SPILL RESPONSE PLAN

AKLAVIK DIESEL GENERATING FACILITY, NT

PLANT #140

NORTHWEST TERRITORIES POWER CORPORATION

Empowering Communities

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1.0 INTRODUCTION

1.1. INTRODUCTION

This Northwest Territories Power Corporation (NTPC) Spill Response Plan (SRP) provides an information base for a response to a hazardous materials spill incident (spill) at the Aklavik Diesel Generating Facility (the Facility).

This plan documents the Corporation'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 Spill Response Plan (SRP) shall be maintained at each plant within the Facility and is also available on the PowerLine under Divisions> Health, Safety & Environment> Spill Response Plans. Plant Superintendents receive regular training on the procedures and information contained in this plan.

In addition to this SRP (to ensure compliance with current legislation) NTPC has completed registration of all tanks with Environment Canada and has received Environment Canada identification numbers that are visible on all fuel tanks that fall within regulations at NTPC facilities.

1.2. SCOPE

This SRP applies to all casual, permanent, part-time, and full-time employees, as well as contractors that provide services or conduct work at the Facility.

1.3. COMPANY POLICIES AND PROCEDURES

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. Therefore operating procedures are regularly updated and personnel trained to ensure safe and environmentally sound operations. Training is provided on the following NTPC policies, procedures, and information sources which are available at operating sites and/or on the PowerLine:

- Spill Response Plan;
- Hazardous Waste Management Plan;
- Fuel Transfer SWP;
- Berm Dewatering SWP;
- Operator Training Manual;
- Plant Operating Manual; and
- Safety Handbook.

1.4. SPILL REPORTING

Detailed information regarding the legal and regulatory requirements of spill reporting in the Northwest Territories is contained within the NTPC Hazardous Waste Management Plan. The Corporation regularly trains personnel on the Hazardous Waste Management Plan and maintains up-to-date copies at operating sites and/or on the PowerLine.

NTPC's Environmental Protection Policy requires the reporting of all spills of hazardous materials to water or over five (5) litres to the NWT 24-Hour Spill Line, unless the minimum quantity specified in regulations is more stringent (i.e. less than 5 litres). Additional information regarding spill-reporting procedures is contained in Section 4.0 of this SRP. Spill Report forms can be found in Appendix A of this document and on the PowerLine. Report spills immediately.

1.5. ROLES AND RESPONSIBILITIES

1.5.1. Onsite Personnel

Onsite personnel shall follow all NTPC policies and procedures while onsite, and shall have the appropriate training to respond to any spill under the supervision of the Plant Superintendent.

1.5.2. Plant Superintendent

The Plant Superintendent 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 Superintendent has the responsibility and authority to initiate the SRP. They are responsible for site safety, notification of management, and supervision of contractors. Once local contractors arrive on site, the Plant Superintendent will supervise and direct any cleanup activity until completion or until authority is passed to other onsite personnel.

1.5.3. Manager, Generation Support

The Plant Superintendent notifies the Manager, Generation Support of any spill incidents. The Manager, Generation Support is responsible for ensuring that the spill response is immediate, effective, and sustained.

1.5.4. The Director, Health, Safety & Environment (HSE)

The Plant Superintendent and/or Manager, Generation Support notifies the Director, (HSE) of any spill incidents. The Director, HSE works with the Manager, Generation Support and/or the Plant Superintendent and the appropriate environmental regulatory body to ensure that the spill response is managed in accordance with existing environmental laws and regulations.

1.6. PLAN MAINTENANCE AND CONTROL

The Director, HSE is responsible for the distribution, maintenance and updating of the SRP. This SRP will be reviewed annually and updated:

i. As required, taking into account changes in the law, environmental factors, NTPC policies, and site-specific characteristics; and/or
ii. Following a 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 SRP distribution list. The SRP holder is responsible for adding new and/or removing obsolete pages upon receipt of updates.

1.7. PLAN DISTRIBUTION

This SRP will be distributed to the following:

i. Health, Safety & Environment Department (control copy)
ii. Manager, Generation Support
iii. Aklavik Diesel Generating Facility
iv. Department of Environment and Natural Resources (ENR)
v. NTPC Intranet PowerLine

2.0 SITE SPECIFICS

2.1. PERSON IN CHARGE

Michael Greenland is the NTPC Plant Superintendent of the Aklavik Diesel Generating Facility (the Facility). He is in charge of the Facility and of activating this spill response plan (SRP). His 24-hour contact information is as follows:

Michael Greenland
Plant Superintendent
Box 30, Aklavik, NT, X0E 0A0
867-978-2003 (w)
867-978-2137 (h)
867-678-0443 (c)

In case of emergency the NTPC Central Control Room can be contacted 24-hours a day, 365 days a year, as follows:

NTPC 24-Hour Central Control Room
Box 2250, Yellowknife, NT, X1A 2P7
867-920-4203 (24 Hour Emergency Phone)

2.2. COMMUNITY INFORMATION

The community of Aklavik (68^0 13'N and 135^0 00'W) is situated 1143 km northwest of Yellowknife on the west bank of the Peel River. The community has a population of 590 (2016 Census).

Aklavik is accessible by air from Inuvik year round and bulk supplies and food are barged in during the summer months. An ice road links Aklavik to Inuvik in the winter.

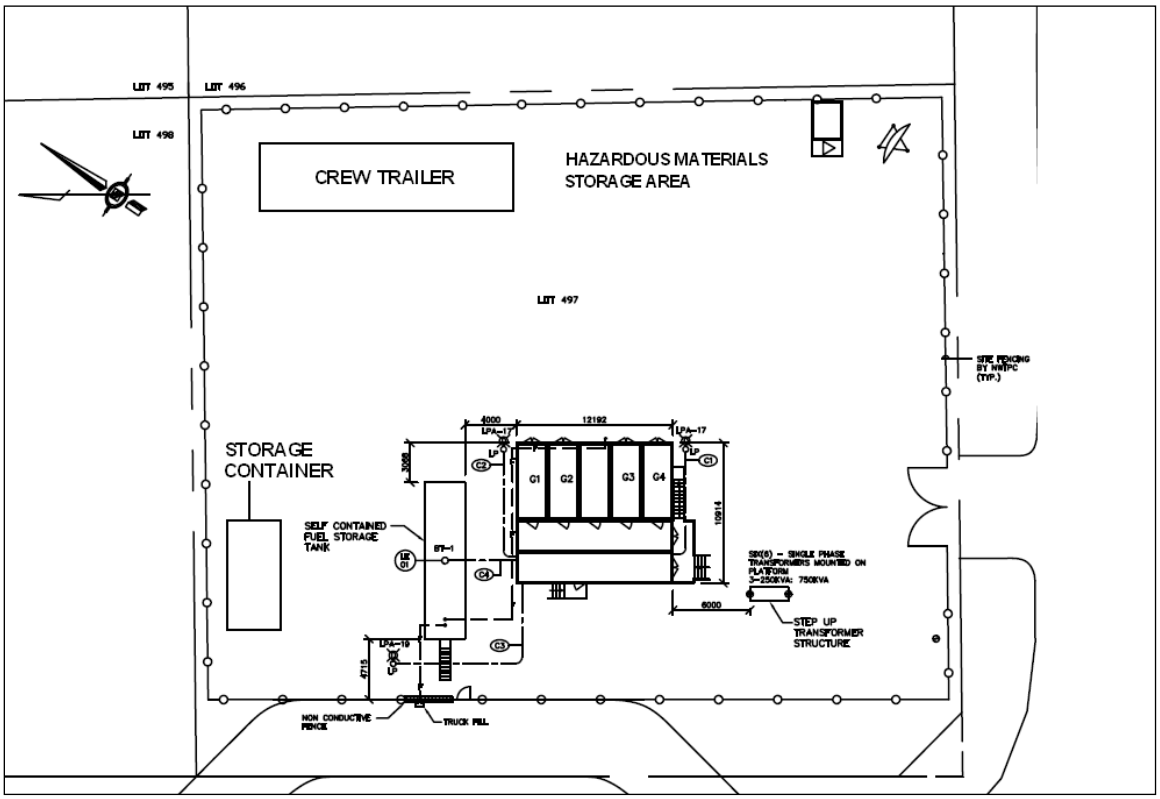
2.3. FACILITY SITE SPECIFICS

Facility Layout

The Facility is located on the northeast side of Aklavik and is surrounded with a chain-link fence. Access to the Facility is through vehicle gates located on both the south and west sides of the lot.

The power plant sits on the west end of the property while the crew trailer sits in the northeast end of the lot. One (1) double-walled, above-ground storage tank (AST) sits north of the plant (see Figure 1). Hazardous material storage in closed on the east side of the lot, south of the crew trailer.

Figure 1: NTPC Plant Site Area – Aklavik



Sensitive Environmental Receptors

The Peel River sits approximately 200 m from the Facility both to the east, west and to the south, as Aklavik is situated at a bend in the river. The primary objective of the spill response is to stop spilled product from reaching the river.

Spill Control

As the site is relatively level, a spill at the Facility could flow in any direction. Once the spill reaches the road, product will travel through ditches and make its way towards the Peel River.

Although roads may not be sufficient to contain more than a small quantity of spilled product, they will provide a solid foundation for a dam system. Culverts will provide potential control points and must be blocked to prevent spilled product from bypassing the dam. Sorbent materials and trenching techniques should be used to intercept flowing product (see Section 4.0).

Onsite Hazardous Product Storage

Next to fuel, lube oil and glycol are the two most abundant hazardous goods stored at the Facility. New and waste lube oil and glycol are stored in drums on the east side of the plant.

Most other fluids stored onsite are kept in small quantities and contained in 205 L drums, 23 L pails, or on pallets, and include paint, solvents, and grease.

Transformers

3-250Kva Transformers are mounted on a platform south of the office (see Figure 1).

Figure 2: Aklavik Plant

2.4. BULK PETROLEUM PRODUCT STORAGE

The Aklavik Facility handles bulk volumes of diesel fuel for generation. An average of 841,000 L of diesel fuel is trucked annually to the Facility from the Imperial Oil tank farm.

Facility fuel storage capacity is 92,274 L, as follows (see Figure 3):

- 1 horizontal 90,000 L double-walled AST, diesel fuel, north of plant
- 1 vertical 1,137 L day tank, diesel fuel, inside plant
- 1 horizontal 1,137 L steel-bermed day tank, diesel fuel, next to office

Figure 3: Facility Fuel Storage

2.5. PRODUCT KNOWLEDGE

The Workplace Hazardous Materials Information System (WHMIS) is Canada's hazardous materials communication standard. The key elements of the system are the cautionary labelling of containers of WHMIS Controlled Products, the provision of Safety Data Sheets (SDS), and worker education programs.

NTPC employees receive WHMIS training to ensure that they understand the properties of products being handled at the Facility. NTPC also ensures that SDS for all products handled at the Facility are maintained onsite and up-to-date. For additional information regarding NTPC's SDS, refer to Section 3.5 of this SRP or to the NTPC Hazardous Waste Management Plan.

2.6. SPILL KITS AND EQUIPMENT

There are three (3) spill kits at the Facility as follows (see Figure 4):

- 2 large overpack spill kits (1 in office, 1 on storage platform)
- 1 ten-gallon spill kit (inside plant)

Figure 4: Facility Spill Kits

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 5):

- **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 5: 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 6).

Figure 6: 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 7).

- **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.

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

- Portable fuel storage (empty drums)
- Hand tools (shovels, rakes)
- Acetylene torch
- Sorbent materials
- Personal protective equipment

Figure 7: Boom Deployment

2.7. HEAVY EQUIPMENT

Heavy equipment is available within the community for emergency spill cleanup. Contact information and equipment available is as follows:

Heavy Equipment Owners	Phone Number (867)
Hamlet of Aklavik	978-2361
K and D Contracting	978-2792
A C Contracting	978-2143
Mackenzie Delta Holdings Ltd.	978-2700

Heavy Equipment Available	Location
Front End Loader	Hamlet/Contractor
Dump Truck	Hamlet/ Contractor
Backhoe	Contractor
Bull Dozer	Contractor
Snow Plow	Contractor
Vacuum Truck	Contractor
Water Truck	Contractor
Fire Truck	Hamlet

3.0 HEALTH AND SAFETY

3.1. SITE CONTROL

In the event of a hazardous materials spill, an immediate assessment will be made to ensure that the site is secure, all non-essential personnel are evacuated from the area, and only those directly involved in the spill response are allowed in the general vicinity of the spilled product.

3.1.1. Fires

There shall be two fully charged 20 lb. class ABC fire extinguishers on hand, as well as a hand-held horn to alert personnel.

3.1.2. Noise Exposure

All Workers must wear hearing protection when operating equipment or machinery or when in areas where noise levels require Workers' to raise their voices to be heard.

3.1.3. Personal Protective Equipment (PPE) Requirements

a. All Workers shall wear class E CSA-approved hardhats, and safety glasses while working on a cleanup site.
b. Selection of outer PPE will be based on the potential for whole body contact with the product. Potential for repeated contact will require rain gear (top/bottoms). Clothing will be kept fully zippered when handling spilled product. Supervising personnel may authorize the removal of suit tops if there is no potential for upper body contact.
c. In situations with high body-contact potential, Workers will seal glove/sleeve and boot/pant leg interfaces with tape.
d. In situations with limited skin contact potential, Workers may wear disposable clean-guard garments or equivalent. In situations with low exposure potential (inspectors, monitors, etc.), personnel need not wear protective clothing.
e. All Workers on shore-cleaning operations shall wear safety goggles.
f. Workers handling contaminated materials will wear outer chemical resistant gloves. Glove/sleeve interfaces will be taped whenever handling heavily contaminated, wet materials.

3.2. Temperature Extremes

Care must be taken when working outdoors in extreme weather conditions. Refer to Safe Work Practices 1.24: Working in Cold Weather and 1.25: Working in Hot Weather for more information.

3.3. Decontamination

Decontamination stations may be established adjacent to or near the spill zone. The decontamination stations will be constructed so that Workers 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.

3.4. 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). NTPC maintains Safety Data Sheets (SDS) for all controlled products used, stored, and/or handled at NTPC work sites. 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/signin

Username: ntpc
Password: msds

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

A selection of SDS from commonly spilled substances have also been included in this document for quick reference (see Appendix E).

4.0 SPILL RESPONSE

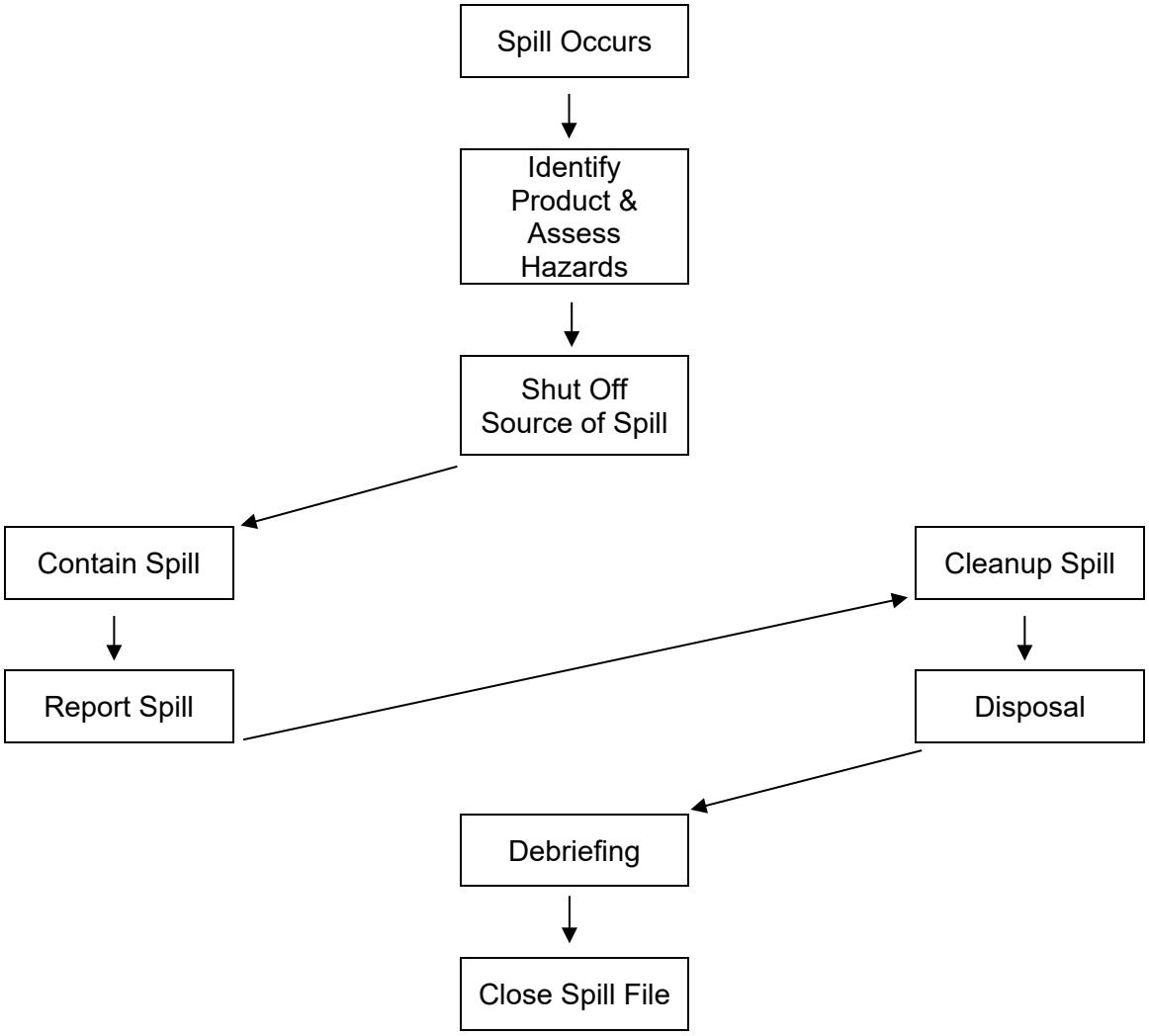
4.1. INTRODUCTION

The following section outlines the steps to take and contacts to make in the event of a hazardous materials spill.

4.2. INITIAL RESPONSE FLOWCHART

The following flowchart (Figure 1) outlines the steps to be taken in the event of a hazardous materials spill. A more detailed description of what is required at each step is outlined in the Initial Response Summary (Section 4.3).

Figure 1: Initial Response Flowchart



4.3. INITIAL RESPONSE SUMMARY

STEP 1 - Identify Product and Assess Hazards

- Identify the spilled product (refer to SDS if necessary).
- Eliminate all sources of ignition.
- Alert all persons in the immediate area that a spill has occurred.
- Where life or property is in danger, there is an emergency. ***Get help.*** Contact the local fire department, police, or municipal authority.
- Keep all persons not directly involved with containment procedures away from the spill site.
- Ensure all personnel involved in the containment procedures are aware of the hazards and are issued personal protective equipment.

  NOTE*: Immediately contact Regional Manager and/or Director, HSE 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.*

STEP 2 - Shut Off Source of Spill

- Locate the spill source(s), and if safe to do so, shut it/them off.
- If the product is being pumped, shut off the pump.
- 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 3 - 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 where the spill can be contained with available staff and equipment. Take all necessary steps to prevent the spill from contaminating any potable water sources or waterways.
- Determine actions to reduce damage as a result of the spill.
- Contain the spill. See Section 4.8 for containment procedures.
- Prepare a contingency plan in case the spill gets out of control of present staff and equipment.

STEP 4 - Report Spill

- Completely fill out a Spill Report form (available in Appendix A and on the PowerLine) and fax to:
  - 24-Hour Spill Line;
  - HSE Department; and

- Regional Manager, Operations.

- For large fuel spills follow the Fuel Spill Calculations Procedures (Appendix E) to determine the spill volume.
- See Section 4.4 for additional information on spill reporting.

STEP 5 - Spill Cleanup and Disposal

- Prior to initiating cleanup and disposal procedures, the appropriate regulatory body and the Director, HSE must approve the procedures.
- Refer to Sections 4.9 to 4.12 of this SRP for information on product recovery, storage, disposal, and site cleanup procedures.
- Upon completion of cleanup fill out a Spill Update Form (available in Appendix B and on the PowerLine) and fax as directed on form.

STEP 6 - Debriefing

- Conduct an internal review of the spill cause, effects, and SRP procedures.

STEP 7 - Close Spill File

- The Director, HSE will follow up with the appropriate regulatory body to ensure that cleanup and/or remediation of the affected areas is satisfactory.

4.4. SPILL REPORTING

It is required by law to immediately report hazardous materials spills to the appropriate government officials. It is NTPC policy to report all hazardous materials spills of 5 L or greater. The reporting procedures are as follows:

1. Fill out a Spill Report form as completely as possible (available in Appendix A and on the PowerLine).
2. Fax or phone in the Spill Report form immediately to the 24-Hour Spill Report Line:

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

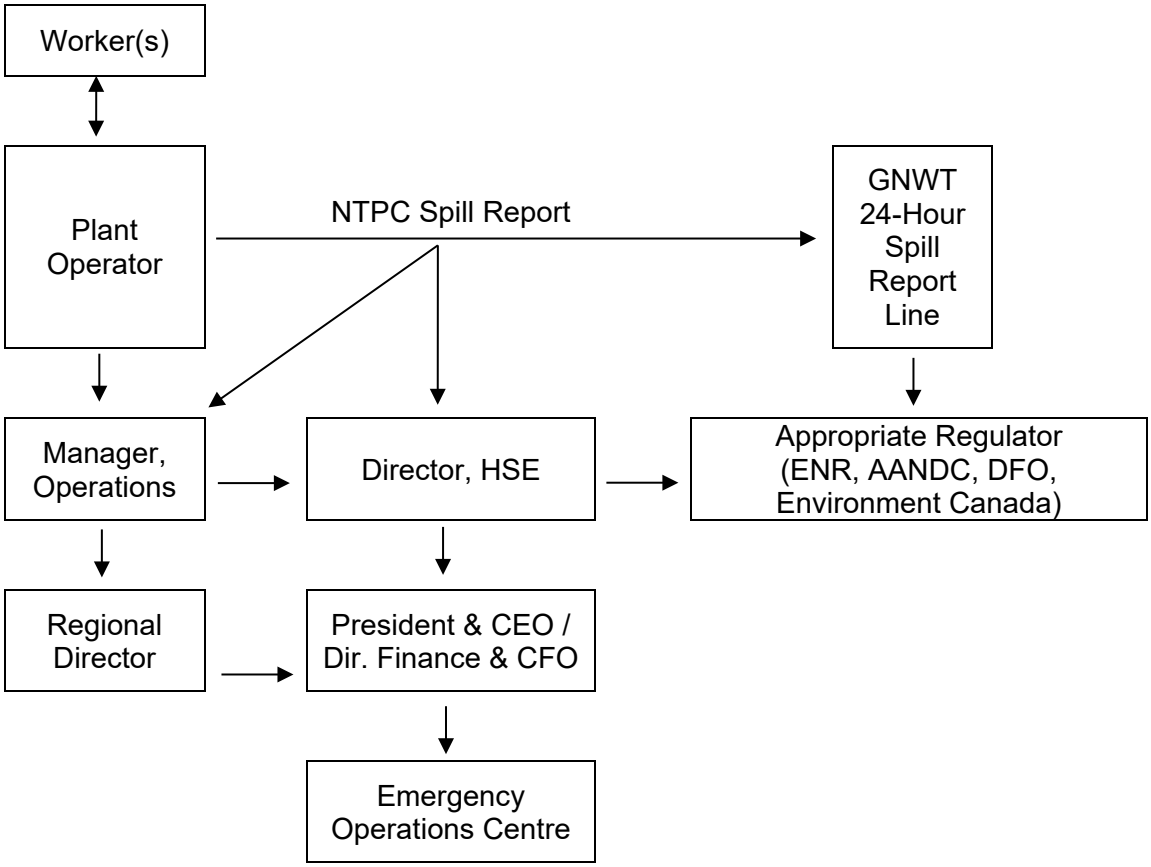
***NOTE**: Collect telephone calls can be made by informing the Operator that you wish to report a spill. RCMP communications may be used if other means are not available.*

3. Fax the Spill Report form to the HSE Department and the Regional Manager, Operations. See phone list (section 4.6) for contact info.

4.5. ORGANIZATIONAL COMMUNICATION PLAN

The flowchart (see Figure 2 below) outlines the typical communication channels used when responding to spills. The seriousness of the spill will determine the individuals notified. For all potential spills to water over 20 L or land over 1000 L emergency declaration may be necessary. In this case, contact the Operations Manager and consult the *Form 11.1: NTPC Emergency Declaration & Response Guidelines* (see PowerLine).

Figure 2: Organizational Communication Flowchart



It is the job of the Director, HSE to contact the appropriate regulator, when necessary; either the Government of the Northwest Territories (GNWT) Department of Environment and Natural Resources (ENR), Aboriginal Affairs and Northern Development Canada (AANDC), or Fisheries and Oceans Canada (DFO).

4.6. COMMUNICATION PROTOCOL

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

When a spill of any size is discovered, notify both:

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

If Regional Manager, 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, Operations or Central Control Room must call the appropriate numbers according to region (see Table 2).

Table 1: NTPC Spill Response Phone List

Division	Position	Name	Phone (867)	Fax (867)
Contact:	Director, Health, Safety & Environment	Dave Dewar	874-5327 (work) 875-0037 (cell)	874-5286
	President & CEO	Cory Strang	874-5217 (w) 875-7676 (c)	874-5349
	Chief Operating Officer	Belinda Whitford	876-669-3303 (w) 867-875-8920 (c)	874-5251
Hydro	Director	Alex Love	669-3313 (w) 446-4712 (c)	669-3316
	Manager, Operations	Vacant	669-3328 (w) 444-6512 (c)	669-3316
	Manager, System Control	Eileen Hendry	669-3301 (w) 446-1170 (c)	669-3316
Thermal	Director	Mike Ocko	777-7711 (w) 445-6520 (c)	777-4318
	Thermal Maintenance Services Manager	Trevor Grant	777-7736 (w) 678-5778 (c)	777-4318
	Mgr. Gen. Support Beaufort/Delta	Bob Eldridge	777-7718 (w) 620-0839 (c)	777-4318
	Maintenance Services Mgr. Deh Cho & Sahtu	Boyd Mallaley	695-7113 (w) 695-1595 (c)	695-7111
	Mgr. Gen. Support Beaufort/Delta	Daniel Bruneau	695-7104 (w) 445-2013 (c)	695-7111

Emergency Response Team: For spills that require emergency declaration refer to NTPC's *Form 11.2: Site Specific Emergency Response Plan* (see PowerLine) for roles and responsibilities for emergency levels I, II, and III.

Table 2: Core Emergency Response Team Phone List

Position	Name	Phone (867)
President & CEO	Cory Strang	874-5217 (w), 875-7676 (c)
Director, Finance & CFO	Vacant	
Director, Engineering	Kumar Balachandran	874-5282 (w), 876-0190 (c)
Director, IT	D'arcy Delorey	874-5206 (w), 876-0168 (c)
Manager, Human Resources	Erin Dean	874-5228 (w) 876-0336 (c)
Director, Hydro Region	Alex Love	669-3326 (w), 446-4712 (c)
Director, Thermal Region	Mike Ocko	777-7711 (w), 445-6520 (c)
Director, Health, Safety & Env.	Dave Dewar	874-5327 (w), 875-0037 (c)
Communications Manager	Doug Pendergast	874-5202 (w), 876-1095 (c)

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

Contact	Phone (867)
Fisheries and Oceans Canada (DFO)	669-4900
Emergency Measures Organization (EMO)	873-7554
Environment and Natural Resources (ENR)	873-7654
Aboriginal Affairs and Northern Development Canada (AANDC) Inspector	669-2768
Department of Lands Inspector	767-9188
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

4.7. GENERAL POLICY ON PUBLIC RELATIONS

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

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 Communications Manager to address the media and 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 Regional Director. 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 on 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 Regional Director informed so that media questions directed to the Corporation can be answered.

5.0 GENERAL CLEANUP

5.1. CONTAINMENT

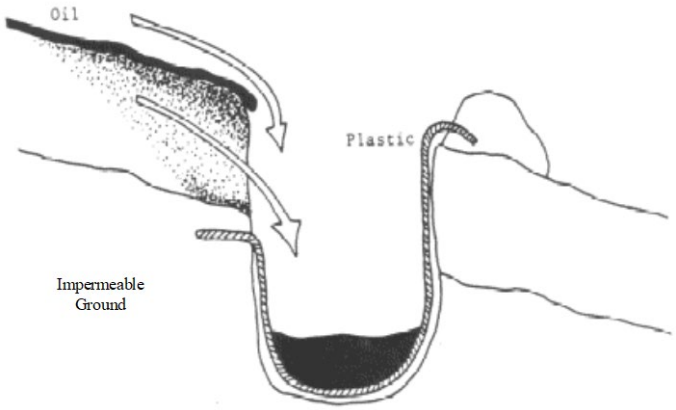
Spill containment may be categorized into land-based containment, water-based containment, and containment under ice.

5.1.1. Land-Based Containment

Trenches

Trenches are practical under summer conditions only. The trench must be dug to groundwater, bedrock, or impermeable ground. 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 3). Sorbent pads, socks, and booms should be placed in the trench to collect spilled product. Materials and equipment that may be used for trench construction include backhoes, loaders, shovels, picks, and waterproof liners. 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.

Figure 3: Trench



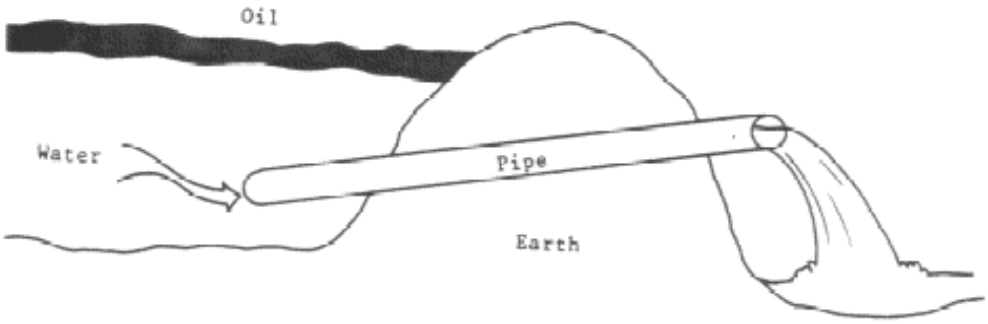
Dams

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 4).

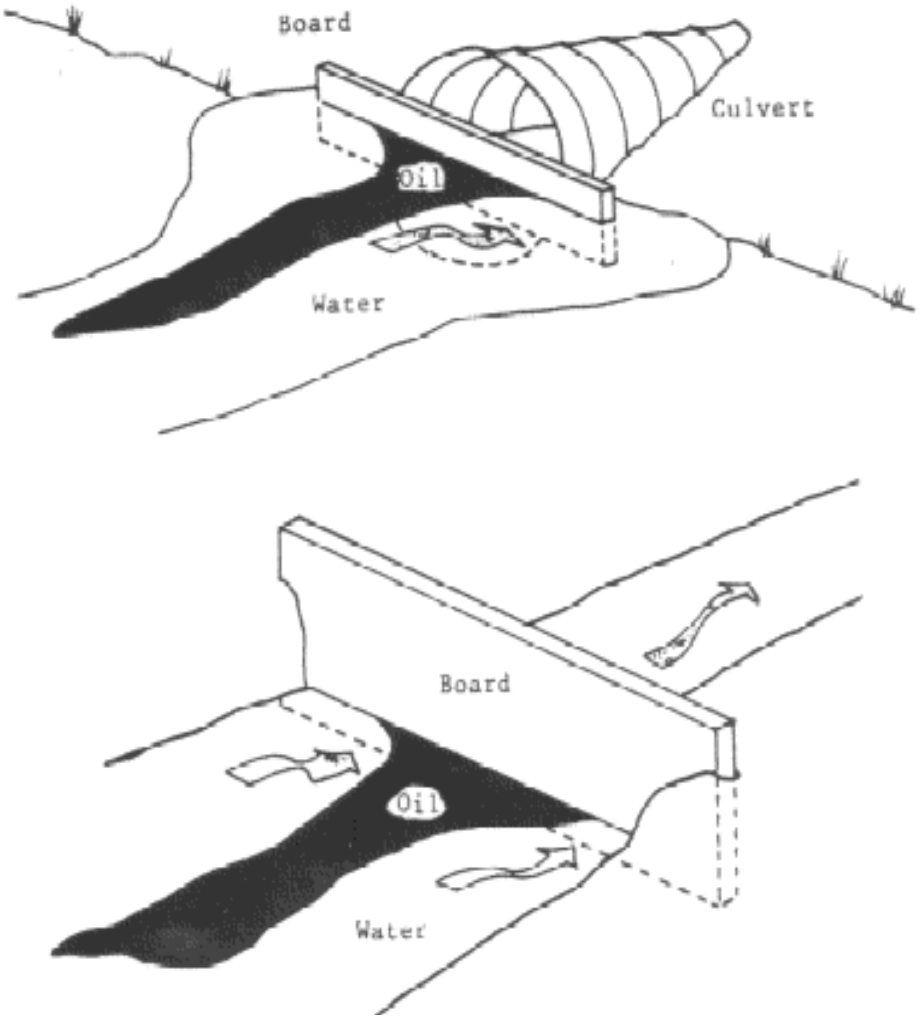
Figure 4: Water Bypass Dam



Weirs

Weirs may be used in ditches and at culvert entrances. Materials commonly used such as plywood, lumber, and sheet metal may be placed to completely or partially block culvert entrances. These barriers are effective on slow-moving streams. Water is allowed to flow under the weir, while product is retained on the surface of the water by the weir (Figure 5).

Figure 5: Weirs



5.1.2. Water-Based Containment

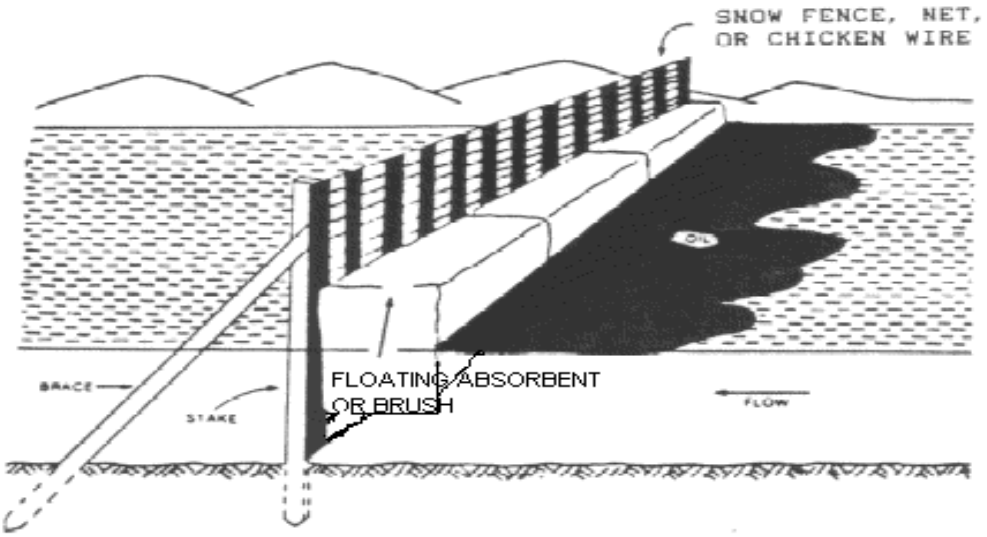
Water-based containment measures generally include the use of barriers or booms. Unless the entire flow of contaminated water can be stopped by damming, water-based methods are limited to the containment and recovery of materials that can be separated from water.

Certain materials such as gasoline and other volatile or flammable petroleum products have a high risk of fire or explosion. For these materials, containment and evaporation (without recovery) or burning may be the preferred approach.

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 6).

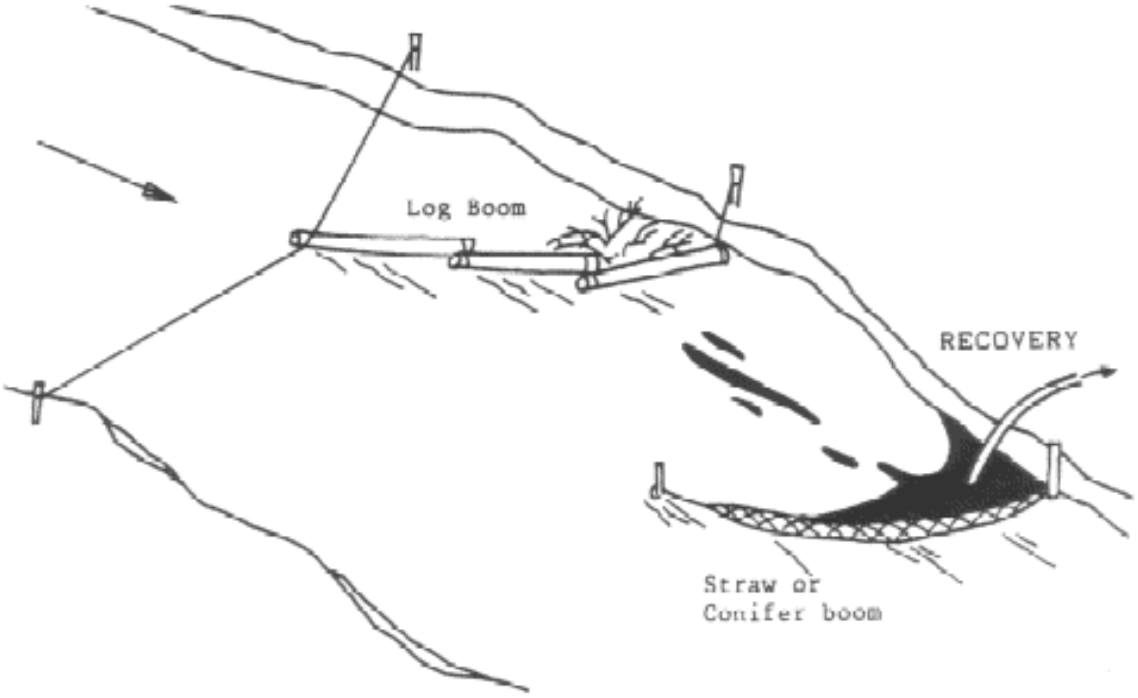
Figure 6: Barrier and Sorbent



Booms

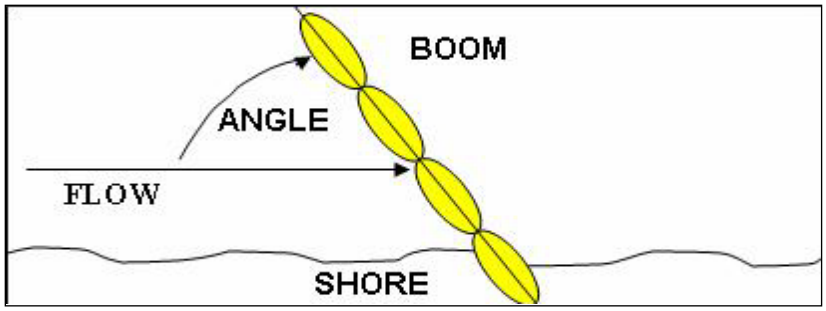
Booms are used to contain a spill of floating liquid or debris, to deflect or divert material to a defined area so that it may be recovered, and to protect sensitive areas from contamination (Figure 7).

Figure 7: Boom Usage



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 8).

Figure 8: Boom Deployment



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.

5.1.3. Containment Under Ice

Ice Slotting

Ice slotting may be used in rivers or streams when current speeds are slow (i.e. less than 0.5 m/s). 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 9, 10). 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 9: Ice Slot

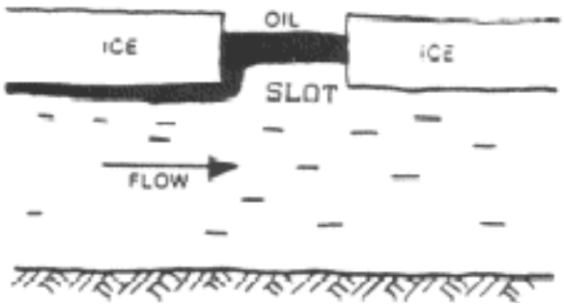
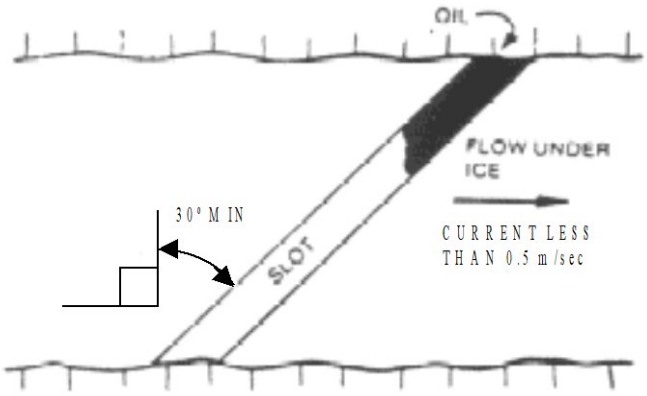


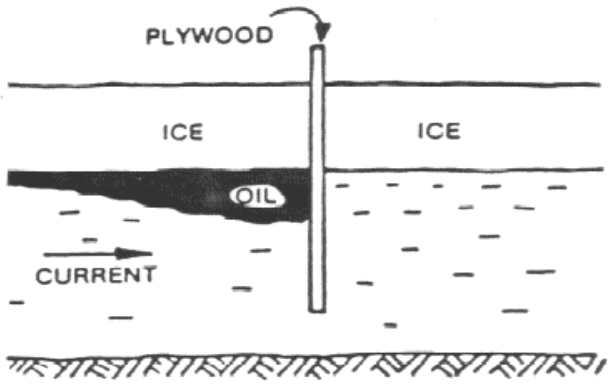
Figure 10: Angled Ice Slot



Vertical Barriers

Vertical barriers such as plywood may be used to deflect product under ice in deep, slow-moving waters (Figure 11). 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 11: Vertical Barriers



5.1.4. 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 overtop of 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.

5.2. RECOVERY

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.

5.2.1. Direct Suction Equipment and Techniques

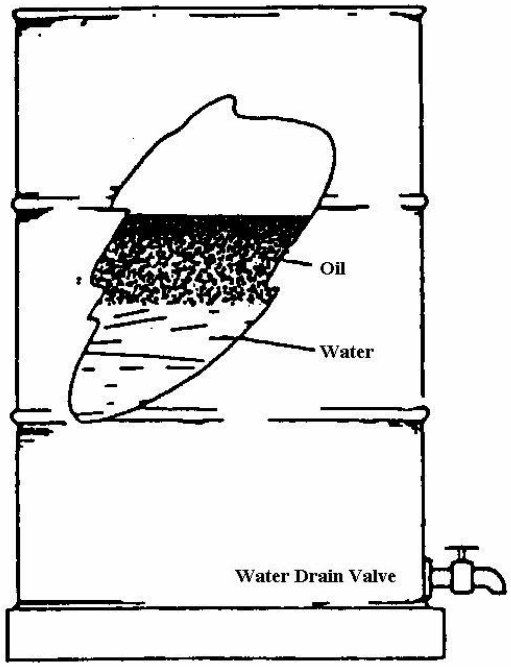
Direct suction methods include the use of vacuum trucks, portable pumps, or shop vacuums. Vacuum cleaners or portable pumps can be used to directly recover materials from damaged containers or from thick slicks on water.

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-litre (45-gallon) drum and plumbing hardware (Figure 12).

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

Figure 12: Improvised Oil-Water Separator Drum



5.2.2. 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.

5.2.3. Sorbent Material

Sorbent materials are commonly used for final cleanup 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.

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.

5.3. STORAGE

Storage is required:

- If a suitable location for disposal cannot be found;
- If climatic conditions do not permit disposal at the time of cleanup;
- 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.

5.3.1. Vehicle Storage

Vehicles suited for the storage of recovered fuel are tank trucks, vacuum trucks, dump trucks, flatbed 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 m^3, while vacuum trucks typically hold around 16 m^3.

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

5.3.2. Open-topped Tanks

Open-topped tanks such as plastic-lined swimming pools with capacities up to 20 m^3 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.

5.3.3. Drums

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

5.4. 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, Health, 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.

5.4.1. Salvage and Recycle

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

5.4.2. 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 INAC.

5.5. FINAL CLEANUP AND RESTORATION

5.5.1. Natural Assimilation (Biodegradation) and Re-vegetation

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.

5.5.2. 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

APPENDIX A

Spill Report Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Government of Northwest Territories | Nunavut | Canada | Inuvialuit Land Administration

NT-NU 24-HOUR SPILL REPORT LINE
Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca

REPORT LINE USE ONLY

A	Report Date: MM DD YY	Report Time:	☐ Original Spill Report **OR** ☐ Update # _____ to the Original Spill Report	**Report Number:**
B	Occurrence Date: MM DD YY	Occurrence Time:		
C	Land Use Permit Number (if applicable):		Water Licence Number (if applicable):	
D	Geographic Place Name or Distance and Direction from the Named Location:		Region: ☐ NT ☐ Nunavut ☐ Adjacent Jurisdiction or Ocean	
E	Latitude: _____ Degrees _____ Minutes _____ Seconds		Longitude: _____ Degrees _____ Minutes _____ Seconds	
F	Responsible Party or Vessel Name:		Responsible Party Address or Office Location:	
G	Any Contractor Involved:		Contractor Address or Office Location:	
H	Product Spilled: ☐ Potential Spill	Quantity in Litres, Kilograms or Cubic Metres:	U.N. Number:	
I	Spill Source:	Spill Cause:	Area of Contamination in Square Metres:	
J	Factors Affecting Spill or Recovery:	Describe Any Assistance Required:	Hazards to Persons, Property or Environment:	
K	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:			

L	Reported to Spill Line by:	Position:	Employer:	Location Calling From:	Telephone:
M	Any Alternate Contact:	Position:	Employer:	Alternate Contact Location:	Alternate Telephone:

REPORT LINE USE ONLY

N	Received at Spill Line by:	Position:	Employer:	Location Called:	Report Line Number:

Lead Agency: ☐ EC ☐ CCG/TCMSS ☐ GNWT ☐ GN ☐ ILA ☐ AANDC ☐ NEB ☐ Other: _____

Significance: ☐ Minor ☐ Major ☐ Unknown

File Status: ☐ Open ☐ Closed

Agency:	**Contact Name:**	**Contact Time:**	**Remarks:**
Lead Agency:			
First Support Agency:			
Second Support Agency:			
Third Support Agency:			

APPENDIX B

Spill Update Form

NORTHWEST TERRITORIES POWER CORPORATION

Spill Update

Submit

Report Update to Supervisor & Environment Dept. Refer to *Policy EV-05, Hazardous Materials Spill Reporting* for more information	**Environment Dept.** 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 ☐	Cleanup Continuing ☐ Expected Completion Date:	Cleanup Completed ☐ Date Completed:

4 Initial Action Plan: Describe each step.

	Y	N	Brief Description
Step 1: Identify product and hazards	☐	☐	
Step 2: Shut off source of spill	☐	☐	
Step 3: a) Spill containment	☐	☐	
b) Report spill	☐	☐	Supervisor ☐ Env. Dept. ☐ NWT 24-hr Spill Report Line ☐
Step 4: Spill cleanup and disposal	☐	☐	
Step 5: Debriefing	☐	☐	

Cleanup Personnel:

Reported by:	Position:	Location:	Telephone No:
Spill Update reported to (please check boxes):	Environmental Department ☐	Supervisor (enter details below) ☐	
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 C

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;

- 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

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 D

Fuel Spill Calculation Procedure

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., -28^0C = 1.0383

6. Obtain the amount of temperature compensated fuel in storage
   - e.g., (22,708 L x 1.0383) = 23,578 L

7. Subtract temperature compensated fuel volume from last month end volume to calculate **Fuel Used Since Last Month End**
   - e.g., (33,737 L – 23,578 L) = 10,159 L
   - This means that the fuel used and spilled since last month end totals 10,159 L

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 E

Safety Data Sheets (SDS)

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

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.

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,

		for at least 15 minutes. Obtain medical attention.
If swallowed	:	Rinse mouth with water. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.
Most important symptoms and effects, both acute and delayed	:	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 (CO2) Water fog. Foam
Unsuitable extinguishing media	:	Do NOT use water jet.
Specific hazards during firefighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	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.

		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/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	525 mg/m3	CA ON OEL
		TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
Kerosine (petroleum); Straight run kerosine	8008-20-6	TWA	200 mg/m3 (total hydrocarbon vapor)	CA BC OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
Fuels, diesel; Gasoil — unspecified	68334-30-5	TWA	100 mg/m3 (total hydrocarbons)	CA AB OEL
		TWA (Vapour and	100 mg/m3 (total hydrocar-	CA BC OEL

		inhalable aerosols)	bons)	
		TWA (Inhal-able fraction and vapor)	100 mg/m3 (total hydrocar-bons)	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.

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

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 COx, NOx, SOx, 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,

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

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.

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

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.

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 Telephone	519-339-2145
Transportation Emergency Phone Number	519-339-2145
Product Technical Information	1-800-268-3183
Supplier General Contact	1-800-567-3776

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

No Reportable Hazardous Substance(s) or Complex Substance(s).

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines see Section 15.

HEALTH EFFECTS

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

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

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

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek

immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

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

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

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

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 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

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

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

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	3 = IARC 2B	5 = ACGIH A1
2 = IARC 2A	4 = ACGIH ALL	6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

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

ECOTOXICITY

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

MOBILITY

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

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

SECTION 16 OTHER INFORMATION

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 04: First Aid Skin - Header was modified.
Section 04: First Aid Eye - Header was modified.
Section 04: First Aid Ingestion - Header was modified.

Section 06: Notification Procedures - Header was modified.
Section 10: Materials To Avoid - Header was modified.
Section 11: 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)

Prepared by: Imperial Oil Limited, IH and Product Safety

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/m3			ACGIH

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

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

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

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

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
If prolonged or repeated contact is likely, chemical-resistant gloves are recommended. If contact with forearms is likely, wear gauntlet-style gloves.

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

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

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

ENVIRONMENTAL CONTROLS

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

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

GENERAL INFORMATION

Physical State: Liquid
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 20ºC
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

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

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks

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

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

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

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

SECTION 14 TRANSPORT INFORMATION

LAND (TDG): Not Regulated for Land Transport

LAND (DOT)
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS 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

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

SECTION 16 OTHER INFORMATION

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Composition: Component table information was modified.
Hazard Identification: CA - Hazards Statement information was modified.
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.

DGN: 5007470 (1002960)

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.

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

This material is defined as a mixture.

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

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: 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

pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 46 cSt (46 mm2/sec) at 40ºC
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	3 = IARC 2B	5 = ACGIH A1
2 = IARC 2A	4 = ACGIH ALL	6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

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

ECOTOXICITY

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

MOBILITY

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

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may

reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

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

DISPOSAL RECOMMENDATIONS

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

REGULATORY DISPOSAL INFORMATION

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

SECTION 14 TRANSPORT INFORMATION

LAND (TDG): Not Regulated for Land Transport

LAND (DOT): Not Regulated for Land Transport

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

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Not controlled

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	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:
Updates made in accordance with implementation of GHS requirements.

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DGN: 5007108 (1015596)
