



NORTHWEST TERRITORIES
POWER
CORPORATION

Empowering Communities

SPILL CONTINGENCY PLAN

SNARE HYDROELECTRIC FACILITY
PLANT #121
BIG SPRUCE LAKE, NORTHWEST TERRITORIES

Issue Date: October 2021

AUTHORIZATION	
Prepared by: _____	Date: _____
Approved by: _____	Date: _____

Spill Contingency Plan Maintenance and Control

The Director, Health, Safety & Environment is responsible for the distribution, maintenance and updating of the Spill Contingency Plan. This Spill Contingency Plan will be updated:

- i. Annually, taking into account changes in the law, environmental factors, NTPC policies, and Facility characteristics; and/or
- ii. Following a major spill incident.

Changes in phone numbers, names of individuals, etc. that do not affect the intent of the plan are to be made on a regular basis. Plan updates will be issued as per the Spill Contingency Plan distribution list. The Spill Contingency Plan holder is responsible for adding new and/or removing obsolete pages upon receipt of updates.

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1	Several	Updates as per Snare Cascades Water License Renewal	Golder Associates Ltd.	November 27, 2014
2	6	Updated in accordance with Environment Canada comments for Snare Cascades Water License Renewal.	NTPC, HSE	January 7, 2015
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DOCUMENT HISTORY				
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7	All	Include GNWT Lands Inspector contact info, update Immediately Reportable Quantities	NTPC, HSE	Jan 2020
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9	All	Updated to include additional fuel storage locations, new camp facilities, quarries and winter roads. Added Appendix J to cover spill contingency plan for the Snare Winter Road.	NTPC, HSE	Sept 2021

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1 INTRODUCTION

The Northwest Territories Power Corporation (NTPC) has prepared this Spill Contingency Plan (SCP) for the Snare Hydroelectric Facility (the Facility) located on the Snare River, Northwest Territories (NWT). The SCP is also referred to as the Spill Response Plan (SRP) in other documents associated with this application.

The Snare Hydro system is a remote power generating facility located approximately 145 km northwest of Yellowknife on the Snare River. The system is a cascade type development comprised of four hydro plants: Snare Rapids, Snare Falls, Snare Forks, and Snare Cascades (see Section 2.1 for details on the snare Hydro system). The four plants are connected by an all-weather road. Air access to the Facility is available year round. Personnel and freight are delivered to the Facility by aircraft which land on Big Spruce Lake and at the all-weather landing strip located near Snare Falls. A winter road is constructed annually linking the Facility to Yellowknife via NWT Highway #3, allowing fuel, oversized equipment, and freight to be delivered to site.

The Dogrib Power Corporation is the holder of Water License W2014L4-0001, which permits the use of the Snare River for storage and hydroelectric production at Snare Cascades. NTPC operates and maintains the Facility on behalf of the Dogrib Power Corporation. NTPC is the holder of Water License N1L4-0150, which permits the use of the Snare River for storage and hydroelectric production at Snare Rapids, Snare Forks and Snare Falls.

In addition, Snare Hydro operates under three Type A Land Use Permits (LUP) from the Wek' èezhii Land and Water Board (WLWB) for the construction and operation of the winter roads (WR's) and quarry and borrow sites. In the fall of 2021 NTPC intends to apply for a site-wide Type A LUP that will consolidate the current LUP's under one permit to authorize existing and future land-use activities. This consolidated LUP will increase efficiencies for all regulatory undertakings related to land use at Snare Hydro, improving processes and interactions for the WLWB, GNWT Lands Inspectors, NTPC and all Snare Hydro stakeholders moving forward.

This SCP demonstrates that NTPC has appropriate response capabilities and measures in place to effectively address potential spills at the Snare Hydroelectric Facility. This plan documents NTPC's local and regional spill response capabilities, presenting information on site specifics, resource inventory, health and safety, incident response, and reporting procedures. A copy of this SCP shall be maintained at each plant within the Facility and is also available on NTPC Intranet PowerLine (the Powerline) under Divisions> Health, Safety & Environment> Spill Response Plans. Plant Operators receive regular training on the procedures and information contained in this plan.

1.1 COMPANY INFORMATION

Contact information for the Facility owner is as follows:

Northwest Territories Power Corporation
4 Capital Drive, Hay River, Northwest Territories X0E 1G2
Phone: 874-5200; Fax: 874-5251

Anthony Upton
Manager, Plant Operations
Northwest Territories Power Corporation
Yellowknife, NT
E: aupton@ntpc.com
P: 1-867-669-3312

Alexander Love
Director, Hydro Operations
Northwest Territories Power Corporation
ALove@ntpc.com
Tel (867) 669-3326

1.2 PURPOSE

The purpose of this SCP is to outline response actions for potential spills of hazardous materials of any quantity, including a worst-case scenario, at the Facility. The plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to respond to a spill. It details the spill response procedures that will minimize potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to a spill. More specifically, the purpose is:

- to comply with NTPC's Environmental Projection Policy (see Section 1.4);
- to identify the organization, responsibilities, and reporting procedures of the Facility response team in the event of a spill;
- to provide readily accessible emergency information to the cleanup crews, management, and government agencies in the event of a spill;
- to comply with federal and territorial regulations and guidelines pertaining to the preparation of contingency plans and notification requirements;
- to promote the safe and effective recovery of spilled materials;
- to minimize the environmental impacts of spills to land or water; and,

- to provide site information on the facilities and contingencies in place if a spill or malfunction should occur.
- to provide site information on the facilities and contingencies in place if a spill or malfunction should occur.

This SCP has been prepared in general accordance with the following reference documents:

- Government of Northwest Territories. 1993. Spill Contingency Planning and Reporting Regulations R-068-93. Yellowknife, N.W.T.
- Government of Northwest Territories. January 2002. Guide to the Spill Contingency Planning and Reporting Regulations. Resources, Wildlife & Economic Development.
- Indian and Northern Affairs Canada (INAC). 2007. Guidelines for Spill Contingency Planning. Yellowknife, N.W.T: Water Resources Division of INAC.
- Government of Northwest Territories. 1993. Northwest Territories Waters Regulations SOR/93-303. Yellowknife, N.W.T. Note that the *Northwest Territories Devolution Act* repealed the *Northwest Territories Waters Act*, reflecting its provisions in the amended *Mackenzie Valley Resource Management Act*. The *Northwest Territories Devolution Act* transferred the Northwest Territories Waters Regulations under the authority of the *Mackenzie Valley Resource Management Act*, and deemed the regulations to remain in force until they are repealed or replaced.
- Canadian Council of Ministers of the Environment (CCME). 2003. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products. Winnipeg, Manitoba.

1.3 SCOPE

This SCP applies to the accidental and/or uncontrolled release of a contaminant into the environment that has the potential for adverse impact. The SCP applies to all casual, permanent, part-time, full-time employees, and contractors who conduct work or provide services at the Facility. This SCP covers activities and operations conducted at the Facility.

1.4 ENVIRONMENTAL POLICY AND PROCEDURES

Policy

NTPC is committed to protecting the environment for existing and future generations by meeting, if not exceeding, environmental regulations. Our environmental principles are based on the fundamental values of responsibility, accountability, and open communication. We will strive for continuous improvement in environmental performance and will manage our operations in an environmentally responsible manner.

Guidelines

NTPC will:

- Comply with all applicable environmental legislation and guidelines;
- Maintain an Environmental Management System;
- Incorporate environmental planning in the design phase of projects;
- Reduce waste and use resources as efficiently as possible;
- Take reasonable measures to prevent and reduce pollution to air, water, and soil;
- Manage hazardous waste in a manner that minimizes risk to the environment;
- Report all hazardous materials spills released to water, regardless of size;
- Report all hazardous materials spills greater than 5 L to ground or floor;
- Policy Review Date: Dec 2020
- Clean up all hazardous materials spills to meet applicable environmental criteria;
- Promote the efficient use of energy to customers;
- Provide employees with the appropriate training and education to help them fulfill their environmental responsibilities;
- Communicate regularly with indigenous groups, government, regulators, industry, community groups, and the public regarding NTPC activities; and
- Respect the heritages of the people and communities that we serve.

NTPC handles several hazardous substances at its power generation facilities and has a responsibility to protect and conserve the environment. Prevention of spills is important for the protection of the health and safety of employees, the community, and the environment. Operating procedures are regularly updated and personnel trained to ensure safe and environmentally sound operations. This SCP will form a component of the Facility's Environmental Management System (EMS). As such, it is a working document that will be reviewed and updated on a regular basis. At a minimum the SCP will be reviewed and updated annually. Training is provided on the following NTPC policies, procedures, and information sources, which are available at the Facility and/or on the NTPC Intranet PowerLine:

- Spill Contingency Plan
- Hazardous Materials Management Plan
- Hazardous Waste Management Plan
- Fuel Transfer Safe Work Practice

- Berm Dewatering Safe Work Practice
- Operator Training Manual
- Plant Operating Manual
- Safety Handbook

The SCP is presented to all employees and contractors during their on-site orientation sessions. All employees and contractors who work with hazardous materials onsite are made aware of the locations of the SCP at the facility and are made aware of the locations where spill kits are stored, and their individual responsibilities to respond to spills. NTPC is committed to keeping personnel up to date on the latest technologies and spill response methods. Training records are documented and maintained.

1.5 SAFETY DATA SHEETS

In the event of a hazardous materials spill, all responders and/or affected parties must be aware of the hazards and properties associated with the spilled product(s). The NTPC maintains Safety Data Sheets (SDS) for all controlled products used, stored, and/or handled at NTPC work sites. The SDS are maintained up-to-date and are located in binders at each plant, mechanics garage, and office.

The Corporation's SDS are also available online at <https://sso.verisk.com/>

User name: ntpc

Password: msds

This login information is also available on the NTPC Intranet PowerLine (the PowerLine) under Division/Health, Safety & Environment/Environment/WHMIS.

1.6 GENERAL RESPONSIBILITIES

1.6.1 General

- No person should handle a substance unless that person is familiar with the hazards.
- No person should use a substance unless that person is familiar with the proper use.

1.6.2 Contractor and Subcontractors

- Know the location of the SCP, spill response materials, first aid stations, emergency and safety equipment, MSDS, emergency exits, and muster stations;
- Wear appropriate personal protective equipment (PPE);

- Know basic spill prevention requirements;
- Know the spill reporting procedures;
- Report all emergencies and spills to the Plant Operator; and
- Comply with all NTPC and Facility policies and procedures when performing duties.

1.6.3 On-site NTPC Employees

- Ensure worksite and personnel safety;
- Know the location of the SCP, spill response materials, first aid stations, emergency and safety equipment, MSDS, emergency exits, and muster stations;
- Wear appropriate PPE;
- Know basic spill prevention requirements;
- Know the spill reporting procedures;
- Report all emergencies and spills to the Plant Operator; and
- Comply with all NTPC and Facility policies and procedures when performing duties.

1.6.4 Plant Operator / On-Scene Coordinator

The Plant Operator has knowledge of the specific procedures that must be followed to work with and/or near hazardous materials in a safe and secure manner. The Plant Operator is also the On-Scene Coordinator and is responsible for:

- ensuring the safety of all personnel and the site;
- ensuring all new site personnel and contractors are oriented and have access to all the required documentation;
- ensuring all NTPC employees and contractors adhere to the requirements of the SCP;
- acting as the On-Scene Coordinator in responding to spills;
- activating and coordinate the SCP and any other required contingency plans in the case of an emergency or spills involving hazardous materials or wastes and direct any cleanup activity until completion or until authority is passed to other personnel;
- notifying NTPC management and local contractors as required;
- reporting the spill to the NWT 24-HOUR SPILL REPORT LINE;
- assisting in developing and implementing spill response training programs and exercises.

1.6.5 Manager, Plant Operations

Ensure that the response initiated at the Facility by the Plant Operator is immediate, effective and sustained.

1.6.6 Director, Health, Safety & Environment

- Maintain and complete the annual review of the SCP.
- Ensure that all SCP documentation remains up-to-date and the updated versions are distributed out to the personnel on site, external agencies and organizations. A formal record is kept of all distribution and amendments.
- Liaise with the Plant Operator and/or Manager, Plant Operations and the appropriate environmental regulatory body to ensure that the response to a spill at the Facility is completed in accordance with existing environmental laws and regulations.
- In coordination with the Plant Operator, prepare and submit any formal reports (within the required time frame) to regulators and NTPC management regarding the management of hazardous materials and spill response.

1.6.7 Third Party Contractors and Suppliers

- Ensure worksite and personnel safety;
- Know the location of the SCP, spill response materials, first aid stations, emergency and safety equipment, MSDS, emergency exits, and muster stations;
- Wear appropriate PPE;
- Know basic spill prevention requirements;
- Know the spill reporting procedures;
- Report all emergencies and spills to their supervisor and/or the Plant Operator; and
- Comply with all NTPC and Facility policies and procedures when performing duties.

1.7 DISTRIBUTION LIST

The SCP and the most recent revisions are distributed internally to:

- i. Health, Safety & Environmental Department, Taltson Hydroelectric Facility/NTPC (control copy)
- ii. Manager, Operations and Maintenance, Taltson Hydroelectric Facility
- iii. Plant Operator, Taltson Hydroelectric Facility
- iv. Manager, System Control, Hydro Region
- v. Central Control Room, NTPC
- vi. Manager, Communications, NTPC
- vii. NTPC Intranet PowerLine

2 SNARE HYDROELECTRIC FACILITY

2.1 FACILITY SETTING

The Snare Hydro system is a remote power generating facility located approximately 145 km northwest of Yellowknife on the Snare River (see Figure 2-1). The system is a cascade type development comprised of four hydro plants: Snare Rapids, Snare Falls, Snare Cascades, and Snare Forks.

The four plants are connected by an all weather road. Air access to the Facility is available year round. Personnel and freight are delivered to the Facility by aircraft which land on Big Spruce Lake and at the all-weather landing strip located near Snare Falls. A winter road is constructed annually linking the Facility to Yellowknife via NWT Highway #3, allowing fuel, oversized equipment, and freight to be delivered to site. Figure 2-1: Snare Hydroelectric System

Figure 2-1: Snare Hydroelectric System

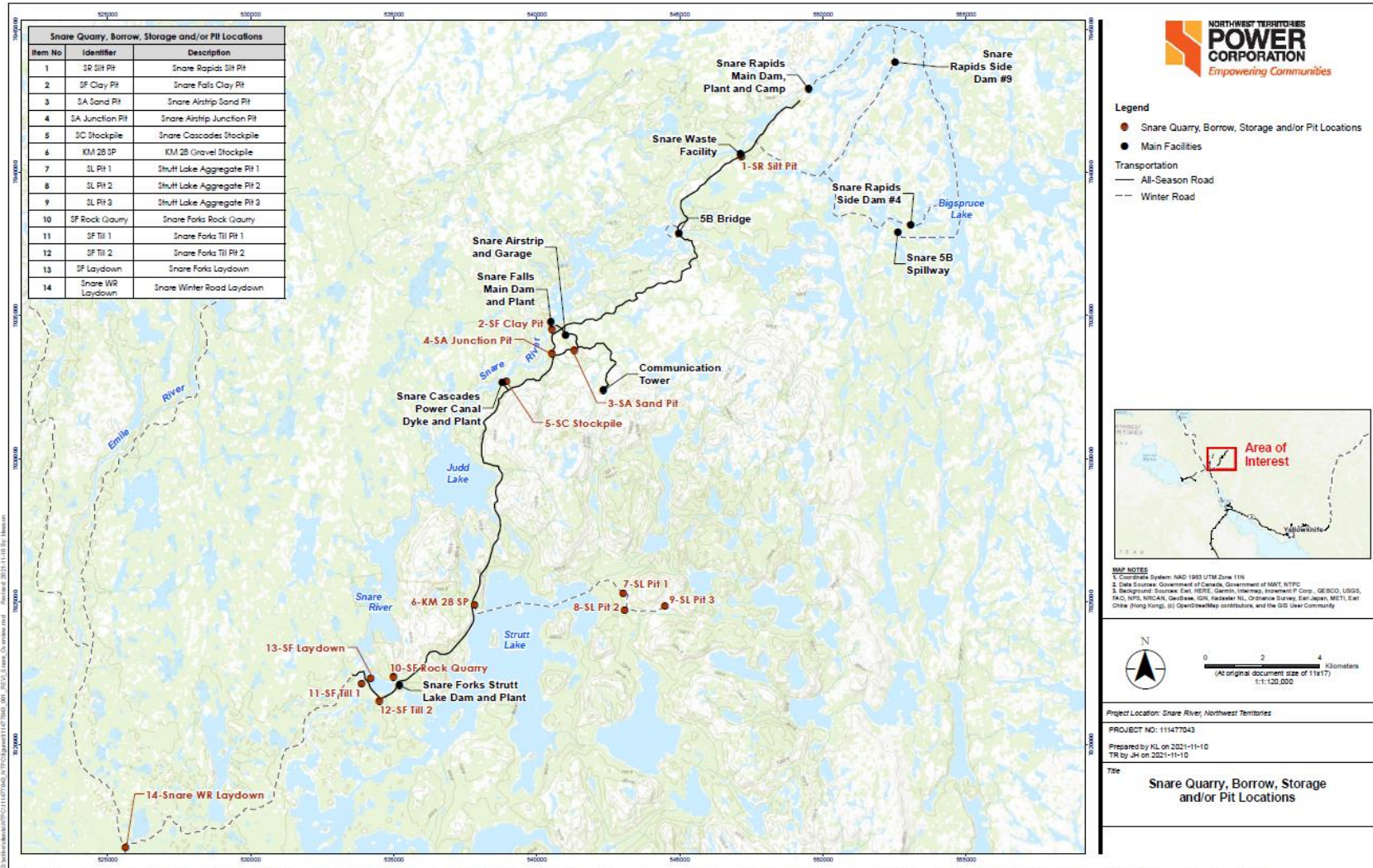


Figure 2-2: Snare Hydro Quarries, Winter Roads and Transmission Lines

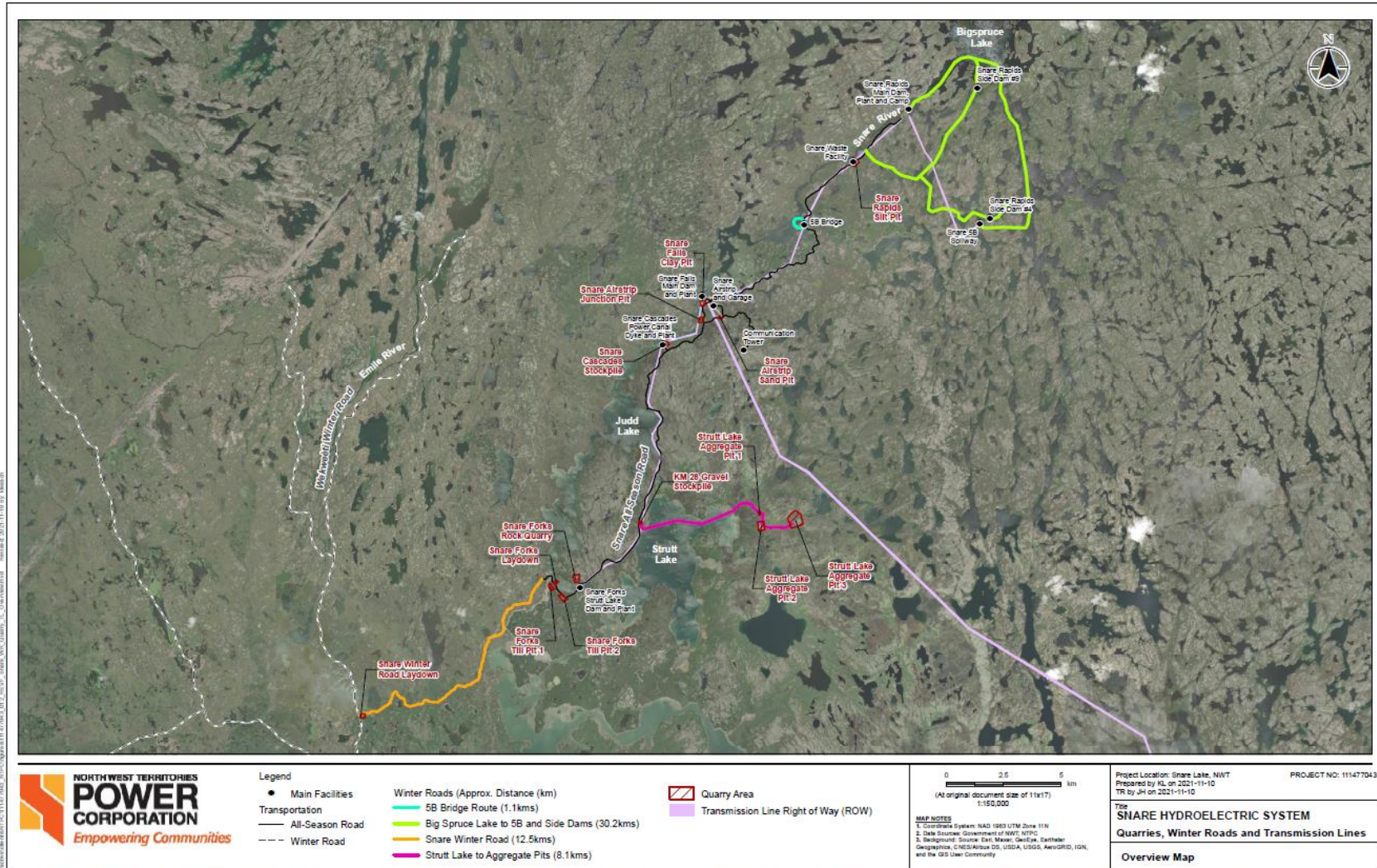
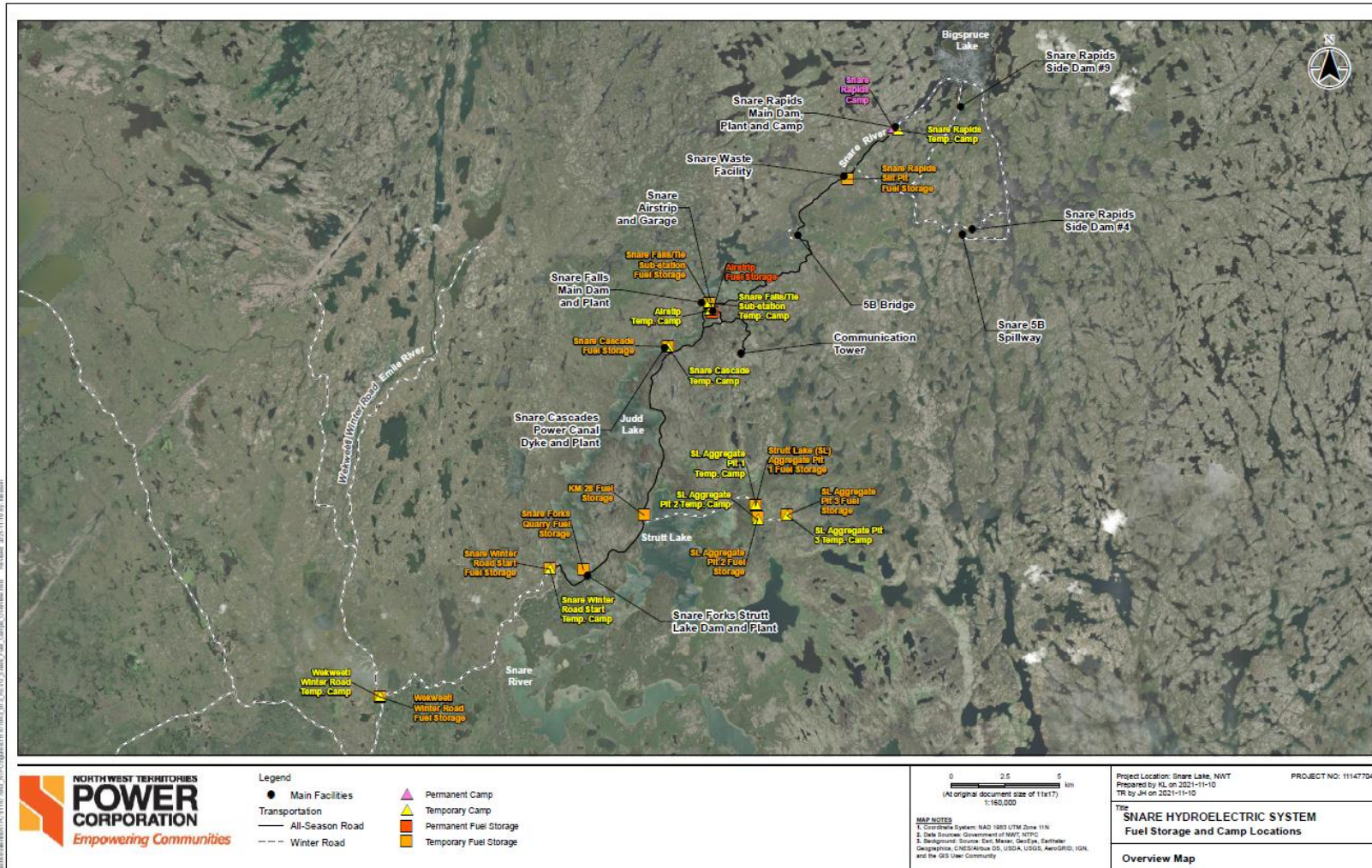


Figure 2-3: Fuel Storage and Camp Locations



Disclaimer: This document has been prepared based on information provided by others as cited in the notice section. Starlec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Starlec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

2.2 SITE DESCRIPTION

2.2.1 Snare Rapids

The Snare Rapids hydro plant (630 31' N, 1160 00' W) is located 145 km northwest of Yellowknife on the southwest end of Big Spruce Lake, the main storage reservoir for the hydro system. The rated plant capacity is 8.5 MW. Flow through the plant is controlled by the 5B spillway south east of the plant.

The plant is directly below the Snare Rapids Dam with the substation immediately south of the plant (see Figure 2-4). The headgate house sits on the upstream side of the dam above the plant and the boathouse sits on the south upstream side of the dam next to the dock. The camp site sits 100 metres (m) southwest of the plant and consists of a camp house (kitchen and sleeping quarters), staff trailer, and freezer building, all surrounded by an electric bear fence. West of the camp is a garage, fire shed, small line storage shed, an electrical shop, and a carpenter shop. In a clearing west of the carpenter shop sits the incinerator. 200 m south of the carpenter shop sits Knob Hill. Buildings on Knob Hill include a line storage shop and a staff house, which is no longer in use. Southeast of Knob Hill sits the helicopter pad and Emergency Response shed, and gas pumps.

Figure 2-4: Snare Rapids Hydroelectric Facility



2.2.2 Snare Falls

The Snare Falls hydro plant and airstrip (630 26' N, 1160 11' W) is located 15 kilometres (km) southwest of Snare Rapids. The rated plant capacity is 7.4 megawatts (MW).

The plant sits directly below the Snare Falls Dam with the substation immediately east of the plant (see Figure 2-5). The headgate sits west of the plant and two spillway gates control flows through the spillway. The tie substation sits approximately 200 m east of the plant.

The airstrip sits approximately 250 m east of the plant. Airstrip facilities include the garage and storage tent on the south side of the strip, a hazardous waste containment berm west of the garage, and a soil remediation berm north of the airstrip. An oil storage shed, a parts storage shed, and the SSI Micro satellite dish and communication shed sit behind the garage. A sea-can with line equipment storage sits east of the garage.

Figure 2-5: Snare Falls Hydroelectric Facility

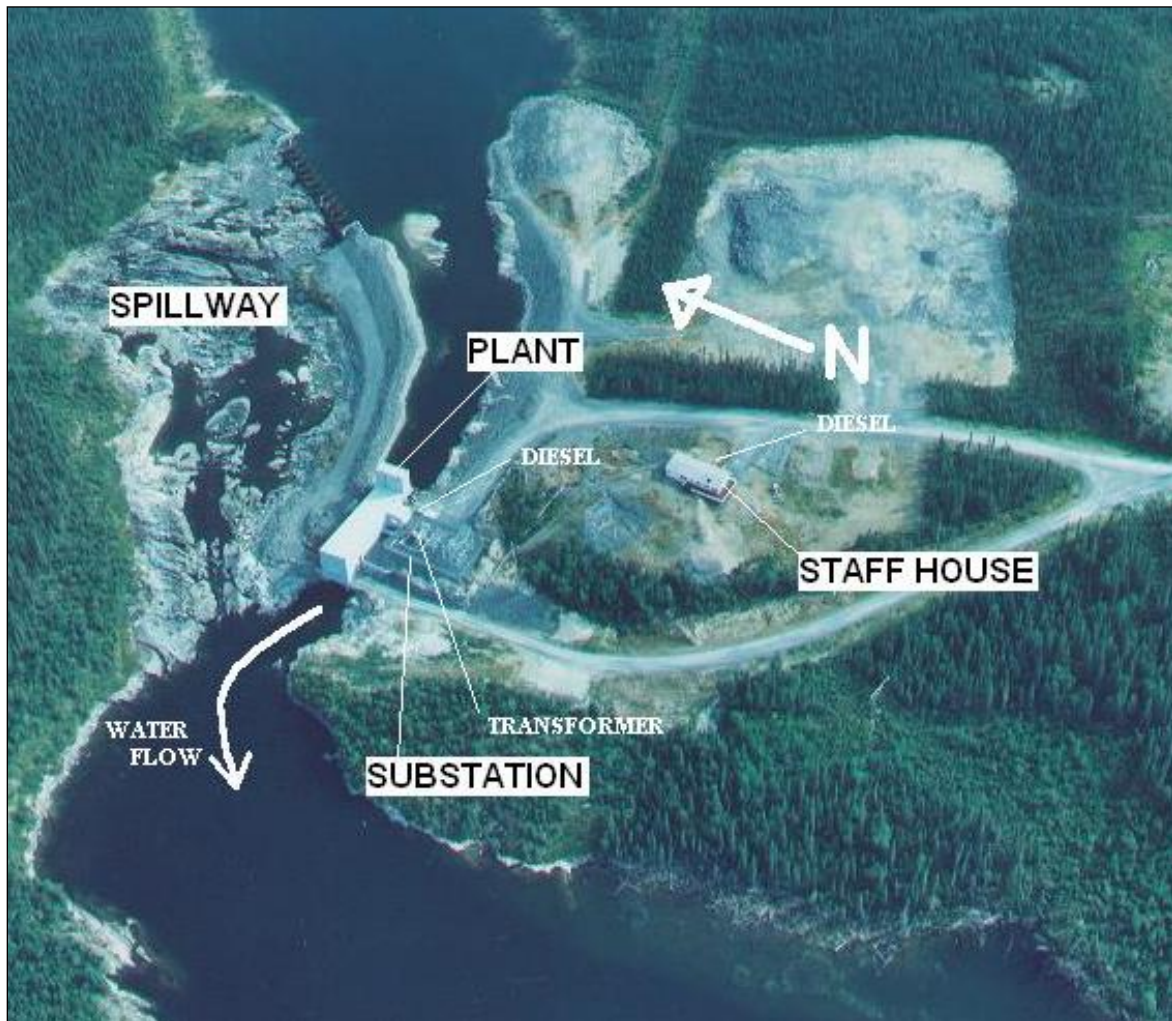


2.2.3 Snare Cascades

The Snare Cascades hydro plant (63° 25' N, 116° 13' W) is located 2 km west of Snare Falls. The rated plant capacity is 4.3 MW.

The plant sits directly below the Snare Cascades Dam with a spillway next to the plant (see Figure 2-6). The staff house sits southeast of the plant. Flow through the spillway north of the plant is controlled by a fixed elevation weir.

Figure 2-6: Snare Cascades Hydroelectric Facility



2.2.4 Snare Forks

The Snare Forks hydro plant (630 20' N, 1160 20' W) is located 10 km southwest of Snare Cascades. The rated plant capacity is 9.2 MW.

The plant is directly below the Strutt Lake Dam with the substation immediately east of the plant (see Figure 2-7). The headgate house sits on the upstream side of the dam above the plant. A rock quarry sits approximately 200 m northeast of the plant. The Snare Forks dam sits 1.25 km northwest of the Snare Forks facility and is next to the Snare Forks spillway. Flow through the spillway is controlled by a fixed elevation weir.

Figure 2-7: Snare Forks Hydroelectric Facility



2.2.5 Construction Scope under the Snare Hydro Land Use Permit

2.2.5.1 Winter Roads

NTPC annually constructs the historical Snare Winter Road (WR) from Snare Forks to the Wekweèti Winter Road, NT linking the facility to Yellowknife via NWT Highway #3, allowing access for resupply fuel, oversized equipment, and freight to be delivered to site. The Snare WR follows the same historical alignment of previous years, so relatively little brushing is required. The road

does not cross any water courses and is 12.5km of portage winter road. The start point of the WR is a temporary laydown/marshalling area located at the southwest corner of Snare Forks, and the end point is a temporary laydown area located at the Wekweètì winter road junction.

Three additional winter roads which have been used intermittently throughout the operation of the facility as required and are included under the scope of this SCP:

- Strutt Lake WR (8.1 km) connecting to three borrow locations on the east side of Strutt Lake. This winter road is currently authorized under Land Use Permit W2019Q0003, which expires on December 18, 2024 and is constructed when crushing is completed at Strutt Lake Pits every 4-8 years.
- The Big Spruce Lake WR 1 (17.8 km) connecting Snare rapids to the Side Dams, and Snare 5B Spillway. This route is entirely on Big Spruce Lake and is constructed every 10-20 years when major maintenance work is required at 5B or Side Dams. There is also a Big Spruce Lake WR 2 route that connects the side dams on Big Spruce Lake to the Snare site road using a couple portages and local inland lakes. The Big Spruce Lake WR 2 route would be used if ice conditions on Big Spruce Lake were not sufficient for WR construction.
- The 5B Bridge route (1.1 km) allowing for continued movement of equipment over the winter months if the 5B bridge every had any issues which impeded travel over the bridge in winter months. This is a contingency route only and would only be used in emergency situations.

The Snare winter roads are presented in Figure 2-2. Please refer to Appendix K for the Snare Winter Roads Spill Contingency Plan.

2.2.5.2 Quarries, Borrow and Storage Locations

Materials from 10 existing historical quarries and/or borrow locations across Snare Hydro will be excavated as required for future construction, resurfacing, upgrades and maintenance at the Snare Hydro Facility. All locations are existing historical borrow locations used intermittently since 1948 throughout the operation of the facility. Blasting would only occur at Snare Forks Rocks Quarry. Excavated aggregate will be stockpiled as needed at quarry and/or borrow locations, or alongside roadways or constructions sites for blending and utilizing. In addition, there will be 4 designated stockpile, storage and/or laydown locations at Snare Cascades Stockpile, KM 28, Snare Forks Laydown and the Wekweètì winter road junction. The existing historical quarries and/or borrow locations across Snare Hydro are presented in Figure 2-2.

2.2.5.3 Snare Falls Substation

The existing substation at the Snare Falls Generating Station will be relocated approximately 70 m southeast of its current location and a new access road, 50 m in length and 6 m wide, will be constructed to link the existing road to the new substation (**Error! Reference source not found.**). |

In addition, pole structures will be relocated and/or replaced to accommodate the new location. The area of the new substation will be approximately 475 m².

2.2.5.4 Operation of Temporary Camps and Fuel Storage

To accommodate additional personnel, 9 potential locations for temporary camps have been identified within quarry/borrow locations and at the start and end of the Snare WR. These proposed locations are presented in Figure 3. Temporary camps will be project specific and used as contingency only if resourcing levels exceed the capacity of the main camp. These camps may include accommodations, offices, washroom facilities, fuel and waste storage. Temporary camps would have a capacity of 4 to 20 people. Maximum Water Usage would be 250 L/p/day x 20 p = 5000L/day or 5m³/day through a temporary self-sustaining water system in which water would be manually drawn from the forebay and stored in a water tank for use at the camp. Sewage would be discharged into temporary sewage pit similar to a winter road camp. All management plans and standard procedures for the Snare Land Use Permit would also apply to the overflow camps

Temporary fuel storage has been included to support any of the temporary camps or locations where crushing would take place but only used when required. Each location would include:

- 1 60,000L double walled diesel tank or another acceptable container for the storage of hydrocarbons.
- 1 double walled 1000L gas tank

Locations for temporary fuels storage are outlined in Figure 2-3, and quantities at each location are discussed in Section 2.3.

2.2.5.5 Miscellaneous Construction Activities

In addition to the above noted land use activities, the following activities will be completed:

- Minor clearing for access roads and access to transmission lines for maintenance.
- Use of heavy equipment not on an existing Right-of-Way, including but not limited to:
 - Maintenance of site roads.
 - Maintenance of transmission infrastructure.
 - Maintenance of dams and side dams.
- Major civil works and construction upgrades over the next 5 years

2.3 LOCATION AND LIST OF HAZARDOUS MATERIALS ON-SITE

Gasoline and diesel fuel are the two main hazardous materials used and stored at the Facility. However, other materials and wastes such as propane, acetylene, oil and glycol are also stored, used and/or generated on-site in small quantities.

The Facility fuel storage capacity is 128,400 litres (L) in Above Ground Storage Tanks (AST) as follows:

- Incinerator containing 1,700 L diesel – Snare Rapids (Figure 2-4);
- 60,000 L double-walled AST, diesel – Snare Falls Airstrip (Figure 2-5);
- 60,000 L double-walled AST, gasoline – Snare Falls Airstrip (Figure 2-5);
- 4,500 L double-walled skid mounted mobile tank – Snare Falls Airstrip (Figure 2-5);
- 1,100 L double-walled AST, diesel – next to plant– Snare Cascades (Figure 2-6); and
- 1,100 L bermed AST, diesel – inside the plant - Snare Forks (Figure 2-7).

In addition to the Facility's fuel storage locations listed above, temporary fuel storage locations will be implemented as required to support the temporary camps or locations where crushing would take place at the following proposed locations. These locations are presented in Figure 2-3 and the capacities and containment description at each location are listed in Table 2-2.

All hazardous materials / waste will be stored in drums or containers within an earthen berm lined with a geofabric protector. The bermed hazardous material storage area is located at the Snare Falls Airstrip adjacent to the Storage Tent (Figure 2-8 and Figure 2-9).

The bermed area measures 20 m by 26 m and includes the following engineering and design features:

- Compacted earth berms of granular material with a similar design to those of the NTPC Jackfish Plant.
- Earth berms are lined for protection with a 60 millimetre high density polyethylene (HDPE) geofabric.
- Separate pieces of the HDPE liner were joined together using plastic welding and testing of the weld was undertaken.
- Backfill was placed on top of the HDPE liner for additional protection of the liner.

Figure 2-8: Snare Falls Hazardous Materials Storage Berm



Figure 2-9: Snare Falls Airstrip and Storage Tent Locations



To assist in the safe and secure storage of fuels, hazardous materials and hazardous waste, the following general guidelines for storage areas/facilities will be considered:

- Design of storage areas shall be in compliance with the National Fire Code, where appropriate.
- Drainage into and from storage areas shall be controlled in order to prevent leaks or spills from migrating off-site and to avoid run-off from entering the storage areas.
- Storage areas shall have controlled access. Only authorized and trained personnel shall have access to storage areas.
- Leaking or deteriorated containers shall be removed and their contents transferred to a sound container.
- Storage areas shall be adequately signed indicating that there is to be no smoking, no sparks or flames and hazardous materials/wastes are stored therein.
- Storage locations shall be clearly defined and marked to prevent damage of storage drums and containers in the event they are covered by snow.
- Incompatible materials shall be segregated by chemical compatibility within the storage area to prevent contact between materials in the event of a release.
- Storage containers will be clearly labelled, visible to all staff and contractors.
- Storage areas shall be located at least 100 m from surface water and on a low-permeability area, where possible.
- Storage areas shall be readily accessible for fire fighting and other emergency procedures.
- Storage areas shall be adequately ventilated to prevent the build up of noxious or toxic vapours.
- Secondary containment or an adequate spill collection system shall be installed to allow for the containment of at least 110% of the largest container or tank volume within the contained area, plus 10% of the aggregate capacity of all other containers or tanks (Details on the bermed waste storage area are provided above and in Figure 2-6).
- Secondary containment shall be kept free of debris, water accumulation and snow.
- Storage areas and associated secondary containment shall be protected from the elements, where possible. In case this is not feasible, the secondary containment volume shall be large enough to allow for any precipitation (rain, snow, and storm water run-on) that may enter containment systems located outdoors, in addition to the required containment volume for stored materials. In addition, sufficient capacity to handle sprinkler water and other water from fire protection efforts will be provided.
- Storage areas shall be constructed, or provided with barriers, to protect containers from the environment and physical damage.
- Adequate spill and emergency response equipment shall be installed at each storage area (i.e., spill control, fire protection, etc.). A list of spill control equipment is provided in Section 6.1 and Appendix F.
- The site shall not be used for long-term storage of hazardous waste (i.e., in excess of one year).

The SCP was developed based on the entire Snare Hydroelectric Facility (i.e., including all four sites). Table 2-1 presents general information on the location of the main fuel, hazardous materials and hazardous waste storage areas. Estimated minimum and maximum quantities of hazardous materials are presented in Table 2-3.

Table 2-1: Main Fuel, Hazardous Material and Hazardous Waste Storage Facilities at the Snare Hydroelectric Facility

Storage Area	General Description	Location
Snare Falls Airstrip Tank Farm	One 60,000 L, double-walled AST containing diesel and one 60,000 L, double-walled AST containing gasoline.	Located at the Snare Falls Airstrip.
Oil Storage Shed	Mainly 205 L and 20 L containers of new oil, lubricant and glycol.	Located at the Snare Falls Airstrip.
Drum Storage Berm (20 m x 26 m)	Mainly 205 L drums for waste oil and glycol. Drums are tracked in the Hazardous Materials Inventory Log and shipped out every year on the Winter Road.	Located at the Snare Falls Airstrip.

In addition to the main locations above, temporary fuel storage areas will be established as required to support the temporary camps or locations where crushing would be place. Table 2-2 presents general information on the proposed locations of temporary fuel, hazardous materials and hazardous waste storage areas.

Table 2-2: Temporary Fuel, Hazardous Material and Hazardous Waste Storage Facilities at the Snare Hydroelectric Facility

Storage Area	General Description	Location
Snare Rapids Silt Pit Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at Snare Rapids Silt Pit
Snare Falls/Tie Sub-station Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at Snare Falls/Tie Sub-station Temp. Camp
Snare Cascade Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at Snare Cascade Temp. Camp
KM 28 Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at KM 28 Fuel Storage

Strutt Lake (SL) Aggregate Pit 1 Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at SL Aggregate Pit 1 Temp. Camp
SL Aggregate Pit 2 Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at SL Aggregate Pit 2 Temp. Camp
SL Aggregate Pit 3 Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at SL Aggregate Pit 3 Temp. Camp
Snare Forks Quarry Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at Snare Forks Quarry
Snare Winter Road Start Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at Snare Winter Road Start
Wekweeti Winter Road Fuel Storage	One 60,000 L, double-walled AST containing diesel and one 10,000 L, double-walled AST containing gasoline.	Located at Wekweeti Winter Road Temp. Camp

Table 2-3: List of Main Hazardous Materials On-Site

Material	Storage Container	Normally On-Site	Maximum On-Site	Storage Location (see Figure 2) and Uses
Diesel	See Table 2-1 and Table 2-2 above			
Gasoline	See Table 2-1 and Table 2-2 above			
Jet Fuel	205 L drum	2050 L (10 drums)	2050 L (10 drums)	Storage C-Can located at the Airstrip.
Lubricating Oil	205 L drum	2050 L (10 drums)	2050 L (10 drums)	New products stored in the Storage Shed, located at the Airstrip. Waste products stored in the Drum Storage Berm at the Airstrip.
Glycol	205 L drum	2050 L (5 drums)	2050 L (5 drums)	New products stored in the Storage Shed, located at the Airstrip. Waste products stored in the Drum Storage Berm at the Airstrip.
Transformer Oil	14,207 L (1 transformer)	28,414 L (2 transformers)	28,414 L (2 transformers)	Concrete berm at Snare Rapids substation.
	7,600 L (1 transformer)	15,200 L (2 transformers)	15,200 L (2 transformers)	Fibreglass berm at Snare Falls substation.
	180 L (2 transformers)	360 L (2 transformers)	360 L (2 transformers)	Fibreglass berm at Snare Falls substation.
	370 L (1 transformer)	370 L (1 transformer)	370 L (1 transformer)	Concrete berm at Snare Cascades substation.
	7,600 L (1 transformer)	7,600 L (1 transformer)	7,600 L (1 transformer)	Concrete berm at Snare Cascades substation.
	7,600 L (1 transformer)	15,200 L (2 transformers)	15,200 L (2 transformers)	Separate fibreglass berms at Snare Forks substation.
Acetylene	100 pound (lbs) tank	400 lb (4 tanks)	400 lb (4 tanks)	Garage at Airstrip
Propane	100 lb tank	500 lb (5 tanks)	500 lb (5 tanks)	Garage at Airstrip
Oxygen	100 lb tank	400 lb (4 tanks)	400 lb (4 tanks)	Garage at Airstrip
Nitrogen	100 lb tank	200 lb (2 tanks)	200 lb (2 tanks)	Snare Rapids Plant

3 SPILLS

3.1 WHAT IS A SPILL?

For the purposes of this SCP, a spill is defined as an accidental release of a contaminant into the environment that has the potential for adverse impact.

3.2 MATERIALS & REPORTABLE SPILLS ON SITE

According to the NWT Spill Contingency Planning and Reporting Regulations, where there is a reasonable likelihood of a spill or accidental release (including in frozen conditions) in an amount equal to or greater than the amounts set out in Table 3-1, the spill must be reported to the NWT 24-HOUR SPILL REPORT LINE at 867-920-8130.

The Plant Operator, or their designate, is responsible for reporting spills at the Facility. The Plant Operator must be notified immediately of any spill, regardless of quantity to land or water.

As a precaution, if there is any doubt as to whether the quantity spilled meets the minimum reportable thresholds listed in Table 3-1, the spill incident shall be reported to the NWT 24-HOUR SPILL REPORT LINE.

Any spill also needs to be reported to the GNWT Lands Land Use Inspector if it is related to the scope of the Land Use Permit and to the GNWT ENR Water Licence Inspectors if it is related to the scope of the Water Licence.

The Facility maintains a detailed log of all spills of hazardous materials, including non-reportable spills. As part of Facility's overall environmental management system, procedures will be implemented to encourage all site workers to communicate non-reportable spill incidents to the Plant Operator.

If there is a spill of any substance into a water body or watercourse which may affect or endanger users of the Snare River, the Emergency Preparedness Plan should be implemented.

Table 3-1: Immediately Reportable Quantities

Transportation Class	Description of Contaminant	Amount Spilled
1	Explosives	any amount
2.1	compressed gas (flammable)	any amount of gas from containers with a capacity greater than 100 L
2.2	compressed gas (non-corrosive, non-flammable)	any amount of gas from containers with a capacity greater than 100 L
2.3	compressed gas (toxic)	any amount
2.4	compressed gas (corrosive)	any amount
3.1, 3.2, 3.3	flammable liquid	≥100 L
3.1, 3.2, 3.3	flammable liquid or vehicle fluid	when released on a frozen water body that is being used as a working surface ≥ 20L
4.1	flammable solid	≥ 25 kg
4.2	spontaneously combustible substances	≥ 25 kg
4.3	water reactant substances	≥ 25 kg
5.1	oxidizing substances	≥ 50 L or 50 kg
5.2	organic peroxides	≥ 1 L or 1 kg
6.1	toxic substances	≥ 5 L or 5 kg
6.2	infectious substances	any amount
7	radioactive substances	any amount
8	corrosive substances	≥ 5 L or 5 kg
9.1 (in part)	Miscellaneous products, substances or organisms	≥ 5 L or 5 kg
9.2	environmentally hazardous substances intended for disposal	≥ 1 L or 1 kg
9.1 (in part)	PCB mixtures of 5 ppm or more	0.5 L or 0.5 kg
None	other contaminants (eg wastewater, waste or spent chemicals)	≥ 100 L or 100 kg
	Sewage and Wastewater	any amount
	Sour natural gas (H ₂ S), sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more
	Unknown Substance	any amount
Report releases or potential releases of any size that: <ol style="list-style-type: none"> 1. Are near or in an open water body; 2. Are near or in a designated sensitive environment or habitat; 3. Pose an imminent threat to human health or safety; or 4. Pose an imminent threat to a listed species at risk or its critical habitat 		any amount

Notes: L = litre; kg = kilogram; PCB = polychlorinated biphenyls; ppm = parts per million.

3.3 SPILL PREVENTION MEASURES

The first step in hazardous materials spill response is to take steps to prevent the spill from occurring. Planning for emergency situations is imperative, due to the nature of the materials stored on site as well as the remoteness of the site. Along with the preventative measures outlined below, adequate training of staff and contractors is paramount.

The following general preventative measures are in place to minimize the risk and impact of a potential spill or release:

- Prior to starting work at the Facility, all employees and contractors are required, as a minimum, to go through an orientation session to familiarize themselves with this SCP, the hazardous materials present at the Facility and the Facility spill response procedures;
- All site staff are trained on the safe handling, transfers and dispensing of fuels at the facility. Safe practices include, but are not limited to, required PPE, constant attendance during fuelling operations, only fuelling when spill kits are available nearby, and awareness of location of pump shut-offs and emergency shut-offs. Records of training are maintained;
- The main fuel and hazardous materials storage and dispensing areas are located more than 100 m from the Snare River; and/or are stored indoors where spills are not likely to exit from the storage building;
- Spill kits are provided wherever fuel is stored, used and transferred. The spill kits and their contents are regularly inspected to ensure that adequate supplies are available;
- Fuel and chemical storage areas are provided with secondary containment; and,
- The Plant Operator conducts daily visual inspections of the facility to check for leaks or damage to the fuel storage containers, as well as for stained or discoloured soils around the fuel and chemical storage areas. Storage areas are kept clear of snow and debris.

NTPC also supports the following general principles for spill prevention:

- Train workers in the use of safe work procedures for hazardous materials, and procedures to clean up spills;
- Encourage workers to take reasonable measures to prevent spills;
- Provide access to up to date MSDS for all hazardous materials;
- Conduct inspections of fuel/chemical storage areas;
- Keep drums/containers sealed or closed, except when removing or adding contents;
- Avoid over filling drums/containers;
- Place drums/containers within a suitable form of secondary or spill containment;
- Keep storage areas secure from unauthorized access;
- Segregate incompatible materials;
- Ensure storage areas are adequately protected from weather and physical damage;

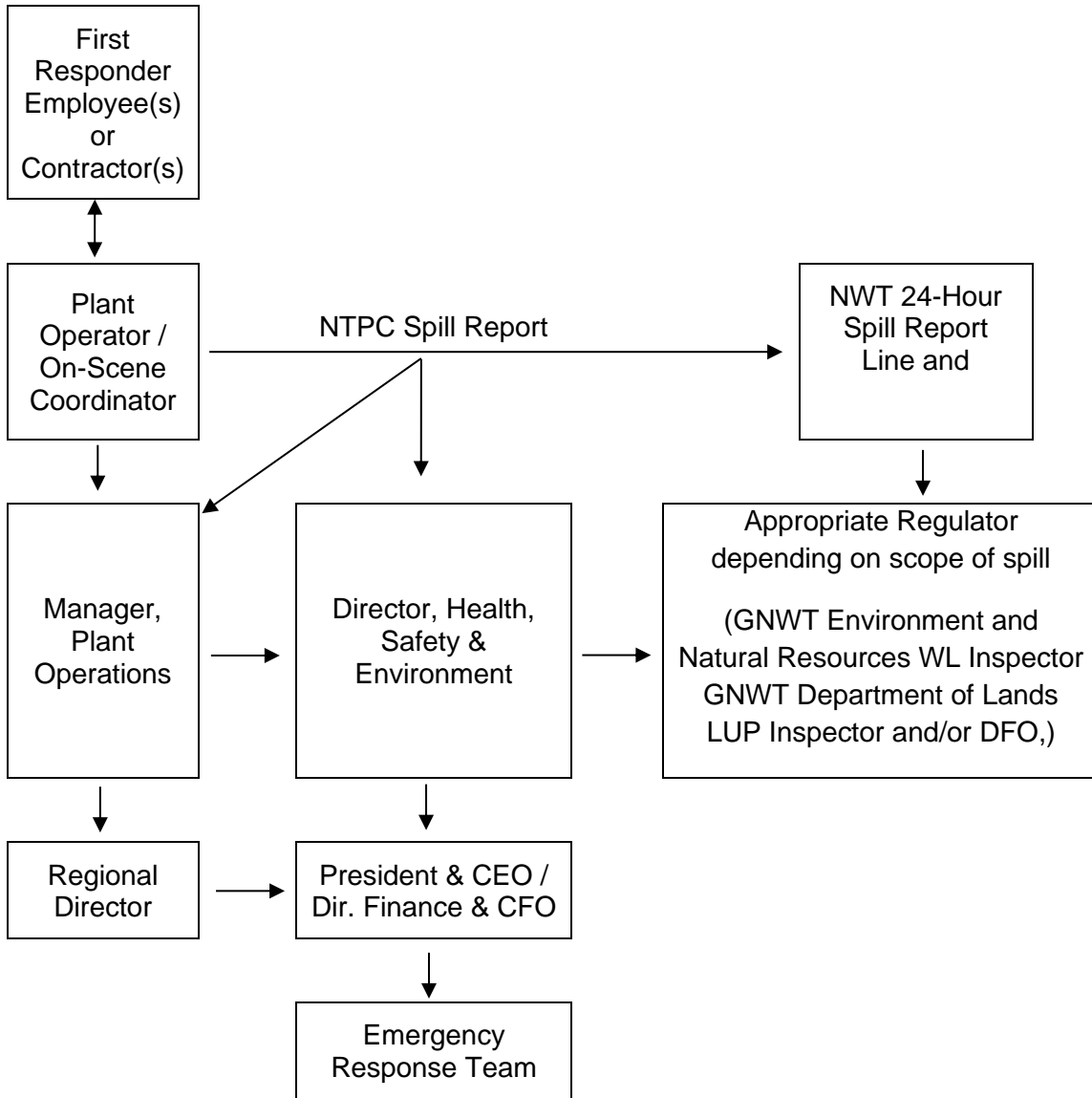
- Provide adequate spill response materials at storage areas;
- Develop and implement good environmental work practices such as the use of oil drip trays and absorbents for servicing vehicles;
- Regularly inspect, clean and maintain machinery which may operate near or perhaps in water; and
- Regularly inspect storage areas.

4 RESPONSE ORGANIZATION

4.1 RESPONSE ORGANIZATION

The flow chart depicted in Figure 4-1 identifies the response organization and the chain of command for responding to a spill. In accordance with the action plan described in Section 5, the response organization details the roles and responsibilities of each party involved in the spill and their contact information, including the 24-hr phone numbers for the responsible personnel. Note that post Devolution (as of April 1, 2014), the Government of the Northwest Territories (GNWT) department of Environment and Natural Resources (ENR) has taken over the duties of Indian and Northern Affairs Canada (INAC) Inspectors for issued water licenses. ENR's North Slave region is responsible for spills under NTCP's water license.

Figure 4-1: Spill Response Organizational Communication Flowchart



4.2 RESPONSE TEAM ROLES AND RESPONSIBILITIES

4.2.1 First Responder

The person who has caused a spill or is the first to observe the spill is the first responder. This includes NTPC employees and contractors working at the Facility. The roles and responsibilities of the first responder are as follows:

- to ensure site and personnel safety;
- to assess the preliminary severity and source of the spill;
- to identify and contain the spill, if it is safe to do so;
- to immediately report to and work with the On-Scene Coordinator
- contractor employees are to report through their Supervisors, who in turn are required to report to the On-Scene Coordinator ; and
- to participate in spill response as a member of the cleanup crew if requested by the On-Scene Coordinator and trained to do so.

4.2.2 On-Scene Coordinator / Plant Operator

The On-Scene Coordinator must be knowledgeable with regard to site operations, initial response actions, and spill response equipment and facilities. At the Facility, the On-Scene Coordinator is the Plant Operator on duty. Responsibilities of the On-Scene Coordinator are as follows:

- to ensure that on-site personnel have the appropriate training to respond to any spill;
- to assume complete authority over clean up personnel and the spill scene, as well as assume responsibility for all mitigation efforts, as required;
- to evaluate the initial situation and assess the magnitude of the problem;
- to report the spill to the NWT 24-HOUR SPILL REPORT LINE at 867.920.8130 as soon as possible;
- to activate the initial response plan;
- to alert and assemble key personnel in the on-site spill response team, as deemed appropriate, to handle the situation;
- to develop the overall plan of action for containment and clean-up of the specific incident, as well as direct and implement the plan;
- to ensure assigned responsibilities are carried out and the activities of spill response team members are coordinated;
- to assess the requirements for people, equipment, materials, and tools to contain the spill in light of what resources are immediately available; urgency will depend on the nature of the spill;
- to assist the Director, Safety and Environment with regulatory and licensing reporting requirements, including gathering relevant information and submitting any formal reports (within the required time frame) to the applicable regulatory agencies and NTPC management detailing the occurrence of a spill; this includes submitting an incident reporting form;
- if authorized by the Manager, Plant Operations act as a spokesperson with the public, media, and government agencies, as required;
- to ensure that the spill response team is provided with proper PPE and spill response equipment; and, to ensure that all spill response personnel receive adequate training to fulfil their responsibilities in responding to a spill.

4.2.3 On-Site Spill Response Team

The On-Site Spill Response Team consists of the First Responder and specifically trained staff who are on site and ready to aid in the clean up of a spill. Responsibilities are as follows:

- liaise with On-Scene Coordinator and keep them informed of clean-up activities;
- ensure on-site resources for spill response and clean up are available;
- assist in obtaining any additional resources not available on site;
- ensure that appropriate PPE is worn properly; and
- conduct clean-up of spills under the direction of the On-Scene Coordinator.

4.2.4 Director, Health, Safety and Environment

In terms of spills, the Director, Health, Safety and Environment is responsible to:

- provide technical advice on the anticipated environmental impacts of the spill;
- advise on the effectiveness of various containment, recoveries, and disposal options, and suggest the most appropriate approach;
- if authorized by the NTPC Manager, Plant Operations act as a spokesperson with the public, media, and government agencies, as required;
- monitor the effectiveness of the clean-up operation and recommend further work, if necessary;
- communicate with the various regulatory agencies as required; and
- complete and fax (867-873-6924) or email (spills@gov.nt.ca) a NWT SPILL REPORT Form to the NWT 24-HOUR SPILL REPORT LINE.

4.2.5 Manager Plant Operations

In the case of a spill that is deemed to be a potential emergency, the Manger Operations is to:

- call the required senior management within NTPC (Table 4-1); and
- ensure that the On-Scene Coordinator is provided will adequate resources to deal with the spill / emergency.

4.2.6 President & CEO and the Director of Finance & CFO

In terms of spill response, responsible to:

- determine if an Emergency Response Team (ERT) is required; and
- determine the personnel on the ERT.

4.3 ORGANIZATIONAL COMMUNICATION PLAN

When a spill has been identified, report the spill to the Plant Operator. The Plant Operators work in shifts, and one of them will always be on-site. They are in charge of the facility and of activating the SCP. They will also inform head office for tracking spills in the company database and notify the head office in the event of public inquiries. The Plant Operators can be reached 24 hours a day, as follows:

Plant Operator
Snare Hydroelectric Facility
(867) 669-4865

If they cannot be reached, contact the NTPC Central Control Room, 24 hours a day, 365 days a year, as follows:

NTPC 24-Hour Central Control Room
Box 2250, Yellowknife, NT, X1A 2P7
(867) 669-3370

In the event that it is not safe to attempt a clean-up effort internally, the Plant Operator / On-Scene Coordinator will contact the Director, Health, Safety and Environment and Plant Operations Manager, or the NTPC On-site Representative and the NWT 24-HOUR SPILL REPORT LINE to coordinate clean up using external resources.

The President & CEO and the Director of Finance & CFO will determine if an Emergency Response Team (ERT) is required to deal with the emergency, and if so, who will be on the ERT from the various departments. A copy of the ERT Corporate Policy is included in Appendix D.

It is the job of the Director, Health, Safety & Environment to contact the appropriate regulator, when necessary: the GNWT ENR or Fisheries and Oceans Canada (DFO).

If Regional Manager, Plant Operations cannot be reached, contact **Central Control Room** in Yellowknife (867-669-3370 phone, 867-669-3385 fax).

If spill response requires assistance or is an emergency, Manager, Plant Operations or Central Control Room must call the appropriate numbers according to region (see Table 4-3).

4.4 CALLS THAT MUST BE MADE

Note: all phone numbers use **area code 867** unless otherwise specified.

When a spill of any size is discovered, the Plant Operator notifies both:

- **Regional Manager, Plant Operations** (see contact info in Table 4-1); and
- **24-Hr Spill Report Line** (920-8130 phone, 873-6924 fax).

If Regional Manager, Plant Operations cannot be reached, contact **Central Control Room** in Yellowknife (669-3370 phone, 669-3385 fax).

If spill response requires assistance or is an emergency, Manager, Plant Operations or Central Control Room must call the appropriate numbers according to region (Table 4-1).

The Environmental Licesning Specalist will inform the GNWT Lands Land Use Inspector if it is related to the scope of the Land Use Permit and to the GNWT ENR Water Licence Inspectors if it is related to the scope of the Water Licence.

Emergency Response Team: For the most serious emergencies (Level-Three Emergency or those involving spills into water) **Senior Leadership** will form the Emergency Response Team immediately (Table 4-2). Senior Leadership may opt to form this team for lesser emergency levels on a case-by-case basis. Should assistance from regulators or government be required (see Table 4-3).

Table 4-1: NTPC Emergency Response Phone List

Region	Position	Name	Phone (867)	Fax
All Regions Must Contact:	Director, Health, Safety & Env.	Edward Smith	874-5327 (work) 875-7737 (cell)	(888) 371-9433
	President & CEO (Acting)	Cory Strang	874-5276 (w) 875-7451 (c)	874-5349
	Director of Financial Officer	Judith Goucher	874-5217 (w) 874-7676 (c)	874-5251
	Chief Operating Officer COO	Belinda Whitford	669-3303 (w) 875-8920 (c)	669-3318
Region	Position	Name	Phone (867)	Fax (867)
Hydro Region	Director, Hydro Division	Alex Love	669-3326 (w) 445-4712 (c)	669-3318
	Manager, Plant Operations	Anthony Upton	669-3312 (w) 445-1841 (c)	669-3316
	Manager, Mechanical Services	Sergio Catlyn	669-6881 (w) 445-3389 (c)	669-3316
	Manager, System Control	Eileen Hendry	669-3301 (w) 444-1170 (c)	669-3316

Thermal Region	Director, Thermal Operations	Mike Ocko	777-7714 (w) 678-5667 (c)	777-4318
	Manager, Maintenance Services	Boyd Mallaley	777-7714 (w) 678-0692 (c)	695-7111

Table 4-2: Core Emergency Response Team Phone List

Position	Name	Phone (867)
President & CEO	Cory Strang	874-5276 (w), 875-7451 (c)
Chief Operating Officer (COO)	Belinda Whitford	699-3303 (w), 875-8920 (c)
Director, Finance & CFO	Judith Goucher	874-5217 (w), 874-7676 (c)
Manager, IT	D'arcy Delorey	874-5206 (w), 876-0168 (c)
Director, Human Resources	Erin Dean	874-5228 (w) 876-0336 (c)
Director, Hydro Region	Alex Love	669-3326 (w), 445-4712 (c)
Director, Thermal Region	Mike Ocko	777-7714 (w), 678-5667 (c)
Director, Health, Safety & Env.	Edward Smith	874-5327 (w), 875-7737 (c)
Communications Manager	Doug Pendergast	874-5202 (w), 876-1095 (c)
Treasury Analyst	Kristen Weingartner	874-5332 (w)

Table 4-3: Local Agencies (in case of emergency only)

Contact	Phone (867)
Department of Fisheries and Oceans (DFO)	669-4900
Emergency Measures Organization (EMO)	873-7554
Environment and Natural Resources (ENR) North Slave Region Officer on call – after hours	873-7443 or 873-7476 873-7181
Department of Lands Inspectors Clint Ambrose (Manager, Resource Management North Slave Regional Office) (e) clint_ambrose@gov.nt.ca	767-9188 (c) 446-0769
Public Works - Fort Simpson Region	695-2325
Public Works - Fort Smith Region	872-5526
Public Works - Inuvik Region	777-1298
Public Works - Yellowknife Region	873-1517
Mackenzie Valley Land and Water Board	669-0506
Wek'eezhii Land and Water Board	669-9590

5 ACTION PLAN

5.1 POTENTIAL DISCHARGE EVENTS – WORST CASE SCENARIOS

In Table 5-1, a list of potential discharge events, with associated discharge volumes and directions is presented for the primary hazardous materials stored on-site. The most likely discharge volume is indicated and the spill clean up procedures will focus on the spills of this quantity. A worst case scenario is also presented. Specific discharge rates are not indicated for each fuel type, as these would vary from a few minutes to several hours, based on the source of leak or puncture.

Table 5-1: List of Hazardous Materials, Potential Discharge Events, Potential Discharge Volumes (Worst Case Scenario in Brackets) and Direction of Potential Discharge

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
Diesel Fuel (AST, vehicles and equipment)	Overfilling of AST at fill port Disconnection or failure of fuel transfer hose during AST filling operations Overfilling of vehicles or equipment at dispensing area Transfer hose leak while dispensing Leak from fuel tank on vehicles and equipment due to collision / accident	Likely < 1,000 L (max 60,000 L if catastrophic failure of double-walled diesel AST)	Spills associated with AST will generally be contained within the fuel dispensing areas. General small spills to ground will spread out overland in direction of downward slope with potential for underground infiltration.
Gasoline (AST, vehicles and equipment)	205 L drum failure due to mechanical damage or corrosion Overfilling of vehicles or equipment at dispensing area Transfer hose leak while dispensing Leak from fuel tanks on vehicles and equipment due to collision / accident All containers / drums in storage area leaking at once (very unlikely)	Likely < 1,000 L (max 60,000 L if catastrophic failure of double-walled gasoline AST)	Spills associated with AST will generally be contained within the fuel dispensing areas. General small spills to ground will spread out overland in direction of downward slope with potential for underground infiltration.
Jet Fuel	205 L drum failure due to mechanical damage or corrosion Overfilling of aircraft at dispensing area Transfer hose leak while dispensing Leak from aircraft fuel tank due to collision / accident	Likely < 205 L (max 205 L)	Spills associated with 205 L drums will be contained within the steel Sea-Can storage shed at the airstrip. On flat ground from aircraft with potential for underground infiltration.

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
	All containers / drums in storage area leaking at once (very unlikely)		
New and Used Lubricating Oil (Storage Shed and Drum Storage Berm)	Minor leaking product container or drum Large puncture, fast leaking container / drum Overfilling of used oil drums All containers / drums in storage area leaking at once (very unlikely)	Likely < 205 L (max 205 L)	General small spills to ground will spread out overland in direction of downward slope with potential for underground infiltration. Product released at storage area will likely be contained by secondary containment system.
New and Used Glycol (Storage Shed and Drum Storage Berm)	Minor leaking product container or drum Large puncture, fast leaking container / drum Overfilling of used glycol drums	Likely < 205 L (max 205 L)	General small spills to ground will spread out overland in direction of downward slope with potential for underground infiltration. Product released at storage area will likely be contained by secondary containment system.
Transformer Oil (Substation)	Minor slow leak from oil containment Significant failure of oil containment due to corrosion or critical system failure	Likely < 1,000 L (max 14,207 L)	Contained within berm.
Propane (Garage at Airstrip)	Leak from open or failed / corroded valve Corrosion of cylinder shell Cylinder puncture / rupture from mechanical damage	Likely < 100 lb (max 100lb)	To the air in the immediate vicinity of leak, moves laterally in same direction as wind, dissipates readily into the open air
Acetylene (Garage at Airstrip)	Leak from open or failed / corroded valve Corrosion of cylinder shell Cylinder puncture / rupture from mechanical damage	Likely < 100 lb (max 100 lb)	To the air in the immediate vicinity of leak, moves laterally in same direction as wind, dissipates readily into the open air
Oxygen (Garage at Airstrip)	Leak from open or failed / corroded valve Corrosion of cylinder shell Cylinder puncture / rupture from mechanical damage	Likely < 100 lb (max 100 lb)	To the air in the immediate vicinity of leak, moves laterally in same direction as wind, dissipates readily into the open air
Nitrogen (Snare Rapids Plant)	Leak from open or failed / corroded valve Corrosion of cylinder shell Cylinder puncture / rupture from mechanical damage	Likely < 100 lb (max 100 lb)	To the air in the immediate vicinity of leak, moves laterally in same direction as wind, dissipates readily into the open air

5.2 POTENTIAL ENVIRONMENTAL IMPACTS OF SPILLS (INCLUDING WORST CASE SCENARIO)

Overall, for all hazardous materials discussed below, impacts are lower during winter as snow is a natural sorbent and ice forms a barrier limiting or eliminating soil or water contamination, thus spills can be more readily recovered when identified and reported.

5.2.1 Flammable and Combustible Liquids

Flammable liquids have flash points below 37.8°C, evaporate quickly, and within a short period of time can reach high vapour concentrations in air. Flammable liquids at the Facility include, but are not limited to, gasoline and aviation fuel. Although not stored on site, aviation fuel will be present in helicopters landing at the Facility. Spills of flammable liquids represent an extreme fire and explosion hazard if vapour concentrations exceed the lower explosion limit (LEL). They are generally harmful if inhaled and can also be absorbed through the skin.

Combustible liquids such as diesel fuel have a **flash point above 37.8°C but below 93.3°C** and are not fire hazards at room temperature. The principal hazard from non-flammable, volatile liquid spills is exposure to the vapour by inhalation or skin absorption.

The most common flammable and combustible materials stored and handled on site are liquids such as gasoline, diesel, and waste oils. For the purposes of spill response actions, lubricants and motor oil have been included with the flammable and combustible compounds given their petroleum hydrocarbon based nature. Glycol product and used glycol spills will also be handled as flammable/combustible materials.

With the exception of very small quantities of fuel and glycol required to maintain the generators, all hazardous materials and wastes are stored and managed at the airport facility. Activities such as burning on ice and the unscheduled releases of water are not anticipated at the Snare Hydroelectric Facility.

Gasoline

Environmental impacts: Gasoline may be harmful to wildlife and aquatic life. It is considered a carcinogen and does not readily biodegrade. Gasoline is quick to volatilize. It has a relatively low solubility in water and is less dense than water, and hence can form a layer of non-aqueous phase liquid (NAPL) floating on top of water if released in sufficient quantities. Runoff into water bodies must be avoided.

Worst case scenario: 60,000 L double wall tank failure and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Diesel

Environmental impacts: Diesel may be harmful to wildlife and aquatic life. It is not readily biodegradable. Diesel burns slowly and thus the risk to the environment is reduced during recovery as burn can be more readily contained compared with volatile fuels. It has a relatively low solubility in water and is less dense than water, and hence can form a layer of NAPL floating on top of water if released in sufficient quantities. Runoff into water bodies must be avoided.

Worst case scenario: AST secondary containment failure or seam/joint failure and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Aviation Fuel

Environmental impacts: Aviation fuel may be harmful to wildlife and aquatic life. It is not readily biodegradable. Aviation fuel is quick to volatilize. It has a relatively low solubility in water and is less dense than water, and hence can form a layer of NAPL floating on top of water if released in sufficient quantities. Runoff into water bodies must be avoided.

Worst case scenario: Aircraft crashed on site, release fuel from its fuel tank. The spilled aviation fuel has the potential to seep into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and the water.

Oil Product, Used Oil and Miscellaneous Oils/Grease

Environmental impacts: Raw oil product, used oils may be harmful to wildlife and aquatic life. Oil products are not readily biodegradable. These compounds generally have a low solubility in water, thereby separating into NAPL. Runoff into water bodies must be avoided.

Worst case scenario: All storage drums punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

5.2.2 Compressed Gases

Compressed gases such as propane and acetylene are stored in relatively small quantities at the Facility. They are flammable and can ignite and explode if exposed to an ignition source. Vapours cannot be contained when released, and it is important that personnel withdraw immediately from any such release. If tanks are damaged, the gas should be allowed to disperse, with no attempt at recovery.

Compressed gas spills/leaks can generally be divided into two categories. The first are those leaks which occur away from the gas cylinder in lines, tubing, or apparatus. These types of leaks can generally be stopped by closing the main cylinder valve, if it is otherwise safe to do so. The second category of leak occurs at the cylinder itself, and cannot be stopped by closing the cylinder valve.

In some cases it may not be possible to close a cylinder valve due to age or poor condition, and as such, this situation falls into the second category of gas leak. **All leaking gas cylinders are considered an emergency if the leak cannot be stopped by closing the cylinder valve.** Leaks of oxygen, flammable gas, or toxic gas are especially dangerous.

Propane

Environmental impacts: Propane is extremely volatile and very flammable, and thus it represents a health hazard for fire and explosion. Propane is not considered toxic or harmful to wildlife or aquatic life or the environment in general. Propane is heavier than air and may travel a considerable distance to an ignition source. Cylinders may vent rapidly or rupture violently from pressure when involved in a fire situation.

Worst case scenario: All cylinders are punctured or fail simultaneously and contents discharge into the surrounding environment and ignite leading to a fire and/or explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to a propane spill is of the utmost concern.

Acetylene

Environmental impacts: Acetylene is not especially toxic to wildlife, aquatic life or the environment in general. Depending on the manufacturing process it can contain toxic impurities such as traces of phosphine and arsine. Acetylene is extremely volatile and very flammable, and thus it represents a health hazard for fire and explosion.

Worst case scenario: All cylinders are punctured or fail simultaneously and contents discharge into the surrounding environment and ignite leading to a fire and/or explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to an acetylene spill is of the utmost concern.

Oxygen

Environmental impacts: Oxygen is not considered toxic or harmful to wildlife or aquatic life or the environment in general. Highly concentrated sources of oxygen promote rapid combustion and therefore are fire and explosion hazards in the presence of fuels.

Worst case scenario: All cylinders are punctured or fail simultaneously and contents discharge into the surrounding environment and promote ignition of flammable material leading to a fire and/or explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to an oxygen spill is of the utmost concern.

5.2.3 Infectious Substances / Sewage

Infectious substances such as biological wastes from the sewage treatment plant are potentially hazardous when inhaled, ingested, and in contact with the eye. Initial preventative measures include wearing appropriate personal protective equipment (impermeable gloves, eye protection, and respirators appropriate for the size and type of spill). In the event of a spill on land, the material will be contained by diking or barriers. Liquids spilled in water will be dammed and diverted. Where raw sewage is spilled, the spill material can be sent to the sewage treatment system to be processed.

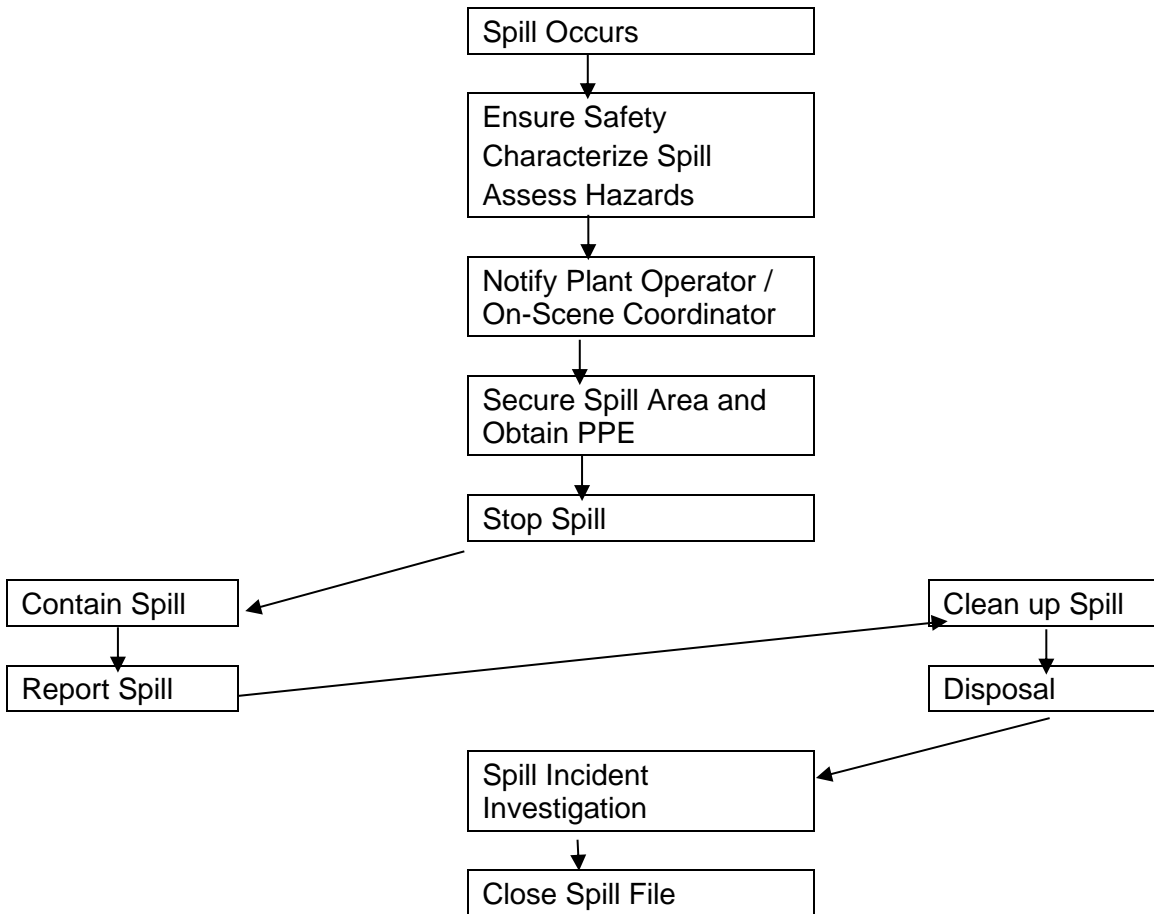
Sewage

Environmental impacts: Microbes in raw sewage can enter the body via the nose, mouth, open wounds or by inhalation of aerosols or dusts. Raw sewage contains biological agents such as bacteria, viruses, fungi and parasites (e.g., tetanos bacterium *Clostridium tetani*, the parasitic worm *Leptospira icterohaemorrhagiae*, the Hepatitis A virus (HAV), protozoan parasites *Giardia* and *Cryptosporidium*, and bacteria *E.coli*) that can cause serious illness and even death. There is also a risk from contamination with unknown chemicals (such as solvents, fuels, general household cleaning chemicals) discharged with grey water and from toxic, irritant, asphyxiating or flammable gases in confined spaces (e.g., septic tanks). The risk of exposure when handling sewage can be reduced significantly by effective and immediate clean-up and by taking appropriate safety precautions.

5.3 SPILL PROCEDURES

The following flowchart (Figure 5-1) outlines the overall steps to be taken in the event of a spill. The detailed description of what is required at each step is outlined in the Spill Response Procedure (Section 5.3.1).

Figure 5-1: Spill Response Flowchart



5.3.1 Spill Response Procedures

STEP 1 – Ensure safety, identify spill and assess hazards and risks

Initial actions for spills include ensuring personnel and site safety. Ensuring personnel and site safety is the responsibility of all parties, particularly the first responder who has the most knowledge of the spill. Upon the identification that a spill or release has occurred, the first responder shall perform the following:

- Ensure safety of yourself and all personnel;
- Alert all persons in the immediate area that a spill has occurred;
- Characterize Spill:
 - identify the material and its hazard potential (refer to MSDS if necessary);

- identify the source of the spill; and,
- identify the amount and the extent of the spill.
- Assess the spill hazards and risks to persons, property and the environment.

Note: *Where life or property is in danger, there is an emergency. **Get help.** Contact the local fire department, police or municipal authority.*

STEP 2 – Notify the Plant Operator / On-Scene Coordinator

After the details about the spill are known, the First Responder shall contact the Plant Operator / On-Scene Coordinator who will activate the SCP.

Note: *The Plant Operator / On-Scene Coordinator is to immediately contact the Manager, Plant Operations (or NTPC On-site Representative) and/or Director, Health, Safety & Environment if a spill response exceeds the abilities/capabilities of onsite personnel or equipment and/or if there is a high potential of adverse effects to offsite areas and/or sensitive ecological or human receptors. See Figure 4-1 Organizational Communication Flowchart.*

STEP 3 – Secure Area and Obtain Personal Protective Equipment

Upon determining what the spilled product is and its hazard potential, the On-Scene Coordinator shall perform the following:

- Keep all personnel not directly involved with the spill response away from the spill area.
- Ensure all personnel involved in the spill response are aware of the hazards of the spilled product, spill response and the environment.
- Obtain the required response equipment and PPE for the spill response team members. Personnel will not be able to use the response equipment and PPE until they have been trained on its proper use and limitations.

STEP 4 – Stop Spill

If Safe to do:

- Locate the spill source and stop it/shut it off (e.g. turn off pump, close valve, turn off equipment, turn off-power source).
- Shut off ignition sources.
- Shut off operating equipment.
- Attend to the injured (refer to MSDS for first aid response).

- If a spill occurs from the wall of a tank and cannot be stopped, transfer the product from the leaking tank to another storage tank in order to reduce the amount spilled. Use secondary containment (drum or pail) to catch the product and prevent further impact where possible.

STEP 5 - Contain Spill

- Determine the direction and speed the spill is moving. Determine what is causing the spill to move (wind, gravity, water, etc.);
- Determine what will be affected by the spill (environment, property);
- Determine the best location where the spill can be contained with available staff and equipment;
- Determine actions to reduce risk/damage to human health, the environment and property as a result of the spill.
 - Contain the spill. Refer to Appendix E for containment methods. Refer to Section 6 and Appendix F for a list of spill response equipment.
 - First attempt to contain the spill so as to prevent its entry directly into a potable water source, water body or into a ditch or conveyance that eventually discharges in to a water body.
 - **Should the spill reach the water, IMMEDIATELY** shut down the generator and stretch a sorbent boom across at the tailrace narrows, and use sorbent pads and booms to collect product from the water's surface.
- Prepare a contingency plan in case the spill gets out of control of present staff and equipment.

Note: Do not contain compounds (e.g. gasoline, aviation fuel) if vapours might accumulate and ignite – allow them to volatilise.

STEP 6 - Report Spill

- Completely fill out a Spill Report Form (Appendix A) and fax to the 24-HOUR SPILL REPORT LINE, Health, Safety & Environment Department, and the Manager of Plant Operations as specified on the form. Form also available on PowerLine.
- For large fuel spills follow the Fuel Spill Calculations Procedures (Appendix B) to determine the spill volume.
- Refer to Section 5.3.2 for additional information on spill reporting procedures.
- Contact GNWT ENR at 873-7181 (see also Table 4-3)
- GNWT Lands Inspector at 767-9188

STEP 7 - Spill Recovery / Cleanup and Disposal

- Prior to initiating clean up and disposal procedures, the appropriate regulatory body and the Director, Safety & Environment must approve the procedures.
- Refer to Sections 5.6 to 5.9 of this SCP for information on product recovery / clean up, storage, disposal, and site clean up procedures.
- Upon completion of clean up fill out a Spill Update Form (Appendix C) and fax as directed on form. Form also available on PowerLine.

STEP 8 – Spill Incident Investigation

- Plant Operator in consultation with Director, Health, Safety & Environment and Manager Plant Operations to conduct an internal review of the spill cause, effects, and effectiveness of the SCP procedures.
- Investigation findings to be used to develop corrective actions.

STEP 9 - Close Spill File

- The Director, Health, Safety & Environment will follow up with the appropriate regulatory body to ensure that a satisfactory clean up and/or remediation of affected areas has been completed.

5.3.2 Spill Reporting Procedures

NTPC policy is to report all spills of fuel or hazardous materials adjacent to or into a water body, regardless of quantity, or spills of hazardous materials over 5 litres unless the minimum quantity specified in the NWT Spill Contingency Planning and Reporting regulation is more stringent (i.e., less than 5 L).

A person reporting a spill shall give as much of the following information as possible:

- a) Date and time of spill.
- b) Location of spill.
- c) Direction the spill is moving.
- d) Name and phone number of a contact person close to the location of spill.
- e) Type of containment spilled and quantity spilled.
- f) Cause of spill.
- g) Whether the spill is continuing or has stopped.
- h) Description of existing containment.
- i) Action taken to contain, recover, clean up and dispose of spilled contaminants.
- j) Name, address and phone number of person reporting spill.
- k) Name of owner or person in charge, management or control of contaminants at time of spill.

Reporting shall not be delayed because of the lack of knowledge of any of the factors listed. No person shall knowingly make a false report of a spill or potential spill.

It is the responsibility of the Plant Operator to report the spill to the 24-HOUR SPILL REPORT LINE at (867) 920-8130 and to the Department of Lands Inspector (867)-767-9188, and they shall perform the following:

1. Fill out the SPILL REPORT Form as completely as possible. The form is available through the NTPC Intranet PowerLine (Appendix A). If required for a large fuel spill, follow the Fuel Spill Calculation Procedures (Appendix B) to determine the spill volume.
2. Fax or phone in the Spill Report Immediately to the 24-HOUR SPILL REPORT LINE at:

Fax: (867) 873-6924
Phone: (867) 920-8130

NOTE: Collect telephone calls can be made by informing the Operator that you wish to report a spill. RCMP communications may be used if other means are not available.

3. Fax Spill Report to Health, Safety & Environment Department and Manager, Plant Operations. See phone list (Table 4-1) for contact info.

5.4 DECONTAMINATION

Adjacent to, or near the spill zone, decontamination stations will be established. The decontamination stations will be constructed so that personnel will pass through the station prior to leaving the contaminated area. The decontamination stations may be bermed and lined with plastic sheeting. Washing solutions may be placed near the spill site. All solutions in tubs will be clearly marked.

Note: Notwithstanding the preceding, all applicable health and safety rules, regulations, and legislation will be adhered to.

5.5 CONTAINMENT

The following section describes various methods which may be employed to contain a spill to land, water, ice or snow.

5.5.1 Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, thus spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. Generally spills on land occur during the late spring, summer or fall when snow cover is at a minimum. It is important that all measures be undertaken to avoid spills reaching open water bodies.

The following methods are described in more detail in Appendix E:

- Dykes
- Trenches
- Dams

5.5.2 Containment of Spills to Water

Spills on water such as rivers, streams or lakes are the most serious types of spills as they can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water.

The following methods are described in more detail in Appendix E:

- Booms
- Weirs
- Barriers

5.5.3 Containment of Spills On or Under Ice

Spills on ice are generally the easiest spills to contain due to the predominantly impermeable nature of the ice. For small spills, sorbent materials are used to soak up spilled fuel. Remaining contaminated ice/slush can be scraped and shovelled into a plastic bag or barrel. However, all possible attempts should be made to prevent spills from entering ice covered waters as no easy method exists for containment and recovery of spills if they seep under ice.

The following methods are described in more detail in Appendix E:

- Dykes
- Trenches
- Snow Fence and Sorbent Barrier
- Burning
- Ice Slotting
- Vertical Barriers

It should be noted that burning on ice is not anticipated to occur and in the event that this mitigation method should be chosen (as an emergency response), authorization from GNWT ENR Inspectors will be secured prior to any action (refer also to Section 5.8.2).

5.5.3.1 Containment of Spills on Snow

Snow is a natural sorbent, thus as with spills on soil, spilled fuel can be more easily recovered. Generally, small spills on snow can be easily cleaned up by raking and shovelling the contaminated snow into plastic bags or empty barrels, and storing these at an approved location.

The following methods are described in more detail in Appendix E:

- Dykes

5.5.4 Barrel Containment

If liquid is leaking from a barrel and the leak cannot be plugged nor are there overpack drums on hand, the barrel can be rolled onto its side so that the leaking area is at the highest point, and will therefore no longer leak. A leak may be plugged with wooden wedges wrapped with a cloth or heavy-duty tape, or by placing an inner tube around the barrel over the leak. The inner tube can be tightened by twisting it with a rod or stick. All of these methods are to be used as temporary seals only. The liquid needs to be transferred into a new barrel or storage tank as soon as possible to prevent further contamination.

5.6 RECOVERY / CLEANUP

In most cases, spill recovery / clean-up is initiated at the far end of the spill and contained moving toward the centre of the spill. Fuel recovery methods generally include direct suction, mechanical removal, and the use of sorbent material. A water spray mist may be used to herd the fuel to an area for collection.

All materials mentioned in this section are available in the spill kits located at the Facility. Following clean up, any tools or equipment used will be properly washed and decontaminated, or replaced if this is not possible.

5.6.1 Direct Suction Equipment and Techniques

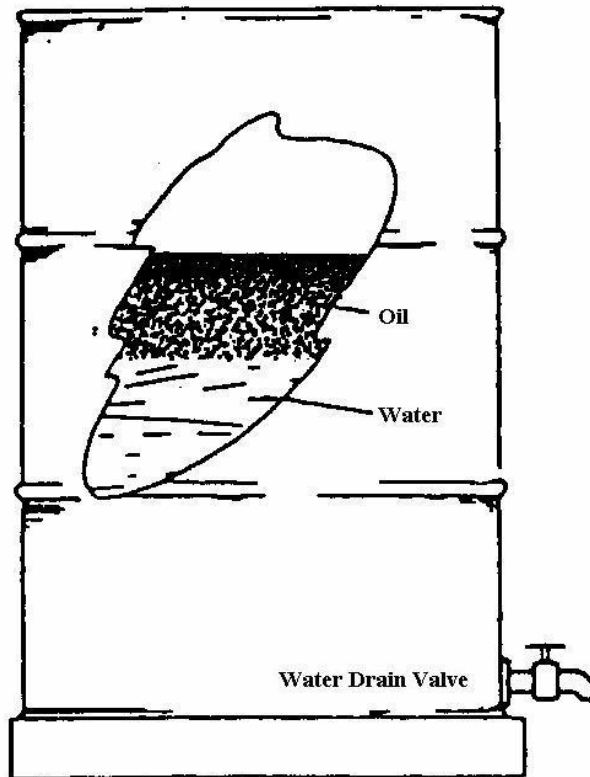
Direct suction methods include the use of vacuum trucks, portable pumps, or shop vacuums. Vacuum cleaners or portable pumps can be used to directly recover materials from damaged containers or from thick slicks on water.

Shop vacuums are suitable for small spills if a power source is available. Commercial skimmers are available for attachment to vacuum sources. These skimmers serve to skim floating product from the water surface while reducing the amount of water recovered. Suction screens may be required to prevent hose plugging by floating debris and to prevent pump damage.

Care should also be taken to prevent the uptake of water in order to minimize both the final volume of material that requires disposal and to prevent emulsification of oil and water. Once removed from the water body, however, water and oil can be separated using gravity separation. Valving on vacuum trucks can be used for water/oil separation, or a drum separator may be readily constructed using a 205-L (45-gallon) drum and plumbing hardware (Figure 5-2).

CAUTION: All containers used for the recovery of fuel must be grounded due to the potential for static-electricity build-up and fire.

Figure 5-2: Improvised Oil-Water Separator Drum



Prior to the release of any water to the environment, it will be analyzed by a Canadian Association of Laboratory Accreditation (CALA) accredited laboratory to verify that the water does not contain petroleum hydrocarbons (PHC). Only water free of detectable PHC will be released to the environment.

5.6.2 Manual and Mechanical Recovery

Manual recovery by use of hand tools (e.g. cans, buckets, shovels, rakes) is an effective means of recovering fuel from small spills or from areas that are inaccessible to larger equipment. This is often the only method available, and in some cases is preferred as it causes the least amount of damage to an area.

Mechanical recovery using heavy construction equipment can be used in some cases for recovery and loading of material for disposal. Caution must be used when operating such equipment around a spill site. In some instances, more damage can be caused from the operation of the equipment than from the spilled product. Escaping petroleum vapours may also be present and pose the danger of explosion and fire.

5.6.3 Sorbent Material

Sorbent materials are commonly used for final clean up and recovery of small amounts of oil or to remove oil in places that are inaccessible to other means of recovery. They are effective in recovering thin as well as thick layers of oil, however large volumes of sorbent are often required. Used sorbent materials are to be placed in drums for future disposal.

The types of sorbent materials available at the Facility and generally available for spill response are listed in Section 6 and Appendix F.

Snow and soil can be used as effective sorbent materials. Once mixed, the oil in snow or soil mixture can be shovelled or picked up using construction equipment and taken to a suitable treatment site.

5.7 STORAGE

Storage is required:

- if a suitable location for disposal cannot be found;
- if climatic conditions do not permit disposal at the time of clean up;
- if the selection of a disposal option requires further assessment; or,
- if transportation to a treatment/disposal facility is dependent on the availability of a suitable transport vehicle.

Storage options generally consist of pails, drums, tanks, berms, or pits. The specific type of storage needed is dependent on the volume of recovered material, the degree of contamination of the water and/or soil, the properties of the spilled product, and the duration of storage required.

5.7.1 Vehicle Storage

Vehicles suited for the storage of recovered fuel are tank trucks, vacuum trucks, dump trucks, flat bed trucks, sled-mounted tanks, and transport trailers. Tank trucks may be used to separate oil and water by emptying the water from the bottom of the tank. Tank trucks typically hold up to 20 cubic metres (m³), while vacuum trucks typically hold around 16 m³.

Flat bed trucks and transport trailers are suitable for carrying tanks and drums braced on pallets.

5.7.2 Open-Topped Tanks

Open-topped tanks such as plastic-lined swimming pools with capacities up to 20 m³ may be quickly assembled on firm, level ground. They may be fed by several hoses at once and can store both liquids and solids. These should be used only for short-term storage when storing fuel.

5.7.3 Drums

Tanks and drums, which are available in all communities, may be used for temporary storage of fuel.

5.8 DISPOSAL

Disposal or destruction of recovered fuel is needed to eliminate the risk of further contamination from the recovered fuel. **No decision, except under emergency conditions, should be made until approval has been obtained from the Director, Safety & Environment and appropriate government agencies.** The 24-HOUR SPILL REPORT LINE should be used to initiate such requests and a follow-up report should describe the disposal methods used. After Devolution in the NWT, on April 1, 2014, the lead agency responsible for inspections under issued water licenses is the GNWT ENR. Accordingly, NTPC will work closely with GNWT ENR inspectors.

5.8.1 Salvage and Recycle

Recovered diesel and lubricating oil may be reused directly as a low-grade heating fuel in waste oil furnaces.

5.8.2 Fuel Burning

Open burning of spilled oil products is not an acceptable disposal method. Open burning is prohibited except in the case of an extreme emergency. Only appropriate government regulators can authorize controlled or open burning of spilled products. This option will only be considered in extreme emergencies (i.e. when humans or environmental receptors are in grave danger of extensive contamination) and following consultations between the Director, Health, Safety & Environment and the GNWT ENR.

5.8.3 Glycol Spill Response

As noted above, only very limited quantities of glycol (ethylene glycol) are used and stored at the Facility (for use in the generators). Details on amounts, storage and potential spill scenarios are provided in tables 2-1, 2-2 and 5-1.

Studies have shown that ethylene glycol is readily biodegradable under both aerobic and anaerobic conditions in soils and water. Research has also demonstrated that ethylene glycol has a low toxicity to aquatic organisms. Accidental glycol spills on the ground (and in the snow) will be treated as described for PHC in the sections above. Considering the small quantities stored and the protective measures at the storage locations, it is considered unlikely that accidentally spilled glycol will enter ground or surface water through runoff processes.

5.9 SITE RESTORATION

For spills of reportable sizes, once a spill has been contained, the Director, Health, Safety and Environment will consult with the GNWT ENR Inspector assigned to the file to determine the level of clean up required. The Inspector may require a site specific study to ensure appropriate clean up levels are met. Methods that may be considered include natural biodegradation of oil and replacement of soil and re-vegetation (see below for further details).

Upon completion of spill clean up efforts, the Plant Operator will conduct an internal review of the spill cause, effects and SCP procedures and then fill out the Spill Update Form (Appendix C) and fax it as directed on form to the Director, Health, Safety and Environment and Manager, Plant Operations. The Spill Update Form also available on NTPC Intranet PowerLine.

5.9.1 Natural Assimilation (Biodegradation) and Revegetation

Oil can be degraded naturally by microorganisms under proper temperature and nutrient conditions. Tilling the affected soil to increase exposure of the soil organisms and oil to oxygen can also be beneficial. The utilization of natural assimilation to treat, in whole or in part, soils affected by spilled oils requires the approval of government agencies.

5.9.2 Replacement of Soil

In some cases, it is necessary to replace contaminated soil with clean soil. This can include grass or sod on the upper layer of soil. Before contaminated material is removed, regulatory agencies must be contacted regarding acceptable disposal sites. Spills that take place on tundra receive special attention due to the presence of sensitive soils and plants. Replacing contaminated tundra may be more detrimental to the area than allowing the contamination to naturally degrade.

Shovels, front-end loaders, backhoes, and dozers may be used to excavate contaminated soil.



6 RESOURCE INVENTORY

The facility maintains numerous resources to support spill response including on and off-site resources.

6.1 ON-SITE RESOURCES

Spill materials and/or spill kits are located throughout the Facility at all designated hazardous materials and waste storage areas. Further details on the types of spill material and spill kits that may be present at the Facility is presented in Appendix F.

There are several spill kits at the Facility, locations and sizes of the kits are as follows:

Drum size and quantity	Location	Notes
3x 95 Gallon Drum Kits	Falls Tailrace, Rapids Tailrace, Forks Tailrace	Kits focus on spills to water 
3x 55 Gallon Drum Kits	Strutt Lake Quarry, Snare Forks Quarry, Snare Rapids Quarry, Airstrip, Camp	Standard kits 
5x 30 Gallon Drum Kits	Falls headgate, Cascades Headgate, Forks Headgate, 5B, Rapids Boat Launch	Standard Kits 
5x 30L Nylon Bag Kits	Loader, Grader, Excavator, Dump Truck, Truck with Tidy Tank	Standard Kits 

- **Snare Rapids: next to front door of plant in parking lot**
- **Snare Falls: next to front door of plant in parking lot**
- **Snare Cascades: next to back door of plant up hill in parking lot**
- **Snare Forks: next to back door of plant in parking lot**

Spill kits in use are yellow plastic overpack oil-only spill kits with varying capacities. Contents of the kits may contain the following:

- 1 - 95 US gallon polyethylene overpack drum
- 4 oil only socks (5" x 10')
- 5 oil only socks (3" x 4')
- 50 oil only pads (17" x 19")
- 5 oil only pillows (12" x 13")
- 1 oil only roll (19" x 115')
- 1 drain cover (36" x 36" x 1/16")
- 1 - 1 lb. plugging compound (pre-mixed)
- 1 caution tape (3" x 1000')
- 2 pair nitrile gloves
- 2 pair safety goggles
- 2 protective coveralls
- 10 printed disposal bags (24" x 48")
- 1 instruction book

Additional spill response equipment is also in storage at the Facility:

- Universal sorbent pads for day to day use (each plant and garage)
- 2 Large plastic overpack drums (Snare Falls airstrip)
- Hand tools – shovels, picks, rakes (airstrip and Snare Rapids garages)
- Personal protective equipment – goggles, gloves, coveralls (each plant)
- 1 - 600 V sump pump (Snare Falls airstrip)
- 1 gas powered Honda water pump (Snare Falls airstrip)
- 300 m of 2" fire hoses (Snare Falls airstrip)
- Portable fuel storage – 2 plastic 500 gallon tanks (Snare Falls airstrip, Snare Rapids electrical shop)
- Portable fuel storage – 10 empty 205 L drums (Snare Falls airstrip)
- Tiger torch (airstrip garage)
- 2 Chain saws (Snare Rapids carpenter shop)
- 2 Brush saws (Snare Rapids carpenter shop)
- Emergency Shed Contents (Rapids Camp):
- 1 Parachute

- 2 long handle spade shovels
- 2 short handle spade shovels
- 2 hip waders (XL)
- 1 long handle axe
- 2 - 12" funnels
- 3 - 15m polar extension cords
- 1 - 6000 Watt generator
- 1 emergency generator operating instruction manual
- 2 propane tiger torches
- 1 - 10' x 12' poly tarp
- 1 - 12' x 14' poly tarp
- 1- 4' x 6' poly tarp
- 1 NWT #2 first aid kit
- 3 Rubbermaid storage bins
- 1 - 400 m roll of ¼" 3 strand poly rope

In addition, earth moving and other equipment located at the Facility is also listed below. Equipment that is available in Yellowknife is listed in Table 6-1.

- Pick-up Truck
- Front end loader
- Grader
- Gravel Truck (2)
- Dozer
- Excavator
- ¾ Ton Flat-deck Pickup (2)
- Lowboy (Semi and Trailer)
- Sorbent pads and booms
- Large plastic overpack drum
- Hand tools (shovels and rakes)
- Personal protective equipment
- Pumps and hoses
- Portable fuel storage (empty drums)
- Tiger torch
- Chain saw

7 LOCAL AGENCIES (IN CASE OF EMERGENCY)

Table 7-2: Local Agencies

Contact	Phone
Department of Fisheries and Oceans (DFO)	(867) 669-4900
Department of Lands Inspectors	(867) 767-9188
Clint Ambrose Manager, Resource Management (Inspector)	(e) clint_ambrose@gov.nt.ca (c) (867) 446-0769
Emergency Measures Organization (EMO)	(867) 873-7554
GNWT (ENR)	(867) 873-7181
Public Works - Fort Simpson Region	(867) 695-2325
Public Works - Fort Smith Region	(867) 872-5526
Public Works - Inuvik Region	(867) 777-1298
Public Works - Yellowknife Region	(867) 873-1517
Mackenzie Valley Land and Water Board	(867) 669-0506
Wek'eezhii Land and Water Board	(867) 669-9590
Environment Canada (Emergency) Yellowknife	(867) 669-4725
GNWT Environment Protection Office	(867) 873-7654
GNWT Environmental Health Office	(867) 669-8979
RCMP (Yellowknife)	(867) 873-1111
Coast Guard – Auxiliary Central & Arctic Region	1-800-267-7270
Medevac (Yellowknife)	(867) 669-4115
Great Slave Helicopters (Yellowknife)	(867) 873-2081
Summit Air (Yellowknife)	(867) 873-4464
Air Tindi	(867) 669-8292

8 TRAINING PROGRAM

NTPC conducts site orientations that include SCP and spill response equipment awareness. Both employees and contractors must complete the NTPC Site Orientation upon entering the Facility for the first time and prior to conducting work. The NTPC Plant Operator provides the site orientation, which provides an overview of this SCP, the locations of spill response equipment, and the procedures to report and respond to a spill incident. Records of site orientations are maintained.

For key NTPC employees responsible to coordinate a response to spill events, NTPC provides an SCP awareness course. In addition to the information provided during the site orientation, spill responders are given a detailed review of this SCP; introduced to step-by-step methods to identify, assess, and respond to spill situations; participate in a review of hazardous materials located on-site and the associated risks; learn how to use absorbent and other spill response equipment; and learn how to properly dispose of contaminated spill response equipment. A mock spill exercise

may be performed to familiarize on-site spill responders with the equipment available and the steps to take during typical spills situations that may occur at the Facility.

All contractors are required to have basic first aid and WHMIS training before being allowed to work at the Facility. All Facility employees and supervisors are also required to have WHMIS and first aid training. Persons involved in the handling and shipping of hazardous materials are required to be trained in the Transportation of Dangerous Goods Regulation (TDG) requirements and must have a valid TDG certificate.

An up-to-date training matrix is kept by the NTPC Training Coordinator and contains records of all environmental, health and safety training completed by employees.

8.1 SPILL CONTINGENCY PLAN TRAINING PROGRAM

The NTPC SCP Training Program is mandatory for all employees. It includes a 55-slide PowerPoint presentation and reviews the following details pertaining to the NTPC spill response processes and this SCP:

- scope;
- person in charge;
- community information;
- facility site specifics;
- layout;
- sensitive environmental receptors;
- spill control;
- on site product storage;
- power transformers;
- bulk petroleum product storage;
- product information;
- spill kits and spill response equipment; and
- heavy equipment.
- health and safety;
- spill response procedures;
- spill reporting;
- general cleanup methods; and
- spill volume calculation procedures.

Employees are not permitted on NTPC facilities without first undergoing the SCP Training Program. Records of employee training are available to all managers.

9 PUBLIC RELATIONS

9.1 GENERAL POLICY ON PUBLIC RELATIONS

If questioned by the public or the media about a spill, refer them to Director, Hydro Operations.

Environmental incidents such as spills often attract local interest and media attention. Employees should not make any statements on behalf of the Corporation to the media or to the public. It is the responsibility of the Regional Director and/or the NTPC Manager, Communications to address the media and thereby the public.

Respond fully to any request from local authorities or emergency workers that will help to control the spill and its damage; however refer all other requests for information to the Director, Hydro Operations. This may include questions from reporters, environmental agencies, or people and property owners affected by a spill. When probing questions are asked, it is important that the response is polite and professional; for example:

“I’m sorry; I don’t have the authority to answer that question. Please contact my Regional Director. His/her phone number is _____.”

Employees should avoid guessing at an answer or making promises that are out of their control, as this can cause problems later for both the employee and the Corporation. No speculation should be made with regard to who is at fault, why the spill occurred, spill volume, when cleanup will be completed, or any other issue. It is the responsibility of the company representative at the site to keep the Director, Hydro Operations informed so that media questions directed to the Corporation can be answered.

APPENDIX A
NWT SPILL REPORT 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:	<input type="checkbox"/> Original Spill Report		Report Number:
	Occurrence Date: MM DD YY	Occurrence Time:	OR <input type="checkbox"/> Update # _____ to the Original Spill Report		
C	Land Use Permit Number (if applicable):		Water Licence Number (if applicable):		
D	Geographic Place Name or Distance and Direction from the Named Location:			Region: <input type="checkbox"/> NT <input type="checkbox"/> Nunavut <input type="checkbox"/> Adjacent Jurisdiction or Ocean	
E	Latitude: _____ Degrees _____ Minutes _____ Seconds		Longitude: _____ Degrees _____ Minutes _____ Seconds		
F	Responsible Party or Vessel Name:		Responsible Party Address or Office Location:		
G	Any Contractor Involved:		Contractor Address or Office Location:		
H	Product Spilled: <input type="checkbox"/> 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: <input type="checkbox"/> EC <input type="checkbox"/> CCG/TCMSS <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> AANDC <input type="checkbox"/> NEB <input type="checkbox"/> Other: _____			Significance: <input type="checkbox"/> Minor <input type="checkbox"/> Major <input type="checkbox"/> Unknown		File Status: <input type="checkbox"/> Open <input type="checkbox"/> Closed
Agency:	Contact Name:	Contact Time:	Remarks:		
Lead Agency:					
First Support Agency:					
Second Support Agency:					
Third Support Agency:					

APPENDIX B
FUEL SPILL CALCULATION PROCEDURES

	OPERATIONS & MAINTENANCE	Standard #	301.21
	Diesel Fuel, General, Section 30I	Date Issued	11/13/07
SUBJECT: FUEL SPILL CALCULATIONS		Page	1 of 2
		Prepared by:	Joe Staszuk
		Approved by	

FUEL SPILL RESPONSE PROCEDURE

In the even of a fuel spill the following steps must be taken:

1. Assess hazards
2. Shut off source of spill
3. Contain spill
4. Calculate amount of fuel spilled
5. Report Spill
6. Spill cleanup and disposal
7. Debriefing


FUEL SPILL CALCULATIONS

Once the source of the spill is shut off and the initial spill containment is underway it is essential to determine the exact amount of fuel spilled. To do so, the following information must be gathered:

1. Gauge the tank with the fuel spill and record the reading
2. Record the fuel temperature
3. Record the generator kWh readings for each engine in the plant
4. Obtain a copy of the last *Month End Thermal Generation Report* (Month End Report)

FUEL DIFFERENCE CALCULATION

1. Record last month's fuel storage volume (Month End Report pages 4-6, line 7)
 - e.g., 33,737 L
2. Add any fuel received between last month end and the fuel spill
 - e.g., no fuel was received (0 L)
3. Conduct a tank dip and record the depth of fuel
 - e.g., 98 cm
4. From the tank dip chart for that specific tank determine the volume of fuel in the tank
 - e.g., 22,708 L
5. Using the recorded fuel temperature obtain the multiplier from the Temperature Compensation Chart
 - e.g., $-28^{\circ}\text{C} = 1.0383$
6. Obtain the amount of temperature compensated fuel in storage
 - e.g., $(22,708 \text{ L} \times 1.0383) = 23,578 \text{ L}$
7. Subtract temperature compensated fuel volume from last month end volume to calculate **Fuel Used Since Last Month End**
 - e.g., $(33,737 \text{ L} - 23,578 \text{ L}) = 10,159 \text{ L}$
 - This means that the fuel used and spilled since last month end totals 10,159 L

	OPERATIONS & MAINTENANCE	Standard #	301.21
	Diesel Fuel, General, Section 30I	Date Issued	11/13/07
SUBJECT: FUEL SPILL CALCULATIONS		Page	2 of 2
		Prepared by:	Joe Staszuk
		Approved by	

FUEL USED IN GENERATION (Table 1 below corresponds with the following steps)

1. Take the present kWh meter readings for each generator from the kWh meter in the generator switchgear
 - e.g., G1 (17,748,000 kWh), G2 (10,110 kWh), G3 (10,820 kWh)
2. Record the previous meter readings from each generator from Month End Report
 - e.g., G1 (17,735,465 kWh), G2 (10,087 kWh), G3 (10,809 kWh)
3. Subtract the difference between present and last month end readings for each generator
 - e.g., G1 (12,535 kWh), G2 (23 kWh), G3 (11 kWh)
4. Obtain meter multipliers from the meters or the Month End Report
 - e.g., G1(x 1), G2(x 600), and G3 (x 600).
5. Obtain actual kWh generated by each unit in the plant using the multiplier
 - e.g., G1 (12,535), G2 (13,800), G3 (6,600)
6. Add the actual generation for all units to get the total generation from end of last month to present
 - e.g., 32,935 kWh
7. Obtain the fuel efficiency from the Month End Report
 - e.g., 3.47 kWh/L
8. Calculate fuel used to generate 32,935 kWh by applying fuel efficiency to total generation
 - e.g., (32,935 kWh / 3.47 kWh/L) = 9,491 L
9. Calculate the **Actual Spill Volume** (fuel used since last month end minus fuel used to generate during this period)
 - e.g., (10,159 L – 9,491 L) = 668 L

Table 1: Calculation Example – Fuel Used in Generation

Unit	G1	G2	G3
1. Present meter reading (kWh)	17,748,000	10,110	10,820
2. Previous meter reading (kWh)	17,735,465	10,087	10,809
3. Difference (kWh)	12,535	23	11
4. Multiplier	1	600	600
5. Actual kWh per generator	12,535	13,800	6,600
6. Total kWh generated	G1 +G2 + G3		32,935
7. Fuel efficiency (kWh/L)			3.47
8. Fuel used in generation (L)	32,935 kWh / 3.47 kWh/L		9,491 L
9. Total fuel spilled (L)	10,159 L – 9491 L		668 L

APPENDIX C
SPILL UPDATE FORM

Spill Update

Report Update to Supervisor & Environment Dept.			Environment Dept.		
Refer to <i>Policy EV-05, Hazardous Materials Spill Reporting</i> for more information			Phone: (867) 874-5327 Fax: 1-888-371-9433		
1 Report Date		2 NWT Spill Number and/or Date and Time of Incident			
3 Stage of Cleanup	Cleanup Not Required <input type="checkbox"/>	Cleanup Continuing <input type="checkbox"/>	Cleanup Completed <input type="checkbox"/>		
	Expected Completion Date:	Date Completed:			
4 Initial Action Plan: Describe each step.					
		Y	N	Brief Description	
Step 1: Identify product and hazards		<input type="checkbox"/>	<input type="checkbox"/>		
Step 2: Shut off source of spill		<input type="checkbox"/>	<input type="checkbox"/>		
Step 3: a) Spill containment		<input type="checkbox"/>	<input type="checkbox"/>		
b) Report spill		<input type="checkbox"/>	<input type="checkbox"/>	Supervisor <input type="checkbox"/>	Env. Dept. <input type="checkbox"/>
				NWT 24-hr Spill Report Line <input type="checkbox"/>	
Step 4: Spill cleanup and disposal		<input type="checkbox"/>	<input type="checkbox"/>		
Step 5: Debriefing		<input type="checkbox"/>	<input type="checkbox"/>		
Cleanup Personnel:					
Reported by:		Position:		Location:	
				Telephone No:	
Spill Update reported to (please check boxes):		Environmental Department <input type="checkbox"/>		Supervisor (enter details below) <input type="checkbox"/>	
Reported to:		Position:		Location:	
				Telephone No:	

* Place additional comments and notes on page 2.

** Ensure to note any potential impacts to sensitive human or ecological receptors, and any impacts to offsite areas.

Spill Update

Additional Comments

APPENDIX D
ENVIRONMENTAL PROTECTION POLICY

Policy Name: Environmental Protection

Policy Number: EV-01

Policy Monitor: Director Health, Safety & Environment

Policy Approver: President & CEO

Approval Date: October 02, 2020

Purpose

The purpose of this policy is to outline the approach to environmental management at the Northwest Territories Power Corporation (NTPC) and to demonstrate NTPC's commitment to environmental protection.

Policy Statement

NTPC is committed to protecting the environment for existing and future generations by meeting, if not exceeding, environmental regulations. Our environmental principles are based on the fundamental values of responsibility, accountability, and open communication. We will strive for continuous improvement in environmental performance and will manage our operations in an environmentally responsible manner.

Guidelines

NTPC will:

- Comply with all applicable environmental legislation, licences, permits, authorizations, and guidelines;
- Maintain an Environmental Management System;
- Incorporate environmental planning in the design phase of projects;
- Reduce waste and use resources as efficiently as possible;
- Take reasonable measures to prevent and reduce pollution to air, water, and soil;
- Manage hazardous waste in a manner that minimizes risk to the environment;
- Report all hazardous materials spills released to water, regardless of size;

Policy Name: Environmental Protection

Policy Number: EV-01

Policy Monitor: Director Health, Safety & Environment

Policy Approver: President & CEO

Approval Date: October 02, 2020

- Report all hazardous materials spills greater than 5 L to ground or floor;
- Clean up all hazardous materials spills to meet applicable environmental criteria;
- Promote the efficient use of energy to customers;
- Provide employees with the appropriate training and education to help them fulfill their environmental responsibilities;
- Communicate regularly with indigenous groups, government, regulators, industry, community groups, and the public regarding NTPC activities; and
- Respect the heritages of the people and communities that we serve.

Roles and Responsibilities

- Everyone has a responsibility to protect the environment.
- NTPC is responsible for the implementation of the Environmental Protection Policy and for providing an environmentally responsible workplace.
- Management is responsible for the implementation of the Environmental Management System and for the environmental performance of NTPC employees.
- Employees are responsible to comply with all environmental rules and regulations and to continually practice environmental protection while performing their duties.
- The Environment Department is responsible to maintain the Environmental Protection Policy and the Environmental Management System with input from

Policy Name: Environmental Protection

Policy Number: EV-01

Policy Monitor: Director Health, Safety & Environment

Policy Approver: President & CEO

Approval Date: October 02, 2020

employees and other stakeholders.

Policy History

Date	Revision #	Description of Change
June 18, 1993	0	New policy
Sept 11, 1997	1	Wording revision
April 10, 2001	2	Wording revision
November 26, 2006	3	Wording revision
March 17, 2010	4	Whole document revision
November 15, 2012	5	Template changed
February 15, 2018	6	Policy revision
October 02, 2020	7	Annual review

President & CEO Signature:  Date: October 02, 2020

APPENDIX E

SPILL CONTAINMENT METHODS

- **Containment of Spills on Land**
- **Containment of Spills on Water**
- **Containment of Spills on and Under Ice**
- **Containment of Spills on Snow**

Specific Spill Containment Methods For Land, Water, Ice And Snow

The following section describes various methods which may be employed to contain a spill to land, water, ice or snow.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, thus spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. Generally spills on land occur during the late spring, summer or fall when snow cover is at a minimum. It is important that all measures be undertaken to avoid spills reaching open water bodies.

Dykes

Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled fuel. A dyke needs to be built up to a size that will ensure the containment of the maximum quantity of fuel that may reach it. A plastic tarp can be placed on and at the base of the dyke such that fuel can pool up and the subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly a dyke may not be necessary and sorbents can be used to soak up fuels before they migrate away from the source of the spill.

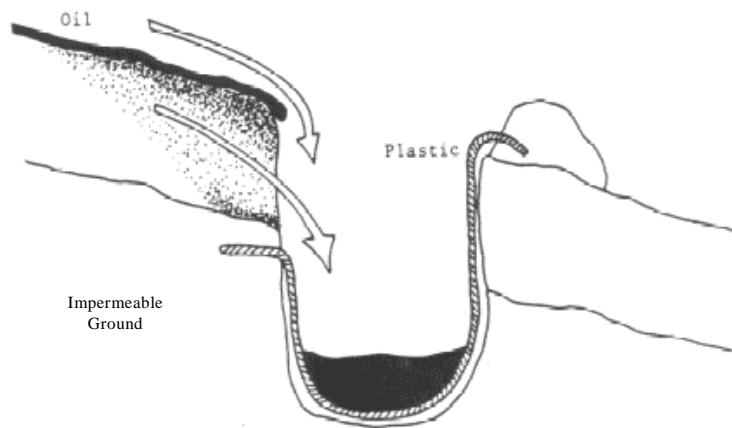
Trenches

Trenches can be dug out to contain spills as long as the top layer of soil is thawed. Backhoes, loaders, shovels, or pick axes can be used depending on the size of the trench required. It is recommended that the trench be dug to the bedrock or permafrost, which will then provide containment layer for the spilled fuel. Fuel can then be recovered using a pump or sorbent materials. Care must be given when working in or near trenches as fumes can build up, causing fire and respiratory hazards. Ensure proper PPE is worn and ignition sources are removed from the area.

If water is present in the excavated trenches, it should be assumed that groundwater contamination may result and eventually be discharged into surface waters. A waterproof liner should be placed on the bottom and sides of the trench.

Shallow trenches placed downslope of the spill will be effective in trapping fuel travelling both on the surface and below the surface (Figure E-1). Sorbent pads, socks, and booms should be placed in the trench to collect spilled product.

Figure E-1: Trench



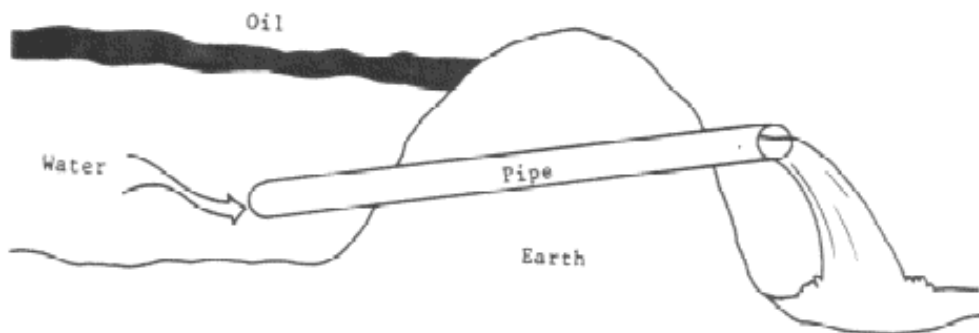
Dams

Dams constructed across ditches can be used to contain a spill and stop its flow. A dam may be built with earth, wood, sandbags, and/or snow. The dam should be lined with plastic sheeting to make it impermeable to the spilled product. In freezing conditions water may be sprayed on a dam to form ice, thereby making the dam impermeable.

Care should be taken to ensure that a dam is large enough to contain the entire spill; insufficient capacity may result in overtopping failure.

For ditches with flowing water or for small streams, it may be necessary to allow water flow to continue while retaining the lighter-than-water liquids (i.e.: hydrocarbons). This can be achieved by building water bypass dams: an earth dam is built stopping the flow of water and oil in the ditch; a pipe is then installed below the water level and passing through the dam. This allows the water to continue flowing while the dam retains the lighter-than-water products (Figure E-2).

Figure E-2: Water Bypass Dam



Containment of Spills to Water

Spills on water such as rivers, streams or lakes are the most serious types of spills as they can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water.

Booms

Booms are commonly used to contain a spill of floating liquid or debris, to deflect or divert material to a defined area so that it may be recovered, and to protect sensitive areas from contamination (Figure E-3). Booms are designed to float and have absorbent materials built into them to absorb fuels at the edge of the boom.

Boom deployment is important, as the angle of the boom in relation to the speed of the water affects how well the oil may be contained. The faster the stream, the more angled the boom must be (Figure E-4).

Several booms arranged in parallel may be necessary to contain all of the product. These should be spaced to allow product, which may escape the first boom, to float to the surface and be contained by the next boom. In addition, the use of several booms permits one boom to be removed at a time for cleaning.

Booms may be either commercially made or homemade. Commercially made booms are designed to float and keep product from escaping under the boom. Homemade booms may be constructed from logs, railroad ties, power poles, trees, lumber, inflated fire hose, or Styrofoam. These may be used to deflect floating material to shore or to keep floating material within a contained area. Individual sections are connected together by rope, chain, or wire. A seal around the joints to prevent leakage can be made by wrapping with plastic sheets or burlap.

Wooden or other floating booms can be used to contain the spilled fluid itself or the sorbent containing the product. They can also be used upstream of sorbent booms to improve the efficiency and longevity of the sorbent material.

Fuel contained within the boom will need to be recovered using sorbent materials or pumps and placed into barrels or bags for disposal.

Figure E-3: Boom Usage

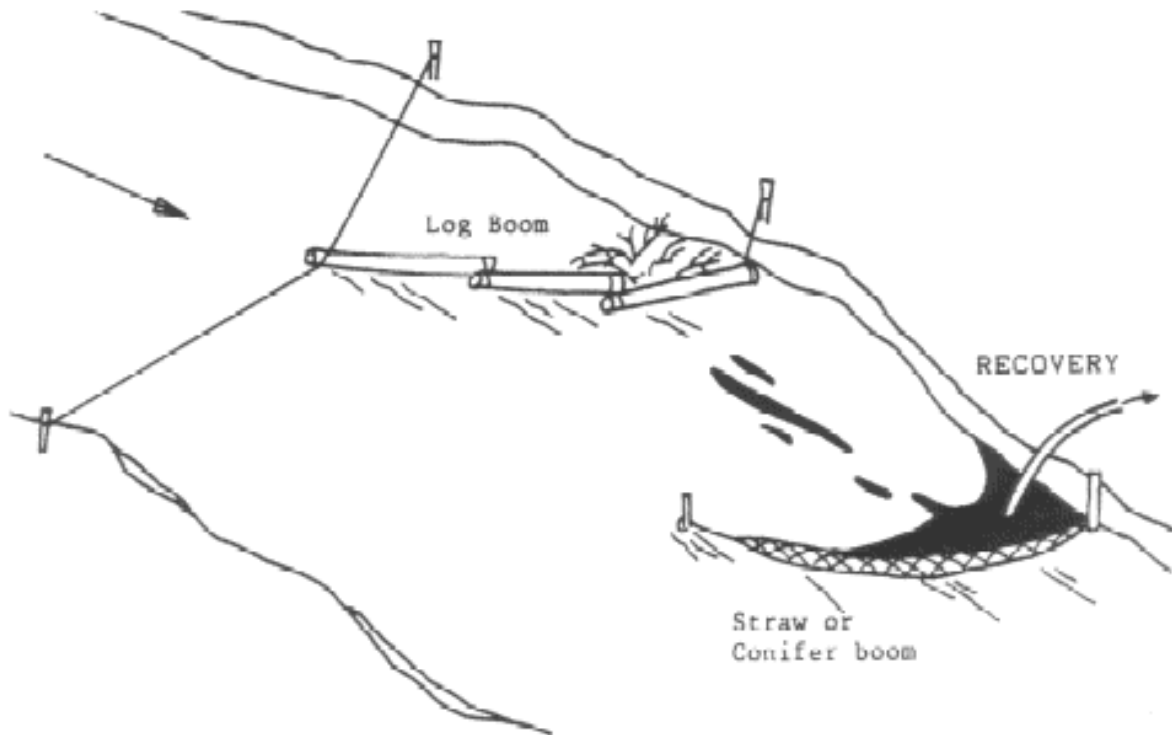
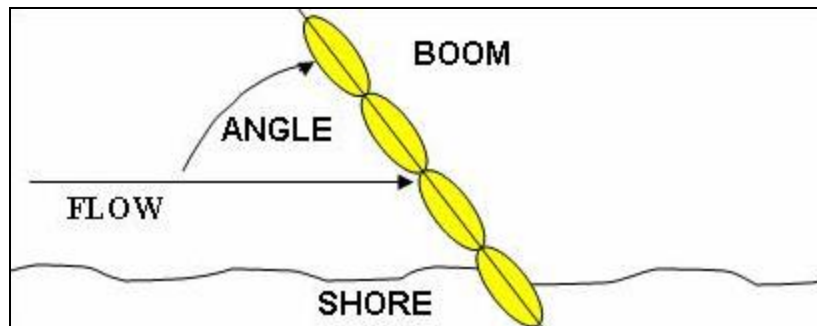


Figure E-4: Boom Deployment

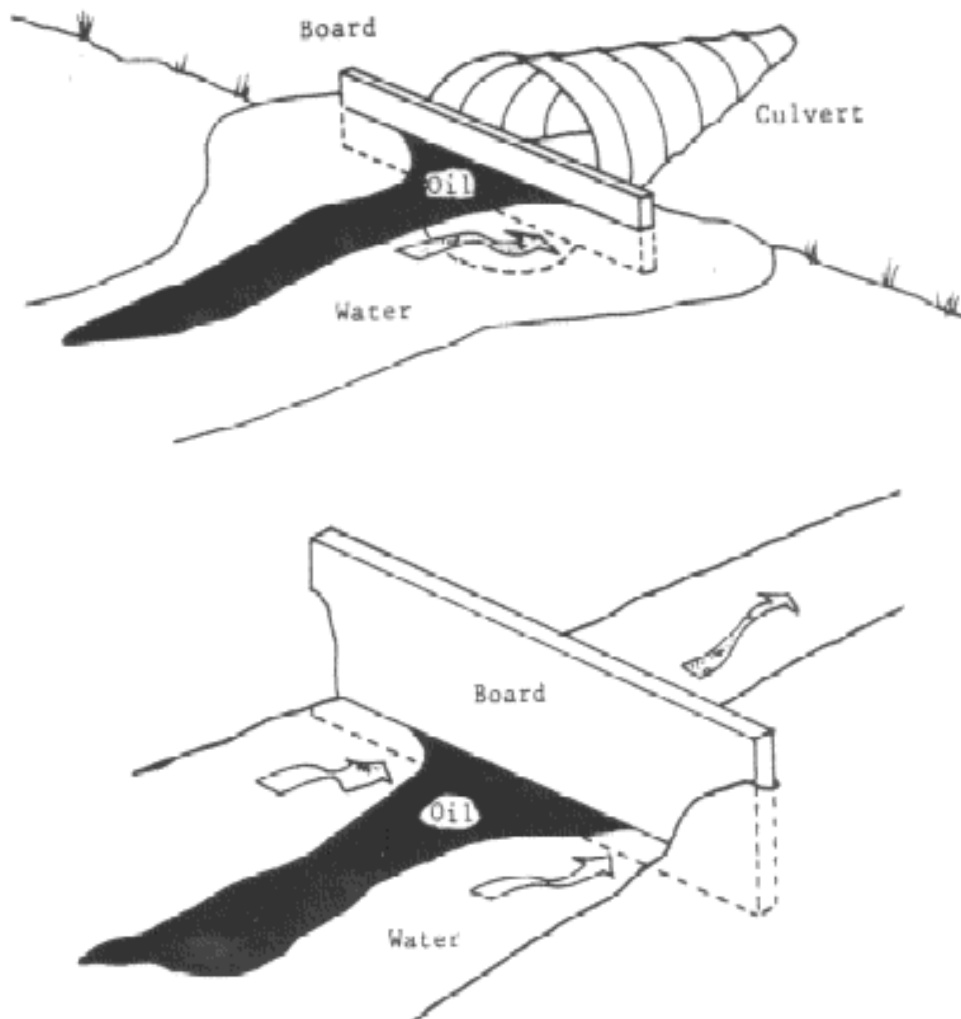


Weirs

Weirs can be used to contain spills in streams, ditches, at culvert entrances and to prevent further migration downstream.

Materials commonly used such as plywood, lumber, and sheet metal may be placed into and across the width of the stream/ditch/culvert such that water can still flow under the weir. Spilled fuel will float on the water surface and be contained at the foot of the weir (Figure E-5). It can then be removed using sorbents, booms or pumps and placed into barrels or plastic bags.

Figure E-5: Weirs



Barriers

In some situations, barriers made of netting or fence material can be installed across a stream, and sorbent materials placed at the base to absorb the spilled product. Sorbents will need to be replaced as soon as they are saturated. Water will be allowed to flow through. This is very similar to the weir option discussed above.

Note that in some cases, it may be appropriate to burn fuel or to let volatile fuels such as gasoline evaporate after containment on the water surface. This should only be undertaken in consultation with and after approval from the INAC or lead agency inspector.

Containment of Spills On and Under Ice

Spills on ice are generally the easiest spills to contain due to the predominantly impermeable nature of the ice. For small spills, sorbent materials are used to soak up spilled fuel. Remaining contaminated ice/slush can be scraped and shovelled into a plastic bag or barrel. However, all possible attempts should be made to prevent spills from entering ice covered waters as no easy method exists for containment and recovery of spills if they seep under ice.

Dykes

Dykes can be used to contain fuel spills on ice. By collecting surrounding snow, compacting it and mounding it to form a dyke down slope of the spill, a barrier is created thus helping to contain the spill. If the quantity of spill is fairly large, a plastic tarp can be placed over the dyke such that the spill pools at the base of the dyke. The collected fuel can then be pumped into barrels or collected with sorbent materials.

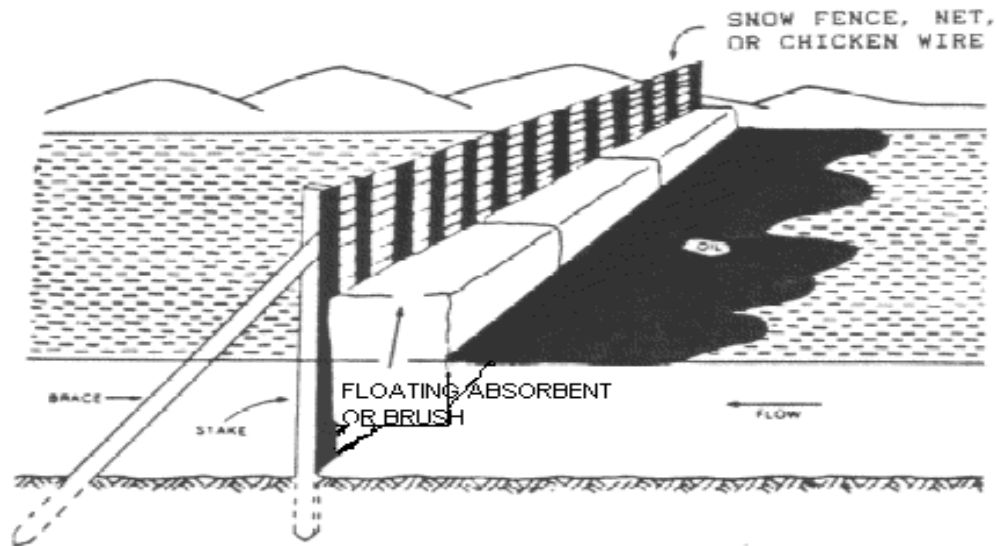
Trenches

For significant spills on ice, trenches can be cut into the ice surrounding and/or down slope of the spill such that fuel is allowed to pool in the trench. It can then be removed via pump into barrels, collected with sorbent materials, or mixed with snow and shovelled into barrels or bags.

Snow Fence and Sorbent Barrier

Snow fence and sorbent barriers may be used in streams (less than 1 m deep) with soft beds into which stakes can be driven. This method is limited to summer conditions. A snow fence barrier is installed to span the width of the stream, anchored at both ends, and stakes are driven into the stream bottom at 1 to 2 m intervals along the fence. Commercial sorbents are placed on the upstream side of the fence and are held against it by the current. Sorbents will float against the upstream side of the barrier, but must be replaced before they become soaked with product and sink. The barrier should be angled against the current for shore side collection. Multiple snow fence barriers can provide backup against potential losses from upstream barriers. Net or chicken wire barriers can be constructed in the same way, and are more practical for stronger currents, as water can flow through them more easily (Figure E-6).

Figure E-6: Barrier and Sorbent



Burning

Burning should only be considered if other approaches are not feasible, and is only to be undertaken with the permission of the GNWT ENR Inspector.

Ice Slotting

For spills under the ice in rivers or streams when current speeds are slow (i.e., less than 0.5 m/s), ice slotting may be used. A trench is cut into the ice using a chain saw or trenching machine at an angle to the current, to deflect and concentrate product that passes through the area (Figure E-7, E-8). Because of thick ice encountered during the winter, cutting and removal of ice blocks is often difficult. Loaders or backhoes may be needed to lift blocks out of the slot, or to push blocks down. Product that accumulates in the ice slot may be pumped out, adsorbed, or burned in place.

Figure E-7: Ice Slot

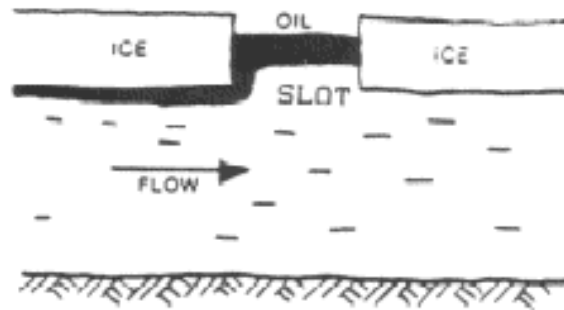
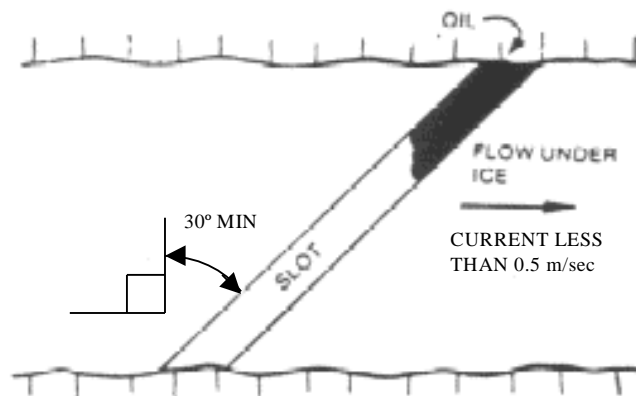


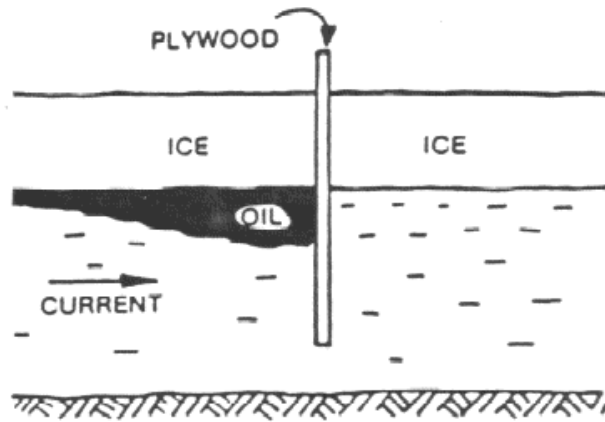
Figure E-8: Angled Ice Slot



Vertical Barriers

If the spill goes under the ice in deep, slow moving water, vertical barriers such as plywood may be used to deflect product (Figure E-9). The ice must be strong enough to support the necessary personnel and equipment. Vertical barriers are put in place by cutting trenches in the ice at an angle to current flow, inserting the plywood barriers, and allowing them to freeze in place. The location of the spilled product may be monitored by drilling observation holes with an ice-auger.

Figure E-9: Vertical Barriers



Containment of Spills on Snow

Snow is a natural sorbent, thus as with spills on soil, spilled fuel can be more easily recovered. Generally, small spills on snow can be easily cleaned up by raking and shovelling the contaminated snow into plastic bags or empty barrels, and storing these at an approved location.

Dykes

Dykes can be used to contain fuel spills on snow. By compacting snow down slope from the spill, and mounding it to form a dyke, a barrier or berm is created thus helping to contain the spill. If the quantity of the spill is fairly large, a plastic tarp can be placed over the dyke such that the spill pools at the base of the dyke. The collected fuel/snow mixture can then be shovelled into barrels or bags, or collected with sorbent materials.

APPENDIX F

SPILL KITS

9.2 SPILL KITS AND EQUIPMENT

NTPC employs two types of sorbent for spill response.

- **Universal Sorbents:** These sorbents pick up most liquids including fuel, oil, glycol, and water. They are used for general spill cleanup on dry land and will sink if placed on water, as they adsorb the water (hydrophilic). For this reason universal sorbents are not to be used on hydrocarbon spills into water.
- **Oil Only Sorbents:** These sorbents only pick up hydrocarbons, such as fuel or lube oil. These sorbents float, as they do not pick up water (hydrophobic), and are to be used for any hydrocarbon spill into water.

Higher quality sorbents will wick up, contain, and retain spilled product much faster and more effectively than low quality sorbent, due to a finer weave of material. Low quality sorbent pads are used around the Facility to clean up drips while higher quality sorbents, found in the spill kits, are used for larger spills.

All plants are equipped with universal sorbent pads for day to day use and the cleanup of spills. For any large or significant spills, spill kits are available for containment and cleanup. Spill kits can be stored both indoors and outdoors and are generally contained in one of the following (see Figure F-1):

- **Overpack Drum:** A yellow plastic drum designed to contain a leaking drum or used/unused spill material.
- **Steel Salvage Drum:** A 205 L steel drum with removable top used to contain used/unused spill material, impacted soil or snow, etc.
- **Spill Kit Locker:** A plastic bin used for spill kit material storage.

Figure F-1: Typical Spill Kits



Spill kits generally contain the following spill response materials:

Sorbent Booms: When a spill occurs into water, floating booms are placed around the spill perimeter to provide containment. Typically a 5 or 8 inch diameter plastic net tube filled with sorbent material, booms prevent the spill from spreading and/or moving downstream to contaminate other areas (see Figure F-2).

Figure F-2: Sorbent Booms



Booms can be clipped together for extra length. The ends should be clipped together so that they overlap, leaving no space at the joint. This ensures that no spilled product leaks out past the boom, and the boom effectively contains and adsorbs the spilled product (see Figure F-3).

- **Sorbent Socks:** Socks are identical to booms in construction; however, they do not clip together. They are generally used for small scale, localized spills.
- **Sorbent Pads:** Individual pads used on drips or leaks.

- **Sorbent Rolls:** A continuous roll of sorbent pads.
- **Printed Disposal Bags:** Soiled absorbent material is put into printed disposal bags which are then tied off for disposal.
- **Instruction Book:** The spill kit instruction book provides information regarding spill kit equipment.
- **Personal Protective Equipment:** Used to augment Facility equipment and supplies. Includes rubber gloves, safety goggles, and protective coveralls.

Figure F-3: Boom Deployment



APPENDIX G
ACRONYMS

ACRONYMS

AST	Aboveground Storage Tank
CE	Chief Engineer
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CIO	Chief Information Officer
CPR	Cardiopulmonary Resuscitation
DFO	Department of Fisheries and Oceans
DNAPL	Dense Non-Aqueous Phase Liquid
EC	Environment Canada
EMO	Emergency Measures Organization
ENR	GNWT Dept. of Environment and Natural Resources
ERT	Emergency Response Team
FSD	GNWT Fuel Services Division
GNWT	Government of the Northwest Territories
HDPE	High Density Polyethylene
INAC	Indian and Northern Affairs Canada
IT	Information Technology
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheets
NAPL	Non-aqueous Phase Liquid
NTCL	Northern Transportation Company Ltd.
NTPC	Northwest Territories Power Corporation
NWT	Northwest Territories
PCB	Polychlorinated Biphenyls
PHC	Petroleum Hydrocarbons
PPE	Personal Protective Equipment
RCMP	Royal Canadian Mounted Police
SCP	Spill Contingency Plan
UST	Underground Storage Tank
WHMIS	Workplace Hazardous Materials Information System

APPENDIX H
MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEET

DIESEL FUEL

000003000395

Version 5.4

Revision Date 2020/10/06

Print Date 2020/10/06



SECTION 1. IDENTIFICATION

Product name : DIESEL FUEL

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

Product code : 103193, 103178, 103136, 103135, 103134, 103133, 103132, 103131, 101799, 102907, 102762, 102763, 102755, 102302, 102744, 101801, 100678, 100677, 101802, 100107, 100668, 100658, 100911, 100663, 100652, 100460, 100065, 101796, 101793, 101795, 101792, 101794, 101791, 100768, 100643, 100642, 100103, 101798, 101800, 101797, 101788, 101789, 101787, 102531, 100734, 100733, 100640, 100997, 100995, 100732, 100731, 100994

Manufacturer or supplier's details
Petro-Canada
P.O. Box 2844, 150 - 6th Avenue South-West
Calgary Alberta T2P 3E3
Canada

Emergency telephone number : CHEMTREC: 1-800-424-9300 (toll free) or +1 703-527-3887;
Suncor Energy: +1 403-296-3000

Recommended use of the chemical and restrictions on use

Recommended use : Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining diesels, marine diesels, MDO and naval distillates may have a higher flash point requirement.

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

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

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

GHS Classification

Flammable liquids : Category 3

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

GHS label elements

Hazard pictograms :



Signal word : Danger

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

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

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If skin irritation occurs: Get medical advice/ attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage:

Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal:

Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact

Aggravated Medical Condition : None known.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
Kerosine (petroleum), hydrodesulfurized; Kerosine — unspecified	64742-81-0	70 - 100 %
Kerosine (petroleum); Straight run kerosine	8008-20-6	
Fuels, diesel; Gasoil — unspecified	68334-30-5	
Alkanes, C10-20-branched and linear	928771-01-1	0 - 30 %
Fatty acids, C16-18 and C18-unsatd., Me esters	67762-38-3	0 - 20 %

All above concentrations are in percent by weight.

SECTION 4. FIRST AID MEASURES

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

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

In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids,

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If swallowed	: for at least 15 minutes. Obtain medical attention. : Rinse mouth with water. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.
Most important symptoms and effects, both acute and delayed	: Harmful if inhaled. Respiratory, skin and eye irritation; nausea; cancer.
Notes to physician	: Treat symptomatically. For specialist advice physicians should contact the Poisons Information Service.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	: Dry chemical Carbon dioxide (CO ₂) Water fog. Foam
Unsuitable extinguishing media	: Do NOT use water jet.
Specific hazards during fire-fighting	: Cool closed containers exposed to fire with water spray.
Hazardous combustion products	: Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion.
Further information	: Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	: Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	: For personal protection see section 8. Ensure adequate ventilation. Evacuate personnel to safe areas. Material can create slippery conditions.
Environmental precautions	: If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	: Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Non-sparking tools should be used. Ensure adequate ventilation. Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

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

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

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Kerosine (petroleum), hydrodesulfurized; Kerosine — unspecified	64742-81-0	TWA	200 mg/m ³ (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m ³ (total hydrocarbon vapor)	CA AB OEL
		TWA	525 mg/m ³	CA ON OEL
		TWA	200 mg/m ³ (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m ³ (total hydrocarbon vapor)	ACGIH
Kerosine (petroleum); Straight run kerosine	8008-20-6	TWA	200 mg/m ³ (total hydrocarbon vapor)	CA BC OEL
		TWA	200 mg/m ³ (total hydrocarbon vapor)	CA AB OEL
		TWA	200 mg/m ³ (total hydrocarbon vapor)	ACGIH
Fuels, diesel; Gasoil — unspecified	68334-30-5	TWA	100 mg/m ³ (total hydrocarbons)	CA AB OEL
		TWA (Vapour and	100 mg/m ³ (total hydrocar-	CA BC OEL

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		inhalable aerosols)	bons)	
		TWA (Inhalable fraction and vapor)	100 mg/m3 (total hydrocarbons)	ACGIH

Engineering measures : Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.
Use only in well-ventilated areas.
Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

Respiratory protection : Concentration in air determines protection needed.
Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Filter type : organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection Material : neoprene, nitrile, polyvinyl alcohol (PVA), Viton(R). Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Remarks : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

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

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

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

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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Bright oily liquid.
Colour	: Clear to yellow (This product may be dyed red for taxation purposes)
Odour	: Mild petroleum oil like.
Odour Threshold	: No data available
pH	: No data available
Melting point	: No data available
Boiling point/boiling range	: 150 - 371 °C (302 - 700 °F)
Decomposition temperature	No data available
Flash point	: > 40 °C (104 °F) Method: closed cup
Auto-Ignition Temperature	: 225 °C (437 °F)
Evaporation rate	: No data available
Flammability	: Flammable in presence of open flames, sparks and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.
Upper explosion limit	: 6 %(V)
Lower explosion limit	: 0.7 %(V)
Vapour pressure	: 7.5 mmHg (20 °C / 68 °F)
Relative vapour density	: 4.5
Relative density	: 0.8 - 0.88
Solubility(ies)	
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: No data available
Viscosity	
Viscosity, kinematic	: 1.3 - 4.1 cSt (40 °C / 104 °F)

SECTION 10. STABILITY AND REACTIVITY

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Reactivity	: Stable at normal ambient temperature and pressure.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: Hazardous polymerisation does not occur.
Conditions to avoid	: Extremes of temperature and direct sunlight.
Incompatible materials	: Reactive with oxidising agents and acids.
Hazardous decomposition products	: May release CO _x , NO _x , SO _x , smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Eye contact
Ingestion
Inhalation
Skin contact

Acute toxicity

Product:

Acute oral toxicity	: Remarks: Based on available data, the classification criteria are not met.
Acute inhalation toxicity	: Acute toxicity estimate: 1.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method Remarks: Harmful if inhaled.
Acute dermal toxicity	: Remarks: Based on available data, the classification criteria are not met.

Components:

Kerosine (petroleum), hydrodesulfurized; Kerosine — unspecified:

Acute oral toxicity	: LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	: LC50 (Rat): > 5.2 mg/l Exposure time: 4 hrs Test atmosphere: dust/mist
Acute dermal toxicity	: LD50 (Rabbit): > 2,000 mg/kg,

Kerosine (petroleum); Straight run kerosine:

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

Fuels, diesel; Gasoil — unspecified:

Acute oral toxicity	: LD50 (Rat): 7,500 mg/kg,
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Acute inhalation toxicity : LC50 (Rat): 4.1 mg/l
Exposure time: 4 h
Test atmosphere: vapour

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

Skin corrosion/irritation

Product:

Remarks: Causes skin irritation.

Serious eye damage/eye irritation

Product:

Remarks: Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation

Product:

Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Product:

Germ cell mutagenicity- Assessment : Based on available data, the classification criteria are not met.

Carcinogenicity

Product:

Carcinogenicity - Assessment : Suspected of causing cancer.

Reproductive toxicity

Product:

Reproductive toxicity - Assessment : Based on available data, the classification criteria are not met.

STOT - single exposure

Product:

Target Organs: Central nervous system
Remarks: May cause drowsiness or dizziness.

STOT - repeated exposure

Product:

Target Organs: Liver, thymus, Bone

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Remarks: May cause damage to organs through prolonged or repeated exposure.

No data available

Aspiration toxicity

Product:

May be fatal if swallowed and enters airways.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

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

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

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

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SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

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

IMDG-Code

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

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

National Regulations

TDG

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

SECTION 15. REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all of the information required by the HPR.

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

DSL On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

For Copy of SDS : Internet: www.petro-canada.ca/msds
Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228
For Product Safety Information: 1 905-804-4752

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

Revision Date : 2020/10/06

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



Product Name: UNLEADED GASOLINE
Revision Date: 10 Jun 2020
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SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: UNLEADED GASOLINE
Product Description: Hydrocarbons and Additives
SDS Number: 8522

Intended Use: Fuel

Trade Names	Trade Names
AUTOMOTIVE GASOLINE	ESSO EXTRA GASOLINE
ESSO MIDGRADE GASOLINE	ESSO PREMIUM GASOLINE
ESSO REGULAR GASOLINE	ESSO SUPREME GASOLINE
EXXON MIDGRADE GASOLINE	EXXON PREMIUM GASOLINE
EXXON REGULAR GASOLINE	GASOLINE MIDGRADE UNLEADED MUL89
GASOLINE MIDGRADE UNLEADED MUL89 DCA	GASOLINE MIDGRADE UNLEADED MUL89 DCA DYED
GASOLINE MIDGRADE UNLEADED MUL89 LDCA	GASOLINE MIDGRADE UNLEADED MUL89 LDCA DYED
GASOLINE PREMIUM UNLEADED PUL91	GASOLINE PREMIUM UNLEADED PUL91 DCA
GASOLINE PREMIUM UNLEADED PUL91 DCA DYED	GASOLINE PREMIUM UNLEADED PUL91 LDCA
GASOLINE PREMIUM UNLEADED PUL91 LDCA DYED	GASOLINE RBOB BLENDSTOCK P91
GASOLINE RBOB BLENDSTOCK R87	GASOLINE REGULAR UNLEADED RUL87
GASOLINE REGULAR UNLEADED RUL87 DCA	GASOLINE REGULAR UNLEADED RUL87 DCA DYED
GASOLINE REGULAR UNLEADED RUL87 DYED	GASOLINE REGULAR UNLEADED RUL87 LDCA
GASOLINE REGULAR UNLEADED RUL87 LDCA DYED	

COMPANY IDENTIFICATION

Supplier: Imperial Oil Downstream
P.O. Box 2480, Station M
Calgary, ALBERTA T2P 3M9 Canada

24 Hour 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 HAZARD IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

CLASSIFICATION:

Flammable Liquids — Category 1
Skin Irritation — Category 2
Germ Cell Mutagenicity — Category 1B
Carcinogenicity — Category 1B
Reproductive Toxicity (Developmental) — Category 2
Specific Target Organ Toxicity — Single Exposure (Central Nervous System) — Category 3
Aspiration Hazard — Category 1

LABEL:

Pictogram:



Signal Word: Danger

Hazard Statements:

H224: Extremely flammable liquid and vapour. H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H336: May cause drowsiness or dizziness. H340: May cause genetic defects. H350: May cause cancer. H361: Suspected of damaging the unborn child.

Precautionary Statements:

P101: If medical advice is needed, have product container or label at hand. P102: Keep out of reach of children. P103: Read label before use. P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P261: Avoid breathing mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin

irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish. P391: Collect spillage. P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up. P501: Dispose of contents and container in accordance with local regulations.

Contains: BENZENE; GASOLINE; TOLUENE

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

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.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. 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).

ENVIRONMENTAL HAZARDS

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

NFPA Hazard ID:	Health: 2	Flammability: 3	Reactivity: 0
HMIS Hazard ID:	Health: 2*	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 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) in Hazardous product

Name	CAS#	Concentration*	GHS Hazard Codes
ETHYL ALCOHOL	64-17-5	0 - 1%	H225, H319(2A)
GASOLINE	86290-81-5	98 - 100%	H224, H304, H336, H340(1B), H350(1B), H361(D), H315, H401, H411

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

Name	CAS#	Concentration*	GHS Hazard Codes
BENZENE	71-43-2	0 - 1.5%	H225, H303, H304, H340(1B), H350(1A), H315,



			H319(2A), H372, H401, H412
CUMENE	98-82-8	0 - 1%	H226, H304, H335, H351, H401, H411
CYCLOHEXANE	110-82-7	0 - 1.5%	H225, H304, H336, H315, H400(M factor 1), H410(M factor 1)
ETHYL BENZENE	100-41-4	0 - 3.5%	H225, H304, H332, H373, H401, H412
N-HEXANE	110-54-3	0 - 5%	H225, H304, H336, H361(F), H315, H373, H401, H411
NAPHTHALENE	91-20-3	0 - 1%	H228(2), H302, H351, H400(M factor 1), H410(M factor 1)
TOLUENE	108-88-3	0 - 20%	H225, H304, H336, H361(D), H315, H373, H401, H412
XYLENES	1330-20-7	0 - 20%	H226, H303, H304, H312, H332, H335, H315, H320(2B), H373, H401, H412

* 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 4	FIRST-AID MEASURES
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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. This material, or a component, may be associated with cardiac sensitization 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 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 (-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 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.) during safety critical tasks, such as bulk fuel loading or unloading operations, or in storage areas where vapours may be present, 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 (100×10^{-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 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. 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

EXPOSURE LIMIT VALUES

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	5 ppm		Skin	Supplier
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		STEL	500 ppm			ACGIH
GASOLINE		TWA	300 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
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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

Flammability (Solid, Gas): N/A
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)
Decomposition Temperature: N/D
Vapour Density (Air = 1): 3.2 at 101 kPa
Vapour Pressure: > 26.6 kPa (200 mm Hg) at 20°C | 76 kPa (570 mm Hg) at 38 °C - 103 kPa (772.5 mm Hg) at 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 40°C | 0.8 cSt (0.8 mm²/sec) at 20°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

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

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: Alkalies, Halogens, Strong Acids, Strong oxidizers

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

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 5000 mg/m3 (Vapour)	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
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	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation: No end point data	Irritating to the skin. Based on test data for structurally similar

for material.	materials.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Caused genetic effects in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475 476
Carcinogenicity: Data available.	Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Caused damage to the fetus in laboratory animals, but the relevance to humans is uncertain. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	May cause drowsiness or dizziness.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 410 412 453

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
ETHYL BENZENE	Inhalation Lethality: 4 hour(s) LC50 17.8 mg/l (Vapour) (Rat); Oral Lethality: LD 50 3.5 g/kg (Rat)
NAPHTHALENE	Inhalation Lethality: 4 hour(s) LC50 > 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD 50 533 mg/kg (Mouse)

OTHER INFORMATION

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. Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to

hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug.

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). **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.

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
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 for the material, components of the material, or for similar materials, through the application of bridging principals.

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



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Special Provisions: 17, 88, 98, 150

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
Marine Pollutant: No
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

CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.

Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA): AIC, DSL, ENCS, KECl, 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
N-HEXANE	110-54-3	6



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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

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

- H224: Extremely flammable liquid and vapor; Flammable Liquid, Cat 1
- H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
- H226: Flammable liquid and vapour; Flammable Liquid, Cat 3
- H302: Harmful if swallowed; Acute Tox Oral, Cat 4
- H303: May be harmful if swallowed; Acute Tox Oral, Cat 5
- H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
- H312: Harmful in contact with skin; Acute Tox Dermal, Cat 4
- H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
- H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
- H320(2B): Causes eye irritation; Serious Eye Damage/Irr, Cat 2B
- H332: Harmful if inhaled; Acute Tox Inh, Cat 4
- H335: May cause respiratory irritation; Target Organ Single, Resp Irr
- H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
- H340(1B): May cause genetic defects; Germ Cell Mutagenicity, Cat 1B
- H350(1A): May cause cancer; Carcinogenicity, Cat 1A
- H350(1B): May cause cancer; Carcinogenicity, Cat 1B
- H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
- H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
- H361(F): Suspected of damaging fertility; Repro Tox, Cat 2 (Fertility)
- H372: Causes damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 1
- H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
- H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
- H401: Toxic to aquatic life; Acute Env Tox, Cat 2
- H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
- H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
- H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

- Composition: Component table information was modified.
- GHS Health Symbol information was modified.
- GHS Physical/Chemical Symbol information was modified.
- Section 02: GHS Contains for LABEL_GHS codes information was modified.
- Section 08: Exposure Limits Table information was modified.
- Section 09 Viscosity information was added.
- Section 11 Substance Toxicology table information was modified.



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Section 11: Tox List Cited Table information was modified.
Section 14: Proper Shipping Name information was modified.
Section 15: Canadian List Citations Table information was modified.
Section 15: National Chemical Inventory Listing information was modified.

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SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: (see Section 16 for Synonyms) **KEROSENE TYPE AVIATION TURBINE FUEL**
Product Description: Hydrocarbons and Additives
SDS Number: 8525

Intended Use: Aviation fuel

COMPANY IDENTIFICATION

Supplier:	Imperial Oil Downstream P.O. Box 2480, Station M Calgary, ALBERTA T2P 3M9	Canada
24 Hour 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 HAZARD IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

CLASSIFICATION:

Flammable Liquids — Category 3
Skin Irritation — Category 2
Reproductive Toxicity (Developmental) — Category 2
Specific Target Organ Toxicity — Single Exposure (Central Nervous System) — Category 3
Aspiration Hazard — Category 1

LABEL:

Pictogram:





Signal Word: Danger

Hazard Statements:

H226: Flammable liquid and vapor. H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H336: May cause drowsiness or dizziness. H361: Suspected of damaging the unborn child.

Precautionary Statements:

P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating, and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P261: Avoid breathing mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish. P391: Collect spillage. P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up. P501: Dispose of contents and container in accordance with local regulations.

Contains: 2-(2-METHOXYETHOXY)-ETHANOL; KEROSENE

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

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.

HEALTH HAZARDS

May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression.

ENVIRONMENTAL HAZARDS

Expected to be toxic to aquatic organisms.

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 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) in Hazardous product

Name	CAS#	Concentration*	GHS Hazard Codes
2-(2-METHOXYETHOXY)-ETHANOL	111-77-3	0.15%	H361(D)
KEROSENE	8008-20-6	> 99 %	H226, H304, H336, H315, H401, H411

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

Name	CAS#	Concentration*	GHS Hazard Codes
Naphthalene	91-20-3	0.1 - < 1%	H302, H351, H400(M factor 1), H410(M factor 1)

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

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.

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]: 38°C (100°F) [ASTM D-93]

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

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.

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: 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 all personal contact. Do not siphon by mouth. 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

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.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
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EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard		Note	Source
KEROSENE	Stable Aerosol.	TWA	5 mg/m ³	Skin	Supplier
KEROSENE	Vapour.	TWA	200 mg/m ³	Skin	Supplier
KEROSENE [as total hydrocarbon vapor]	Non-Aerosol	TWA	200 mg/m ³	Skin	ACGIH
Naphthalene		TWA	10 ppm	Skin	ACGIH

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
 Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

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

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
 No special requirements under ordinary conditions of use and with adequate ventilation.

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

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. 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): 0.81
Flammability (Solid, Gas): N/A
Flash Point [Method]: 38°C (100°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 5.0
Autoignition Temperature: N/D
Boiling Point / Range: < 205°C (401°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): 4 at 101 kPa
Vapour Pressure: [N/D at 20°C] | < 1 kPa (7.5 mm Hg) at 38°C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 8.8 cSt (8.8 mm²/sec) at -20°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -40°C (-40°F)

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

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

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

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

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 5.28 mg/l (Vapour)	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
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	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 420
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation (Rabbit): Data available.	Irritating to the skin. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475 476 478 479
Carcinogenicity: Data available.	Not expected to cause cancer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: No end point data for material.	Contains a substance that may be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.

Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	May cause drowsiness or dizziness.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 410 412 413

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
Naphthalene	Inhalation Lethality: 4 hour(s) LC50 > 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD 50 533 mg/kg (Mouse)

OTHER INFORMATION

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.

DIETHYLENE GLYCOL MONOMETHYL ETHER: Oral maternal exposure of animals resulted in teratogenicity. Dermal maternal exposure of animals resulted in slight toxicity to the fetus. Jet fuel: Some jet fuels have potential in mice to suppress indicators of immune system functionality. The relevance of these effects to humans is uncertain.

Contains:

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

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms.

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

DISPOSAL RECOMMENDATIONS

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

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

SECTION 14	TRANSPORT INFORMATION
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Product Name: KEROSENE TYPE AVIATION TURBINE FUEL
Revision Date: 25 May 2017
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LAND (TDG)

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

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

LAND (DOT)

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

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

SEA (IMDG)

Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1863
Packing Group: III
Marine Pollutant: No
Label(s): 3
Transport Document Name: FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PG III

AIR (IATA)

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

SECTION 15

REGULATORY INFORMATION

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



Product Name: KEROSENE TYPE AVIATION TURBINE FUEL
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CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.

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: None.

--REGULATORY LISTS SEARCHED--

1 = TSCA 4
2 = TSCA 5a2

3 = TSCA 5e
4 = TSCA 6

5 = TSCA 12b
6 = NPRI

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

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

- H226: Flammable liquid and vapour; Flammable Liquid, Cat 3
- H302: Harmful if swallowed; Acute Tox Oral, Cat 4
- H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
- H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
- H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
- H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
- H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
- H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
- H401: Toxic to aquatic life; Acute Env Tox, Cat 2
- H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
- H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Updates made in accordance with implementation of GHS requirements.

SYNONYMS: KEROSENE-TYPE AVIATION TURBINE FUEL, JET A, JET A-1, AVIATION TURBINE FUEL, JET A-1 (FSII), CAN/CGSB-3.24 GRADE F34

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MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: ANTIFREEZE/COOLANT
Product Description: Glycol
MSDS Number: 8512
Product Code: 351010101022
Intended Use: Antifreeze/coolant

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
ETHYLENE GLYCOL	107-21-1	90 - 99%	Oral Lethality: LD50 4700 mg/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 Section 15).

HEALTH EFFECTS

May cause harm to the unborn child. Harmful or fatal if swallowed. 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. High-pressure injection under skin may cause serious damage.

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. 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.

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: Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume

FLAMMABILITY PROPERTIES

Flash Point [Method]: 116°C (240°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15
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. Consult an expert. Warn other shipping. Material will sink. Remove material, as much as possible, using mechanical equipment.

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

ENVIRONMENTAL PRECAUTIONS

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

SECTION 7 HANDLING AND STORAGE

HANDLING

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

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard		Note	Source
ETHYLENE GLYCOL	Aerosol.	Ceiling	100 mg/m ³		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
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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: Colourless
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density: > 1
Flash Point [Method]: 116°C (240°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15
Autoignition Temperature: 400°C (752°F)
Boiling Point / Range: N/A
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: N/A
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: N/D
Melting Point: N/D
Pour Point: -13°C (9°F)
Decomposition Temperature: N/D

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

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Acids, Alkalies, Strong oxidizers

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

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
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Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Negligible hazard at ambient/normal handling temperatures. Based on test data for structurally similar materials.
Ingestion	
Toxicity (Human): LDLo 100 ml	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.

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

DISPOSAL RECOMMENDATIONS

Even though this product is readily biodegradable, it must not be indiscriminately discarded into the environment. Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

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

LAND (DOT)

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

Hazard Class & Division: 9

ID Number: 3082

Packing Group: III

Product RQ: 5102.04 LBS - ETHYLENE GLYCOL

ERG Number: 171

Label(s): 9

Transport Document Name: UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, 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
, EHS

SECTION 15	REGULATORY INFORMATION
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WHMIS Classification: Class D, Division 1, Subdivision B: Toxic Material 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: 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
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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.
- Section 01: Company Mailing Address information was modified.
- Section 05: Fire Fighting Measures - Fire Fighting Instruction information was modified.
- Section 05: Hazardous Combustion Products information was modified.
- Section 10: Materials to Avoid information was modified.
- Section 13: Regulatory Disposal Information - Header information was modified.
- Section 14: Label(s) information was added.
- Section 15: National Chemical Inventory Listing - Header information was modified.
- Section 16: Not determined, Not applicable information was modified.

PRECAUTIONARY LABEL TEXT:

WHMIS Classification: Class D, Division 1, Subdivision B: Toxic Material Class D, Division 2, Subdivision A: Very Toxic Material

HEALTH HAZARDS

May cause harm to the unborn child. Harmful or fatal if swallowed.

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. 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.

SPILL/LEAK

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

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

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DGN: 5007470 (1002960)

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Prepared by: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: HEAVY DUTY ANTIFREEZE 60/40 PREMIX
Product Description: Glycol
MSDS Number: 8514
Product Code: 35101010A0H7
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	55 - 65%	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. High-pressure injection under skin may cause serious damage.

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: 40°C (104°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. Consult an expert. Warn other shipping. Material will sink. Remove material, as much as possible, using mechanical equipment.

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

ENVIRONMENTAL PRECAUTIONS

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

SECTION 7

HANDLING AND STORAGE

HANDLING

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

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard		Note	Source
ETHYLENE GLYCOL	Aerosol.	Ceiling	100 mg/m ³		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
Colour: Violet
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density: > 1
Flash Point [Method]: 116°C (240°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15.3
Autoignition Temperature: 40°C (104°F)
Boiling Point / Range: N/D
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: N/D
Melting Point: N/D
Pour Point: -52°C (-62°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers, Acids, Alkalies

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

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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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): LDLo 100 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
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The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

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

DISPOSAL RECOMMENDATIONS

Even though this product is readily biodegradable, it must not be indiscriminately discarded into the environment. Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

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

LAND (DOT)

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

Hazard Class & Division: 9

ID Number: 3082

Packing Group: III

Product RQ: 7692.31 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: AICS, DSL, EINECS, ENCS, IECSC, KECI, PICCS, TSCA

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

Chemical Name	CAS Number	List Citations
ETHYLENE GLYCOL	107-21-1	6

--REGULATORY LISTS SEARCHED--

1 = TSCA 4

3 = TSCA 5e

5 = TSCA 12b

2 = TSCA 5a2

4 = TSCA 6

6 = NPRI

SECTION 16 OTHER INFORMATION

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: 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: Colour was modified.
Section 11: Inhalation - Header 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 06: Accidental Release- Spill Management- Water 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: 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.
Composition: Component table was modified.
Section 16: Health Hazards was modified.
Section 16: Health Hazards - Header 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 01: Company Contact Methods Sorted by Priority was modified.
Section 11: Tox List Cited Table was modified.
Section 13: Regulatory Disposal Information - Header was modified.
Section 14: Product RQ - Header was added.
Section 14: Product RQ was added.
Section 15: Canadian List Citations Table was added.
Section 15: Chemical Name - Header was added.
Section 15: CAS Number - Header was added.
Section 15: List Citations -Header was added.
Section 01: Product Code was added.
Section 01: Product Code - Header was added.

PRECAUTIONARY LABEL TEXT:

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

HEALTH HAZARDS

May cause harm to the unborn child.

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, 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.

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Prepared by: Imperial Oil Limited, IH and Product Safety



SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: TERESSO 46
Product Description: Base Oil and Additives
SDS Number: 8192
Product Code: 201560307020
Intended Use: Lubricant

COMPANY IDENTIFICATION

Supplier: Imperial Oil Downstream
P.O. Box 2480, Station M
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 HAZARD IDENTIFICATION

This material is considered to be NON-HAZARDOUS according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS

No significant hazards.



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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 3	COMPOSITION / INFORMATION ON INGREDIENTS
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This material is defined as a mixture.

No Hazardous Substance(s) or Complex Substance(s) required for disclosure.

SECTION 4	FIRST-AID MEASURES
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INHALATION

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

SKIN CONTACT

Wash contact areas with soap and water. 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
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EXTINGUISHING MEDIA

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

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 200°C (392°F) [ASTM D-92]

Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0

Autoignition Temperature: 357°C (675°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. 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: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor 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 hydrocarbons are recommended. 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: 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 type of container used to store the material may affect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

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 is recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction).

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

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: Amber
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.87
Flammability (Solid, Gas): N/A
Flash Point [Method]: 200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: 357°C (675°F)
Boiling Point / Range: 322°C (612°F) - 600°C (1112°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): > 2 at 101 kPa
Vapour Pressure: [N/D at 20°C] | < 1 kPa (7.5 mm Hg) at 38°C
Evaporation Rate (n-butyl acetate = 1): N/D



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pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 46 cSt (46 mm²/sec) at 40°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -24°C (-11°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.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.

Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

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.

CMR Status: None.

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

DISPOSAL RECOMMENDATIONS

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

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

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

LAND (DOT): Not Regulated for Land Transport

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

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15	REGULATORY INFORMATION
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WHMIS Classification: Not controlled

CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.



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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: None.

--REGULATORY LISTS SEARCHED--

1 = TSCA 4
2 = TSCA 5a2

3 = TSCA 5e
4 = TSCA 6

5 = TSCA 12b
6 = NPRI

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Updates made in accordance with implementation of GHS requirements.

The information and recommendations contained herein are, to the best of Imperial Oil's knowledge and belief, accurate and reliable as of the date issued. Imperial Oil assumes no responsibility for accuracy of information unless the document is the most current available from an official Imperial Oil distribution system. The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, republication or retransmission of this document, in whole or in part, is not permitted.

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MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: XD-3 EXTRA ENGINE OIL 0W-40
Product Description: Synthetic Base Stocks and Additives
MSDS Number: 16336
Intended Use: Engine oil

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada
24 Hour Environmental / Health Emergency 519-339-2145
Telephone
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]: 210C (410F) [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

Avoid contact with used product. 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. Keep away from incompatible materials.

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

GENERAL INFORMATION

Physical State: Liquid
Colour: Amber
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.845
Flash Point [Method]: 210C (410F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: N/D
Vapour Density (Air = 1): N/D

Vapour Pressure: < 0.1 kPa (0.75 mm Hg) at 20°C
Evaporation Rate (n-butyl acetate = 1): < 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 15 cSt (15 mm²/sec) at 100C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -45°C (-49°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.
CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.
MATERIALS TO AVOID: Strong oxidizers
HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m ³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (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

For the product itself:

Diesel engine oils: Not carcinogenic in animals tests. Used and unused diesel engine oils did not produce any carcinogenic effects in chronic mouse skin painting studies. Oils that are used in gasoline engines may become hazardous and display the following properties: Carcinogenic in animal tests. Caused mutations in

vitro. Possible allergen and photoallergen. Contains polycyclic aromatic compounds (PAC) from combustion products of gasoline and/or thermal degradation products.

Contains:

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitising in test animals and humans.

Additional information is available by request.

CMR Status: None.

--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.

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
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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, KECI, TSCA

Special Cases:

Inventory	Status
ELINCS	Restrictions Apply
ENCS	Restrictions Apply

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
ZINC DITHIOPHOSPHATE	68649-42-3	6

--REGULATORY LISTS SEARCHED--

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

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:
 Section 04: First Aid Skin - Header was modified.
 Section 04: First Aid Eye - Header was modified.
 Section 04: First Aid Ingestion - Header was modified.

Section 06: Notification Procedures - Header was modified.
Section 10: Materials To Avoid - Header was modified.
Section 11: Acute Toxicity Table Header 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 16: CA Prepared by - Header was modified.
Section 09: Oxidizing Properties was modified.
Section 13: Regulatory Disposal Information - Header was modified.
Section 15: Special Cases - Header was added.
Section 15: Special Cases Table was added.
Section 15: Inventory - Header was added.
Section 15: Status - Header was added.
Section 09: DMSO IP was deleted.
Section 09: DMSO IP - Header was deleted.
Section 08: Exposure Limits Table was deleted.
Section 11: Chemical Name - Header was deleted.
Section 11: CAS Number - Header was deleted.
Section 11: List Citation - Header was deleted.
Section 11: Tox List Cited Table was deleted.
Section 09: Form - Header was deleted.
Section 09: Physical State was deleted.
Section 08: OEL Table - Substance Name Column - Header was deleted.
Section 08: OEL Table - Form Column - Header was deleted.
Section 08: OEL Table - Limit Column - Header was deleted.
Section 08: OEL Table - Notation Column - Header was deleted.
Section 08: OEL Table - Source Column - Header was deleted.

WHMIS Classification: Not controlled

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itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, republication or retransmission of this document, in whole or in part, is not permitted.

DGN: 5014703 (1012615)

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Prepared by: Imperial Oil Limited, IH and Product Safety

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: XD-3 EXTRA ENGINE OIL 30
Product Description: Base Oil and Additives
MSDS Number: 8048
Intended Use: Engine oil

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada
24 Hour Environmental / Health Emergency 519-339-2145
Telephone
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]: 225C (437F) [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

Avoid contact with used product. 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
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Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Colour: Brown
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.889
Flash Point [Method]: 225C (437F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: 310C (590F) - 600C (1112F)
Vapour Density (Air = 1): N/D

Vapour Pressure: [N/D at 20°C] | < 0.1 kPa (0.75 mm Hg) at 38C
Evaporation Rate (n-butyl acetate = 1): < 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 12 cSt (12 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

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m ³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (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

For the product itself:

Diesel engine oils: Not carcinogenic in animals tests. Used and unused diesel engine oils did not produce any carcinogenic effects in chronic mouse skin painting studies. Oils that are used in gasoline engines may

become hazardous and display the following properties: Carcinogenic in animal tests. Caused mutations in vitro. Possible allergen and photoallergen. Contains polycyclic aromatic compounds (PAC) from combustion products of gasoline and/or thermal degradation products.

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.

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A

3 = IARC 2B
4 = ACGIH ALL

5 = ACGIH A1
6 = ACGIH A2

SECTION 12	ECOLOGICAL INFORMATION
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The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

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

DISPOSAL RECOMMENDATIONS

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

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty

drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14	TRANSPORT INFORMATION
-------------------	------------------------------

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.

Complies with the following national/regional chemical inventory requirements: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

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

Chemical Name	CAS Number	List Citations
ZINC DITHIOPHOSPHATE	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
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N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

- Section 04: First Aid 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 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.
- Hazard Identification: Hazards Note was modified.
- Section 16: CA Prepared by - Header was modified.
- Section 09: Oxidizing Properties was modified.
- Section 13: Regulatory Disposal Information - Header was modified.
- Section 11: Chemical Name - Header was deleted.
- Section 11: CAS Number - Header was deleted.
- Section 11: List Citation - Header was deleted.
- Section 11: Tox List Cited Table was deleted.

WHMIS Classification: Not controlled

The information and recommendations contained herein are, to the best of Imperial Oil's knowledge and belief, accurate and reliable as of the date issued. Imperial Oil assumes no responsibility for accuracy of information unless the document is the most current available from an official Imperial Oil distribution system. The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, republication or retransmission of this document, in whole or in part, is not permitted.

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Prepared by: Imperial Oil Limited, IH and Product Safety



Safety Data Sheet

This safety data sheet complies with the requirements of: WHIMS 2015

Product name Nitrogen

1. Identification of the Substance/Preparation and of the Company/Undertaking

Product Identifier

Product name Nitrogen

Other means of identification

Product code 005373

UN/ID no UN1066

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended use No information available

Uses advised against No information available

Details of the Supplier of the Safety Data Sheet

Initial Supplier Identifier

Johnson Controls Inc.
Canadian Distribution Centre
20 Delta Park Blvd
Brampton ON L6T 5E7
Telephone: 1-888-888-7838

Emergency Telephone Number

Emergency telephone CHEMTREC 001-800-424-9300 or 001-703-527-3887

2. Hazards Identification

Classification

Gases under pressure Simple asphyxiants

Compressed Gas dissolved gas

Label Elements

WARNING

Hazard statements

Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation



Product code 005373

/ Product name Nitrogen /

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Precautionary Statements - Storage

Protect from sunlight. Store in a well-ventilated place

OTHER INFORMATION

3. Composition/information on Ingredients

Substance

Chemical name	CAS No.	weight-%	Hazardous Material Information Review Act registry number (HMIRA registry #)	Date HMIRA filed and date exemption granted (if applicable)
Nitrogen	7727-37-9	90 - 100%	-	-

4. First aid measures

Description of first aid measures

- Inhalation** Remove to fresh air.
- Eye contact** Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
- Skin contact** In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- Ingestion** Clean mouth with water and drink afterwards plenty of water.

Most Important Symptoms and Effects, Both Acute and Delayed

Symptoms No information available.

Indication of Any Immediate Medical Attention and Special Treatment Needed

Note to physicians Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the



Product code 005373

/ Product name Nitrogen /

PAGE 3 / 8

surrounding environment.

Unsuitable extinguishing media Do not extinguish a leaking gas fire unless leak can be stopped.

Specific hazards arising from the chemical Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists. Containers may explode when heated. Ruptured cylinders may rocket.

Hazardous Combustion Products Carbon oxides. Fluorinated oxides. Nitrogen oxides (NOx). Oxides of sulfur.

Explosion Data

Sensitivity to Mechanical Impact Yes.

Sensitivity to Static Discharge None.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions CONTENTS UNDER PRESSURE. Empty containers pose a potential fire and explosion hazard. Do not cut, puncture of weld containers.

Environmental Precautions

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. Handling and Storage

Precautions for Safe Handling

Advice on safe handling CONTENTS UNDER PRESSURE. Empty containers pose a potential fire and explosion hazard. Do not cut, puncture of weld containers.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight.

8. Exposure Controls/Personal Protection

Control Parameters

Exposure Limits This product, as supplied, does not contain any hazardous materials with occupational



exposure limits established by the region specific regulatory bodies.

OTHER INFORMATION None known.

Appropriate Engineering Controls

Engineering controls Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Eye/face protection No special protective equipment required.

Skin and body protection No special protective equipment required.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical State	Compressed Gas
Appearance	No data available
Color	Colorless
Odor	None
Odor Threshold	No data available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	No data available	No data available
Melting point/freezing point	No data available	No data available
Boiling point / boiling range	-2 °C / 28 °F	
Flash Point	No data available	No data available
Evaporation Rate	No data available	No data available
Flammability (solid, gas)		No data available
Flammability limit in air		No data available
Upper flammability limit:	No data available	
Lower flammability limit:	No data available	
Vapor Pressure	No data available	No data available
Vapor Density	No data available	No data available
Relative Density		No data available
Water Solubility	No data available	No data available
Solubility in Other Solvents	No data available	No data available
Partition coefficient	No data available	No data available
Autoignition Temperature	No data available	No data available
Decomposition Temperature	No data available	No data available
Kinematic viscosity	No data available	No data available
Dynamic viscosity	No data available	No data available
Explosive properties	No data available.	No data available
Oxidizing properties	No data available.	

OTHER INFORMATION

softening point No data available



Product code 005373

/ Product name Nitrogen /

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Molecular Weight No data available
VOC content (%) No data available
Density No data available
Bulk Density No data available

10. Stability and Reactivity

Reactivity No information available.
Chemical Stability Stable under normal conditions.
Possibility of hazardous reactions None under normal processing.
Hazardous Polymerization Hazardous polymerization does not occur.
Conditions to Avoid Excessive heat.
Incompatible Materials None known based on information supplied.
Hazardous decomposition products Carbon oxides. Nitrogen oxides (NOx). Oxides of sulfur. Fluorinated oxides.

11. Toxicological Information

Information on Likely Routes of Exposure

Product Information

Inhalation Specific test data for the substance or mixture is not available.
Eye contact Specific test data for the substance or mixture is not available.
Skin contact Specific test data for the substance or mixture is not available.
Ingestion Specific test data for the substance or mixture is not available.

Information on Toxicological Effects

Symptoms No information available.

Numerical Measures of Toxicity

Acute Toxicity

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation No information available.
Serious eye damage/eye irritation No information available.
Respiratory or skin sensitization No information available.
Germ cell mutagenicity No information available.



Carcinogenicity	No information available.
Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Target organ effects	Respiratory System.
Aspiration hazard	No information available.

12. Ecological Information

Ecotoxicity	The environmental impact of this product has not been fully investigated.
Persistence and Degradability	No information available.
Bioaccumulation	No information available.
Other Adverse Effects	No information available.

13. Disposal Considerations

Waste Treatment Methods

Waste from residues/unused products	Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.
Contaminated packaging	Do not reuse empty containers.

14. Transport Information

TDG

UN/ID no	UN1066
Proper Shipping Name	Nitrogen, compressed
Hazard class	2.2
Description	UN1066, Nitrogen, compressed, 2.2

MEX

UN/ID no	UN1066
Proper Shipping Name	Nitrogen, compressed
Hazard class	2.2
Description	UN1066, Nitrogen, compressed, 2.2

ICAO (air)

UN/ID no	UN1066
Proper Shipping Name	Nitrogen, compressed



Product code 005373

/ Product name Nitrogen /

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Hazard class 2.2
Special Provisions A69
Description UN1066, Nitrogen, compressed, 2.2

IATA

UN/ID no UN1066
Hazard class 2.2
ERG Code 2L
Special Provisions A69
Description UN1066, Nitrogen, compressed, 2.2

IMDG

UN/ID no UN1066
Hazard class 2.2
EmS-No F-C, S-V
Description UN1066, Nitrogen, compressed, 2.2

RID

UN/ID no UN1066
Proper Shipping Name Nitrogen, compressed
Hazard class 2.2
Classification Code 1A
Description UN1066, Nitrogen, compressed, 2.2 (13)
Labels 2.2 (+13)

ADR

UN/ID no UN1066
Proper Shipping Name Nitrogen, compressed
Hazard class 2.2
Classification Code 1A
Tunnel restriction code (E)
Special Provisions 653
Description UN1066, Nitrogen, compressed, 2.2, (E)
Labels 2.2

ADN

Proper Shipping Name Nitrogen, compressed
Hazard class 2.2
Classification Code 1A
Special Provisions 653
Description UN1066, Nitrogen, compressed, 2.2
Hazard label(s) 2.2
Limited Quantity (LQ) 120 ml

15. Regulatory Information

REGULATORY INFORMATION

International regulations

Ozone-depleting substances (ODS) Not Applicable

Persistent Organic Pollutants Not Applicable

Export Notification requirements Not Applicable

International Inventories



Product code 005373

/ Product name Nitrogen /

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TSCA	Complies
DSL/NDSL	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

16. Other information, including date of preparation of the last revision

<u>NFPA</u>	Health Hazards 0	Flammability 0	Instability 0	Physical and chemical properties Simple asphyxiants
<u>HMIS</u>	Health Hazards 0	Flammability 0	Physical Hazards 3	Personal Protection X

Revision date 06-Jun-2018

Revision note No information available.

Disclaimer

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

End of Safety Data Sheet


SAFETY DATA SHEET

Acetylene

Section 1. Identification

GHS product identifier	: Acetylene
Chemical name	: acetylene
Other means of identification	: Ethyne; Ethine; Narcylen; C ₂ H ₂ ; Acetylen; UN 1001; Vinylene
Product type	: Gas.
Product use	: Synthetic/Analytical chemistry.
Synonym	: Ethyne; Ethine; Narcylen; C ₂ H ₂ ; Acetylen; UN 1001; Vinylene
SDS #	: 001001
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
24-hour telephone	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gas
GHS label elements	
Hazard pictograms	: 
Signal word	: Danger
Hazard statements	: Extremely flammable gas. May form explosive mixtures with air. Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.
Precautionary statements	
General	: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Fusible plugs in top, bottom, or valve melt at 98°C to 107°C (208°F to 224°F). Do not discharge at pressures above 15psig (103kpa). Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Approach suspected leak area with caution.
Prevention	: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Response	: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.
Storage	: Protect from sunlight. Store in a well-ventilated place.
Disposal	: Not applicable.
Hazards not otherwise classified	: In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture	: Substance
Chemical name	: acetylene
Other means of identification	: Ethyne; Ethine; Narcylen; C2H2; Acetylen; UN 1001; Vinylene
Product code	: 001001

CAS number/other identifiers

CAS number : 74-86-2

Ingredient name	%	CAS number
acetylene	100	74-86-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : Contact with rapidly expanding gas may cause burns or frostbite.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

- Eye contact** : No specific data.
- Inhalation** : No specific data.
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

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

Section 4. First aid measures

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

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

- Special protective actions for fire-fighters** : 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. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

- 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.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
acetylene	<p>NIOSH REL (United States, 10/2016). CEIL: 2662 mg/m³ CEIL: 2500 ppm</p> <p>ACGIH TLV (United States, 3/2017). Oxygen Depletion [Asphyxiant].</p> <p>California PEL for Chemical Contaminants (Table AC-1) (United States). Oxygen Depletion [Asphyxiant].</p>

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

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.

Individual protection measures

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.

Section 8. Exposure controls/personal protection

- Eye/face protection** : 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, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin protection**
- Hand protection** : 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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : 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. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. 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.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Gas.
- Color** : Colorless.
- Odor** : Mild. Ethereal.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : -81°C (-113.8°F)
- Boiling point** : Not available.
- Critical temperature** : 35.25°C (95.5°F)
- Flash point** : Closed cup: -18.15°C (-0.67°F)
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.
Highly flammable in the presence of the following materials or conditions: heat.
- Lower and upper explosive (flammable) limits** : Lower: 2.5%
Upper: 100%
- Vapor pressure** : 635 (psig)
- Vapor density** : 0.907 (Air = 1)
- Specific Volume (ft³/lb)** : 14.7058
- Gas Density (lb/ft³)** : 0.0691
- Relative density** : Not applicable.
- Solubility** : Not available.
- Solubility in water** : 1.2 g/l
- Partition coefficient: n-octanol/water** : 0.37
- Auto-ignition temperature** : 305°C (581°F)

Section 9. Physical and chemical properties

Decomposition temperature	: Not available.
Viscosity	: Not applicable.
Flow time (ISO 2431)	: Not available.
Molecular weight	: 26.04 g/mole
Aerosol product	
Heat of combustion	: -48257522 J/kg

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Incompatible materials	: Oxidizers
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Section 11. Toxicological information

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : 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.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Section 12. Ecological information

Product/ingredient name	LogP _{ow}	BCF	Potential
acetylene	0.37	-	low

Mobility in soil






Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1001	UN1001	UN1001	UN1001	UN1001
UN proper shipping name	ACETYLENE, DISSOLVED	ACETYLENE, DISSOLVED	ACETYLENE, DISSOLVED	ACETYLENE, DISSOLVED	ACETYLENE, DISSOLVED
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Additional information

DOT Classification

: **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 15 kg.

TDG Classification

: Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).

Explosive Limit and Limited Quantity Index

0

Passenger Carrying Ship Index

75

Passenger Carrying Road or Rail Index

Forbidden

Section 14. Transport information

Special provisions

38

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 15 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
Clean Air Act (CAA) 112 regulated flammable substances: acetylene

Clean Air Act Section 112 : Not listed

(b) Hazardous Air Pollutants (HAPs)

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Section 15. Regulatory information

Not listed.

Inventory list

Australia	: This material is listed or exempted.
Canada	: This material is listed or exempted.
China	: This material is listed or exempted.
Europe	: This material is listed or exempted.
Japan	: Japan inventory (ENCS) : This material is listed or exempted. Japan inventory (ISHL) : Not determined.
Malaysia	: Not determined.
New Zealand	: This material is listed or exempted.
Philippines	: This material is listed or exempted.
Republic of Korea	: This material is listed or exempted.
Taiwan	: This material is listed or exempted.
Thailand	: Not determined.
Turkey	: This material is listed or exempted.
United States	: This material is listed or exempted.
Viet Nam	: Not determined.

Section 16. Other information

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

Health	/	0
Flammability		4
Physical hazards		3

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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



Note: The instability hazard rating for acetylene, dissolved (stabilized acetylene) is 2.

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gas	Expert judgment According to package

Section 16. Other information

History

Date of printing : 1/18/2018

Date of issue/Date of revision : 1/18/2018

Date of previous issue : 10/10/2017

Version : 1.01

Key to abbreviations

: ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

▣ Indicates information that has changed from previously issued version.

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.

SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: COMMERCIAL PROPANE (NON ODORIZED)
Product Description: Liquefied Hydrocarbon Gas, Gas or Liquefied Gas
SDS Number: 13602

Intended Use: Fuel gas

COMPANY IDENTIFICATION

Supplier:	Imperial Oil Downstream P.O. Box 2480, Station M Calgary, ALBERTA T2P 3M9	Canada
24 Hour 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 HAZARD IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

CLASSIFICATION:

Flammable Gases — Category 1
Gases Under Pressure — Liquefied Gas
Simple Asphyxiants — Category 1

LABEL:

Pictogram:



Signal Word: Danger

Hazard Statements:

H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.



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May displace oxygen and cause rapid suffocation.

Precautionary Statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: In case of leakage, eliminate all ignition sources. P410 + P403: Protect from sunlight. Store in a well-ventilated place.

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. 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. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Exposure to concentrations above 10% of the LEL may cause a general central nervous system (CNS) depression typical of anesthetic gases or intoxicants. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS

No significant hazards.

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 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) in Hazardous product

Name	CAS#	Concentration*	GHS Hazard Codes
ALKANES, C4	68513-65-5	1 - 2.5%	H220
ETHANE	74-84-0	1 - < 5%	H220, H280, H402
ISOBUTANE	75-28-5	1 - 2.5%	H220, H280
PROPANE	74-98-6	90 - 99%	H220, H280
PROPYLENE	115-07-1	1 - 10%	H220, H280, H402



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

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 material, or a component, may be associated with cardiac sensitization 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.



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Hazardous Combustion Products: Incomplete combustion products, Oxides of carbon

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. 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).

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. 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. Outside or detached storage preferred. Storage containers should be earthed and bonded.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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. Contact the Supplier for additional information.

GENERAL INFORMATION

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

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.51
Flammability (Solid, Gas): Flammable - Category 1
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)
Decomposition Temperature: N/D
Vapour Density (Air = 1): 1.5 at 101 kPa
Vapour Pressure: 850 kPa (6375 mm Hg) at 20°C

Evaporation Rate (n-butyl acetate = 1): > 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/A
Solubility in Water: Negligible
Viscosity: 0.5 cSt (0.5 mm²/sec) at 40°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

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

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

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

MATERIALS TO AVOID: Strong oxidizers

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

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 15 minute(s) LC50 1443 mg/l (Gas)	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Not applicable.
Skin	
Acute Toxicity: No end point data for material.	Not applicable.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes.
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer.
Aspiration: No end point data for material.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.

Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471
Carcinogenicity: No end point data for material.	Not expected to cause cancer.
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 422
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 422

OTHER INFORMATION

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). Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug. 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.



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ECOTOXICITY

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

MOBILITY

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

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

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

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

SECTION 13

DISPOSAL CONSIDERATIONS

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

DISPOSAL RECOMMENDATIONS

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

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14

TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: LIQUEFIED PETROLEUM GASES, not odorized
Hazard Class & Division: 2.1
UN Number: 1075
Packing Group: (N/A)

LAND (DOT)



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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)
Marine Pollutant: No
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

CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.

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



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--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

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

H220: Extremely flammable gas; Flammable Gas, Cat 1

H280: Contains gas under pressure; may explode if heated; Pressurized Gas

H402: Harmful to aquatic life; Acute Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Updates made in accordance with implementation of GHS requirements.

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APPENDIX I

SNARE WINTER ROAD SPILL CONTINGENCY PLAN

APPENDIX K

SNARE HYDRO WINTER ROADS SPILL CONTINGENCY PLAN

1 INTRODUCTION

The Northwest Territories Power Corporation (NTPC) has prepared this appendix for the Snare Hydroelectric Facility Spill Contingency Plan (SCP) for the Winter Roads (WRs) located at the Snare Hydroelectric Facility, including the Snare Winter Road (WR), Strutt Lake WR, Big Spruce Lake WR, and the 5B Bridge route. The WRs at Snare Hydro facility are required to support upgrades and maintenance activities. The Snare WR is constructed annual and the Strutt Lake WR, Big Spruce Lake WR, and the 5B Bridge routes will be constructed on an as-needed basis.

This appendix outlines the spill response procedures and guidelines for contractors and companies operating on the WRs and complements the spill response procedures, guidelines, and information provided in the SCP.

This appendix demonstrates that NTPC has appropriate response capabilities and measures in place to effectively address potential spills on the WRs. This appendix documents NTPC's local and regional spill response capabilities, presenting information specific to the Snare Hydro Facility's WRs. This appendix is not a standalone document and it must be read in conjunction with the Facility SCP. Copies of the SCP with this appendix should be provided to all third-party contractors and suppliers operating on the WRs so that their personnel (e.g. equipment operators and drivers) are familiar with its contents and understand their responsibilities in the event of a spill on the WRs.

1.1 PURPOSE

The purpose of this appendix is to expand the scope of the Facility Spill Contingency Plan to include response actions for potential spills of hazardous materials of any quantity on the Snare Hydroelectric Facility WRs.

1.2 SCOPE

This appendix applies to the accidental and/or uncontrolled release of a contaminant into the environment that has the potential for adverse impact. This appendix applies to all casual, permanent, part-time, full-time employees, and contractors who conduct work or provide services on the Snare Hydroelectric Facility WRs. This appendix covers activities and operations conducted on the WRs.

1.3 GENERAL RESPONSIBILITIES

Same as described in Section 1.6 of the Spill Contingency Plan with the following additions

1.3.1 Contractor and Subcontractors

- All contractor and sub-contractor equipment and vehicles operating or travelling on the Snare Hydroelectric Facility WRs must be equipped with a 205L (45 Gal) Drum Spill Kit.
- All contractor and sub-contractor personnel travelling on the WR must be prepared to act as the First Responder in the event that they are the first to arrive at the scene of a spill.

1.3.2 NTPC Employees

- All NTPC equipment and vehicles operating or travelling on the Snare Hydroelectric Facility WRs must be equipped with a 45-Gallon Drum Spill Kit.
- All NTPC personnel travelling on the WRs must be prepared to act as the First Responder in the event that they are the first to arrive at the scene of a spill.

1.3.3 Third Party Contractors and Suppliers

- All equipment and vehicles from third party contractors and suppliers operating or travelling on the Snare Hydroelectric Facility WRs must be equipped with a 45-Gallon Drum Spill Kit.
- All third-party contractor and supplier personnel travelling on the WRs must be prepared to act as the First Responder in the event that they are the first to arrive at the scene of a spill.

1.3.4 Plant Operator

- The Plant Operator remains the On-Scene Coordinator for spills at the Snare Hydroelectric Facility as per the Spill Contingency Plan.

1.3.5 Manager, Operations - Central Control Room / On-Scene Coordinator

- Ensure that spill response initiated at the Facility by the Plant Operator is immediate, effective, and sustained.
- Support the Project Manager, Engineering (or designate) in coordinating spill response activities on the Snare Hydroelectric Facility WRs

1.3.6 Director, Health, Safety & Environment

- Liaise with the Project Manager, Engineering and the appropriate environmental regulatory body to ensure that the response to a spill on any WRs is completed in accordance with existing environmental laws and regulations.

- In coordination with the Project Manager, Engineering, prepare and submit any formal reports (within the required timeframe) to regulators and NTPC management regarding the management of hazardous materials and spill response.

2 PLAN TESTING AND TRAINING

Pre-incident training on the SCP is required for it to be an effective tool for the NTPC. The first time it is to be consulted should not be when an incident of emergency event has occurred. Companies operating on the Snare Hydro Facility WRs must train all personnel involved with the WRs on the contents of the SCP and their specific roles within it.

The SCP and this appendix will be tested to ensure that it is current, comprehensive, and effective. Appropriate communication drills and notification tests will be conducted under the direction of the Project Manager, Engineering.

The techniques for spill response outlined in the SCP are meant to act as a guideline or reference only. They are not intended to be a substitute for proper training. It is important that all employers ensure that any personnel with a designated safety role be suitably trained in how to perform their responsibilities.

3 ADDITIONAL PLANS AND RESOURCES

This appendix is to be used in conjunction with the following references:

- Snare Hydroelectric Facility Spill Contingency Plan
- Snare Hydroelectric Land Use Operations and Maintenance Plan
- Snare Winter Road Waste Management Plan

4 PROJECT DETAILS

NTPC annually constructs the historical Snare Winter Road (WR) from Snare Forks to the Wekweètì Winter Road, NT linking the facility to Yellowknife via NWT Highway #3, allowing access for resupply fuel, oversized equipment, and freight to be delivered to site. The Snare WR follows the same historical alignment of previous years, so relatively little brushing is required. The road does not cross any water courses and is 12.5km of portage winter road. The start point of the WR is a temporary laydown/marshalling area located at the southwest corner of Snare Forks, and the end point is a temporary laydown area located at the Wekweètì winter road junction. The temporary laydown at the Wekweètì winter road junction will be expanded to allow more space for staging of equipment and the potential for a temporary camp and/or fuel to be installed if required.

Three additional winter roads which have been used intermittently throughout the operation of the facility as required and will be included in the scope of the LUP include:

- Strutt Lake WR (8.1 km) connecting to three borrow locations on the east side of Strutt Lake. This winter road is currently authorized under Land Use Permit W2019Q0003, which expires on December 18, 2024 and is constructed when crushing is completed at Strutt Lake Pits every 4-8 years.
- The Big Spruce Lake WR 1 (17.8 km) connecting Snare rapids to the Side Dams, and Snare 5B Spillway. This route is entirely on Big Spruce Lake and is constructed every 10-20 years when major maintenance work is required at 5B or Side Dams. There is also a Big Spruce Lake WR 2 route that connects the side dams on Big Spruce Lake to the Snare site road using a couple portages and local inland lakes. The Big Spruce Lake WR 2 route would be used if ice conditions on Big Spruce Lake were not sufficient for WR construction.
- The 5B Bridge route (1.1 km) allowing for continued movement of equipment over the winter months if the 5B bridge every had any issues which impeded travel over the bridge in winter months. This is a contingency route only and would only be used in emergency situations.

The overland portion of the proposed WRs will follow previously constructed WR alignments (Strutt Lake WR, Snare WR), with an average width of the portages (overland) right-of-way of 8 to 10 metres (m). Widening of the existing portages is not expected, and only minimal brushing of the portages will be required for the Snare WR and the Strutt Lake WR. If ice and/or environmental conditions are not sufficient on the existing alignments minor changes may be required to ensure the safety of the route.

No soil stripping, removal of overburden, or draining of waterbodies/wetlands is expected during WR construction. However, small amounts of vegetation present on the portages and surface of the borrow sources will be removed. Vegetation clearing will be minimized to danger tree removal only. These activities will occur during winter months only. Any bushes or trees that are cleared will be moved to the edge of the WR corridor and left to naturally decompose..

Operation of the WRs will include use of the road for routine maintenance of the hydro facilities, and for transportation of materials and fuel for the planned upcoming construction activities.

For the Snare WR the road may be used for personnel transportation until the end of March or until the road is closed due to weather. The Snare winter roads are presented in Figure 1.

6 SPILLS

6.1 MATERIALS & REPORTABLE SPILLS ON THE WINTER ROADS

The Project Manager, Engineering (or designate) is responsible for reporting spills on the Snare Hydroelectric Facility WRs. The Project Manager, Engineering, must be notified immediately of any spill regardless of quantity to land or water within the WR corridor (see Table 3-1 in the Spill Contingency Plan for Immediately Reportable Quantities).

6.2 SPILL PREVENTION MEASURES

In addition to the measures described in Section 3.3 in the Spill Contingency Plan, the following additional general preventative measures are in place to minimize the risk and impact of a potential spill or release:

- Prior to starting to work or travel on the Snare Hydroelectric Facility WR, all employees and contractors (including third party contractors and suppliers) are required, as a minimum, to go through an orientation session to familiarize themselves with this SCP, the hazardous materials that will be transported on the WRs, and the WR spill response procedures.
- All vehicles and equipment travelling or operating on the winter road will be equipped with spill kits. The spill kits and their contents are to be regularly inspected to ensure that adequate supplies are available.
- Regularly inspect the WR marshalling and laydown areas and any pullout or parking areas along the WR for minor spills or leaks from parked vehicles.

7 RESPONSIBLE PARTY

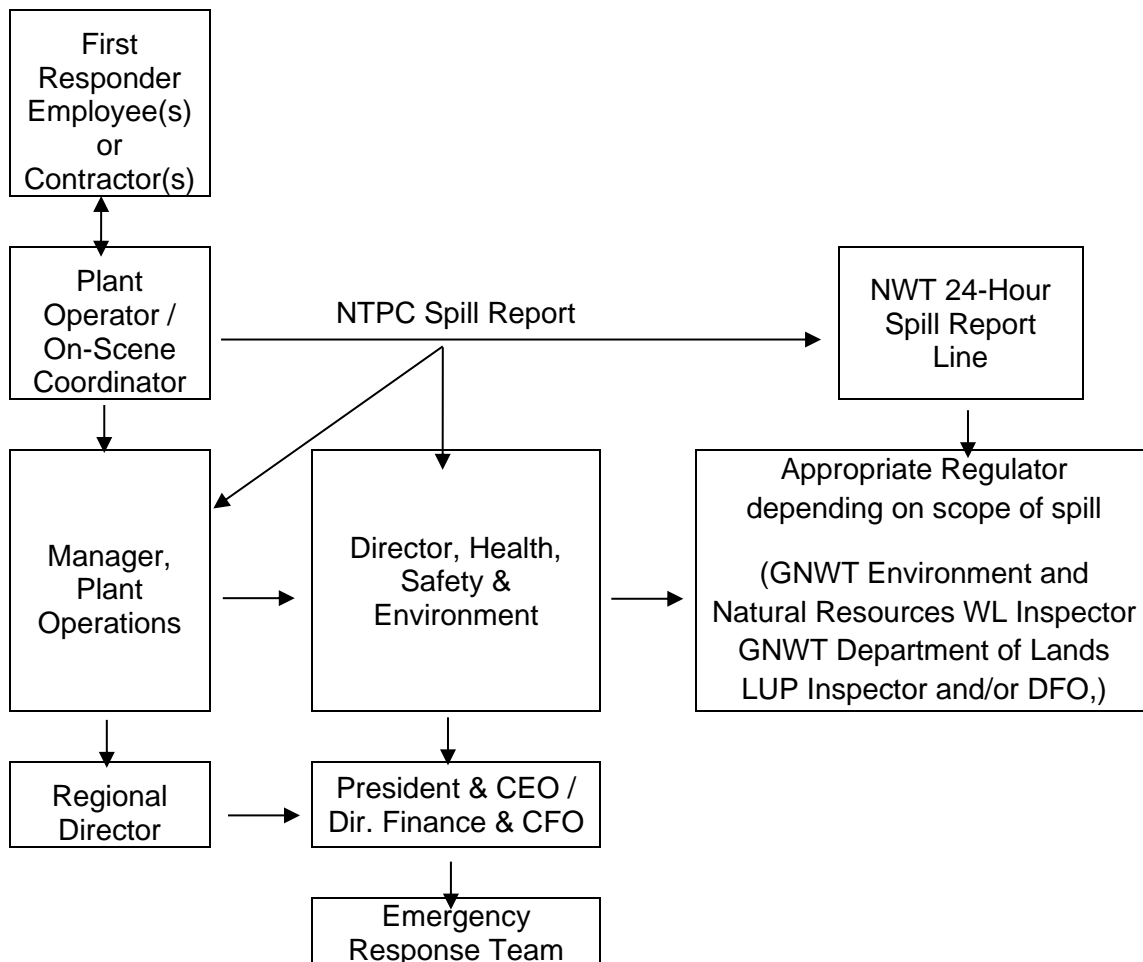
The Responsible Party is the organization or individual whose equipment or personnel are directly involved with, or the cause of, the spill. This could be a third-party contractor or supplier, NTPC staff, or any other WR user. The responsibility for any incident or accident lies with the Responsible Party and they will be held accountable for any emergency response or clean-up costs associated with the incident.

8 RESPONSE ORGANIZATION

The spill response organization, communication flowchart, response team roles and responsibilities, and organizational communication plan described in Section 4 in the Spill Contingency Plan remains in effect for incidents involving spills on the Snare Hydroelectric Facility WRs with two important exceptions. First, Yellowknife will be the nexus for coordinating

spill responses on the WR. Where the Plant Operator is the On-Scene Coordinator for spills at the Snare Hydroelectric Facility, the Manager, Operations – Central Control Room (or designate) based in Yellowknife will be the On-Scene Coordinator for spills on the Snare Hydroelectric Facility WR. When a spill of any size is discovered, the Manager, Operations – Central Control Room, and 24-Hr Spill Report Line must be notified. Second, first responder to incidents on the WR as described in Section 4.1.1 in the Spill Contingency Plan includes NTPC employees and contractors as well as third party contractors and suppliers working or travelling on the Snare Hydroelectric Facility WRs (see Figure 2).

Figure 2: Spill Response Organizational Communication Flowchart



The flow chart depicted in Figure 2 identifies the response organization and the chain of command for responding to a spill. In accordance with the action plan described in Section 5 of the Spill Contingency Plan, the response organization details the roles and responsibilities of each party involved in the spill and their contact information, including the 24-hr phone numbers for the responsible person.

Emergency Response Team (ERT): For spills into water on the WR, **Senior Leadership** will form the ERT immediately (Table 4-2 in the Spill Contingency Plan). Senior Leadership may opt to form this team for lesser covered, the Manager, Operations – Central Control Room and the 24-Hr emergency levels on a case-by-case basis. Should assistance from regulators or government be required, agencies with some ability to support are provided in Table 4-3 of the Spill Contingency Plan.

9 ACTION PLAN

9.1 POTENTIAL DISCHARGE EVENTS – WORST CASE SCENARIOS

In Table 1, a list of potential discharge events, with associated discharge volumes and directions is presented for the primary hazardous materials that will be transported on the Snare Hydroelectric Facility WRs. The most likely discharge volume is indicated, and the spill clean-up procedures will focus on the spills of this quantity. A worst-case scenario is also presented. Specific discharge rates are not indicated for each fuel type as these would vary from a few minutes to several hours, based on the source of leak or puncture.

Spills may occur on land, snow, ice or water, or in combination, depending on the conditions at the time of the spill. Any product or material recovered during spill response should be disposed of as per the Snare Hydroelectric Facility WRs Waste Management Plan.

Table 1: List of Hazardous Materials, Potential Discharge Events, Potential Discharge Volumes (Worst Case Scenario in Brackets) and Direction of Potential Discharge

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
Diesel Fuel (Fuel tanker, vehicles, and heavy equipment)	Leak from fuel tank on vehicles and equipment due to collision / accident on WR Fuel tanker rollover Re-fueling spill from equipment located along the WR Leak from fuel tank on a vehicle that breaks through an ice crossing.	Likely < 10 L (max 43,000 L if catastrophic failure of Super B train)	Spills associated with vehicle accidents or re-fuelling on the WR will generally be contained on top of the ice, snow, or frozen ground. The contaminated snow / ice / snow can be shovelled up and place in drums for offsite disposal. Larger spills, including those on ice can be cleaned up
Gasoline (Vehicles and 205 L drums being transported via WR to Snare Hydroelectric Facility)	Large puncture, fast leaking container due to collision / accident during transport on WR Re-fueling spill from equipment located along the WR Leak from fuel tanks on vehicles and equipment due to collision / accident on WR.	Likely < 250 L (max 250 L if a full drum is ruptured)	
Jet Fuel (205 L drums)	Large puncture, fast leaking container	Likely < 250 L	

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
being transported via WR to Snare Hydroelectric Facility)	due to due to collision / accident during transport on WR.	(max 250 L if a full drum is ruptured)	with heavy equipment. Care must be taken not to spread contaminated snow during transport by heavy equipment.
New and Used Lubricating Oil (Vehicles and equipment operating on WR, 205L drums being transported to Snare Hydroelectric Facility via WR)	Large puncture, fast leaking container due to due to collision / accident during transport on WR Leak from engine on vehicles and equipment due to collision / accident on WR Small leak from vehicle parked / stopped on WR for an extended period of time.	Likely < 250 L (max 250 L if a full drum is ruptured)	
New and Used Glycol (Vehicles and equipment operating on WR, 205L drums being transported to Snare Hydroelectric Facility via WR)	Large puncture, fast leaking container due to due to collision / accident during transport on WR Leak from engine on vehicles and equipment due to collision / accident on WR Small leak from vehicle parked / stopped on WR for an extended period of time.	Likely < 250 L (max 250 L if a full drum is ruptured)	
Every precaution must be taken to ensure that spills do not enter a waterway. If there is any possibility of contamination, a stream or river should be protected by diversion of the spill from the watercourse. This could be done with trenches and/or berms, or the use of absorbent berms (see Appendix E).			

9.2 POTENTIAL ENVIRONMENTAL IMPACTS OF SPILLS (INCLUDING WORST CASE SCENARIO)

Refer to Section 5.2 of the Spill Contingency Plan.

9.3 SPILL PROCEDURES

Refer to Section 5.3 of the Spill Contingency Plan.

9.4 DECONTAMINATION

Refer to Section 5.4 of the Spill Contingency Plan.

9.5 CONTAINMENT

Refer to Section 5.5 of the Spill Contingency Plan.

9.6 RECOVERY / CLEANUP

Refer to Section 5.6 of the Spill Contingency Plan.

9.7 STORAGE

Refer to Section 5.7 of the Spill Contingency Plan.

9.8 DISPOSAL

Refer to Section 5.8 of the Spill Contingency Plan.

9.9 SITE RESTORATION

Refer to Section 5.9 of the Spill Contingency Plan.

10 RESOURCE INVENTORY

Refer to Section 6 of the Spill Contingency Plan. In addition, all vehicles and equipment will have a 205 L (45 Gal) Drum Spill Kit when travelling or operating on the WR.

11 TRAINING PROGRAM

NTPC conducts site orientations that include SCP and spill response equipment awareness. Both employees and contractors must complete the NTPC Site Orientation upon entering the Facility for the first time and prior to conducting work. The NTPC Plant Operator provides the site orientation, which provides an overview of this SCP, the locations of spill response equipment, and the procedures to report and respond to a spill incident. Records of site orientations are maintained.

For key NTPC employees responsible to coordinate a response to spill events, NTPC provides an SCP awareness course. In addition to the information provided during the site orientation, spill responders are given a detailed review of this SCP; introduced to step-by-step methods to identify, assess, and respond to spill situations; participate in a review of hazardous materials located on-site and the associated risks; learn how to use absorbent and other spill response equipment; and learn how to properly dispose of contaminated spill response equipment. A mock spill exercise may be performed to familiarize on-site spill responders with the equipment available and the steps to take during typical spills situations that may occur at the Facility.

All contractors are required to have basic first aid and WHMIS training before being allowed to work at the Facility. All Facility employees and supervisors are also required to have WHMIS and first aid training. Persons involved in the handling and shipping of hazardous materials are required to be trained in the Transportation of Dangerous Goods Regulation (TDG) requirements and must have a valid TDG certificate.

An up-to-date training matrix is kept by the NTPC Training Coordinator and contains records of all environmental, health and safety training completed by employees. Third-party contractors and suppliers are required to maintain records of all WR-related HSE training completed by their

personnel. On request by the NTPC Training Coordinator, third-party contractors and suppliers must provide proof of the WR-related HSE training and/or qualifications of any personnel that will work or travel on the Snare Hydroelectric Facility WRs.

12 PUBLIC RELATIONS

Refer to Section 9 of the Spill Contingency Plan.