlife Agency

See Emergency Contacts (Section 2) for telephone numbers

LEVEL 1 EMERGENCY:

- ❑ No immediate hazard to the public or environment exists but the situation has the potential to escalate to a Level 2 emergency.
- ❑ Situation can be controlled by Company.

Examples:
- Situations in which an odour or leak has been detected.
- Small contained fire or explosion has occurred.
- Indication of product release.
- Security breach.
- External threat (bomb).
- Spill confined to lease / Limited quantity.

Actions:
- Internal response to eliminate or control the emergency.
- Activation of ERP
- Standby notification to CEOC Team.
- External reporting requirements.
- Standby notification to sensitive public.

LEVEL 2 EMERGENCY:

- ❑ A Level 1 Emergency which has escalated to become a potential or limited hazard to the public or environment.
- ❑ Local/Regional media interest.
- ❑ Situation may be controlled by Company, but could require external assistance.

Examples:
- Confirmed release of gas/liquids with imminent control probable.
- Fire/explosion which remains out of control.
- External security breach or confirmed bomb threat.
- Substantial spill (probably off lease).

Actions - Level 1, Plus:
- Public safety action as appropriate – Shelter/Evacuation/Ignition/Roadblocks.
- Activation of initial CEOC Team and assembly at CEOC.
- Activation of external resources as appropriate.

LEVEL 3 EMERGENCY:

- ❑ A Level 2 Emergency which has escalated in scope and is an immediate or major hazard to the public or environment.
- ❑ Significant media interest.
- ❑ Situation is uncontrolled and will require external assistance to bring under control.

Examples:
- Uncontrolled release from any source resulting in prolonged concentrations which exceed evacuation criteria.
- Ignition procedures implemented.
- Uncontrolled release from any source which may result in an environmental disaster (spill enters a water course).
- Ongoing breach or security or bomb threat.

Actions - Level 2, Plus:
- Escalated response actions utilizing appropriate external resources.
- Enhanced CEOC Team membership.

EMERGENCY RESPONSE
SIDE 1

ON-SCENE COMMANDER
INCIDENT COMMANDER
MEDIA & COMM. COORDINATOR
GAS MONITORING CREW

LEVELS OF EMERGENCY
IGNITION PROCEDURES
GOVERNMENT AGENCIES
CORPORATE COMM. TEAM

GAS MONITORING CREW

Conduct gas monitoring to determine release concentrations under the direction of the On-Scene Commander

Locating the Emergency Hazard Area for a Gas Release:
- ❑ Gas Monitoring Crew (c/w SCBA/gas detection and communication equipment) locate downwind at nearest un-evacuated residence.
- ❑ Gas Monitoring Crews to record gas readings on form (Section 6) and relay to On-Scene Commander or Incident Commander.
- ❑ Gas Monitoring Crews to advance toward or retreat from the release as determined by the readings obtained. Crews should always maintain their own safety.

The Protective Action Zone (PAZ) is:
- ❑ The initial calculated <u>downwind</u> geographical area at highest risk.

Delineating the Protective Action Zone:
- ❑ Expand or retract the PAZ based on air quality monitoring or other pertinent data.

MEDIA & COMMUNICATIONS COORDINATOR

Facilitate communication between the Company, the media and the general public

- ❑ Dispatch company representative to the Government Emergency Coordination Centre (ECC), if activated.
- ❑ Coordinate all statements with ECC representative and Incident Commander.
- ❑ Gather detailed, factual information as quickly as possible.
- ❑ Provide the following information to the media and any interested members of the general public:
  -type and status of emergency
  -location of incident
  -areas affected by the incident
  -description of products involved
  -contacts for additional information
  -actions being taken, including anticipated time required
- ❑ Provide regular updates.
- ❑ Keep media/public commitments**.**
- ❑ Direct Corporate Communications Team to assist Incident Commander, as required.

Only the Media & Communications Coordinator, or his designate, may make statements to the media.

CORPORATE COMMUNICATIONS TEAM

Assist the Media & Communications Coordinator.
- ❑ Log response actions (essential to keep accurate records and continuously track order of responses).
- ❑ Contact additional staff/equipment/services as required.
- ❑ Contact mutual assistant groups as appropriate.
- ❑ Notify and confer with appropriate government agencies.
- ❑ Update weather reports if situation warrants.
- ❑ Continuously report all notification statuses to Media & Communications Coordinator.

EMERGENCY RESPONSE CHECKLIST

PUBLIC SAFETY COORDINATOR (PSC)

Coordinates all aspects of the Shelter/Evacuation process using available resources to protect Public Safety

- ❑ Assist Incident Commander and On-Scene Commander with organizing Roadblock Crews, Telephone Crews And Evacuation Crews.
- ❑ Establish a prioritized resident list beginning with residences/businesses located downwind close to the emergency incident site.
- ❑ Organize **Telephone Crew** to contact area users with the applicable public safety message (no more than 7 residents per Telephoner).
- ❑ Assemble and dispatch **Evacuation Crew**(s) to assist residents/businesses requiring assistance with evacuation.
- ❑ In consultation with the Incident Commander, direct Evacuation Crews/Telephoners to proceed with one of the following safety actions:
  - "**SHELTER**" residents/businesses inside the PAZ until gas levels indicate the area is safe.
  - "**EVACUATION**" of residents/businesses inside the PAZ if conditions indicate area is not safe.
- ❑ Appoint & direct **Evacuation Centre Coordinator** to establish the Reception Centre.
- ❑ Maintain record of the public's status, both inside and outside the EPZ and communicate status to the On-Scene or Incident Commander.
- ❑ Liaise with the government officials if called upon to assist with public safety actions.
- ❑ If helicopter is dispatched to assist with public safety actions, establish air-to-ground communication link.

SHELTER/EVACUATION PROCEDURES

Alternatives for the protection of public safety should be considered on a site-specific basis, taking into account all pertinent factors

SHELTER-IN-PLACE:
Criteria for implementation:
- Not enough time to safely evacuate residents/businesses from the area.
- The product release will be of short duration (i.e. several minutes to half an hour).
- Release of limited duration or the location of release has not been identified.
- Waiting for evacuation assistance.
- Residences/businesses would be at higher risk if they were asked to evacuate.

Implementation by Public Safety Coordinator:
- ❑ Determine from maps which residents must be sheltered based on initial data from on-site responders.
- ❑ Assign personnel to contact residents by phone with emphasis on those downwind from the incident.
- ❑ Maintain record of all residents asked to take shelter using the Resident Contact Log in Section 6.

EVACUATION
Implement as deemed appropriate by the IC and OSC.
Implementation by Public Safety Coordinator:
- ❑ Determine appropriate Reception Centre and direct Evacuation Centre Coordinator there.
- ❑ Determine from maps which residents must be evacuated.
- ❑ Assign personnel to contact residents by phone or proceed to residence if required (i.e. assistance required or no answer).
- ❑ Maintain a record of all evacuated persons.

EVACUATION CREWS

Assist with evacuation of the Protective Action Zone

- ❑ Assemble at designated site for briefing by Public Safety Coordinator (if possible).
- ❑ Proceed, in designated evacuation vehicles, to residents/businesses to initiate evacuation procedures.
- ❑ Ensure the following information is delivered:
  - The type of emergency and related dangers.
  - Directions for proceeding out of the area safely.
  - Provide assistance to individuals requesting help.
- ❑ If residence is unoccupied, record in Resident Contact Log (Section 6).
- ❑ Report evacuation status to Public Safety Coordinator.
- ❑ Record all evacuation data on Resident Contact Log (Section 6).
- ❑ After evacuation procedures are completed, assist roadblock crews with securing the PAZ and manning roadblocks.

TELEPHONE CREWS

Assist Public Safety Coordinator with prioritizing and conducting Resident call down

- ❑ Assist the Public Safety Coordinator with prioritizing resident call down.
- ❑ Confirm with Public Safety Coordinator which message is to be delivered to area residences/businesses ("Shelter" or "Evacuation").
- ❑ Fill in appropriate information in message form.
- ❑ Proceed to contact residences/businesses and deliver selected message.
- ❑ Maintain an accurate log of all telephone conversations, times, etc. on Resident Contact Log (Section 6).
- ❑ Establish communications with Evacuation Centre Coordinator, relaying resident and/or business status as it changes.
- ❑ Notify the Public Safety Coordinator of any problems, issues or requirements arising from the contact process (i.e. no contact made, need for assistance, only children at home, etc.).
- ❑ Assist with post-emergency notifications when the emergency is called down by the Incident Commander.

LEVEL 1 EMERGENCY:

- ❑ No immediate hazard to the public or environment exists but the situation has the potential to escalate to a Level 2 emergency.
- ❑ Situation can be controlled by Company.

Examples:
- Situations in which an odour or leak has been detected.
- Small contained fire or explosion has occurred.
- Indication of product release.
- Security breach.
- External threat (bomb).
- Spill confined to lease / Limited quantity.

Actions:
- Internal response to eliminate or control the emergency.
- Activation of ERP
- Standby notification to CEOC Team.
- External reporting requirements.
- Standby notification to sensitive public.

LEVEL 2 EMERGENCY:

- ❑ A Level 1 Emergency which has escalated to become a potential or limited hazard to the public or environment.
- ❑ Local/Regional media interest.
- ❑ Situation may be controlled by Company, but could require external assistance.

Examples:
- Confirmed release of gas/liquids with imminent control probable.
- Fire/explosion which remains out of control.
- External security breach or confirmed bomb threat.
- Substantial spill (probably off lease).

Actions - Level 1, Plus:
- Public safety action as appropriate – Shelter/Evacuation/Ignition/Roadblocks.
- Activation of initial CEOC Team and assembly at CEOC.
- Activation of external resources as appropriate.

EMERGENCY RESPONSE SIDE 2

PUBLIC SAFETY COORDINATOR EVACUATION & ROADBLOCK CREWS TELEPHONE CREWS EVACUATION CENTRE COORDINATOR

EVACUATION CENTRE COORDINATOR

Assist Public Safety Coordinator with notifications, record keeping and securing equipment/services for evacuation

- ❑ Pick up evacuation centre kit (if applicable) and ERP Manual.
- ❑ Proceed to designated Reception Centre to receive evacuees.
- ❑ Contact additional personnel to assist as required.
- ❑ Set up Reception Centre (tables/chairs) as needed.
- ❑ Record the arrival of all members of the public on the Evacuation Centre Check-in Sheet (Section 6).
- ❑ Liaise with Public Safety Coordinator to ensure resident concerns are addressed and answered promptly.
- ❑ Report status of evacuees to Public Safety Coordinator and record status on the Evacuation Centre Check-in Sheet (Section 6).
- ❑ Assist residents with compensation issues.
- ❑ Assist with post-emergency actions.

DOWNGRADING AN EMERGENCY

The Level of Emergency may be downgraded through joint decision of the IC and the appropriate Government Agencies

- ❑ Activities can be downgraded once when there is no longer a threat to people, property or the environment.
- ❑ Incident Commander (in consultation with the OSC) will notify all affected parties that the emergency is over, including:
  - ❑ Company and external resources used to handle the emergency
  - ❑ Affected/evacuated area residents
  - ❑ Government agencies
  - ❑ Media & Communications Coordinator (who must then issue a media statement)
- ❑ OSC to ensure affected residences are clear of gas before allowing residents to return
- ❑ OSC to provide transportation to evacuated residents
- ❑ OSC to ensure evacuated personnel return and roadblocks are discontinued.
- ❑ OSC to complete initial Incident Investigation Report Form.
- ❑ OSC/IC are to make arrangements for repair, clean-up, refurbishing of equipment, etc.
- ❑ IC to initiate critical stress management action as appropriate.
- ❑ IC to conduct a post-incident debriefing within 30 days and submit report to the appropriate government agency.
- ❑ IC to ensure reimbursement of all costs incurred by residents due to the emergency.

ROADBLOCK CREWS

Establish and maintain PAZ roadblocks

Prior To Dispatch:
- ❑ Assemble at designated site for briefing by On-Scene Commander (if possible).
- ❑ Obtain roadblock kits and applicable safety equipment.
- ❑ Establish schedule of report-in times to On-Scene Commander.

To Isolate the Protective Action Zone (PAZ):
- ❑ Establish a safe route to get to your location and an escape route should conditions warrant.
- ❑ Record vehicle information for vehicles stopping at roadblock on Roadblock Log (Section 6).
- ❑ Monitor gas levels and relay information to On-Scene Commander. Be prepared to move position of roadblock(s) as conditions change.
- ❑ Maintain roadblock until relieved or informed by On-Scene Commander to stand down.
- ❑ Finalize report.

LEVEL 3 EMERGENCY:

- ❑ A Level 2 Emergency which has escalated in scope and is an immediate or major hazard to the public or environment.
- ❑ Significant media interest.
- ❑ Situation is uncontrolled and will require external assistance to bring under control.

Examples:
- Uncontrolled release from any source resulting in prolonged concentrations which exceed evacuation criteria.
- Ignition procedures implemented.
- Uncontrolled release from any source which may result in an environmental disaster (spill enters a water course).
- Ongoing breach or security or bomb threat.

Actions - Level 2, Plus:
- Escalated response actions utilizing appropriate external resources.
- Enhanced CEOC Team membership.

LEVELS OF EMERGENCY SHELTER / EVACUATION & DOWNGRADING PROCEDURES