REPORT

Spill Contingency Plan

Temporary Overland Winter Access to the Ikhil I-37 and Reindeer C-36 Former Wellsites, East-central Mackenzie Delta, Inuvialuit Settlement Region, Northwest Territories

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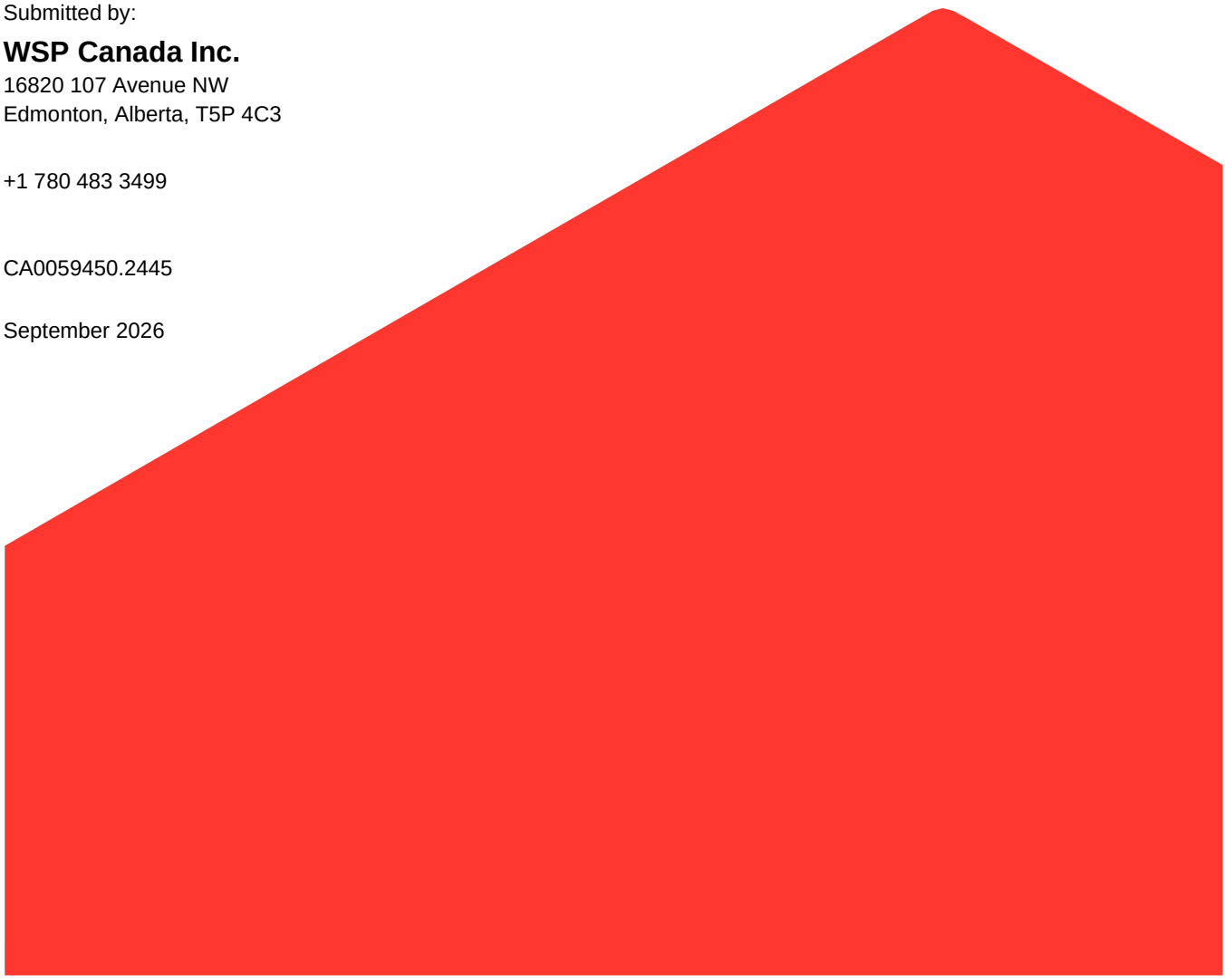
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1.0 INTRODUCTION

1.1 Background

WSP Canada Inc. (WSP) has prepared this Spill Contingency Plan (the Plan) on behalf of Shell Canada Limited (Shell) to support the environmental site assessments (ESAs) at the Ikhil I-37 and Reindeer C-36 former wellsites (the Sites) on Inuvialuit 7(1)(A) Private Land in the east-central Mackenzie Delta of the Inuvialuit Settlement Region (ISR), Northwest Territories (NWT) (the Project). The purpose of this Plan is to describe the spill prevention measures and appropriate responses to several types of spills that may occur during the ESA activities at the Sites as well as ice road and temporary overland winter access construction, maintenance and use.

The Plan will be effective upon its approval and will be implemented during the Project. It includes the Spill Response Contact List for relevant organizations and agencies in the NWT, and the reporting requirements in the event of a chemical, fuel or waste spill. Paper copies of this Plan will be available at the Sites (through the Site Supervisor). All personnel will have access to paper and digital copies of the Plan.

1.2 Location and Description

The Sites are between 49 and 90 kilometres (km) northwest of Inuvik, in the ISR. The location of the Sites are presented in Figure 1 (Appendix A) and in Table A.

Table A: Locations of the Sites

Site Name	Latitude	Longitude	Distance from Inuvik (km)
Ikhil I-37	68°46'33.53" N	134° 7'51.26" W	49
Reindeer C-36	69° 5'10.47" N	134°39'25.13" W	90

Access to the Sites in summer will be via helicopter or boat (Reindeer C-36 only). Access to the Sites in winter will be via ice road extension from the Inuvik to Aklavik public ice road, snowpack ramps and temporary overland winter access, as presented in Figure 2 (Appendix A).

Gulf Canada developed and subsequently abandoned the Sites for oil and gas exploration in 1973 (Komex/IEG 2006). Based on a review of available historical information, historical features potentially include: a well centre, drilling waste sump, a former fuel storage area, flare pit, camp sump, wood pilings and/or former access roads.

1.3 Project Summary

The multi-season, multi-year Project will allow staged ESAs to be completed at the Sites. The stages will include summer and winter activities as outlined in the following text.

Summer Scope of Work

The summer stage of the Project may consist of the following activities.

- Light Detection and Ranging and orthographic imagery of the Sites collected through overflights between May and September.

- Site access via helicopter or boat (Reindeer C-36 only). If accessed by boat, a low ground pressure non-rutting summer vehicle [e.g., ARGO/SHERP or similar] may be used to transport field staff and equipment from the boat landing area(s) to the assessment area(s).
- Aerial (via helicopter) and ground-based visual inspection of the Sites, including site photography and drone surveys to collect high resolution imagery.
- Completion of soil sampling from approximately 20 hand auger boreholes. Additional hand auger boreholes may be completed based on field observations.
- Completion of sediment, surface water and porewater sampling from approximately 10 locations using appropriate hand tools and equipment. Co-located sediment, surface water and porewater samples may be collected from ponded areas (potential drilling waste sump, camp sump and/or flare pit) and from background locations.
- Completion of geotechnical soil sampling using hand tools (e.g., hand auger, shovel/spade) from areas near the drilling waste sumps.
- Assessing the depth of the active layer at locations on and around the Sites using a hand auger or a thaw probe/poking rod.
- Collecting ecological information (such as information on aquatic and terrestrial habitats and incidental observations, and vegetation tissue samples).
- Temporary fuel storage at the Sites will be in jerry cans for refueling of the ARGO/SHERPs, if applicable. The boats will be fueled in Inuvik at the start of each trip and at the Sites from jerry cans, as needed.
- Loose and accessible historical debris, if encountered, that can be safely transported by helicopter or boat may be recovered and transported off site for disposal at a licensed facility (e.g., in Inuvik).
- Geophysical surveys (e.g., electromagnetic [EM], electrical resistivity tomography [ERT] or other) and sump pond bathymetry may be completed.

This multi-year (2026 to 2031) Project is proposed to allow for the flexibility to complete the summer scopes of work over multiple summers, as needed.

Winter Scope of Work

The winter stage of the Project may consist of the following activities.

- Construction of an ice road extension from a junction approximately 30 km along the Inuvik to Aklavik public ice road to the Sites (Figure 2, Appendix A). This will allow site access for equipment as well as the off-site transport and disposal of waste materials. The ice road extension may be approximately 70 km long. It is expected that ice road reconnaissance and profiling will begin in early winter and construction will be finished in January/February.
- Construction of spur ice road, snowpack ramps and temporary overland winter access to allow access to the Sites (Figure 2, Appendix A). Access to the Sites will be completed in late winter/early spring.
- Limited vegetation (e.g., willows and small growth trees) brushing may be required for site and borehole access.

- Mobilization of equipment (e.g., environmental drilling rig, trucks) to the Sites on the ice road/temporary overland winter access for the duration of the winter stage of the Project.
- Completion of soil sampling using an environmental drill rig. Approximately 35 boreholes will be drilled at each Site to depths appropriate for assessment. Additional boreholes may be completed based on field observations. Several of these boreholes may be completed with temporary thermistor installations.
- Temporary fuel storage at the Sites will be in a fuel truck and pick-up truck with slip tank for refueling of equipment and vehicles.
- Loose and accessible historical debris, if encountered, may be collected, transported and disposed of off site at approved facilities.
- Geophysical surveys (e.g., EM, ERT or other) may be completed.

This multi-year (2026 to 2031) Project is proposed to allow for the flexibility to complete the winter scopes of work over multiple winters, as needed.

1.4 Project Contacts

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1.5 Roles and Responsibilities

Shell is responsible for the overall content and assignment of responsibilities of this Plan. Shell's contractors are responsible for the implementation of this Plan and are expected to adhere to it. All personnel working on the Project, including Shell employees, contractors and consultants, will be made aware of this Plan.

1.6 Contractors

Local qualified contractors will be used to complete the ice road construction, the winter camp and environmental site assessment activities, where possible.

1.7 Guidelines

This document was prepared using the following guideline.

- Guidelines for Spill Contingency Planning (INAC 2007).

1.8 Shell Commitment and Policy on Health, Security, Safety, the Environment and Social Performance

In accordance with Shell's Policy on Health, Security, Safety the Environment (HSSE) and Social Performance (SP), every Shell company implements the following commitments (Shell 2025, internet site), which states:

The Shell Commitment and Policy on HSSE and SP is a set of core principles intended to ensure the health and safety of our workforce, minimise environmental impact, respect our neighbours and contribute to sustainable development.

1.8.1 Commitment

In Shell we are all committed to:

- *Pursue the goal of no harm to people.*
- *Respect nature by protecting the environment, reducing waste, making a positive contribution to biodiversity and reducing Greenhouse Gases.*
- *Use material and energy efficiently to provide our products and services.*
- *Respect our neighbours and contribute to the societies in which we operate.*
- *Develop energy resources, products and services consistent with these aims.*
- *Operate assets safely, efficiently and responsibly.*
- *Publicly report on our performance.*
- *Play a leading role in promoting best practice in our industries.*
- *Manage HSSE & SP matters as any other critical business activity.*

- *Create a working environment which is psychologically safe and enables learning in support of this commitment. In this way we aim to achieve a performance we can be proud of, to earn the confidence of customers, shareholders and society at large, to be a good neighbour and to contribute to sustainable development.*

1.8.2 Policy

Every Shell Company:

- *Has a systematic approach designed to ensure compliance with the law and achieve continuous performance improvement.*
- *Sets targets for improvement and measures, appraises and reports performance.*
- *Requires contractors to manage HSSE and SP in line with this policy.*
- *Requires joint ventures under its operational control to apply this policy, and uses its influence to promote it in its other ventures.*
- *Engages effectively with neighbours and impacted communities; and includes HSSE and SP performance in the appraisal of staff and rewards accordingly.*

2.0 POTENTIAL SPILLS AND THEIR ENVIRONMENTAL IMPACTS

A variety of equipment will be used for this Project. Spills may result from several occurrences including the following:

- leaks or ruptures of fuel truck, tanks or other containment;
- valve or line failure in systems, vehicles or heavy equipment;
- vehicular accidents;
- spill during fuel transfer;
- leaks from containment/collection systems;
- vandalism; and
- human error.

Table B below provides a list of hazardous materials stored and used on site that may cause environmental impacts if spilled. Details on storage and volumes (in litres [L]) are also provided.

Table B: Summary of Hazardous Materials Stored and Used on site during all Stages of the Project

Hazardous Material	Storage Type	Storage Capacity	Location Description
Diesel	2 x Fuel truck 10 x Jerry cans	18,200 L each 20 L each	In a bermed and lined containment (winter) that is at least 30 metres (m) from the high-water mark of nearest water body. Jerry cans stored in drip tray (summer) at least 30 m from the high-water mark of nearest water body.

Hazardous Material	Storage Type	Storage Capacity	Location Description
Gasoline	1 x Slip tank	500 L each	At least 30 m from the high-water mark of nearest water body in a mobile truck (slip tank)
Coolant	1 x Pails/jugs	<200 L each	Stored on mobile mechanic's truck
Lube	1 x Pails/jugs	<200 L each	Stored on mobile mechanic's truck
Oil	1 x Pails/jugs	<200 L each	Stored on mobile mechanic's truck
Grease	1 x Pails/tubes	<200 L each	Stored on mobile mechanic's truck
Sewage- at the Sites	2 x Tank	0.2 m^3 (200 L)	Pacto waterless toilet (or equivalent) in the warming trailer
Camp Sewage/Grey water	1 x Tank	40,000 L	Located with the temporary self-contained camp at Camp Farewell or potentially on the ice in the north-central Mackenzie Delta. Only one temporary self-contained camp will be operating at a time.

Notes: m^3 – cubic metre; < – less than

2.1 Antifreeze-coolant, Fuel, Lube Oils and Grease

Gasoline, diesel, coolant, lube oils and grease may be harmful to human health, wildlife and aquatic life. Diesel burns slowly, which reduces the risk to the environment during recovery because a burn can be more easily contained.

Fuel storage at the Sites will be in a fuel truck, slip tank and jerry cans for refueling of equipment and vehicles, with appropriate secondary containment measures and spill kits. The fuel storage and refueling areas (Figure 3 and 4, Appendix A) will be bermed and lined (winter) or use drip trays (summer) with a containment volume of at least 110% of the total volume of stored fuel, and at least 30 m from the high-water mark of the nearest water body.

During the winter stage, two fuel trucks containing diesel (with a maximum capacity of 18,200 L each) and one pick-up truck with a slip tank containing gasoline (with a maximum capacity of 500 L) will be used. During the summer stage, jerry cans with either gasoline or diesel containing 20 L each will be used to refuel the ARGO/SHERPs and boats. The helicopter will not be refueled at the Sites during the summer.

In a worst-case scenario during the winter stage of the Project, the fuel trucks and tanks are punctured or opened and contents seep through and overflow secondary containment and spill onto frozen ground/ice/snow. This would involve up to 37,000 L of diesel/gasoline if all fuel leaked.

In addition, limited quantities of fuel from the winter access construction equipment (e.g., grader, plow trucks, snowcat, dozer), transport equipment (e.g., pick-up trucks, loader) and on-site equipment (e.g., drill rig, ARGO/SHERP) could leak onto the surrounding land/ice. Emergency response drills and daily safety meetings will address this scenario.

In a worst-case scenario during the summer stage of the Project, up to 10 jerry cans are punctured or opened and contents leak onto the surrounding environment. This would involve up to 200 L of diesel/gasoline if all fuel leaked. In addition, limited quantities of fuel/diesel from the ARGO/SHERP (used for site access from the boat landing area) could leak. Emergency response drills and daily safety meetings will address this scenario.

For on-site refueling at a dedicated refueling area, at least 30 m away from the high-water mark of the nearest water body, drip trays will be placed beneath the refueling caps of the equipment. Spill kits with absorbent materials will be available on site during all refueling activities. Dedicated and trained personnel will conduct refueling activities.

Antifreeze or engine coolant products are used in automotive engines and generally consist of ethylene glycol or propylene glycol mixed with distilled water. Coolant will be used in the engines of the vehicles on site only in limited quantities that could leak onto the surrounding land/ice.

2.2 Sewage

Direct exposure to sewage may be harmful to wildlife and humans, as it may cause illness. An approximately 40,000 L heated combined sewage and greywater tank for the camp at Camp Farewell or on the river ice in the north-central Mackenzie Delta (only one camp will be used at a time) and the Pacto waterless toilets (or equivalent) for the warming trailer will be mobilized via the ice road for the duration of the winter months of the Project. Sewage/greywater from the temporary self-contained camp and the Pacto toilets will be emptied weekly, at a minimum, or as required using a vacuum sewage truck (tank) and as bagged waste (Pacto toilets) for waste disposed of at a licensed facility (e.g., in Inuvik). Approval from the Town of Inuvik is provided in the Waste Management Plan.

In a worst-case scenario, both the sewage tank for the camp and the Pacto toilets at the Sites are ruptured, and the contents leak into the surrounding environment. This would involve up to 40,400 L of sewage/greywater. Emergency response drills and daily safety meetings will address this scenario.

2.3 Classification of Dangerous Goods

The waste generator (consignor) is responsible for classifying all dangerous goods that are shipped. Goods classified by the manufacturer will be verified by the contractor on site. Where the composition of the products has been changed, (e.g., mixtures of hazardous waste), the products may need to be reclassified. The carrier is responsible for ensuring that the documentation matches the package. All vehicles transporting dangerous goods into, or out of the Sites will have proper placarding on vehicles. Containers will also be labelled according to the requirements laid out by the *Transportation of Dangerous Goods (TDG) Act* and Regulations. The Site Contractor is responsible for completing the shipping document. Personnel transporting dangerous goods must complete transportation of dangerous goods training.

Persons ordering and receiving dangerous goods will ensure that shipping documents are sent by the suppliers where required by the *TDG Act* and Regulations, and will refuse shipments if not in compliance. Documents will be completed in accordance with the requirements and will be retained for at least two years.

2.4 Fuel Transfer

Vehicles and equipment will be fueled from the fuel truck, slip tanks or jerry cans. The following precautions will be implemented during all fuel transfers.

- Fuel transfer will only be completed by experienced personnel.
- All fuel storage and transfer will take place at a dedicated refueling area, a minimum of 30 m from any water body.

- The fuel transfer procedure consists of using a powered pump nozzle that feeds directly into the equipment's fuel tank. All equipment (nozzles, hoses and joints) will be designed for fuel operations and will be visually inspected before each transfer.
- Spill kits and containments will always be available during fuel transfers.
- Nozzle locks are not permitted and fuelling will be observed at all times.
- Nozzle is to be kept in upright position unless refuelling and always when reeling or unreeling fuel hose.
- Hoses are to be properly hung or wrapped and nozzles placed in their holster when not in use.
- A spill containment tray or absorbent pads must be placed under the fuelling point.
- Tanks are not to be filled to capacity, to allow room for expansion.

3.0 SPILL RESPONSE ORGANIZATION

3.1 Regulatory Agencies

The Government of the Northwest Territories (GNWT) Department of Environment and Climate Change (ECC) is responsible for coordinating regulatory oversight and investigation of hazardous material spills in the NWT. Federal agencies (Crown Indigenous Relations and Northern Affairs Canada, Environment and Climate Change Canada [ECCC] and Transport Canada) are responsible in accordance with their jurisdiction for spill investigations and cleanup monitoring in the NWT. The Inuvialuit Land Administration is responsible for spills on private land in the ISR. The Inuvialuit Water Board (IWB) is responsible for regulatory oversight and investigation of discharges to inland waters and the Canadian Coast Guard is the lead response agency overseeing spills from ships and barges.

3.2 Spill Reporting Procedures

The spill reporting thresholds for a wide variety of materials, compounds and liquids are provided in the Spill Contingency Planning and Reporting Regulations under the NWT *Environmental Protection Act* (GNWT 1998) and are provided in Appendix B.

All spills, regardless of quantity, will be reported to the Site Supervisor and the Shell Project Manager. Spills that exceed the applicable reporting thresholds will be reported to the Northwest Territories/Nunavut (NT/NU) Spill Line and applicable regulatory agencies, and also all spills where the accidental release:

- is near or into an open water body;
- is near or into a designated sensitive environment or sensitive wildlife habitat;
- poses an imminent threat to human health or safety; and
- poses an imminent threat to a listed species-at-risk or its critical habitat.

If applicable, a detailed report including GPS location(s) will be submitted to the applicable regulatory agency no later than 30 days after the initial report of any spill occurrence.

Table C provides the current spill response contact list and Figure A (in the text below) depicts a flow chart for spill response. The Site Supervisor (and Alternate) will be responsible for activating the Plan.

Table C: Spill Response Contact List

Organization	Contact	Phone Number
Northwest Territories 24-Hour Spill Report Line	n/a	(867) 920-8130
IWB (Executive Director)	Mardy Semmler	(867) 678-8609
GNWT ECC, Inuvik (Manager of Resource Management)	Jozef Carnogursky	(867) 678-8090 ext. 24656
GNWT ECC, Inuvik (Water Resources Officer)	Lloyd Gruben	(867) 678-8090 ext. 24659
Fisheries Joint Management Committee	n/a	(867) 777-2828
Canadian Coast Guard	n/a	1-800-265-0237
Site Supervisor	TBD	TBD
WSP Project Manager	Tammara Grendus Virginia Anderson	Cell: (587) 892-9976 Cell: (250) 469-4795
WSP Health and Safety Advisor	Darren Nippers	Cell: (403) 472-0425
Shell Program Manager	Kyle Thompson	(403) 691-3174
Shell Media and Public Enquiries	n/a	(800) 661-1600

Notes:

n/a – not applicable

TBD – to be determined and assigned prior to commencement of fieldwork

A variety of communications equipment will be available at the Site for use during the Project. Table D below summarizes the communications equipment for the Project.

Table D: Communications Equipment for the Project

Company	Equipment (Number)
WSP	Satellite phone (2) / cell phone (2) / inReach device (2) / hand-held radios (2)
Subcontractors	Cell phone (3)/ hand-held radios (3)/ inReach devices (3)
Total	Satellite phone (2) / cell phones (5) / inReach device (5)/ hand-held radios (5)

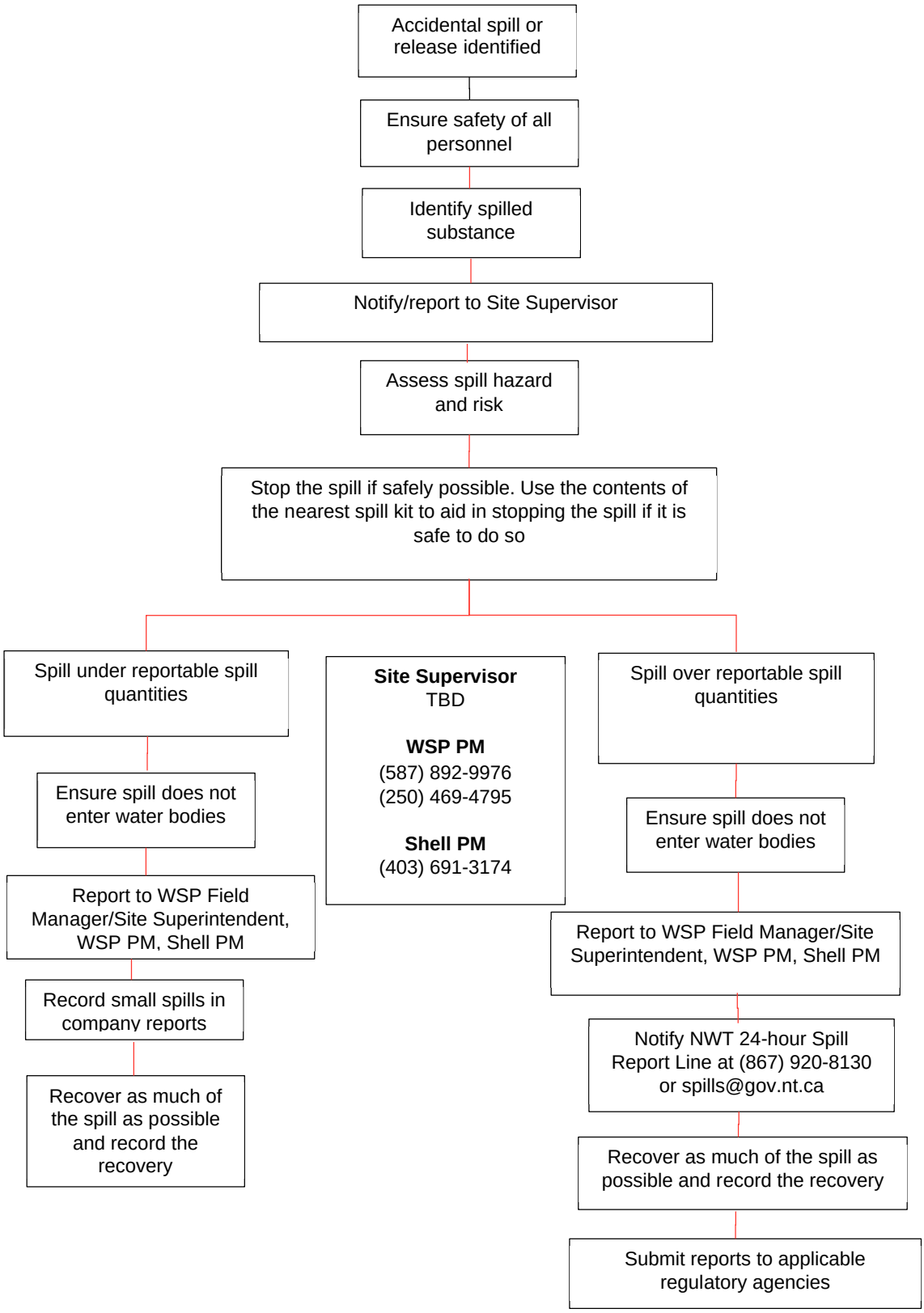


Figure A: Spill Response Flowchart

4.0 PREVENTIVE MEASURES

The following section provides details on the existing preventive measures that are in place for the Project addressing fuel storage, secondary containment, fuel handling procedures and related activities that have the potential to result in a spill event.

- Spill kits will be located wherever fuel is stored and at designated refueling areas.
- Speed limits will be implemented on the ice road and temporary overland winter access.
- All workers will receive spill contingency planning training prior to beginning work.
- The Spill Contingency Plan will be available at the Sites and distributed to all Project staff.
- Pre-Project and tailgate safety meetings will be held regularly to reinforce compliance with proper procedures and minimize the risks of accidents and malfunctions in the field.
- Project staff involved in site activities will be trained in the storing, handling, and transporting of petroleum products and other hazardous substances for the duration of the Project to ensure all necessary precautions are taken to prevent a spill.
- Fuels will be stored in a designated storage area more than 30 m from the high-water mark of the nearest water body.
- The fuel storage and refueling areas will be bermed and lined (winter) or use drip trays (summer) with a containment volume of at least 110% of the total volume of stored fuel.
- Personal protective equipment (PPE) will always be worn when handling hazardous materials.
- Spill mats and/or drip pans/trays will be placed under all equipment and vehicles when not in use or when stationary for more than 2 hours.
- Regular inspections and maintenance will be conducted for all equipment and vehicles (to confirm they are in good working order and free of leaks) including fuel transfer hoses and fuel/oil lines.
- Appropriately sized fuel transfer hoses will be used for refuelling of motorized equipment.
- Identified equipment or vehicle deficiencies will be repaired.
- Drips will be cleaned up immediately.
- Equipment used near water bodies will be clean and free of oil, grease or other deleterious substances.
- Vehicles travelling on the ice road will be properly loaded and loads appropriately secured and covered where necessary.

The Site Supervisor or designated fuel monitor will conduct daily visual inspections to check for leaks or damage to any fuel storage or transfer equipment. Regular maintenance and inspections of all motorized equipment will also be undertaken to avoid preventable leaks.

5.0 SPILL RESPONSE ACTIONS

The following steps outline the general spill response procedures for initial actions to be taken to contain and clean up a spill, as well as disposing of contaminated materials. Spills on snow, ice or land will spread outward from the initial spill point toward lower-lying areas or spread by wave/wind/current action on water. Penetration downward into snow, ice and soil will also occur at a rate that is dependent on the snow, ice or soil type, and the nature of the product spilled and the temperature.

5.1 Initial Spill Response Actions

Initial spill response actions include the following.

- Remove all sources of ignition (e.g., no smoking, shut off engines) if spilled material is flammable/ignitable.
- If possible, identify the spilled material (e.g., gasoline, diesel, antifreeze, etc.).
- Secure the affected area, ensuring the area is safe for entry and does not represent a threat to human health and safety of the spill responders. Restrict access to the area.
- If possible, identify where the spill is coming from (i.e., the source). Determine if the spill is still occurring (i.e., still leaking) or if the spillage has stopped. If the spill has not stopped, determine if it is safe to stop or control the spill (e.g., plug hole, close valve, upright container), or contain the spill (e.g., place a container or tarp with built up edges under the spill source to contain the spill).
- If the spill is too large to be controlled with the spill materials at hand, contact the Northwest Territories 24-Hour Spill Report Line, and report the spill immediately and request assistance (refer to Table C for contact information). Use materials on hand to attempt controlling the spill.
- If the spill (of a liquid) is small enough to be controlled with the spill response materials at hand, prevent spilled contaminants from spreading or entering waterways by using sorbent materials or construct a snow/soil dike down slope from the spill. Once the spill has been controlled and further spreading prevented, contact the Northwest Territories 24-Hour Spill Report Line and report the spill (refer to Table C for contact information).
- If possible, with spill response materials at hand, clean up the remaining spilled contaminant and store contaminated materials (snow, ice, water, soil and used spill absorbents) in a secure container for appropriate off-site disposal. Do not flush the affected area with water.
- If possible, remove any contained liquid by transferring into secure drums.
- Complete the Spill Report Form (Appendix C).

5.2 Spills on Land

Following the initial hazard assessment and development of a site safety plan, detailed information on the location and effects of the spill will be collected. The spill boundary will be identified with the appropriate equipment.

Details on reporting requirements are provided in Section 9.0. It is important to note the terrain, snow, ice or soil types, characteristics and conditions, distance to nearest water body as well as the vegetation types on the Sites.

Surface runoff patterns, erosion potential, moisture levels and movement of the water table can all impact the severity of the spill and the way in which it can be contained, so it is imperative to take note of all these observations before proceeding with cleanup.

The next course of action is to determine the equipment resources that are required to control the spill. The initial assessment will impact what equipment will be used, how it will be transported to the spill site and how it will improve or create access to the spill.

5.3 Spills on Snow/Ice

Any spill occurring on snow/ice will follow the same general procedure as for spills on land. It is expected that the contaminant will penetrate downward into the snow/ice, especially if the contaminant is warm, further than it would on soil; therefore, the HSSE representative will complete a thorough inspection to ensure all the spill is cleaned up. Snow/ice that was removed during the cleanup may melt inside the containment barrel; however, leak proof seals will be in place to prevent this water from spilling outside of the containment barrel and the barrel will be placed in secondary containment until removed from the Sites and disposed of at an approved disposal facility.

It is possible that vehicles on the ice road could be the source of a spill. The ice road will be inspected daily by a dedicated ice road inspector. All vehicles will have drip trays to catch spills should one occur and larger vehicles such as tractor trailers will have belly wraps available to contain any observed leaks that cannot be repaired. Any vehicle that caused a leak on the ice road, the temporary overland winter access or at the Sites will have the leak stopped and contained, and the vehicle will be taken out of service until the source of the leak can be repaired. All spills, no matter how small, will be reported to the Site Supervisor and cleaned up immediately. If a spill is not able to be cleaned up immediately (due to severe weather event, etc.), the location of the spill will have a GPS coordinate taken and a clean up crew will be dispatched as soon as it is safe to do so. It is not expected that there will be impacted ice/snow which would melt into the river because all spills, regardless of size, will be cleaned up as soon as possible.

5.4 Spills on Water

Begin by assessing the characteristics of the affected water course, including width, depth and current. Shoreline characteristics and sensitivities also need to be taken into consideration. The type of impact, type of sensitivity (ecological, cultural, human use, etc.) and any access limitations can all affect the way in which a spill will be contained.

In the absence of any current or wind, a spill on water bodies will spread out in all directions from the site of the spill until a uniform stable thickness is reached. If wind and/or current are present, the spill will move with the wind or current until it reaches the shoreline.

Wave action in the water body may also affect the spill causing oil-in-water or water-in-oil emulsions to form, making recovery and cleanup efforts more difficult.

Responding staff will attempt to contain the spill to as small an area as possible. Dispersion of the spill over a large area on the water body could cause widespread impacts when the spill reaches the shore. If the spill can be contained on the water body, the spilled material is moved toward shore for recovery.

Containment options for spills on water bodies may include the use of a containment boom to surround the spill. If the area that may be impacted by the spilled materials is environmentally sensitive, appropriate shoreline protection measures (such as sorbents and skimmers) may be implemented.

5.5 Measures to Protect Wildlife

In the event of an accidental spill on water or land, measures will be implemented to prevent wildlife and birds from accessing the area.

These measures will include on-site Wildlife Monitors watching for and safely deterring approaching terrestrial or avian wildlife (e.g., by yelling and shouting and waving arms in the air) as described in the Wildlife Management and Monitoring Plan (Section 4.3.3). Encounters with predatory wildlife are excluded from this approach and will be handled as described in the Wildlife Management and Monitoring Plan (Section 4.4). If the spill cannot be cleaned up immediately, snow fence and wood stakes with coloured or reflective tape (to deter birds from landing on and/or accessing the affected area) will be placed around the affected area. Snow fence and stakes will be removed once the spill is fully remediated.

Robust deterrents will be in place; however, in the unlikely event that wildlife comes into contact with a spill, the following organizations will be contacted and their recommendations immediately implemented.

- GNWT – ECC / Wildlife and Forestry for the Beaufort Delta Region in Inuvik (Northwest Territories) at 1-867-678-8091 ext. 53661 (for injured terrestrial wildlife and non-migratory birds);
- ECCC – Canadian Wildlife Service for the Northern Region at cwsnorth-scfnord@ec.gc.ca (for migratory birds); or
- Fisheries and Oceans Canada – Fish and Fish Habitat Protection Program / Arctic Region at 1-855-852-8320 (for fish and fish habitat).

5.6 First Aid

First aid measures will vary based on the type of materials involved in the spill. It is recommended that personnel follow all chemical-specific instructions or call the Northwest Territories 24-Hour Spill Report Line for assistance. Refer to the material-specific Safety Data Sheets (SDS; Appendix D) if skin contact, eye contact, inhalation or ingestion should occur, and follow the first aid procedure in the SDS. Information on poison control for ingested hazardous materials can be obtained by calling the Inuvik Regional Hospital at (867) 777-8000, Aklavik Health Centre at (867) 978-2516 or Tuktoyaktuk Regional Health Services at (867) 977-2321. Additional details are provided in the Project-specific Emergency Response Plan.

6.0 RESPONSE ACTIONS BY SPILL TYPE

6.1 Chemical Spills

The action plan laid out here is generally applicable to any chemical spill that the Project may encounter. Refer to Workplace Hazardous Materials Information System (WHMIS) labels and SDS (Appendix D) for material-specific information.

6.1.1 Initial Action

In the event of a chemical spill, the following measures will be taken immediately.

- Determine the type of chemical. Refer to the SDS if special handling and disposal requirements are not known.
- Evacuate unnecessary personnel.

- Ventilate area of leak or spill (opening all doors and windows if inside equipment, winter camp or warming trailer).
- Wear PPE (gloves, safety glasses, impervious material long-sleeved shirt/coat).
- If available, wear respirator/self-contained breathing apparatus.
- Remove all other chemicals from the area if safe to do so.
- For indoor spills (e.g., inside equipment, winter camp or warming trailer), dilute with water, mop or wipe up and place in proper container. After mopping up chemical, wash area well with soap and water, mopping into spill container and not to the ground.
- For outdoor spills, contain by diking (soil/dry sand/kitty litter), absorb with inert material (soil/dry sand/kitty litter) and place in chemical waste container.
- Do not use combustible materials (e.g., sawdust or cardboard).
- Contain runoff from spill clean-up.
- Notify the Northwest Territories 24-Hour Spill Report Line at 867-920-8130 as required.

6.1.2 Follow-Up Action

After the spill has been cleaned up, other than reporting, disposal and follow-up activities may be required. The following measures will be taken if applicable.

- Contain chemical, inert absorbent material and mop up water as directed by Northwest Territories 24-Hour Spill Report Line personnel and applicable regulators; dispose of material off site at an approved facility, as appropriate.
- Arrange for repair or replacement of chemical containers and equipment, if damaged or leaking.
- Submit a detailed report on the occurrence to the applicable regulatory agency within 30 days of reporting the spill event.

6.2 Petroleum Product Spills

Petroleum product spills may range from minor spills during operations, such as refuelling, to constant leakage from tanks or equipment fuel lines in need of repair, to major spills.

Depending on the location and size of the spill, a petroleum product spill may result in contaminated snow/ice/soil/water. The contaminated material must be cleaned up and removed for disposal along with the spilled petroleum product. Refer to WHMIS labels and SDS (Appendix D) for material-specific information. Both oil-only spill pads and sorbent spill pads are included in the spill kits.

6.2.1 Initial Action

In the event of a petroleum or antifreeze product spill, the following measures will be taken immediately.

- Shut off ignition sources, if safe to do so.
- Identify the spilled material and locate the source.

- Stop the spill at the source, if safe to do so.
- Take actions to contain/clean up spilled material.
- Record relevant information for reporting including the quantity of material spilled, product type, location, date, weather and other relevant information.
- Notify the Northwest Territories 24-Hour Spill Report Line for all spills in excess of reporting thresholds at (867) 920-8130.

6.2.2 Follow-Up Action

After the initial clean-up and reporting procedures, other activities may be required such as reporting and disposal. The following measures will be taken if applicable.

- Collect soil (snow/ice/water) samples, as applicable, for laboratory analysis to determine that the spill has been cleaned up.
- Dispose of impacted soil or water off site at an approved facility, as appropriate.
- Arrange for repair or replacement of petroleum product containers and equipment, if damaged or leaking.
- Submit a detailed report on the occurrence to the relevant regulatory agency within 30 days of reporting the event.
- For large spills, determine the level of final clean-up in consultation with the relevant regulatory agency.

6.3 Antifreeze Product Spills

Antifreeze or engine coolant products are used in automotive engines that could leak onto the surrounding snow/ice/soil/water. The contaminated material must be cleaned up and removed for disposal along with the spilled antifreeze product. Refer to WHMIS labels and SDS (Appendix D) for material-specific information. Both oil-only spill pads and sorbent spill pads are included in the spill kits.

6.3.1 Initial Action

In the event of an antifreeze product spill, the following measures will be taken immediately.

- Shut off ignition sources, if safe to do so.
- Identify the spilled material and locate the source.
- Stop the spill at the source, if safe to do so.
- Take actions to contain/clean up spilled material.
- Record relevant information for reporting including the quantity of material spilled, product type, location, date, weather and other relevant information.
- Notify the Northwest Territories 24-Hour Spill Report Line for all spills in excess of reporting thresholds at (867) 920-8130.

6.3.2 Follow-Up Action

After the initial clean-up and reporting procedures, other activities may be required such as reporting and disposal. The following measures will be taken if applicable.

- Collect soil (snow/ice/water) samples, as applicable, for laboratory analysis to determine that the spill has been cleaned up.
- Dispose of impacted soil or water off site at an approved facility, as appropriate.
- Arrange for repair or replacement of equipment, if damaged or leaking.
- Submit a detailed report on the occurrence to the relevant regulatory agency within 30 days of reporting the event.

6.4 Sewage

The disposal of sewage from the from the Pacto waterless toilets (or equivalent) in the on-site warming trailers will be undertaken in a manner that will prevent sewage leaks. In the event of a leak, the area of impact will be minimized and then cleaned up.

Sewage generated at the temporary self-contained camp at Camp Farewell or potentially on the river ice in the north-central Mackenzie Delta (only one camp will be used at a time) will be managed under separate Environmental Impact Screening Committee Files (Registry File: [04/25-06], [10/24-04]). Details on camp location, sewage volume and disposal are provided in the Waste Management Plan. In the event of a spill, the area of impact will be minimized and then cleaned up.

6.4.1 Initial Action

In the event of a sewage spill, the following measures will be taken immediately.

- Shut off ignition sources if methane gas is present (when safe to do so).
- Identify the spilled material and locate the source.
- Stop the spill at the source, if safe to do so.
- Take actions to contain/clean up spilled material.
- Record relevant information for reporting including the quantity of material spilled, product type, location, date, weather and other relevant information.
- Notify the Northwest Territories 24-Hour Spill Report Line for all spills in excess of reporting thresholds at (867) 920-8130.

6.4.2 Follow-Up Action

After the initial clean-up and reporting procedures, other activities may be required such as reporting and disposal. The following measures will be taken if applicable.

- Load material into trucks and dispose of sewage off site (e.g., at the Inuvik sewage lagoon).
- Submit a detailed report on the occurrence to the applicable regulatory agency within 30 days of reporting the spill event.

7.0 RESOURCE INVENTORY

The following section provides details on the resources that will be available at the Sites to aid in spill response.

7.1 On-Site Resources

A minimum of three spill kits and a spill tray for every potential source (e.g., tanks, fuelling locations and any mobile equipment) will be at the Sites during the winter with contents described below. A minimum of two spill kits and a spill tray for every potential source will be at the Sites during the summer scope. In addition, hand tools and other equipment are at the Sites at all times to assist with spill response.

Spill kits will be replenished throughout the program as required. The spill kits detailed in Sections 7.1.1 and 7.1.2 will be available on site during all stages of the Project.

7.1.1 Spill Kit Contents

Spill kits include the following items:

- four Tyvek splash suits;
- four pairs of chemical master gloves;
- 10 large bags with ties for temporary use;
- two oil only booms (5” by 10');
- 50 oil only mats (16” by 20”);
- five sorbent socks;
- 10 sorbent pads;
- two large tarps;
- roll(s) of duct tape;
- one utility knife;
- one field notebook and pencil;
- one rake;
- one pickaxe;
- three aluminum scoop shovels; and
- one instruction binder.

Additional supplies to aid in the event of a chemical, fuel or sewage spill will also be available. The kit will include the following:

- heavy-duty gloves;
- safety glasses;
- mop/wringer/spill squeegee;

- shovel/broom/dustpan;
- chemical spill container with sealable lid;
- sand/kitty litter (absorbent, non-flammable material); and
- Pulaski.

7.1.2 Earth-Moving and Other Equipment

The following equipment will be available at the Sites during the winter stage of the Project:

- one grader;
- one snowplow truck;
- one fuel truck with fuel transfer hoses; and
- tool kit including hacksaw, hammer and screwdrivers.

A snowcat, graders and up to four plow trucks will be used during the ice road reconnaissance and construction; however, the equipment will not be kept at the Sites during the winter stage of the Project.

7.2 Off-Site Resources

Spill response contact numbers are provided in Table C.

8.0 SPILL RESPONSE TRAINING

WSP is committed to ensuring that all personnel involved in spill response activities fully understand their roles and the roles of others with whom they may interact during an incident. To meet this commitment and to ensure personnel respond effectively, a comprehensive training program will be implemented as described in the following text.

8.1 Orientation

Personnel will receive the following orientation.

- Provide all site personnel with an orientation of the Project's Spill Contingency Plan and its applicable elements.
- Discuss and clarify bridging between WSP's emergency response procedures and this Project's Spill Contingency Plan, where applicable.
- Utilize summary wall charts outlining key responsibilities and lines of communication for quick reference purposes.
- Devote a portion of scheduled safety and/or staff meetings to discussion of spill response issues on an ongoing basis.

8.2 Specialized Spill Response Training

Spill response training will include the following.

- Make available (through WSP'S Site Supervisor) all the required training.

- Ensure personnel working at the Sites comply with the Project's safety training requirements (e.g., First Aid/CPR, WHMIS, Transportation of Dangerous Goods, Fire Extinguisher Safety, etc.).
- The company transporting fuel for the Project will be properly licensed and insured for the activity and required to have and, if needed, implement an emergency response and spill response plan.

8.3 Spill Response Drills

WSP will conduct a minimum of one on-site spill response drill during each stage of the Project to ensure the readiness of the Project team. This drill will be reported as required through the issued permits and licences.

8.4 External Orientation

As appropriate, brief and familiarize all external groups or agencies having a role in this Plan and define their specific responsibilities under the Plan.

8.5 Training Records

The Site Supervisor will be tracking all training requirements and compliance utilizing a spreadsheet. Training records will be reviewed by Site Supervisor prior to mobilization.

9.0 REPORTING REQUIREMENTS

As outlined in Section 3.2, all spills, regardless of quantity, will be reported to the Site Supervisor and the Shell Project Manager. Spills to be reported include spills that have already occurred, or potential spills that are about to occur. Spills must be reported to the Northwest Territories 24-Hour Spill Report Line if the amount is greater than or equal to the amount listed in the spill reporting thresholds (Appendix B) as provided by the Spill Contingency Planning and Reporting Regulations under the *Environmental Protection Act* (EPA 1988).

In accordance with the Spill Contingency Planning and Reporting Regulations, all spills exceeding the reporting thresholds will be reported immediately to the Northwest Territories 24-Hour Spill Report Line at (867) 920-8130. The following details will be provided (if possible):

- date and time of spill;
- location of spill;
- direction spill is moving;
- name and phone number of a contact person close to the location of spill;
- type and quantity of contaminant spilled and cause of spill;
- whether spill is continuing or has been stopped;
- description of existing containment;
- actions taken to contain, recover, clean-up and dispose of the contaminant; and
- name and phone number of the person reporting the spill and the person in charge or control of contaminants at time of spill.

A detailed report on the occurrence must also be submitted within 30 days of the event. The NT/NU Spill Report Form to be completed as part of the reporting is included in Appendix C.

If an uncontrolled release exceeding reporting thresholds occurs, in addition to the appropriate regulatory authorities (Table C), the local Hunters and Trappers Committee (HTC) and the Fisheries Joint Management Committee will be notified. Contact information is provided below.

- Tuktoyaktuk HTC: (867) 340-0057
- Aklavik HTC: (867) 978-2723
- Inuvik HTC: (867) 777-3671
- Fisheries Joint Management Committee: (867) 777-2828, fjmc-rb@jointsec.nt.ca

10.0 SAFETY DATA SHEETS

The SDS are provided in Appendix D for the materials outlined in Section 2.0. It should be noted that the documents in Appendix D still use the previous name Material Safety Data Sheets but are referred to by their current official name (SDS).

These SDS are presented for information purposes only and should not be used for WHMIS purposes. SDS' from the actual vendors will be acquired and maintained for WHMIS compliance, and as applicable, will replace the sheets in this Plan.

The list of hazardous material presented in this Plan is not intended to be a comprehensive list of potential chemicals and petroleum products the Project might use but is merely to present the common chemicals and petroleum products that may be encountered on a regular basis.

11.0 REFERENCES

Literature Cited

EPA (*Environmental Protection Act*). 1988. R.S.N.W.T 1988, c.E-7. Last amended 2017.

GNWT (Government of the Northwest Territories). 1998. Consolidated Spill Contingency Planning and Reporting Regulations R-068-93, Yellowknife, NT. Available at https://www.justice.gov.nt.ca/en/files/legislation/environmental-protection/environmental-protection.r2.pdf

INAC (Indian and Northern Affairs Canada). 2007. Guidelines for Spill Contingency Planning. Available at https://mvlwb.com/sites/default/files/guidelines_for_spill_contingency_planning_2007.pdf

Komex/IEG (Komex International Ltd. and IEG Environmental). 2006. 2005 Drilling Waste Sump Inventory Study in the Inuvialuit Settlement Region. Prepared for ConocoPhillips Canada. June 2006.

Internet Site

Shell (Shell Canada Limited). 2026. Commitment, policies and standards. Available at: https://www.shell.com/sustainability/our-approach/commitments-policies-and-standards.html. Accessed February 2026.

12.0 STATEMENT OF LIMITATIONS

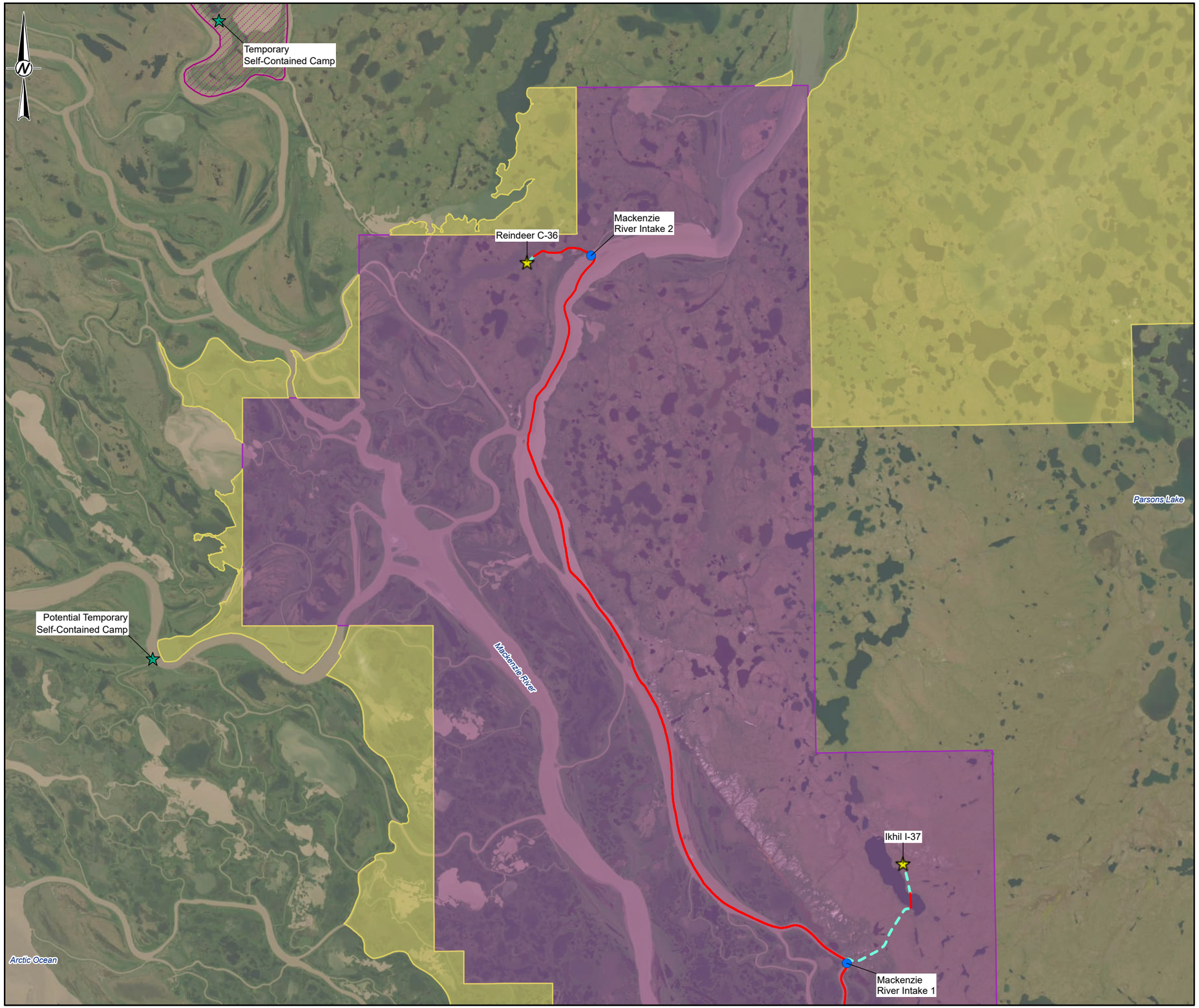
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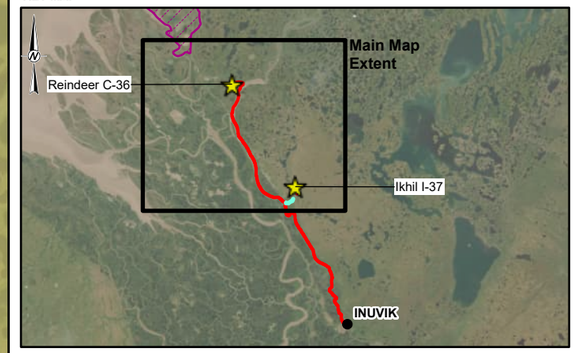
The factual data, interpretations, suggestions, recommendations, and opinions expressed in this document pertain to the specific project, site conditions, and are not applicable to any other project or site location. In order to properly understand the factual data, interpretations, suggestions, recommendations and opinions expressed in this document, reference must be made to the entire document.

APPENDIX A

Figures



KEY MAP



SCALE: 1:2,000,000

LEGEND

- SITE LOCATION
- SELF-CONTAINED CAMP
- APPROXIMATE WATER INTAKE
- PROPOSED ICE ROAD
- PROPOSED TEMPORARY OVERLAND WINTER ACCESS
- KENDALL ISLAND BIRD SANCTUARY

PRIVATE LANDS TITLES AND RIGHTS

- INUVIALUIT 7(1)(A) LANDS FOR SURFACE AND SUBSURFACE TITLE
- INUVIALUIT 7(1)(B) LANDS FOR SURFACE TITLE

Feature	Latitude (DMS)	Longitude (DMS)
Temporary Self-Contained Camp	69°12'34.75"N	135° 5'58.25"W
Potential Temporary Self-Contained Camp	68°52'58.51"N	135°11'31.38"W
Mackenzie River Intake 1	68°43'31.49"N	134°12'46.35"W
Mackenzie River Intake 2	69° 5'19.97"N	134°33'57.73"W

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1:220,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - CANADA
2. BASE MAP: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 8N

CLIENT
SHELL CANADA LIMITED

PROJECT
ENVIRONMENTAL SITE ASSESSMENTS
IKHIL I-37 AND REINDEER C-36 FORMER WELLSITES
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

TITLE
IKHIL I-37 AND REINDEER C-36 SITE LOCATION

CONSULTANT

wsp

YYYY-MM-DD	2026-09-28
DESIGNED	S.VILLENEUVE
PREPARED	C.MEDINA
REVIEWED	J.KRIZAN
APPROVED	T.GRENDUS

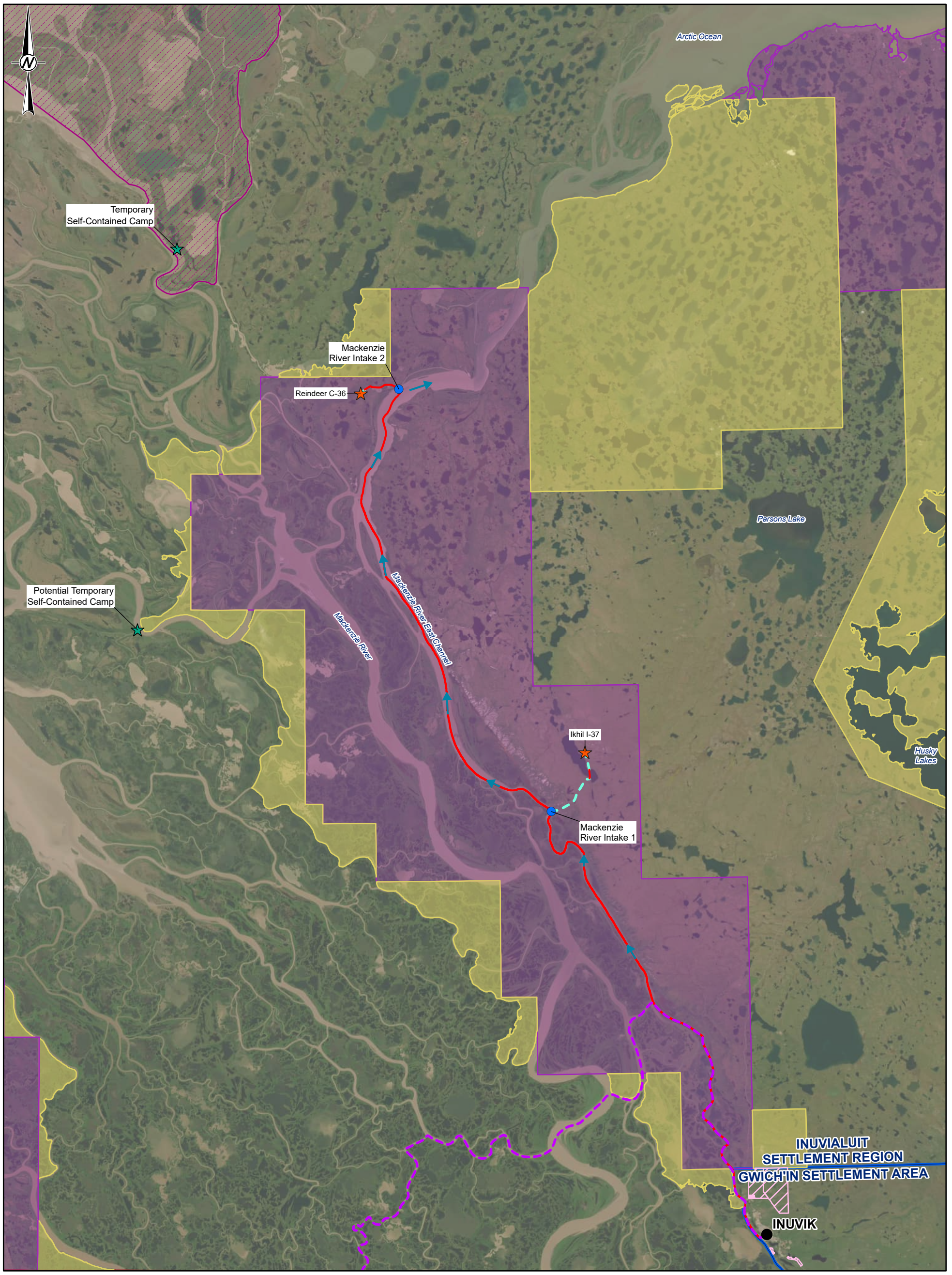
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LEGEND

- SITE LOCATION
- SELF-CONTAINED CAMP
- APPROXIMATE WATER INTAKE
- DIRECTION OF RIVER FLOW
- PROPOSED ICE ROAD
- PROPOSED TEMPORARY OVERLAND WINTER ACCESS
- PUBLIC SEASONAL ICE ROAD
- KENDALL ISLAND BIRD SANCTUARY
- SETTLEMENT REGION BOUNDARY

PRIVATE LANDS TITLES AND RIGHTS

- INUVIALUIT 7(1)(A) LANDS FOR SURFACE AND SUBSURFACE TITLE
- INUVIALUIT 7(1)(B) LANDS FOR SURFACE TITLE
- GWICH'IN LANDS SURFACE AND SUBSURFACE RIGHTS
- GWICH'IN LANDS SURFACE RIGHTS

Feature	Latitude (DMS)	Longitude (DMS)
Temporary Self-Contained Camp	69°12'34.75"N	135° 5'58.25"W
Potential Temporary Self-Contained Camp	68°52'58.51"N	135°11'31.38"W
Mackenzie River Intake 1	68°43'31.49"N	134°12'46.35"W
Mackenzie River Intake 2	69° 5'19.97"N	134°33'57.73"W

0 3,000 6,000 12,000

1:350,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - CANADA
2. BASE MAP: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 8N

CLIENT
SHELL CANADA LIMITED

PROJECT
ENVIRONMENTAL SITE ASSESSMENTS
IKHIL I-37 AND REINDEER C-36 FORMER WELLSITES
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

TITLE
IKHIL I-37 AND REINDEER C-36 SITE LOCATIONS WITH PROPOSED ICE ROAD AND TEMPORARY OVERLAND ACCESS

CONSULTANT
wsp

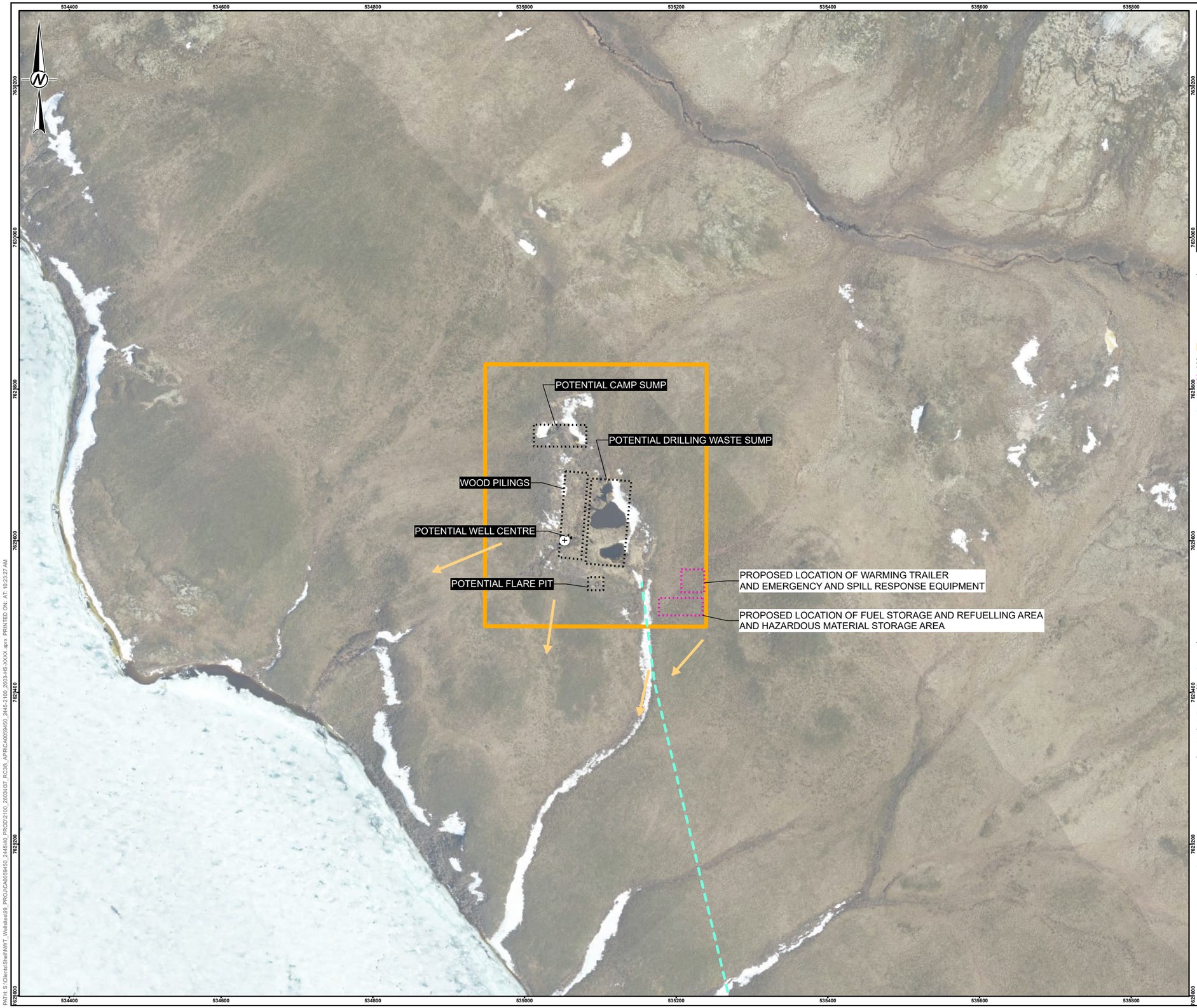
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DESIGNED	S.VILLENEUVE
PREPARED	C.MEDINA
REVIEWED	J.KRIZAN
APPROVED	T.GRENDUS

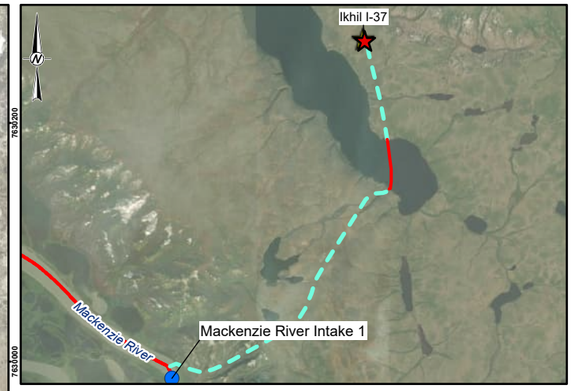
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KEY MAP SCALE: 1:100,000

LEGEND

- WELL MARKER
- APPROXIMATE WATER INTAKE
- POTENTIAL DIRECTION OF SURFACE FLOW
- PROPOSED APPROXIMATE EXTENT OF ASSESSMENT AREA
- INFERRED APPROXIMATE FOOTPRINT OF POTENTIAL FACILITIES
- PROPOSED FEATURE
- PROPOSED ICE ROAD
- PROPOSED TEMPORARY OVERLAND WINTER ACCESS

Temporary Features	Latitude (DMS)	Longitude (DMS)
Proposed Location of Warming Trailer and Emergency and Spill Response Equipment	68° 46' 30.74"N	134° 7' 41.55"W
Proposed Location of Fuel Storage and Refuelling Area and Hazardous Material Storage Area	68° 46' 29.69"N	134° 7' 43.13"W

0 50 100 150 200
1:5,000 Metres

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE
2. FACILITY FOOTPRINTS SHOWN ARE INFERRED AND APPROXIMATE ONLY BASED ON EXPERIENCE AND OBSERVATIONS OF ON-SITE FEATURES, HISTORICAL INFORMATION, AND AERIAL SITE PHOTOGRAPHS

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - CANADA
2. AERIAL IMAGERY: TAKEN BY WSP. DATED: JUNE 2025.
3. BASE MAP (KEYMAP): VANTOR, EARTHSTAR GEOGRAPHICS
4. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 8N
5. SOURCE: 2010 HOBBIT REPORT IKHIK I-37

CLIENT
SHELL CANADA LIMITED

PROJECT
ENVIRONMENTAL SITE ASSESSMENTS
IKHIL I-37 AND REINDEER C-36 FORMER WELLSITES
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

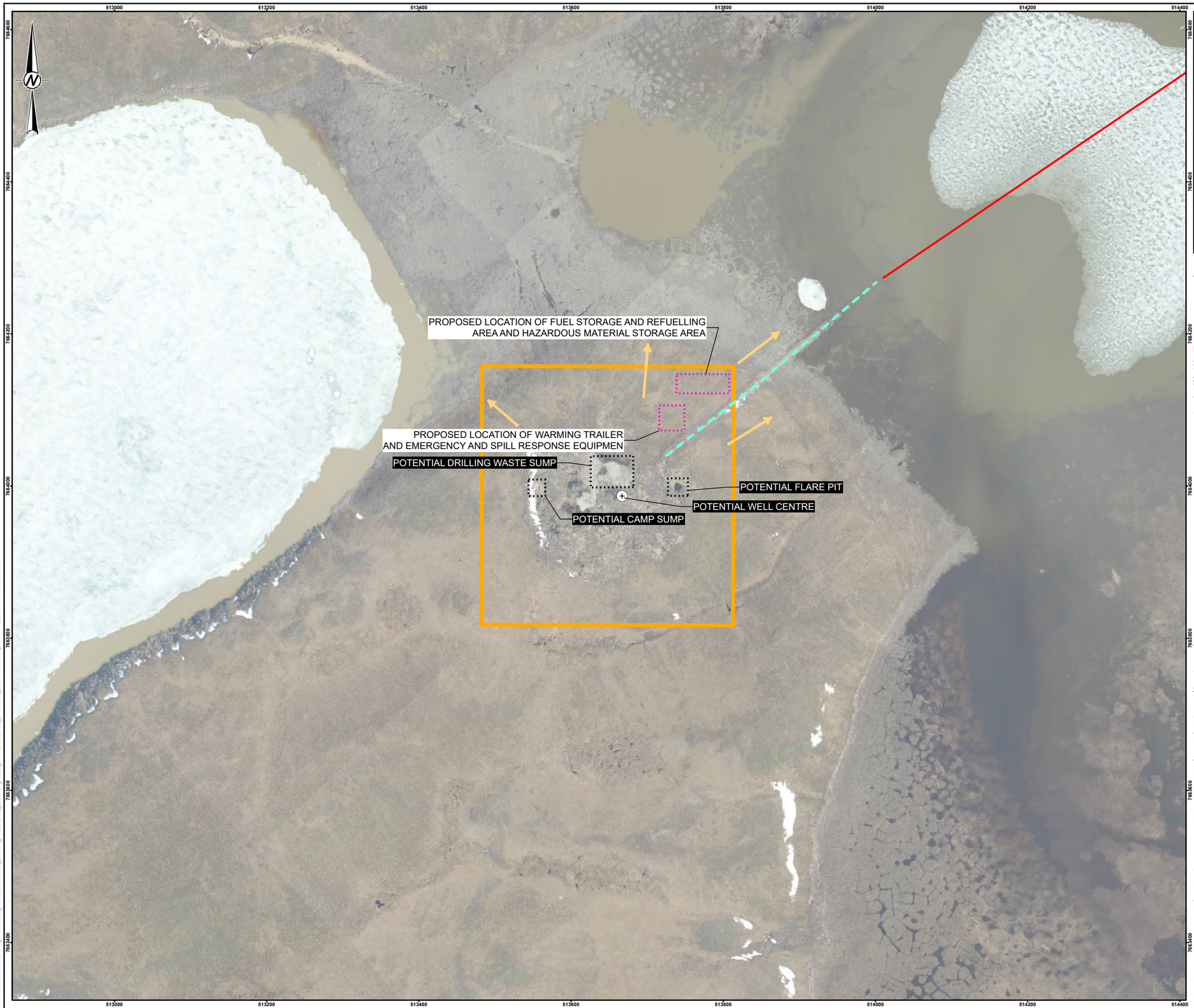
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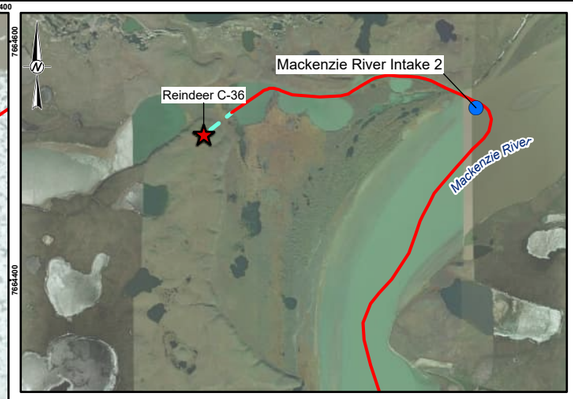
CONSULTANT

YYYY-MM-DD	2026-09-28
DESIGNED	S.VILLENEUVE
PREPARED	C.MEDINA
REVIEWED	J.KRIZAN
APPROVED	T.GRENDUS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
CA0059450.2445	2100.2603	0	3

PATH: S:\Clients\Shell\NWT_Wellsites\99_PROJ\CA0059450_2445\40_PROD\2100_2603\I37_RC36_APR\CA0059450_2445-2100_2603-HS-XXXX.aprx PRINTED ON: AT: 10:23:27 AM





KEY MAP SCALE: 1:60,000

LEGEND

- WELL MARKER
- APPROXIMATE WATER INTAKE
- POTENTIAL DIRECTION OF SURFACE FLOW
- PROPOSED APPROXIMATE EXTENT OF ASSESSMENT AREA
- PROPOSED TEMPORARY FEATURE
- INFERRED APPROXIMATE FOOTPRINT OF POTENTIAL FACILITIES
- PROPOSED ICE ROAD
- PROPOSED TEMPORARY OVERLAND WINTER ACCESS

Temporary Features	Latitude (DMS)	Longitude (DMS)
Proposed Location of Fuel Storage and Refuelling Area and Hazardous Material Storage Area	69° 5' 14.3"N	134° 39' 15.21"W
Proposed Location of Warming Trailer and Emergency and Spill Response Equipment	69° 5' 12.81"N	134° 39' 19.09"W

0 50 100 150 200

1:5,000 Metres

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. FACILITY FOOTPRINTS SHOWN ARE INFERRED AND APPROXIMATE ONLY BASED ON EXPERIENCE AND OBSERVATIONS OF ON-SITE FEATURES, HISTORICAL INFORMATION, AND AERIAL SITE PHOTOGRAPHS

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - CANADA
2. AERIAL IMAGERY: TAKEN BY WSP. DATED: JUNE 2025.
3. BASE MAP (KEYMAP): VANTOR, EARTHSTAR GEOGRAPHICS
4. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 8N
5. SOURCE: 2010 HOBBIT REPORT REINDEER F-36 (C-36)

CLIENT

SHELL CANADA LIMITED

PROJECT

ENVIRONMENTAL SITE ASSESSMENTS
IKHIL I-37 AND REINDEER C-36 FORMER WELLSITES
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

TITLE

REINDEER C-36 PROPOSED APPROXIMATE SITE ASSESSMENT AREA

CONSULTANT

wsp

YYYY-MM-DD	2026-09-28
DESIGNED	S.VILLENEUVE
PREPARED	C.MEDINA
REVIEWED	J.KRIZAN
APPROVED	T.GRENDUS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
CA0059450.2445	2100.2603	0	4

PATH: S:\Clients\Shell\NWT_Wellsites\99_PROJ\CA0059450_2445\40_PROD\2100_2603\137_RC36_APRC\A0059450_2445-2100_2603-HS-XXXX_aprx PRINTED ON: AT 10:24:07 AM

APPENDIX B

Spill Reporting Threshold

Spill Reporting Threshold

Immediately Reportable Spill Quantities as per the GNWT Reportable Quantities for Spills.

Substance for NWT 24-Hour Spill Line	Immediately Reportable Quantities
Explosives Compressed gas (toxic/corrosive) Infectious substance Sewage and Wastewater (unless otherwise authorized) Radioactive materials Unknown substance	Any amount
Compressed gas (Flammable) Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
Flammable liquid	≥100 L
Flammable solid Substances liable to spontaneous combustion Water reactant substances	≥ 25 kilogram (kg)
Oxidizing substances	≥ 50 L or 50 kg
Organic peroxides Environmentally hazardous substances intended for disposal	≥1 L or 1 kg
Toxic substances	≥ 5 L or 5 kg
Corrosive substances Miscellaneous products, substances or organisms	≥ 5 L or 5 kg
Polychlorinated biphenyl (PCB) mixtures of 5 or more parts per million (ppm)	≥ 0.5 L or 0.5 kg
Other contaminants--for example, crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater	≥ 100 L or 100 kg
Sour natural gas (i.e., contains H_2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more
Flammable liquid Vehicle fluid	≥ 20 L When released on a frozen water body that is being used as a working surface

Note: ≥ – greater than or equal to

In addition, all releases of harmful substances, regardless of quantity, are to be reported to the NWT spill line if the release is near or into an open water body, is near or into a designated sensitive environment or habitat, poses an imminent threat to human health or safety, or poses an imminent threat to a listed species at risk or its critical habitat.

APPENDIX C

NT/NU Spill Response Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

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

REPORT LINE USE ONLY

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

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

REPORT LINE USE ONLY

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

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

Significance: ☐ Minor ☐ Major ☐ Unknown

File Status: ☐ Open ☐ Closed

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

APPENDIX D

Safety Data Sheets

Material Safety Data Sheet
Diesel Fuel#2-Low Sulfur (LS) and Ultra Low Sulfur Diesel (ULSD)

NFPA:



TESORO

HMIS III:

HEALTH	1
FLAMMABILITY	2
PHYSICAL	0

0 = Insignificant, 1 = Slight, 2 = Moderate, 3 = High, 4 = Extreme

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Diesel Fuel#2-Low Sulfur (LS) and Ultra Low Sulfur Diesel (ULSD)		
Synonyms	:	888100004790		
MSDS Number	:	888100004790	**Version** :	2.7
Product Use Description	:	Fuel		
Company	:	Tesoro Refining & Marketing Co. 300 Concord Plaza Drive, San Antonio, TX 78216-6999		
Tesoro Call Center	:	(877) 783-7676	**Chemtrec (Emergency Contact)** :	(800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Regulatory status : This material is considered hazardous by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200).

Signal Word : WARNING

Hazard Summary : Toxic

Potential Health Effects

Eyes : Eye irritation may result from contact with liquid, mists, and/or vapors.

Skin : Skin irritation leading to dermatitis may occur upon prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed. Long-term, repeated skin contact may cause skin cancer

Ingestion : Harmful or fatal if swallowed. Do NOT induce vomiting. This material can irritate the mouth, throat, stomach, and cause nausea, vomiting, diarrhea and restlessness Aspiration hazard if liquid is inhaled into lungs, particularly from vomiting after ingestion. Aspiration may result in chemical pneumonia, severe lung damage, respiratory failure and even death.

Target Organs : Kidney, Liver, Skin, Eyes, Central nervous system

Inhalation : Vapors or mists from this material can irritate the nose, throat, and lungs, and can cause signs and symptoms of central nervous system depression, depending on the concentration and duration of exposure.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Weight %
Fuels, diesel, No 2; Gasoil - unspecified	68476-34-6	100%
Naphthalene	91-20-3	0.75 - 1%
Nonane	111-84-2	0.75 - 1%
1,2,4-Trimethylbenzene	95-63-6	1 - 5%
Xylene	1330-20-7	1 - 5%
Sulfur	7704-34-9	15 ppm maximum

SECTION 4. FIRST AID MEASURES

Inhalation : Move to fresh air. Give oxygen. If breathing is irregular or stopped, administer artificial respiration. Seek medical attention immediately.

Skin contact : Take off all contaminated clothing immediately. Wash off immediately with soap and plenty of water. Wash contaminated clothing before re-use. If skin irritation persists, seek medical attention immediately.

Eye contact : Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, seek medical attention.

Ingestion : Do not induce vomiting without medical advice. If a person vomits when lying on his back, place him in the recovery position. Seek medical attention immediately.

Notes to physician : Symptoms: Dizziness, Discomfort, Headache, Nausea, Disorder, Vomiting, Lung oedema, Aspiration may cause pulmonary edema and pneumonitis., Liver disorders, Kidney disorders.

SECTION 5. FIRE-FIGHTING MEASURES

Form : Liquid

Flash point : 51.7 - 82.2 °C (125.1 - 180.0 °F)

Suitable extinguishing media : Carbon dioxide (CO2), Water spray, Dry chemical, Foam, Keep containers and surroundings cool with water spray.

Specific hazards during fire fighting : Fire Hazard. Do not use a solid water stream as it may scatter and spread fire. Cool closed containers exposed to fire with water spray.

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus and protective suit. Use personal protective equipment.

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

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to contain spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact. Ensure adequate ventilation. Use personal protective equipment.

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

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

CERCLA Hazardous substances and corresponding RQs :

Naphthalene	91-20-3	100 lbs
Xylene	1330-20-7	100 lbs
Nonane	111-84-2	100 lbs

SECTION 7. HANDLING AND STORAGE

Handling : Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

Advice on protection against fire and explosion : Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other containers. Precautions to prevent static-initated fire or explosion during transfer, storage or handling, include but are not limited to these examples:

(1) Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.

(2) Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously

containing low flash point products (such gasoline or naphtha).
(3) Storage tank level floats must be effectively bonded.
For more information on precautions to prevent static-initated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents (2008).

Dust explosion class : Not applicable

Requirements for storage areas and containers : Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Advice on common storage : Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.

Other data : Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

List	Components	CAS-No.	Type:	Value
OSHA Z1	Naphthalene	91-20-3	PEL	10 ppm 50 mg/m3
	Xylene	1330-20-7	PEL	100 ppm 435 mg/m3
ACGIH	Diesel Fuel	68476-30-2	TWA	100 mg/m3
	Naphthalene	91-20-3	TWA	10 ppm
		91-20-3	STEL	15 ppm
	Xylene	1330-20-7	TWA	100 ppm
		1330-20-7	STEL	150 ppm
	Nonane	111-84-2	TWA	200 ppm

Engineering measures : Use adequate ventilation to keep gas and vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Use only intrinsically safe electrical equipment approved for use in classified areas.

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

Hand protection : Gloves constructed of nitrile, neoprene, or PVC are recommended. Consult manufacturer specifications for further information.

Skin and body protection	:	If needed to prevent skin contact, chemical protective clothing such as of DuPont TyChem®, Saranex or equivalent recommended based on degree of exposure. The resistance of specific material may vary from product to product as well as with degree of exposure.
Respiratory protection	:	A NIOSH/ MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection. Use a NIOSH/ MSHA-approved positive-pressure supplied-air respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.
Work / Hygiene practices	:	Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	Liquid
Appearance	:	Clear, straw colored
Odor	:	Characteristic petroleum (kerosene) odor
Flash point	:	38 °C (100 °F)
Thermal decomposition	:	No decomposition if stored and applied as directed.
pH	:	Not determined
Freezing point	:	Not applicable
Boiling point	:	149 - 371 °C(300 - 700 °F)
Vapor Pressure	:	< 2 mm Hg at 20 °C
Relative Vapor Density	:	>1.0 (Air = 1.0)
Water solubility	:	Negligible
Percent Volatiles	:	100 %
Conductivity (conductivity can be reduced by environmental factors such as a decrease in temperature)		Diesel Fuel Oils at terminal load rack: At least 25 pS/m Ultra Low Sulfur Diesel (ULSD) without conductivity additive: 0 pS/m to 5 pS/m ULSD at terminal load rack with conductivity additive: At least 50 pS/m but conductivity may decrease from environmental factors such as temperature drop. JP-8 at terminal load rack: 150 pS/m to 600 pS/m

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	:	Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers. Viton ® ; Fluorel ®
Materials to avoid	:	Strong oxidizing agents Peroxides
Hazardous decomposition products	:	Carbon monoxide, carbon dioxide and noncombusted hydrocarbons (smoke). Diesel exhaust particulates may be a lung hazard - see Section 11.
Thermal decomposition	:	No decomposition if stored and applied as directed.
Hazardous reactions	:	Keep away from oxidizing agents, and acidic or alkaline products.

SECTION 11. TOXICOLOGICAL INFORMATION

Carcinogenicity

NTP	:	Naphthalene (CAS-No.: 91-20-3)
IARC	:	Naphthalene (CAS-No.: 91-20-3)
OSHA	:	No component of this product which is present at levels greater than or equal to 0.1 % is identified as a carcinogen or potential carcinogen by OSHA.
CA Prop 65	:	WARNING! This product contains a chemical known to the State of California to cause cancer. naphthalene (CAS-No.: 91-20-3)
Skin irritation	:	Irritating to skin.
Eye irritation	:	Irritating to eyes.
Further information	:	Studies have shown that similar products produce skin cancer or skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation. Positive mutagenicity results have been reported. Repeated over-exposure may cause liver and kidney injury Components of the product may affect the nervous system. IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

Component:

Fuels, diesel, No 2; Gasoil - unspecified	68476-34-6	Acute oral toxicity: LD50 rat Dose: 5,001 mg/kg Acute dermal toxicity: LD50 rabbit Dose: 2,001 mg/kg Acute inhalation toxicity: LC50 rat Dose 7.64 mg/l Exposure time: 4 h Skin irritation: Classification: Irritating to skin. Result: Severe skin irritation Eye irritation Classification: Irritating to eyes.

		Result: Mild eye irritation
Naphthalene	91-20-3	Acute oral toxicity: LD50 rat Dose: 2,001 mg/kg Acute dermal toxicity: LD50 rat Dose: 2,501 mg/kg Acute inhalation toxicity: LC50 rat Dose: 101 mg/l Exposure time: 4 h Skin irritation: Classification: Irritating to skin. Result: Mild skin irritation Eye irritation: Classification: Irritating to eyes. Result: Mild eye irritation Carcinogenicity: N11.00422130
Nonane	111-84-2	Acute oral toxicity: LD50 mouse Dose: 218 mg/kg Acute inhalation toxicity: LC50 rat Exposure time: 4 h
1,2,4-Trimethylbenzene	95-63-6	Acute inhalation toxicity: LC50 rat Dose: 18 mg/l Exposure time: 4 h Skin irritation: Classification: Irritating to skin. Result: Skin irritation Eye irritation: Classification: Irritating to eyes. Result: Eye irritation
Xylene	1330-20-7	Acute oral toxicity: LD50 rat Dose: 2,840 mg/kg Acute dermal toxicity: LD50 rabbit Dose: ca. 4,500 mg/kg Acute inhalation toxicity: LC50 rat Dose: 6,350 mg/l Exposure time: 4 h Skin irritation: Classification: Irritating to skin. Result: Mild skin irritation Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product. Eye irritation: Classification: Irritating to eyes. Result: Mild eye irritation

SECTION 12. ECOLOGICAL INFORMATION

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

Component:

Naphthalene	91-20-3	Toxicity to algae: EC50 Species: Dose: 33 mg/l Exposure time: 24 h

1,2,4-Trimethylbenzene	95-63-6	Toxicity to fish: LC50 Species Pimephales promelas (fathead minnow) Dose: 7.72 mg/l Exposure time: 96 h Acute and prolonged toxicity for aquatic invertebrates: EC50 Species Daphnia Dose: 3.6 mg/l Exposure time: 48 h

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal : Consult federal, state and local waste regulations to determine appropriate waste characterization of material and allowable disposal methods.

SECTION 14. TRANSPORT INFORMATION

CFR

Proper shipping name	: DIESEL FUEL
UN-No.	: 1202 (NA 1993)
Class	: 3
Packing group	: III

TDG

Proper shipping name	: DIESEL FUEL
UN-No.	: UN1202 (NA 1993)
Class	: 3
Packing group	: III

IATA Cargo Transport

UN UN-No.	: UN1202 (NA 1993)
Description of the goods	: DIESEL FUEL
Class	: 3
Packaging group	: III
ICAO-Labels	: 3
Packing instruction (cargo aircraft)	: 310
Packing instruction (cargo aircraft)	: Y309

IATA Passenger Transport

UN UN-No.	: UN1202 (NA 1993)
Description of the goods	: DIESEL FUEL
Class	: 3
Packaging group	: III
ICAO-Labels	: 3
Packing instruction (passenger aircraft)	: 309
Packing instruction (passenger aircraft)	: Y309

IMDG-Code

UN-No.	:	UN 1202 (NA 1993)
Description of the goods	:	DIESEL FUEL
Class	:	3
Packaging group	:	III
IMDG-Labels	:	3
EmS Number	:	F-E S-E
Marine pollutant	:	No

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Toxic by ingestion
Severe skin irritant
Moderate eye irritant
POSSIBLE CANCER HAZARD

TSCA Status : On TSCA Inventory

DSL Status : All components of this product are on the Canadian DSL list.

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard
Fire Hazard

PENN RTK US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Components	CAS-No.
Nonane	111-84-2
1,2,4-Trimethylbenzene	95-63-6
Xylene	1330-20-7
Naphthalene	91-20-3
Fuels, diesel, No 2; Gasoil - unspecified	68476-34-6

MASS RTK US. Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Components	CAS-No.
Naphthalene	91-20-3
Xylene	1330-20-7
1,2,4-Trimethylbenzene	95-63-6
Nonane	111-84-2

NJ RTK US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Components	CAS-No.
Nonane	111-84-2
1,2,4-Trimethylbenzene	95-63-6
Xylene	1330-20-7
Naphthalene	91-20-3
Fuels, diesel, No 2; Gasoil - unspecified	68476-34-6

SARA III — US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

Components	CAS-No.
Naphthalene	91-20-3
Xylene	1330-20-7
1,2,4-Trimethylbenzene	95-63-6

California Prop. 65 : WARNING! This product contains a chemical known to the State of California to cause cancer.

Naphthalene 91-20-3

SECTION 16. OTHER INFORMATION

Further information

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 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.

Prepared by : GWU mbH
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D-57078 Siegen

Germany

Telephone: +49-(0)271-88072-0

Revision Date : 10/16/2008

27, 29, 30, 31, 32, 33, 36, 39, 46, 94, 98, 99, 100, 101, 102, 103, 111, 282, 319, 1051, 1052, 1057, 1064, 1072, 1074, 1174, 1376, 1609, 1617, 1626, 1636, 1750, 1752, 1753, 1759, 1763, 1764, 1859, 1866, 1876, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1929, 1931, 1933, 1988

SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: **MOBIL DELVAC 1300 SUPER 15W-40**
Product Description: Base Oil and Additives
SDS Number: 19863
Product Code: 201520403560
Intended Use: Engine oil

COMPANY IDENTIFICATION

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

24 Hour Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
Product Technical Information	1-800-268-3183
Supplier General Contact	1-800-567-3776

SECTION 2 HAZARD IDENTIFICATION

This material is considered to be 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.

Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	GHS Hazard Codes
ALKYL PHENOL	125643-61-0	1 - < 5%	H413
C14-16-18 ALKYL PHENOL	CONFIDENTIAL	0.1 - < 1%	H317, H373
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	1 - < 5%	H304
ZINC ALKYL DITHIOPHOSPHATE	113706-15-3	0.1 - < 1%	H303, H315, H318, H401, H411

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

SECTION 4 FIRST-AID MEASURES

INHALATION

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

SKIN CONTACT

Wash contact areas with soap and water. 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]: >215°C (419°F) [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.

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

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 type of container used to store the material may affect static accumulation and dissipation. Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard			Note	Source
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	Inhalable fraction.	TWA	5 mg/m3			ACGIH

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: Brown

Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.875
Flammability (Solid, Gas): N/A
Flash Point [Method]: >215°C (419°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): > 2 at 101 kPa
Vapour Pressure: < 0.013 kPa (0.1 mm Hg) at 20ºC
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: 109 cSt (109 mm2/sec) at 40ºC | 14.1 cSt (14.1 mm2/sec) at 100°C [ASTM D 445]
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -27°C (-17°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

For the product itself:

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components, this formulation, or similar formulations.
Diesel engine oils: Not carcinogenic in animals tests. Used and unused diesel engine oils did not produce any carcinogenic effects in chronic mouse skin painting studies. Oils that are used in gasoline engines may become hazardous and display the following properties: Carcinogenic in animal tests. Caused mutations in vitro. Possible allergen and photoallergen. Contains polycyclic aromatic compounds (PAC) from combustion products of gasoline and/or thermal degradation products.

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitising in test animals.

CMR Status: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A
3 = IARC 2B
4 = ACGIH ALL
5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

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. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

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

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: DSL, ENCS, ISHL, PICCS, TSCA

Special Cases:

Inventory	Status
AIIC	Restrictions Apply
IECSC	Restrictions Apply
KECI	Restrictions Apply
TCSI	Restrictions Apply

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
CARBONIC ACID, MAGNESIUM SALT (1:1)	546-93-0	6
TOLUENE	108-88-3	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

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H303: May be harmful if swallowed; Acute Tox Oral, Cat 5
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H317: May cause allergic skin reaction; Skin Sensitisation, Cat 1
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H401: Toxic to aquatic life; Acute Env Tox, Cat 2

H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
H413: May cause long lasting harmful effects to aquatic life; Chronic Env Tox, Cat 4

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Composition: Component table information was modified.
Section 13: Disposal Considerations - Disposal Recommendations information was modified.
Section 15: Canadian List Citations Table information was modified.
Section 15: Special Cases Table information was modified.
Section 16: Copyright - Imperial Oil information was modified.
Section 16: Disclaimer - IOL information was modified.
Section 16: HCode Key information was modified.

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SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

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

Intended Use: Fuel

Trade Names	Trade Names
AUTOMOTIVE GASOLINE	ESSO EXTRA GASOLINE
ESSO MIDGRADE GASOLINE	ESSO PREMIUM GASOLINE
ESSO REGULAR GASOLINE	ESSO SUPREME GASOLINE
EXXON MIDGRADE GASOLINE	EXXON PREMIUM GASOLINE
EXXON REGULAR GASOLINE	GASOLINE MIDGRADE UNLEADED MUL89
GASOLINE MIDGRADE UNLEADED MUL89 DCA	GASOLINE MIDGRADE UNLEADED MUL89 DCA DYED
GASOLINE MIDGRADE UNLEADED MUL89 LDCA	GASOLINE MIDGRADE UNLEADED MUL89 LDCA DYED
GASOLINE PREMIUM UNLEADED NO ETHANOL	GASOLINE PREMIUM UNLEADED PUL91
GASOLINE PREMIUM UNLEADED PUL91 DCA	GASOLINE PREMIUM UNLEADED PUL91 DCA DYED
GASOLINE PREMIUM UNLEADED PUL91 LDCA	GASOLINE PREMIUM UNLEADED PUL91 LDCA DYED
GASOLINE RBOB BLENDSTOCK P91	GASOLINE RBOB BLENDSTOCK R87
GASOLINE REGULAR UNLEADED RUL87	GASOLINE REGULAR UNLEADED RUL87 DCA
GASOLINE REGULAR UNLEADED RUL87 DCA DYED	GASOLINE REGULAR UNLEADED RUL87 DYED
GASOLINE REGULAR UNLEADED RUL87 LDCA	GASOLINE REGULAR UNLEADED RUL87 LDCA DYED

COMPANY IDENTIFICATION

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

24 Hour Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
Product Technical Information	1-800-268-3183
Supplier General Contact	1-800-567-3776

SECTION 2 HAZARD IDENTIFICATION

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

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

CLASSIFICATION:

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

LABEL:
Pictogram:



Signal Word: Danger

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

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

POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage.P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.P501: Dispose of contents and container in accordance with local regulations.

Contains: BENZENE; GASOLINE; TOLUENE

Other hazard information:

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

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

PHYSICAL / CHEMICAL HAZARDS

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

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. Exposure to benzene is associated with cancer (acute myeloid leukaemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders (see Section 11).

ENVIRONMENTAL HAZARDS

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

NFPA Hazard ID:	Health:	2	Flammability:	3	Reactivity:	0
HMIS Hazard ID:	Health:	2*	Flammability:	3	Reactivity:	0

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

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

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

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

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

Name	CAS#	Concentration*	GHS Hazard Codes

BENZENE	71-43-2	0 - 1.5%	H225, H303, H304, H340(1B), H350(1A), H315, H319(2A), H372, H401, H412
CUMENE	98-82-8	0 - 1%	H226, H304, H335, H351, H401, H411
CYCLOHEXANE	110-82-7	0 - 1.5%	H225, H304, H336, H315, H400(M factor 1), H410(M factor 1)
ETHYL BENZENE	100-41-4	0 - 3.5%	H225, H304, H332, H373, H401, H412
N-HEXANE	110-54-3	0 - 5%	H225, H304, H336, H361(F), H315, H373, H401, H411
NAPHTHALENE	91-20-3	0 - 1%	H228(2), H302, H351, H400(M factor 1), H410(M factor 1)
TOLUENE	108-88-3	0 - 20%	H225, H304, H336, H361(D), H315, H373, H401, H412
XYLENES	1330-20-7	0 - 20%	H226, H303, H304, H312, H332, H335, H315, H320(2B), H373, H401, H412

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

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

SECTION 4 FIRST-AID MEASURES

INHALATION

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

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This material, or a component, may be associated with cardiac sensitization following very high exposures (well

above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

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

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: -40°C (-40°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

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

PROTECTIVE MEASURES

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

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H_2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-

resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

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

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

ENVIRONMENTAL PRECAUTIONS

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

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid all personal contact. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices, etc.) during safety critical tasks, such as bulk fuel loading or unloading operations, or in storage areas where vapours may be present, unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a

semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard			Note	Source
BENZENE		STEL	1 ppm		Skin	Supplier
BENZENE		TWA	0.5 ppm		Skin	Supplier
BENZENE		STEL	2.5 ppm		Skin	ACGIH
BENZENE		TWA	0.5 ppm		Skin	ACGIH
CUMENE		TWA	5 ppm		Skin	Supplier
CUMENE		TWA	50 ppm			ACGIH
CYCLOHEXANE		TWA	100 ppm			ACGIH
ETHYL ALCOHOL		STEL	1000 ppm			ACGIH
ETHYL BENZENE		TWA	20 ppm			ACGIH
GASOLINE		STEL	200 ppm			Supplier
GASOLINE		TWA	100 ppm			Supplier
GASOLINE		STEL	500 ppm			ACGIH
GASOLINE		TWA	300 ppm			ACGIH
N-HEXANE		TWA	50 ppm		Skin	ACGIH
NAPHTHALENE		TWA	10 ppm		Skin	ACGIH
TOLUENE		TWA	20 ppm			ACGIH
XYLENES		STEL	150 ppm			ACGIH
XYLENES		TWA	100 ppm			ACGIH

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

ENGINEERING CONTROLS

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

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

PERSONAL PROTECTION

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

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

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

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

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended.

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

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

Chemical/oil resistant clothing is recommended.

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

ENVIRONMENTAL CONTROLS

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

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

GENERAL INFORMATION

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

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.74
Flammability (Solid, Gas): N/A
Flash Point [Method]: -40°C (-40°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 20°C (68°F) - 225°C (437°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): 3.2 at 101 kPa
Vapour Pressure: > 26.6 kPa (200 mm Hg) at 20ºC | 76 kPa (570 mm Hg) at 38 °C - 103 kPa (772.5 mm Hg) at 38°C
Evaporation Rate (n-butyl acetate = 1): > 10
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3
Solubility in Water: Negligible
Viscosity: <1 cSt (1 mm2/sec) at 40ºC | 0.8 cSt (0.8 mm2/sec) at 20°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

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

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

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

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

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

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 5000 mg/m3 (Vapour)	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar

	materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation: No end point data for material.	Irritating to the skin. Based on test data for structurally similar materials.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Caused genetic effects in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475 476
Carcinogenicity: Data available.	Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Caused damage to the fetus in laboratory animals, but the relevance to humans is uncertain. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	May cause drowsiness or dizziness.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 410 412 453

TOXICITY FOR SUBSTANCES

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

OTHER INFORMATION

For the product itself:

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

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

Contains:

BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer in laboratory animal studies. CUMENE: Repeated inhalation exposure of cumene vapour produced damage in the kidney of male rats only. These effects are believed to be species specific and are not relevant to humans. ETHANOL: Prolonged or repeated exposure to high concentrations of ethanol vapour or overexposure by ingestion may produce adverse effects to brain, kidney, liver, and reproductive organs, birth defects in offspring, and developmental toxicity in offspring. GASOLINE UNLEADED: Carcinogenic in animal tests. Chronic inhalation studies resulted in liver tumours in female mice and kidney tumours in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations in-vitro or in-vivo. Negative in inhalation developmental studies and reproductive tox studies. Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing). NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.

N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown. TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects. ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

CMR Status:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 5
CUMENE	98-82-8	3
ETHYL BENZENE	100-41-4	3
GASOLINE	86290-81-5	3
NAPHTHALENE	91-20-3	3

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A
3 = IARC 2B
4 = ACGIH ALL
5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

ECOTOXICITY

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

MOBILITY

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

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

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Majority of components -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

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

SECTION 13 DISPOSAL CONSIDERATIONS

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

DISPOSAL RECOMMENDATIONS

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

REGULATORY DISPOSAL INFORMATION

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

SECTION 14 TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: GASOLINE
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II
Marine Pollutant: Yes
Special Provisions: 17, 88, 98, 150

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

LAND (DOT)

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

SEA (IMDG)

Proper Shipping Name: MOTOR SPIRIT or GASOLINE or PETROL
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1203
Packing Group: II
Marine Pollutant: No
Label(s): 3
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-40°C c.c.)

AIR (IATA)

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

SECTION 15 REGULATORY INFORMATION

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

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

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	6
CUMENE	98-82-8	6
CYCLOHEXANE	110-82-7	6
ETHYL BENZENE	100-41-4	6
N-HEXANE	110-54-3	6
NAPHTHALENE	91-20-3	6
TOLUENE	108-88-3	6
XYLENES	1330-20-7	6

--REGULATORY LISTS SEARCHED--

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

SECTION 16 OTHER INFORMATION

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

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

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Section 01: Alternate Product Names Table information was modified.
Section 11: Chronic Tox - Component information was modified.

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SAFETY DATA SHEET

Section 1. Identification

Product name Hydraulic Oil 32

SDS # 401106

Code 401106-US03

Relevant identified uses of the substance or mixture and uses advised against

Product use Hydraulic fluid
For specific application advice see appropriate Technical Data Sheet or consult our company representative.

Supplier BP Lubricants USA Inc.
1500 Valley Road
Wayne, NJ 07470
Telephone: +1-888-CASTROL

EMERGENCY HEALTH INFORMATION: +1-800-447-8735

EMERGENCY SPILL INFORMATION: +1-800-424-9300 (CHEMTREC USA)
+1-703-527-3887 (CHEMTREC outside the US)

Section 2. Hazards identification

OSHA/HCS status This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture Not classified.

GHS label elements

Signal word No signal word.

Hazard statements No known significant effects or critical hazards.

Precautionary statements

Prevention Not applicable.

Response Not applicable.

Storage Not applicable.

Disposal Not applicable.

Hazards not otherwise classified Defatting to the skin.
Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency.
See 'Notes to physician' under First-Aid Measures, Section 4 of this Safety Data Sheet.

Section 3. Composition/information on ingredients

Substance/mixture Mixture

Highly refined mineral oil (IP 346 DMSO extract < 3%). Proprietary performance additives.

Ingredient name	CAS number	%
Distillates (petroleum), hydrotreated heavy paraffinic	64742-54-7	≥90

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

Section 3. Composition/information on ingredients

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Check for and remove any contact lenses. Get medical attention.

Skin contact
Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if symptoms occur.

Inhalation
If inhaled, remove to fresh air. Get medical attention if symptoms occur.

Ingestion
Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Protection of first-aiders
No action shall be taken involving any personal risk or without suitable training.

Most important symptoms/effects, acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

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

Notes to physician
Treatment should in general be symptomatic and directed to relieving any effects.

Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discolored and extremely painful with extensive subcutaneous necrosis.
Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimize tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.

Specific treatments
No specific treatment.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media
In case of fire, use foam, dry chemical or carbon dioxide extinguisher or spray.

Unsuitable extinguishing media
Do not use water jet.

Specific hazards arising from the chemical
In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous combustion products
Combustion products may include the following:
carbon oxides (CO, CO_2) (carbon monoxide, carbon dioxide)

Special protective actions for fire-fighters
No action shall be taken involving any personal risk or without suitable training. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire.

Special protective equipment for fire-fighters
Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment. Floors may be slippery; use care to avoid falling.

For emergency responders

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

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill

Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill

Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Store and use only in equipment/containers designed for use with this product. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Not suitable

Prolonged exposure to elevated temperature

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Distillates (petroleum), hydrotreated heavy paraffinic	**ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 11/2009 Form: Inhalable fraction **OSHA PEL (United States).** TWA: 5 mg/m³ 8 hours. Issued/Revised: 6/1993

Appropriate engineering controls

All activities involving chemicals should be assessed for their risks to health, to ensure exposures are adequately controlled. Personal protective equipment should only be considered after other forms of control measures (e.g. engineering controls) have been suitably evaluated. Personal protective equipment should conform to appropriate standards, be suitable for use, be kept in good condition and properly maintained. Your supplier of personal protective equipment should be consulted for advice on selection and appropriate standards. For further information contact your national organisation for standards.

Section 8. Exposure controls/personal protection

Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.
The final choice of protective equipment will depend upon a risk assessment. It is important to ensure that all items of personal protective equipment are compatible.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Safety glasses with side shields.

Skin protection

Hand protection

Wear protective gloves if prolonged or repeated contact is likely. Wear chemical resistant gloves. Recommended: Nitrile gloves. The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/ manufacturer and with a full assessment of the working conditions.

Body protection

Use of protective clothing is good industrial practice.
Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Cotton or polyester/cotton overalls will only provide protection against light superficial contamination that will not soak through to the skin. Overalls should be laundered on a regular basis. When the risk of skin exposure is high (e.g. when cleaning up spillages or if there is a risk of splashing) then chemical resistant aprons and/or impervious chemical suits and boots will be required.

Other skin protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.
The correct choice of respiratory protection depends upon the chemicals being handled, the conditions of work and use, and the condition of the respiratory equipment. Safety procedures should be developed for each intended application. Respiratory protection equipment should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Section 9. Physical and chemical properties

Appearance

Physical state Liquid.

Color Yellow.

Odor Not available.

Odor threshold Not available.

pH Not applicable.

Melting point Not available.

Boiling point Not available.

Flash point Open cup: >175°C (>347°F) [Cleveland.]

Pour point -27 °C

Evaporation rate Not available.

Flammability (solid, gas) Not applicable. Based on - Physical state

Section 9. Physical and chemical properties

Lower and upper explosive (flammable) limits	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Density	<1000 kg/m³ (<1 g/cm³) at 15°C
Solubility	insoluble in water.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Kinematic: 32 mm^2/s (32 cSt) at 40°C Kinematic: 5.44 mm^2/s (5.44 cSt) at 100°C

Section 10. Stability and reactivity

Reactivity	No specific test data available for this product. Refer to Conditions to avoid and Incompatible materials for additional information.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	Avoid all possible sources of ignition (spark or flame).
Incompatible materials	Reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Information on the likely routes of exposure	Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact	No known significant effects or critical hazards.
Skin contact	No known significant effects or critical hazards.
Inhalation	Vapor inhalation under ambient conditions is not normally a problem due to low vapor pressure.
Ingestion	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	No specific data.
Skin contact	Adverse symptoms may include the following: irritation dryness cracking
Inhalation	No specific data.
Ingestion	No specific data.

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

Short term exposure

Section 11. Toxicological information

Potential immediate effects Not available.

Potential delayed effects Not available.

Long term exposure

Potential immediate effects Not available.

Potential delayed effects Not available.

Potential chronic health effects

General No known significant effects or critical hazards.

Carcinogenicity No known significant effects or critical hazards.

Mutagenicity No known significant effects or critical hazards.

Teratogenicity No known significant effects or critical hazards.

Developmental effects No known significant effects or critical hazards.

Fertility effects No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

No testing has been performed by the manufacturer.

Persistence and degradability

Expected to be biodegradable.

Bioaccumulative potential

This product is not expected to bioaccumulate through food chains in the environment.

Mobility in soil

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

Mobility Spillages may penetrate the soil causing ground water contamination.

Other adverse effects No known significant effects or critical hazards.

Other ecological information Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

Section 13. Disposal considerations

Disposal methods The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-
Transport hazard class(es)	-	-	-	-
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.
Additional information	-	-	-	-

Special precautions for user Not available.

Transport in bulk according to IMO instruments Not available.

Section 15. Regulatory information

U.S. Federal regulations

United States inventory (TSCA 8b) All components are active or exempted.

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 311/312

Classification Not applicable.

SARA 313

Form R - Reporting requirements This product does not contain any hazardous ingredients at or above regulated thresholds.

Supplier notification This product does not contain any hazardous ingredients at or above regulated thresholds.

State regulations

Massachusetts The following components are listed: OIL MIST, MINERAL

New Jersey None of the components are listed.

Pennsylvania None of the components are listed.

California Prop. 65

⚠ **WARNING**: This product can expose you to chemicals including Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including Ethyl acrylate, which is known to the State of California to cause cancer, and Toluene, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Other regulations

Australia inventory (AICS) All components are listed or exempted.

Canada inventory All components are listed or exempted.

China inventory (IECSC) All components are listed or exempted.

Japan inventory (ENCS) All components are listed or exempted.

Korea inventory (KECI) All components are listed or exempted.

Philippines inventory (PICCS) All components are listed or exempted.

Section 15. Regulatory information

Taiwan Chemical Substances Inventory (TCSI): All components are listed or exempted.

REACH Status: For the REACH status of this product please consult your company contact, as identified in Section 1.

Section 16. Other information

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



History

Date of issue/Date of revision: 06/09/2021.

Date of previous issue: No previous validation.

Prepared by: Product Stewardship

Key to abbreviations

ACGIH = American Conference of Industrial Hygienists
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
CAS Number = Chemical Abstracts Service Registry Number
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
OEL = Occupational Exposure Limit
SDS = Safety Data Sheet
STEL = Short term exposure limit
TWA = Time weighted average
UN = United Nations
UN Number = United Nations Number, a four digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.
Varies = may contain one or more of the following 64741-88-4, 64741-89-5, 64741-95-3, 64741-96-4, 64742-01-4, 64742-44-5, 64742-45-6, 64742-52-5, 64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-57-0, 64742-58-1, 64742-62-7, 64742-63-8, 64742-65-0, 64742-70-7, 72623-85-9, 72623-86-0, 72623-87-1

Indicates information that has changed from previously issued version.

Notice to reader

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from BP Group.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken. You can contact the BP Group to ensure that this document is the most current available. Alteration of this document is strictly prohibited.

Material Safety Data Sheet

Back

Trade Name: UNIVERSAL ANTIFREEZE / COOLANT **Manufacturer:** Recochem Inc.

MSDS Code: 15-244 **Type of Chemical:**

Notes:
MATERIAL SAFETY DATA SHEET

WHMIS (Classification): Class D-2A: Material causing other toxic effects (VERY TOXIC)

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: UNIVERSAL ANTIFREEZE / COOLANT
Synonyms: Coolant. Antifreeze
Chemical Family: Glycol
Chemical Formula: Not applicable
Associated Product's Item Code: 35-249FS
CAS#: Mixture
DSL: CEPA DSL 1,2-Ethanediol
Material Uses: Idustrial applications: Coolant and antifreeze formulations.

Manufacturer:
Recochem Inc.
850 Montee de Liesse
Montreal, Quebec
514-341-3550

In Case Of Emergency:
Recochem Inc.
Communications and Regulatory Affairs Department 905-791-1788

SECTION 2. HAZARDOUS INGREDIENTS

Name CAS# % By Weight Canadian Values (ACGIH) U.S. Values (OSHA)
1) Ethylene glycol 107-21-1 90-98 CEIL: 100 ppm from ACGIH (Canada, 1999) Not available

SECTION 3. EMERGENCY OVERVIEW

HAZARD OVERVIEW:
WARNING. POISON HARMFUL OR FATAL IF SWALLOWED. Possible damage to kidneys and liver.

Potential Acute Health Effects;
Very dangerous in case of ingestion. Severe overexposure can result in death. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation.

Note to Physician:
Treatment with ethanol to inhibit the metabolism of glycol to oxafate. Early administration of ethanol may counter the toxic effects of ethylene glycol (cardiopulmonary effects attributed to metabolic acidosis and renal damage). Hemodialysis or peritoneal dialysis have been on benefit.

SECTION 4. FIRST AID MEASURES

EYE CONTACT:
Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. If irritation persists, seek medical attention.

SKIN CONTACT:
Gently and thoroughly wash the contaminated skin with running water and non-abraisive soap. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

INHALATION:
Allow the victim to rest in well ventilated area. If irritation persists, seek medical attention.

INGESTION:
DO NOT induce vomiting. Have concsious person drink several glasses of water or milk. SEEK IMMEDIATE MEDICAL ATTENTION.

SECTION 5. FIRE FIGHTING MEASURES

Products Of Combustion: These products are carbon oxides (CO, CO2)
Fire Fighting Media and Instructions: SMALL FIRE: Use dry chemicals, CO2, water spray or foam.
LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.
Fire Hazards: When heated to decomposition, it emits acrid smoke and irritating fumes.
Explosion Hazards: Not a product presenting risks of explosion.

SECTION 6. ACCIDENTAL RELEASE MEASES

Small Spill and Leak: Dilute with water and mop up, or absorb with an inert DRY material and place in an appropriate waste disposal container.
Large Spill and Leak: Absorb with an inert material and put the spilled material in an appropriate waste disposal. Dispose of in accordance with regular regulations.

SECTION 7. HANDLING AND STORAGE

HANDLING: Avoid contamination with reactive substances. After handling, always wash hands thoroughly with soap and water.
STORAGE; Keep container dry. Keep container tightly closed. Keep in a cool, well ventilated place.

SECTION 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering Controls: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximinal to the work station location.

Personal Protection:
Eyes: Splash goggles.
Body: No speical protective clothing is required
Respiratory: Wear appropriate respirator when ventilation is inadequate.
Hands: Gloves (impervious)

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear viscous liquid Odor: Odorless
Molecular Weight: Not applicable Taste: Sweet
pH (1% Soln/Water): 9 to 11 (Basic) Color: Green
Boiling/ Condensation Point: 197 C (386.6 F) Volatility: 0% (w/w)
Melting/Freezing Point: -13 C (8.6F) Evaporation Rate: 0.01 compared to Butyl acetate
Specific Gravity: 1.115 to 1.145 (Water = 1) Odor Threshold: Not available
Vapor Pressure: 0.06 mm of Hg (@ 20 C) Viscosity: Not available
Vapor Density: 2.1 (Air=1) Solubility: Soluble in water, methanol, diethyl ether
VOC Content: Not available Other Properties: Not available

The product is : May be combustible at high temperature.
Autoignition Temperature: 412.78 C (775 F)
Flash Point: CLOSED CUP: 116.1 C (241 F) (Tagliabue.) OPEN CUP: 115.6 C (240.1 F) (Cleveland)
Flammable Limits: LOWER: 3.2% UPPER: 15.3%
Fire Hazards in Pressence of Various Substances: Combustible I presence of open flame and sparks

SECTION 10. STABILITY AND REACTIVITY

Stability: The product is stable

Conditions of Instabiltiy: No additional remark
Incompatibilities with Various Substances: Reactive with oxidizing agents, acids, alkalis.

SECTION 11. TOXICOLOGICAL INFORMATION

Routes of Entry: Eye contact. Ingestion
Toxicity to Animals: Acute oral toxicity (LD50): 4700 mg/kg (Rat). Acute Dermal toxicity (LD50): 9530 mg/kg (Rabbit)
Acute Effects On Humans:
Eyes: Slightly hazardous in case of eye contact. (Irritant)
Skin: Not considered a skin irritant or skin corrosive.
Inhalation: Slightly hazardous in case of inhalation (lung irritant). Vapors are unlikely due to physical properties.
Ingestion: Extremely dangerous in case of ingestion. May be fatal if swallowed.

Chronic Effects On Humans:
CARCINOGENIC EFFECTS: A4 (Not classifieable for human or animal). By ACGIH.
MUTAGENIC EFFECTS: Not available'
TERATOGENIC EFFECTS: Teratogenic in mice at levels below maternal toxicity
DEVELOPMENTAL TOXICITY: Fetotoxic in mice at levels below maternal toxicity. The substance may be toxic to liver and kidneys. Repeated or prolonged exposure to substance can produce target organ damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity: Not availble

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Information: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

SECTION 14. TRANSPORT INFORMATION

TDG Classification (Canada): Not controlled under TDG (Canada)
PIN (Canada): Not applicable
Special Provision for Transport (Canada): Not applicable
IMDG Classification: 9
PIN: Shipping Name: Environmentally hazardous substance, liquid, N.O.S. (Ethylene glycol) UNNA: UN 3082 PG: III
Marine Polluntant: Not polluntant
DOT Classification (U.S.A.) : Not a DOT controlled material (United States)
PIN: Not available
Special Provisions for Transport (U.S.): Regulated Quantity (RQ)= 5000 lbs (2268 kg)
For bulk shipments equal or greater than Regulated Quantity (RQ), please adhere to classification as outlined in IMDG Classification section

SECTION 15. OTHER REGULATORY INFORMATION AND PICTOGRAMS

WHMIS Classification: Class D-2A: Material causing other toxic effects (VERY TOXIC)
HCS Classifaction (U.S.A.): Class: Target Organ Effects
USA Regulatory Lists: TSCA inventory: 1,2 -Ethanediol
Hazardous Material Information System (U.S.A.)
Health: 1
Flammability: 1
Reactivity: 0
Personal Protection: B

SECTION 16. OTHER INFORMATION

Validated and Verified by : Products Development and Technical Coordinator

Notice To Reader:
To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidaries assumes any liability whatsoever for the accuracy or completedness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only

hazards that exist.

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBILGREASE 28**
Product Description: Synthetic Base Stocks and Additives
Product Code: 201550402020, 530626-85
Intended Use: Grease

COMPANY IDENTIFICATION

Supplier: **Boeing Distribution Australia Pty Ltd.**
20-22 Lindaway Place
Tullamarine
Victoria 3043 Australia

Product Technical Information	(8:00am to 4:30pm Mon to Fri)	1300 919 904
Supplier General Contact	61 3 9339 3000	
FAX	+61 3 9338 9773	

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Contains: N-PHENYL-1-NAPHTHYLAMINE May produce an allergic reaction.

Other hazard information:

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. Secondary amines or materials containing secondary amines should not be added to this product due to the risk of forming nitrosamines, some of which have been shown to be carcinogenic in lab animals.

Environmental Hazards:
Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert

advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
N-PHENYL-1-NAPHTHYLAMINE	90-30-2	0.1 - < 1%	H302, H317, H373, H400(M factor 1), H410(M factor 1)
N-OLEYLSARCOSINE	110-25-8	0.1 - < 1%	H315, H318, H332, H400(M factor 1), H412
PENTAERYTHRITOL	115-77-5	1 - < 5%	None
SODIUM NITRITE	7632-00-0	0.1 - < 1%	H272(2)(S), H301, H319(2A), H400(M factor 1)
SODIUM PHOSPHATE, TRIBASIC	10101-89-0	0.1 - < 1%	H315, H319(2A), H335

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. Other ingredients determined not to be hazardous up to 100%.

SECTION 4 FIRST AID MEASURES

INHALATION
Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

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.

NOTE TO PHYSICIAN
None

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]: >204°C (400°F) [EST. FOR OIL, ASTM D-92 (COC)]
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.

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.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do so without risk. Scrape up spilled material with shovels into a suitable container for recycle or disposal.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface

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

ENVIRONMENTAL PRECAUTIONS

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

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard. Contains Sodium nitrite. Do not add amines which may form cancer causing nitrosamines.

Static Accumulator: This material is not a static accumulator.

STORAGE
Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Source
PENTAERYTHRITOL	Inhalable dust.	TWA	10 mg/m3			Australia WES
PENTAERYTHRITOL		TWA	10 mg/m3			ACGIH
SODIUM PHOSPHATE, TRIBASIC		STEL	5 mg/m3			OARS WEEL

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

Biological limits

No biological limits allocated.

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:
Particulate
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:
Nitrile,Viton
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: Solid
Form: Semi-fluid
Colour: Dark Red
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15.6 °C): 0.945 [Calculated]
Flammability (Solid, Gas): N/A
Flash Point [Method]: >204°C (400°F) [EST. FOR OIL, ASTM D-92 (COC)]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F) [Estimated]
Decomposition Temperature: N/D
Vapour Density (Air = 1): > 2 at 101 kPa
Vapour Pressure: < 0.013 kPa (0.1 mm Hg) at 20 ºC
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: 29.3 cSt (29.3 mm2/sec) at 40 ºC | 5.7 cSt (5.7 mm2/sec) at 100°C [Estimated]
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

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

NOTE: Most physical properties above are for the oil component in the material.

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

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

INCOMPATIBLE MATERIALS: Strong oxidisers

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.

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
N-PHENYL-1-NAPHTHYLAMINE	Oral Lethality: LD 50 1625 mg/kg (Rat)

OTHER INFORMATION

For the product itself:

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components, this formulation, or similar formulations.

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. N-phenyl-1-naphthylamine (PAN): A single oral overexposure may result in clinical signs/symptoms of cyanosis, headache, shallow respiration, dizziness, confusion, low blood pressure, convulsions, coma, or jaundice. Hematuria may occur due to bladder and kidney irritation, and anemia may develop later. Repeated exposure in laboratory animals caused liver and kidney damage and depressed bone marrow activity. Undiluted PAN is a skin sensitiser. Human testing of lubricants containing 1.0% PAN resulted in no reactions indicative of sensitisation. Phenyl-alpha-naphthylamine (PAN): Undiluted PAN is a skin sensitizer. Human testing with lubricants containing 1.0% PAN caused no reactions indicative of sensitization. SODIUM NITRITE: Ingestion of sodium nitrite may reduce the oxygen-carrying capacity of blood and may cause cyanosis (bluish skin), shortness of breath, palpitations, coma, and/or death.

IARC Classification:

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
SODIUM NITRITE	7632-00-0	2

--REGULATORY LISTS SEARCHED--

1 = IARC 1 2 = IARC 2A 3 = IARC 2B

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

ECOTOXICITY

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

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

Suitable routes of disposal are supervised incineration, preferentially with energy recovery, or appropriate recycling methods in accordance with applicable regulations and material characteristics at the time of disposal.

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 (ADG) : 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

This material is not considered hazardous according to Australia Model Work Health and Safety Regulations.

Product is not regulated according to Australian Dangerous Goods Code.

No Poison Schedule number allocated by the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) established under the Therapeutic Goods Act.

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Listed or exempt from listing/notification on the following chemical inventories : AIIC, DSL, ENCS, IECSC, ISHL, TCSI, TSCA

Special Cases:

Inventory	Status
KECI	Restrictions Apply

SECTION 16 OTHER INFORMATION

KEY TO ABBREVIATIONS AND ACRONYMS:

N/D = Not determined, N/A = Not applicable, STEL = Short-Term Exposure Limit, TWA = Time-Weighted Average

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H272(2): May intensify fire; oxidizer; Oxidizing Solid, Cat 2
H301: Toxic if swallowed; Acute Tox Oral, Cat 3
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H317: May cause allergic skin reaction; Skin Sensitisation, Cat 1
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
H332: Harmful if inhaled; Acute Tox Inh, Cat 4
H335: May cause respiratory irritation; Target Organ Single, Resp Irr
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
No revision information

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DGN: 2006172DAU (553106)

Prepared by: Exxon Mobil Corporation
EMBSI, Clinton NJ USA
Contact Point: See Section 1 for Local Contact number

End of (M)SDS

SAFETY DATA SHEET

Propane

Section 1. Identification

GHS product identifier : Propane

Chemical name : propane

Other means of identification : Propyl hydride; n-Propane; Dimethyl methane; Bottled gas; propane in gaseous state; propane liquefied, n-Propane; Dimethylmethane; Freon 290; Liquefied petroleum gas; Lpg; Propyl hydride; R 290; C3H8; UN 1075; UN 1978; A-108; Hydrocarbon propellant.

Product type : Liquefied gas

Product use : Synthetic/Analytical chemistry.

Synonym : Propyl hydride; n-Propane; Dimethyl methane; Bottled gas; propane in gaseous state; propane liquefied, n-Propane; Dimethylmethane; Freon 290; Liquefied petroleum gas; Lpg; Propyl hydride; R 290; C3H8; UN 1075; UN 1978; A-108; Hydrocarbon propellant.

SDS # : 001045

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

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

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May cause frostbite.
May displace oxygen and cause rapid suffocation.
May form explosive mixtures with air.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources.

Storage : Protect from sunlight. Store in a well-ventilated place.

Section 2. Hazards identification

Disposal : Not applicable.

Hazards not otherwise classified : Liquid can cause burns similar to frostbite.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : propane

Other means of identification : Propyl hydride; n-Propane; Dimethyl methane; Bottled gas; propane in gaseous state; propane liquefied, n-Propane; Dimethylmethane; Freon 290; Liquefied petroleum gas; Lpg; Propyl hydride; R 290; C3H8; UN 1075; UN 1978; A-108; Hydrocarbon propellant.

Product code : 001045

CAS number/other identifiers

CAS number : 74-98-6

Ingredient name	%	CAS number
Propane	100	74-98-6

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

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if adverse health effects persist or are severe. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Liquid can cause burns similar to frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Section 4. First aid measures

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : Ingestion of liquid can cause burns similar to frostbite.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:, frostbite

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:, frostbite

Ingestion : Adverse symptoms may include the following:, frostbite

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

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

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

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Gas may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back, causing fire or explosion.

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

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

Section 6. Accidental release measures

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

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

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

Section 7. Handling and storage

Precautions for safe handling

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

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

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

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

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Propane	**NIOSH REL (United States, 10/2016).** TWA: 1800 mg/m³ 10 hours. TWA: 1000 ppm 10 hours. **OSHA PEL (United States, 5/2018).** TWA: 1800 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 1800 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **ACGIH TLV (United States, 3/2019). Oxygen Depletion [Asphyxiant]. Explosive potential.**

Section 8. Exposure controls/personal protection

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

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Thermal hazards : If there is a risk of contact with the liquid, all protective equipment worn should be suitable for use with extremely low temperature materials.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas.

Color : Colorless.

Odor : Odorless.BUT MAY HAVE SKUNK ODOR ADDED.

Odor threshold : Not available.

pH : Not available.

Melting point : -187.6°C (-305.7°F)

Boiling point : -42.1°C (-43.8°F)

Section 9. Physical and chemical properties

Critical temperature : 96.55°C (205.8°F)

Flash point : Closed cup: -104°C (-155.2°F)
Open cup: -104°C (-155.2°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive (flammable) limits : Lower: 1.8%
Upper: 8.4%

Vapor pressure : 109 (psig)

Vapor density : 1.6 (Air = 1)

Specific Volume (ft ^{3}/lb) : 8.6206

Gas Density (lb/ft ^{3}) : 0.116 (25°C / 77 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.0244 g/l

Partition coefficient: n-octanol/water : 1.09

Auto-ignition temperature : 287°C (548.6°F)

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 44.11 g/mole

Aerosol product

Heat of combustion : -46012932 J/kg

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow gas to accumulate in low or confined areas.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Liquid can cause burns similar to frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Ingestion : Ingestion of liquid can cause burns similar to frostbite.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:, frostbite

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:, frostbite

Ingestion : Adverse symptoms may include the following:, frostbite

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

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Section 11. Toxicological information

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Propane	1.09	-	low

Mobility in soil

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

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

Section 13. Disposal considerations

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

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1978	UN1978	UN1978	UN1978	UN1978
UN proper shipping name	PROPANE SEE ALSO PETROLEUM GASES, LIQUEFIED	PROPANE	PROPANE SEE ALSO PETROLEUM GASES, LIQUEFIED (propane)	PROPANE	PROPANE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

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

Additional information

DOT Classification : **Limited quantity**
Yes.

Packaging instruction
Passenger aircraft
Quantity limitation: Forbidden.

Cargo aircraft
Quantity limitation: 150 kg

Special provisions
19, T50

For domestic transportation only, UN1075 may be substituted for the UN number shown as long as the substitution is consistent on package markings, shipping papers, and emergency response information. See 49 CFR 172.102 Special Provision 19.
Containers of NON-ODORIZED liquefied petroleum gas must be marked either NON-ODORIZED or NOT ODORIZED as of September 30, 2006. [49 CFR 172.301(f), 326(d), 330(c) and 338(e)]

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Vessel Index 65
Passenger Carrying Road or Rail Index Forbidden
Special provisions 29, 42

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

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

Section 14. Transport information

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act (CAA) 112 regulated flammable substances: propane

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

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

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

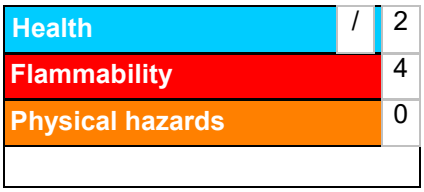
Europe : This material is listed or exempted.

Section 15. Regulatory information

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

Section 16. Other information

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



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

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

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



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

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas	Expert judgment Expert judgment

History

Date of printing	:	11/15/2020
Date of issue/Date of revision	:	11/15/2020
Date of previous issue	:	10/5/2020
Version	:	1.02

Section 16. Other information

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

References : Not available.

Other special considerations : The information below is given to call attention to the issue of “Naturally occurring radioactive materials”. Although Radon-222 levels in the product represented by this MSDS do not present any direct Radon exposure hazard, customers should be aware of the potential for Radon daughter build up within their processing systems, whatever the source of their product streams. Radon-222 is a naturally occurring radioactive gas which can be a contaminant in natural gas. During subsequent processing , Radon tends to be concentrated in Liquefied Petroleum Gas streams and in product streams having a similar boiling point range. Industry experience has shown that this product may contain small amounts of Radon-222 and its radioactive decay products, called Radon “daughters”. The actual concentration of Radon-222 and radioactive daughters in the delivered product is dependent on the geographical source of the natural gas and storage time prior to delivery. Process equipment (i.e. lines, filters, pumps and reaction units) may accumulate significant levels of radioactive daughters and show a gamma radiation reading during operation. A potential external radiation hazard exists at or near any pipe valve or vessel containing a Radon enriched stream, or containing internal deposits of radioactive material due to the transmission of gamma radiation through its wall. Field studies reported in the literature have not shown any conditions that subject workers to cumulative exposures in excess of general population limits. Equipment emitting gamma radiation should be presumed to be internally contaminated with alpha emitting decay products which may be a hazard if inhaled or ingested. Protective equipment such as coveralls, gloves, and respirator (NIOSH/MHSA approved for high efficiency particulates and radionuclides, or supplied air) should be worn by personnel entering a vessel or working on contaminated process equipment to prevent skin contamination, ingestion, or inhalation of any residues containing alpha radiation. Airborne contamination may be minimized by handling scale and/or contaminated materials in a wet state.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET
According to the Hazardous Products Regulations
Ethylene Glycol Antifreeze Grade

Version	Revision Date:	SDS Number:	Print Date: 2021-09-29
5.3	2021-09-22	800001009853	Date of last issue: 09.07.2021
			Date of first issue: 21.10.2003

SECTION 1. IDENTIFICATION

Product name : Ethylene Glycol Antifreeze Grade

Product code : U1281, U1293, U1296

Manufacturer or supplier's details

Manufacturer/Supplier : **Shell Chemicals Canada**
PO Box 4280 STN C
CALGARY AB T2T 5Z5
Canada

Telephone : 1-855-697-4355

Telefax : 1-866-213-7508

Emergency telephone number

CHEMTREC (24 hr) : 1-800-424-9300

Recommended use of the chemical and restrictions on use

Recommended use : Chemical intermediate.

Restrictions on use : This product must not be used in applications other than the above without first seeking the advice of the supplier.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) : Category 4

Specific target organ toxicity - repeated exposure : Category 2 (Kidney)

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : PHYSICAL HAZARDS:
Not classified as a physical hazard under GHS criteria.
HEALTH HAZARDS:
H302 Harmful if swallowed.
H373 May cause damage to organs (Kidney) through prolonged

or repeated exposure.
ENVIRONMENTAL HAZARDS:
Not classified as an environmental hazard under GHS criteria.

Precautionary statements : **Prevention:**
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
Response:
P301 + P312 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell.
P330 Rinse mouth.
P314 Get medical advice/ attention if you feel unwell.
Storage:
No precautionary phrases.
Disposal:
P501 Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

Other hazards which do not result in classification
Inhalation of vapours or mists may cause irritation to the respiratory system.
Slightly irritating to respiratory system.
Slightly irritating to the skin.
Slightly irritating to the eye.
Vapours may be irritating to the eye.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Substance name : Ethylene Glycol Antifreeze Grade

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)
ethanediol	107-21-1	90 - 100
Diethylene glycol	111-46-6	0 - 10

SECTION 4. FIRST-AID MEASURES

General advice : Not expected to be a health hazard when used under normal conditions.

If inhaled : No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.

In case of skin contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
If persistent irritation occurs, obtain medical attention.

In case of eye contact	:	Flush eye with copious quantities of water. Remove contact lenses, if present and easy to do. Continue rinsing. If persistent irritation occurs, obtain medical attention.
If swallowed	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Rinse mouth.
Most important symptoms and effects, both acute and delayed	:	Kidney toxicity may be recognized by blood in the urine or increased or decreased urine flow. Other signs and symptoms can include nausea, vomiting, abdominal cramps, diarrhoea, lumbar pain shortly after ingestion, and possibly narcosis and death. Not considered to be an inhalation hazard under normal conditions of use. Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. No specific hazards under normal use conditions. Skin irritation signs and symptoms may include a burning sensation, redness, or swelling. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Ingestion may result in nausea, vomiting and/or diarrhoea.
Protection of first-aiders	:	When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
Notes to physician	:	Call a doctor or poison control center for guidance. Treat symptomatically. May cause significant renal, respiratory, and CNS toxicity. May cause significant acidosis. The preferred treatment is immediate transportation to a medical facility and use of appropriate treatment including possible administration of activated charcoal, gastric lavage and or gastric aspiration. If none of the above are immediately available and a delay of more than one hour is anticipated before such medical attention can be obtained, induction of vomiting may be appropriate using IPECAC syrup (Contraindicated if there are any signs of CNS depression). This should be considered on a case by case basis following specialist advice. Specific other treatments may include ethanol therapy, fomepizole, treatment of acidosis and haemodialysis. Seek specialist advice without delay.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Alcohol-resistant foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires

only.

Unsuitable extinguishing media	:	Do not use water in a jet.
Specific hazards during fire-fighting	:	Material will not burn unless preheated. Carbon monoxide may be evolved if incomplete combustion occurs. Containers exposed to intense heat from fires should be cooled with large quantities of water.
Specific extinguishing methods	:	Standard procedure for chemical fires.
Further information	:	Evacuate the area of all non-essential personnel. Keep adjacent containers cool by spraying with water.
Special protective equipment for firefighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Observe all relevant local and international regulations. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Avoid contact with skin, eyes and clothing.
Environmental precautions	:	Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Use appropriate containment to avoid environmental contamination. Ventilate contaminated area thoroughly.
Methods and materials for containment and cleaning up	:	Contain run-off from residue flush and dispose of properly. Soak up residue with an absorbent such as clay, sand or other suitable material. For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak

up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely

Additional advice : For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

SECTION 7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Advice on safe handling : Use local exhaust extraction over processing area.
Handle and open container with care in a well-ventilated area.
Do not empty into drains.
When handling product in drums, safety footwear should be worn and proper handling equipment should be used.
Handling Temperature:
Ambient.

Avoidance of contact : Strong oxidising agents.
Strong acids.
Strong bases.

Product Transfer : Keep containers closed when not in use. Do not pressurize drum containers to empty.

Storage

Conditions for safe storage : Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

Other data : Tanks must be clean, dry and rust-free.
Keep container tightly closed.
Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat.
Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions.
Drums should be stacked to a maximum of 3 high.
Storage Temperature:
Ambient.

Packaging material	:	Suitable material: Stainless steel., Mild steel., Carbon steel Unsuitable material: Data not available
Container Advice	:	Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.
Specific use(s)	:	Not applicable Ensure that all local regulations regarding handling and storage facilities are followed.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
ethanediol	107-21-1	TWA (Vapour)	25 ppm	ACGIH
		STEL (Vapour)	50 ppm	ACGIH
		STEL (Inhalable fraction, Aerosol only)	10 mg/m3	ACGIH

Contains no components with occupational exposure limit values.

Biological occupational exposure limits

No biological limit allocated.

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Engineering measures : Adequate ventilation to control airborne concentrations.
Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
Eye washes and showers for emergency use.
The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
Appropriate measures include:

General Information:
Always observe good personal hygiene measures, such as washing hands 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.
Practice good housekeeping.
Define procedures for safe handling and maintenance of controls.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or subsequent recycle.

Personal protective equipment

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers.
Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
If air-filtering respirators are suitable for conditions of use:
Select a filter suitable for the combination of organic gases and vapours and particles [Type A/Type P boiling point >65°C (149°F)].

Hand protection
Remarks : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Nitrile

rubber gloves. Incidental contact/Splash protection: PVC or neoprene rubber gloves. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Eye protection : If material is handled such that it could be splashed into eyes, protective eyewear is recommended.

Skin and body protection : Skin protection is not ordinarily required beyond standard work clothes.
It is good practice to wear chemical resistant gloves.

Thermal hazards : Not applicable

Protective measures : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
The following information, while appropriate for the product is general in nature. The selection of Personal Protective Equipment will vary depending on the conditions of use.

Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet.
Launder contaminated clothing before re-use.

Environmental exposure controls

General advice : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.
Information on accidental release measures are to be found in section 6.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Slightly viscous liquid.
Colour	:	colourless
Odour	:	mild
Odour Threshold	:	25 ppm
pH	:	Not applicable
Melting / freezing point	:	-13 °C / 9 °F
Boiling point/boiling range	:	190 - 240 °C / 374 - 464 °F
Flash point	:	121 °C / 250 °F Method: ASTM D-93 / PMCC
Evaporation rate	:	0.01 Method: ASTM D 3539, nBuAc=1
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	28 %(V)
Lower explosion limit	:	3.2 %(V)
Vapour pressure	:	< 10 Pa (20 °C / 68 °F)
Relative vapour density	:	Data not available
Relative density	:	1.115 Method: ASTM D4052
Density	:	Typical 1,113 kg/m3 (20 °C / 68 °F)Method: ASTM D4052
Solubility(ies)		
Water solubility	:	completely soluble
Partition coefficient: n-octanol/water	:	log Pow: -1.93 (20 °C / 68 °F) Data not available
Auto-ignition temperature	:	Data not available
Decomposition temperature	:	Data not available
Viscosity		
Viscosity, dynamic	:	Data not available

Viscosity, kinematic	:	26 mm2/s (20 °C / 68 °F) Method: ASTM D445
Explosive properties	:	Not applicable
Oxidizing properties	:	Not applicable
Surface tension	:	Data not available
Conductivity	:	Data not available
Molecular weight	:	62 g/mol

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.
Chemical stability	:	No hazardous reaction is expected when handled and stored according to provisions Oxidises on contact with air.
Possibility of hazardous reactions	:	None known.
Conditions to avoid	:	Extremes of temperature and direct sunlight. Product cannot ignite due to static electricity.
Incompatible materials	:	Strong oxidising agents. Strong acids. Strong bases.
Hazardous decomposition products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment : Information given is based on product testing.

Information on likely routes of exposure
Skin and eye contact are the primary routes of exposure although exposure may occur through inhalation or following accidental ingestion.

Acute toxicity

Components:

ethanediol:

Acute oral toxicity : LD 50 (Rat, male and female): > 2,000 mg/kg
Method: Acceptable non-standard method.
Remarks: Harmful if swallowed.
There is a marked difference in acute oral toxicity between rodents and man, man being more susceptible than rodents. The estimated fatal dose for man is 100 milliliters (1/2 cup). This material has also been shown to be toxic and potentially lethal by ingestion to cats and dogs.

Acute inhalation toxicity : LC 50 (Rat, male and female): > 2.5 mg/l
Exposure time: 6 h
Test atmosphere: Aerosol
Method: Literature data
Remarks: LC50 > 1.0 - <= 5.0 mg/l
LC50 greater than near-saturated vapour concentration.
Based on available data, the classification criteria are not met.

Acute dermal toxicity : LD 50 (Mouse, male and female): > 2,000 mg/kg
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Diethylene glycol:

Acute oral toxicity : LD 50 (Rat, male and female): > 5,000 mg/kg
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.
There is a marked difference in acute oral toxicity between rodents and man, man being more susceptible than rodents. The estimated fatal dose for man is 100 milliliters (1/2 cup). This material has also been shown to be toxic and potentially lethal by ingestion to cats and dogs.

Acute inhalation toxicity : LC 50 (Rat): > 1 -<= 5 mg/l
Exposure time: 4 h
Test atmosphere: Aerosol
Method: Literature data
Remarks: LC50 greater than near-saturated vapour concentration.
Based on available data, the classification criteria are not met.

Acute dermal toxicity : LD 50 (Rabbit): > 2,000 mg/kg
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Components:

ethanediol:
Species: Rabbit
Method: Acceptable non-standard method.

Remarks: Slightly irritating to skin.
Insufficient to classify.

Diethylene glycol:
Species: Rabbit
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation

Components:
ethanediol:
Species: Rabbit
Method: Acceptable non-standard method.
Remarks: Slightly irritating to the eye.
Insufficient to classify.

Diethylene glycol:
Species: Rabbit
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation

Components:
ethanediol:
Species: Guinea pig
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Diethylene glycol:
Species: Guinea pig
Method: Tested according to Annex V of Directive 67/548/EEC.
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Components:
ethanediol:

Genotoxicity in vitro	:	Method: OECD Test Guideline 471 Remarks: Based on data from similar materials
	:	Method: Acceptable non-standard method. Remarks: Based on data from similar materials
	:	Method: Literature data Remarks: Based on data from similar materials
Genotoxicity in vivo	:	Species: Rat Method: Literature data Remarks: Based on available data, the classification criteria

are not met.

Germ cell mutagenicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

Diethylene glycol:
Genotoxicity in vitro : Method: OECD Test Guideline 471
Remarks: Based on available data, the classification criteria are not met.

: Method: OECD Test Guideline 473
Remarks: Based on available data, the classification criteria are not met.

: Method: OECD Test Guideline 479
Remarks: Based on available data, the classification criteria are not met.

Genotoxicity in vivo : Species: Mouse
Method: OECD Test Guideline 474
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

Carcinogenicity

Components:
ethanediol:
Species: Mouse, (male and female)
Application Route: Oral
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Carcinogenicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

Diethylene glycol:
Species: Rat, (male and female)
Application Route: Oral
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.
Tumours produced in animals are not considered relevant to humans.

Carcinogenicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

IARC No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or

equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Components:

ethanediol:

Effects on fertility : Species: Rat
Sex: male and female
Application Route: Oral

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

Effects on foetal development : Species: Rat, male and female
Application Route: Oral
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.
Causes foetotoxicity in animals; considered to be secondary to maternal toxicity.

Reproductive toxicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

Diethylene glycol:

Effects on fertility : Species: Mouse
Sex: male and female
Application Route: Oral

Method: Acceptable non-standard method.
Remarks: Based on available data, the classification criteria are not met.

Effects on foetal development : Species: Rabbit, female
Application Route: Oral
Method: OECD Test Guideline 414
Remarks: Based on available data, the classification criteria are not met.

Reproductive toxicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

STOT - single exposure

Components:

ethanediol:
Remarks: Inhalation of vapours or mists may cause irritation to the respiratory system.
Based on available data, the classification criteria are not met.
Ingestion may cause drowsiness and dizziness.

Diethylene glycol:
Remarks: Based on available data, the classification criteria are not met.
Inhalation of vapours or mists may cause irritation to the respiratory system.
Ingestion may cause drowsiness and dizziness.

STOT - repeated exposure

Components:
ethanediol:
Exposure routes: Oral
Target Organs: Kidney
Remarks: May cause damage to organs or organ systems through prolonged or repeated exposure.

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

Repeated dose toxicity

Components:
ethanediol:
Species: Rat, male
Application Route: Oral
Method: Test(s) equivalent or similar to OECD Test Guideline 408
Target Organs: Kidney

Diethylene glycol:
Species: Rat, male and female
Application Route: Oral
Method: Acceptable non-standard method.
Target Organs: No specific target organs noted

Species: Dog, male
Application Route: Dermal
Method: OECD Test Guideline 410
Target Organs: No specific target organs noted

Aspiration toxicity

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

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

Further information

Components:

ethanediol:
Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

Diethylene glycol:
Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

SECTION 12. ECOLOGICAL INFORMATION

Basis for assessment : Information given is based on product testing.

Ecotoxicity

Components:

ethanediol:

Toxicity to fish (Acute toxicity) : LC50 (Pimephales promelas (fathead minnow)): 72,860 mg/l
Exposure time: 96 h
Method: Other guideline method.
Remarks: Practically non toxic:
LC/EC/IC50 > 100 mg/l

Toxicity to crustacean (Acute toxicity) : EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: Practically non toxic:
LC/EC/IC50 > 100 mg/l

Toxicity to algae/aquatic plants (Acute toxicity) : EC50 (Pseudokirchneriella subcapitata (algae)): 6,500 - 13,000 mg/l
Exposure time: 96 h
Method: Other guideline method.
Remarks: Practically non toxic:
LC/EC/IC50 > 100 mg/l

Toxicity to fish (Chronic toxicity) : NOEC (Pimephales promelas (fathead minnow)): 15,380 mg/l
Exposure time: 7 d
Method: Other guideline method.
Remarks: NOEC/NOEL > 100 mg/l

Toxicity to crustacean(Chronic toxicity) : NOEC (Chironomus sp. (midge)): 8,590 mg/l
Exposure time: 7 d
Method: Other guideline method.
Remarks: NOEC/NOEL > 100 mg/l

Toxicity to bacteria : EC20 (Activated sludge, domestic waste): > 1,995 mg/l
Exposure time: 0.5 h
Method: Other guideline method.
Remarks: Practically non toxic:
LC/EC/IC50 > 100 mg/l

Diethylene glycol:

Toxicity to fish (Acute toxicity)	:	LC50 (Pimephales promelas (fathead minnow)): 75,200 mg/l Exposure time: 96 h Method: Literature data. Remarks: Practically non toxic: LL/EL/IL50 > 100 mg/l
Toxicity to crustacean (Acute toxicity)	:	EC50 (Daphnia magna (Water flea)): > 10,000 mg/l Exposure time: 24 h Method: Other guideline method. Remarks: Practically non toxic: LL/EL/IL50 > 100 mg/l
Toxicity to algae/aquatic plants (Acute toxicity)	:	EC50 (Scenedesmus quadricauda (Green algae)): 2,700 mg/l Exposure time: 192 h Method: Information given is based on data obtained from similar substances. Remarks: Practically non toxic: LL/EL/IL50 > 100 mg/l
Toxicity to fish (Chronic toxicity)	:	NOEC (Pimephales promelas (fathead minnow)): 15,380 mg/l Exposure time: 7 d Method: Other guideline method. Remarks: NOEC/NOEL > 100 mg/l
Toxicity to crustacean(Chronic toxicity)	:	NOEC (Ceriodaphnia dubia (Water flea)): 8,590 mg/l Exposure time: 7 d Method: Other guideline method. Remarks: NOEC/NOEL > 100 mg/l
Toxicity to bacteria	:	EC20 (Activated sludge, domestic waste): > 1,995 mg/l Exposure time: 0.5 h Method: Other guideline method. Remarks: Practically non toxic: LL/EL/IL50 > 100 mg/l

Persistence and degradability

Components:

ethanediol:

Biodegradability	:	Biodegradation: 90 - 100 % Exposure time: 10 d Method: OECD Test Guideline 301A Remarks: Readily biodegradable. Not Persistent per IMO criteria. International Oil Pollution Compensation (IOPC) Fund definition: “A non-persistent oil is oil, which, at the time of shipment, consists of hydrocarbon fractions, (a) at least 50% of which, by volume, distills at a temperature of 340ºC (645ºF) and (b) at least 95% of which, by volume, distils at a temperature of 370ºC (700ºF) when tested by the ASTM Method D-86/78 or any subsequent revision thereof."

Diethylene glycol:
Biodegradability : Biodegradation: 70 - 80 %
Exposure time: 28 d
Method: OECD Test Guideline 301B
Remarks: Readily biodegradable.
Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulative potential

Partition coefficient: n-octanol/water : log Pow: -1.93 (20 °C)
Remarks: Data not available

Components:

ethanediol:
Bioaccumulation : Remarks: Does not have the potential to bioaccumulate significantly.

Diethylene glycol:
Bioaccumulation : Remarks: Does not bioaccumulate significantly.

Mobility in soil

Components:

ethanediol:
Mobility : Remarks: Disperses in water.
If product enters soil, one or more constituents will be highly mobile and may contaminate groundwater.

Diethylene glycol:
Mobility : Remarks: If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.
Dissolves in water.

Other adverse effects

Components:

ethanediol:
Results of PBT and vPvB assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

Additional ecological information : Does not have ozone depletion potential.

Diethylene glycol:
Results of PBT and vPvB assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

Additional ecological infor- : Data not available

mation

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Recover or recycle if possible.
It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Remove all packaging for recovery or waste disposal.
Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment.
Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination.
Do not dispose into the environment, in drains or in water courses
Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local regulations may be more stringent than regional or national requirements and must be complied with.

MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.

Contaminated packaging : Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.

SECTION 14. TRANSPORT INFORMATION

National Regulations

TDG
Not regulated as a dangerous good

International Regulations

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

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

Pollution category	:	Z
Ship type	:	3
Product name	:	Ethylene glycol

Special precautions for user

Remarks	:	Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	**:**	This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen enriched atmospheres displaces available oxygen which may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

SECTION 15. REGULATORY INFORMATION

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

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

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

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

AICS	:	Listed
DSL	:	Listed
IECSC	:	Listed
ENCS	:	Listed
KECI	:	Listed
NZIoC	:	Listed
PICCS	:	Listed
TSCA	:	Listed

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR -

Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

A vertical bar (|) in the left margin indicates an amendment from the previous version.

Sources of key data used to compile the Safety Data Sheet	:	The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).
Revision Date	:	2021-09-22

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.

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