QULLIQ ENERGY CORPORATION
IQALUIT HYDRO-ELECTRIC PROJECT



# 2013 FIELD INVESTIGATION SPILL CONTINGENCY PLAN

**PREPARED FOR:**

Qulliq Energy Corporation
Iqaluit, Nunavut
Canada, X0A 0H0

**PREPARED BY:**

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NB103-137/8-3
Rev 0
December 14, 2012

Knight Piésold
CONSULTING
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ISO 9001 - FS 64925
ISO 14001 - EMS 550121
OHSAS 18001 - OHS 550122

# QULLIQ ENERGY CORPORATION
# IQALUIT HYDRO-ELECTRIC PROJECT

## 2013 FIELD INVESTIGATION SPILL CONTINGENCY PLAN
## NB103-137/8-3

| Rev | Description | Date | Approved |
|---|---|---|---|
| 0 | Issued in Final | December 14, 2012 | |

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## EXECUTIVE SUMMARY

This Spill Contingency Plan for the 2013 field investigation at the Iqaluit Hydro-Electric Project will be in effect upon commencement of the program and applies to all licensed elements of the program.

This Plan has been drafted to support environmental screening and permitting of the field investigation program. The Plan will be updated and revised as appropriate to reflect any changes that may arise prior to commencement of the field program.

Any spills will be reported to:

**24-Hour Spill Report Line**
**Tel. (867) 920-8130**
**or**
**Fax (867) 920-8127**

Additionally, any spills will be reported to the appropriate landowners:

**Qikiqtani Inuit Association**
PO Box 1340
Iqaluit, NU, Canada
X0A 0H0
Tel: (867) 979-5391, 1-800-667-2742 (Land Administrator)
Fax: (867) 979-3238

**Aboriginal Affairs and Northern Development Canada**
PO Box 2200
Iqaluit, NU, Canada
X0A 0H0
Tel: (867) 975-4280 (Land Administration Manager)
Fax: (867) 975-4286

Additional copies and updates of the Plan may be obtained by contacting:

**Qulliq Energy Corporation** - Engineering Department
PO Box 250
Iqaluit, NU, Canada
X0A 0H0
Tel: (867) 979-7540 (Director of Engineering)

or

**Knight Piésold Ltd.**
1650 Main Street West
North Bay, ON, Canada
P1B 8G5
Tel: (705) 476-2165 (Project Manager)

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# 1 – INTRODUCTION

## 1.1 PURPOSE

The purpose of this Spill Contingency Plan (the Plan) is to provide to Qulliq Energy Corporation (QEC), its contractors and government agencies with the necessary information to respond effectively to spill events that might occur during the field investigation program at the Iqaluit Hydro-Electric Project. The Project location is shown on Figure 1.1. The Plan defines the responsibilities of key response personnel and provides action plans to address fuel and other spills.

The Plan was developed with the aid of:

- *Nunavut's Environmental Protection Act*
- *Spill Contingency Planning and Reporting Regulations (NWT Reg (Nu) 068-93*
- *Contingency Planning and Spill Reporting in Nunavut, A Guide to the New Regulations (DOE, 2012)*
- *the Guidelines for Spill Contingency Planning (AANDC, 2007)*

## 1.2 RESPONSE PRINCIPLES

Response to spills will be based on the following principles:

- Ensuring safety and well-being of all personnel
- Evacuation to a place of safety
- Communication with supervisors, on-site personnel, on-site coordinators, on-site emergency medical professionals, project manager, and regulatory authorities and other external contacts
- Stopping or limiting an ongoing spill
- Establishing and initiating further response, reporting procedures, and follow-up programs

## 1.3 TERMS AND CONDITIONS OF PERMITS AND LICENCES

QEC's proposed field program will be subject to the licenses/permits listed in Table 1.1.

**Table 1.1 Proposed Permits and Licenses**

| Type of Authorization | Permit No. | Authorizing Agency | Governing Activity | Dates Valid |
|---|---|---|---|---|
| Inuit Land Use Licence | N/A | Qikiqtani Inuit Association | Emergency shelters, storage of drummed fuel, carrying out geotechnical drilling and environmental studies | Pending |
| Federal Land Use Permit | N/A | Aboriginal Affairs and Northern Development Canada | Establishment and operation of a temporary camp, storage of drummed fuel, carrying out geotechnical drilling and environmental studies | Pending |

| Type of Authorization | Permit No. | Authorizing Agency | Governing Activity | Dates Valid |
|---|---|---|---|---|
| Commissioner's Land Use Permit | N/A | Government of Nunavut, Department of Community and Government Services | Geotechnical drilling; fuel caches for drilling | Pending |
| Type B Water Licence | N/A | Nunavut Water Board | Water use and waste disposal activities for drilling and camp | Pending |
| Scientific Licence | N/A | Nunavut Research Institute | Carrying out non-biological research | Pending |
| Licence to Fish for Scientific Purposes | N/A | Department of Fisheries and Oceans | Conducting fish and fish habitat related studies | Pending |
| Wildlife Research Permit | N/A | Government of Nunavut, Department of Environment | Wildlife baseline surveys | Pending |
| Archaeological Permit | N/A | Government of Nunavut, Department of Culture and Heritage | Archaeological surveys | Pending |

The following paraphrases the terms and conditions typical of the above pending authorizations that are relevant to spill response:

1. Restrict all land use operation to lands designated to the Project.
2. Prevent petroleum or chemical products from spreading to surrounding lands or into water bodies.
3. Ensure all petroleum containers are labelled with the owner's name.
4. Keep petroleum storage containers at least 30 metres from the ordinary high water mark of any water body.
5. Report spills immediately to 24-hour spill line.
6. Implement sediment and erosion control measures to prevent entry of sediment into water.
7. Locate drill sumps at least 30 metres from the ordinary high water mark of any water body.
8. Contain greywater in a sump located at least 30 metres above the ordinary high water mark of any water body.
9. Contain all sewage in latrine pits located at least 30 metres above the ordinary high water mark of any water body.
10. Treat any latrine pits with lime and cover with 0.5 m of native material prior to abandonment.

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SYLVIA GRINNELL TERRITORIAL PARK
IQALUIT
TAILRACE DISCHARGE LOCATION
PROPOSED FIELD CAMP
POWERHOUSE
PENSTOCK
FUEL DRUM CACHE
DAM
FUEL DRUM CACHE
FLOODED RESERVOIR
CROWN LAND (AANDC)
ARMSHOW SOUTH
INUIT OWNED LAND (QIA)
TRANSMISSION LINE
PARK - COMISSIONER'S LAND
EMERGENCY SHELTER AND FUEL DRUM CACHE
LOWER LAKE
PENSTOCK
SUBMERGED OUTFALL
FUEL DRUM CACHE
UPPER LAKE
POWERHOUSE
DAM
FUEL DRUM CACHE
JAYNES INLET
FROBISHER BAY

SCALE 5 2.5 0 5 10 15 20 km

**LEGEND:**

- COMMUNITY
- PROPOSED FIELD CAMP
- EMERGENCY SHELTER AND FUEL CACHE
- HUNTER CAMP LOCATION
- PARKS SHELTER
- TRANSMISSION LINE (ROUTING NOT ESTABLISHED)
- PENSTOCK ROUTE (ROUTING NOT ESTABLISHED)
- TERRITORIAL PARK
- RIVER/STREAM/DRAINAGE
- WATER
- PROPOSED DAM LOCATION
- PROPOSED POWERHOUSE LOCATION
- AREA SUBJECT TO GEOTECHNCIAL INVESTIGATION
- INUIT OWNED LAND - SURFACE AND SUBSURFACE INCLUDING MINERALS
- INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS
- CROWN LAND (AANDC)

**NOTES:**

1. BASE MAP 1:250,000 © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009). ALL RIGHTS RESERVED. (HTTP://ATLAS.NRCAN.GC.CA/AUTH/ENGLISH/MAPS/TOPO/INDEX.HTML)
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N.
3. CONTOUR INTERVAL IS 60 METRES.
4. BOUNDARIES OF INUIT OWNED LAND PROVIDED BY NUNAVUT TUNNGAVIK INCORPORATED IN 2012. HTTP://WWW.NTILANDS.COM/DATA.HTML
5. CAMP LOCATIONS PROVIDED BY QIKIQTANI INUIT ASSOCIATION (2012).

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QULLIQ ENERGY CORPORATION

IQALUIT HYDRO-ELECTRIC PROJECT

**PROJECT LOCATION**
**2013 FIELD PROGRAMS**

Knight Piésold CONSULTING

P/A NO. NB103-137/8
REF NO. 3
**FIGURE 1.1**
REV 0

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# 2 – PROJECT FACILITIES

## 2.1 PROJECT SITES

The Project consists of two potential hydro-electric sites:

- Armshow River South
- Jaynes Inlet

The location of these sites relative to the City of Iqaluit is shown on Figure 1.1. The layout of each site is shown on Figure 2.1.

Each site's resources and equipment to respond to spills is described in the following sections.

## 2.2 ARMSHOW SOUTH SITE

The Armshow River South site is located on Crown Land near the mouth of the river and will consist of a full-service tent camp equipped with running water. Greywater will be discharged to a suitable location for overland disposal. A small camp incinerator will dispose of combustible materials, including food wastes, to minimize the potential to attract wildlife. A pit latrine or incinerating toilets will be used for sewage disposal.

Fuel will be slung by helicopter to the camp and drill sites. A bulk delivery of drums during the early open water season by barge or boat may be considered as a means to offset helicopter usage. Storage of drums will be in accordance with AANDC's *Draft Fuel Storage and Handling Guidelines* (AANDC, 2008).

## 2.3 JAYNES INLET SITE

The Jaynes Inlet site will consist of a two emergency shelter tent camps. One emergency shelter camp will be situated on Inuit-Owned Land (IOL) and the other on Crown Land.

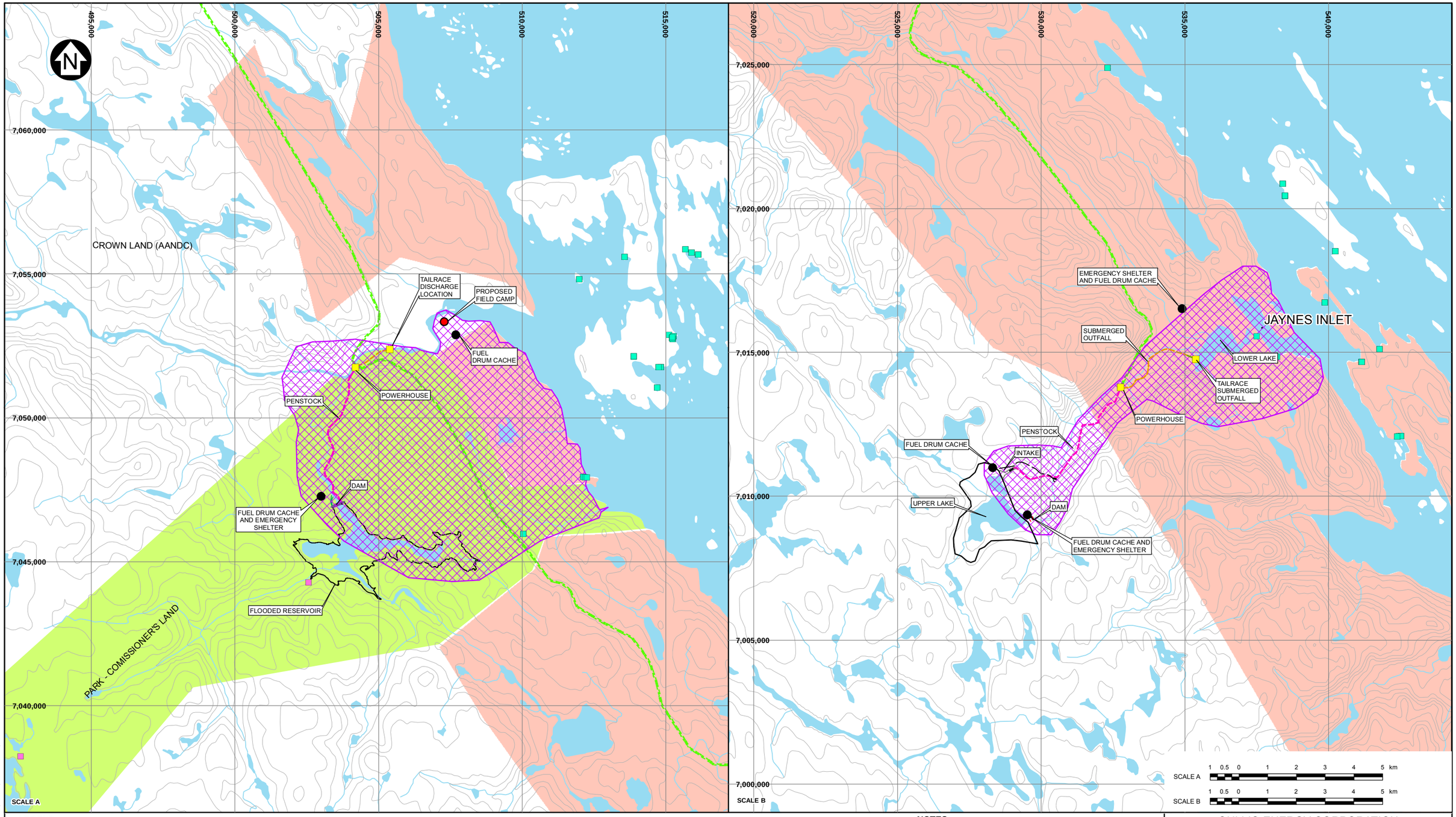
Drilling and helicopter use will require fuel caches to be established at each of the camps and at the drill site. Drums of fuel will be slung to the Jaynes site from Iqaluit or the Armshow River site.

## 2.4 EQUIPMENT

The following equipment will be positioned at the various project sites and could be utilized to respond to spills:

**Table 2.1 Project Site Equipment**

| Jaynes Inet | Armshow South |
|---|---|
| ATVs (2) | ATVs (2) |
| Fiberglass boats and outboards (2) | Fiberglass boats and outboards (2) |
| Emergency shelters (2) | Emergency shelter (1) |
| | 20-person camp (1) |
| Heli-portable drill, mixing station and recirculating bins/sumps (1) | |
| Helicopter (1) | |




**LEGEND:**

- COMMUNITY
- PROPOSED FIELD CAMP
- EMERGENCY SHELTER AND FUEL CACHE
- HUNTER CAMP LOCATION
- PARKS SHELTER
- TRANSMISSION LINE ROUTE
- PENSTOCK ROUTE (ROUTING NOT ESTABLISHED)
- RIVER/STREAM/DRAINAGE
- WATER
- AREA SUBJECT TO GEOTECHNCIAL INVESTIGATION
- INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS (QIKIQTANI INUIT ASSOCIATION)
- COMMISSIONER'S LAND (GOVERNMENT OF NUNAVUT)
- CROWN LAND (AANDC)

| REV | DATE | DESCRIPTION | DESIGNED | DRAWN | CHK'D | APP'D |
|---|---|---|---|---|---|---|
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5. CAMP LOCATIONS PROVIDED BY QIKIQTANI INUIT ASSOCIATION (2012).

QULLIQ ENERGY CORPORATION

IQALUIT HYDRO-ELECTRIC PROJECT

**FIELD INVESTIGATION STUDY AREAS**

Knight Piésold CONSULTING

P/A NO. NB103-137/8

REF NO. 3

**FIGURE 2.1**

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# 3 – RESPONSE ORGANIZATION

## 3.1 SPILL RESPONSE TEAM

The following table represents the contacts related to the Spill Response Team:

**Table 3.1 Spill Response Team**

| Position | Contact |
|---|---|
| Director of Engineering | Stephen Kerr<br>Qulliq Energy Corporation<br>PO Box 250<br>Iqaluit, NU, Canada, X0A 0H0<br>Tel: (867) 979-7540 |
| Project Manager | Richard Cook<br>Knight Piésold Ltd.<br>1650 Main Street West<br>North Bay, ON, Canada, P1B 8G5<br>Tel: (705) 476-2165<br>Fax: (705) 474-8095 |
| On-site Coordinator | TBD<br>Field Camp<br>Satellite Phone: TBD |
| Air Nunavut National Air Ambulance System | Iqaluit Airport<br>Tel: (867) 979-4018 |
| Project Personnel | A crew of between 10 to 20 people will be on site to assist in spill response |

The responsibilities of the **On-site Coordinator** include the following:

- Assume authority over the scene and personnel
- Activate the Plan
- Evaluate the initial response and assesses the severity of the spill
- Report the spill to the Project Manager and/or Director of Engineering
- Report to the Project Manager and provide recommendations on resource requirements (additional manpower, equipment, material, etc.)
- Mobilize personnel and equipment
- Implement follow-up programs

The responsibilities of the **Project Manager** include the following:

- Manage site activities including, but not limited to supporting the On-site Coordinator in implementation of the Plan
- Report to the Director of Engineering on incidents, response measures and outcomes
- Obtain additional required resources not available on site
- Document the cause of the spill and effectiveness of the response
- Implement the appropriate measures to prevent a recurrence

- Prepare and provide any required follow-up documentation to the Director of Engineering
- Ensure that the situation is resolved and all follow-up communication and reports are filed with the necessary regulatory authorities (including spill reports)

The responsibilities of the **Director of Engineering** include the following:

- Liaise with Project Manager, providing overall direction of corporate resources
- Communicate with shareholders, stakeholders and government agencies
- Provide media relations, as required

# 4 – SPILL RESPONSE PLANS

## 4.1 GENERAL

A spill is classified as the discharge of petroleum products or other dangerous substances into the environment. Potential hazards to humans, vegetation, water resources, fish and wildlife will vary in severity depending on several factors. These factors include the nature of the material, the quantity spilled, the location and the season.

Fuel is most likely material to be spilled. The largest fuel container will be 205 L. Therefore, a fuel spill would be limited to likely one or more drums. Other chemicals that may be spilled include small quantities of lubricants and oils. Drilling in the arctic also requires calcium chloride flakes which are dissolved in water to produce drilling brine. Material Safety Data Sheets (MSDS) for the various materials are included in Appendix A.

Clean-up of calcium chloride involves management of a solid. Release of this material in water will result in the rapid dissolution and dispersion of the material.

## 4.2 FIRST RESPONSE - REACT

The potential for spills to occur will be minimized during fuel handling, transfer, or storage operations:

- Immediately clean up minor spills
- Conduct regular inspections of fuel barrel storage areas and hoses for evidence of leaks
- Use impermeable liners at all petroleum transfer sites and under stationary machinery
- Train/retrain personnel in proper fuel handling and spill contingency procedures. There is no problem with accepting that you are unsure of what to do. Call for help to deal with any incident.

The first person on site of the spill is responsible for initiating the following actions:

- Identify the product, location and source of the spill. Check container labels including warning labels, markings, etc.
- **SAFETY FIRST/PROTECT PEOPLE** - Prevent personnel from approaching the site and keep them at a sufficient distance to prevent injury by a fire or explosion
- Do not panic, contact help from camp and/or nearest source of personnel. Work as a team, plan the response and then **REACT**:
  - **Remove/stop the flow-source at the source** - Reduce or terminate the flow of product without endangering anyone. If the fuel source is a drum, then transfer the fuel to an empty drum. Wherever possible use the empty drums located within the berms specifically designed for that purpose (use diesel for diesel, gasoline for gasoline Jet A for Jet A, etc.) If using a drum designed for a different product, ensure that it is relabeled in a conspicuous manner.
  - **Envelop the spill, assess the seriousness of the spill** - Evaluate potential dangers to human health and safety, the aquatic environment, wildlife, vegetation and other land resources. Ensure that the spill is localized and prevent the spread of the spill.
  - **Absorb/accumulate** - Utilize the correct spill kit to absorb and clean up spilled material. Remember that safety is the highest priority. Take the time needed to ensure that the spill cannot do more damage and the initial clean up deals with the spill.

- **Containerize/clean up the spill** - Follow procedures appropriate for the location, environment, and material and time of year. Utilize material in the spill kit. Remember the priority in first response is to stop, accumulate and clean up the spill.
- **Transmit a report detailing the spill** - Report the spill to the **24-hour Spill Line** at **Tel: (867) 920-8130 or Fax: (867) 873-6924**. See Section 4.7 for additional details including additional reporting contacts. Provide basic information such as location of spill, name of polluter, type and amount of material spilled, date and time of the spill and any perceived threat to human health or environment. A blank Spill Reporting Form is included as Appendix B.

## 4.3 SPILL RESPONSE - LAND

Response to spills on land may include the following additional steps:

- Identify the source of the leak or spill
- Contain the spill at the source, if possible
- Stop a leak from a barrel by:
  - Cease filling operations, if leaking vessel is receiving fuel
  - Check pump valves and seals on pumps, if leaking
  - Transfer all fuels from leaking barrels
  - Place plastic sheeting at the foot of the leak to minimise seepage to the environment
- Contain and clean spills on land (gravel, rock, vegetation) using the following methods:
  - Place a soil berm down slope of the running or seeping fuel. Place plastic tarps at the foot of and over the berm to permit the fuel to pool on the plastic for easy capture. In the winter, make berms of snow and line with plastic. Use absorbent sheeting to soak up fuel. Squeeze fuel from the pads into drums or plastic pails. The pads can be re-used. Pump larger pools of fuel into empty drums. Prevent fuel from entering a body of water where it will have a greater environmental impact.
  - Use absorbent sheeting to soak up petroleum products from rocks. Place sheeting in empty drums for eventual disposal by incineration.
  - Use a light covering of alternate absorbent material to absorb films of petroleum products from arctic vegetation
  - Remove contaminated soil and vegetation for disposal. Contact the appropriate regulatory authority before undertaking this action.
  - Use snow as a natural absorbent and compact and use as a berm. Place plastic sheeting over the snow berm.

## 4.4 SPILL RESPONSE - WATER

Response to spills of petroleum products on water will include the first response actions previously described in Section 4.2, and possibly the following additional steps:

- Deploy floating 'boom(s)' to contain the floating product
- Use absorbent pads and similar materials to capture small spills on water. Slowly draw in absorbent booms to encircle spilled fuel and absorb it. These materials are hydrophobic and will therefore, absorb hydrocarbons but repel water. Absorbent booms are often relied on to recover any hydrocarbons that escape containment booms.

- Deploy a skimmer once a boom has been secured to capture the spilled product and pump it through hoses to empty fuel drums
- In the event of a larger spill on water, limit the extent of the spill by using booms. The 24-Hour Spill Report Line should be used to keep regulatory authorities up to date of the situation and if assistance is required.

## 4.5 SPILL RESPONSE - SNOW AND ICE

Response to spills on snow and ice will include the initial action previously detailed and possibly the following specific steps:

- Where a spill occurs on ice, use compacted snow around the edge and line with plastic sheeting to serve as a berm. The ice will prevent seepage of fuel into the water, but contaminated snow and ice must be scraped up immediately.
- Place contaminated snow and ice in drums or on plastic and within plastic lined berms on land

## 4.6 SPILL REPORTING

After the initial action to a spill, complete the Spill Report Form (Appendix B) and call the 24-hour Spill Report Line:

**24-Hour Spill Report Line**
**Tel: (867) 920-8130 or Fax: (867) 873-6924**

It is the responsibility for the Project Manager to prepare the proper reports and transmit the reports to the Environmental Protection Division of the Government of Nunavut, and the affected landowner(s).

The following Table 4.1 is an additional contact list for spill reporting:

**Table 4.1 Additional Spill Reporting Contact List**

| Department | Email | Telephone |
|---|---|---|
| AANDC - Water Resources Officer | nunavutwaters@aadnc-aandc.gc.ca | (867) 975-4298 |
| DFO - Iqaluit | nunavuthabitat@dfo-mpa.gc.ca | (867) 979-8000 |
| Environment Canada | enviroinfo@ec.gc.ca | (780) 495-2615 |
| GN-Department of Environment, Environmental Protection Division | environment@gov.nu.ca | (867) 975-7700 |
| Qikiqtani General Hospital | N/A | (867) 975-8600 |
| Iqaluit RCMP | N/A | (867) 979-0123 |

## 4.7 DISPOSAL OF SPILLED MATERIAL

Drums may be used to contain and transport spilled material for removal from site by air to an approved disposal facility. Tote bags may be used to contain contaminated soils or contaminated snow and ice during winter.

## 5 – ENVIRONMENTAL MAPPING

### 5.1 PETROLEUM STORAGE FACILITIES

The petroleum products required for the planned field investigation work will be transported by helicopter or possibly by sealift to the Armshow River South camp for off-loading. A main fuel storage area will be established at this location in accordance with the Draft Fuel Storage Guidelines (AANDC, 2008). Smaller caches will be established at the drill sites and at Jaynes Inlet for helicopter refueling.

All fuel will be stored a minimum of 30 m from any high water mark and fuel transfer from tanks to equipment will be performed with the aid of fuel pumps. Fuel drum storage areas with 20 drums or more will be visually inspected on a daily basis to check for leakage or damage to any of the containers.

Material Safety Data Sheets (MSDS) for all fuels and potential chemicals are included as Appendix A and sufficient spill kits will be positioned at fuel storage areas and caches.

The total petroleum product requirement for the field investigation program is summarized in Table 5.1. The total volume of fuel stored on site will be considerably less than the volumes indicated.

**Table 5.1 Field Investigation Fuel Requirements**

| Fuel | Number of Containers and Capacity of Containers | Total Amount of Fuel (in Litres) | Proposed Storage Methods |
|---|---|---|---|
| Diesel | 75 - 205L | 15,000 | Drums (minimum of 30 m from the high water mark of any water body) |
| Gasoline | 2 - 205L | 410 | |
| Aviation fuel | 200 - 205L | 41,000 | |
| Propane | 12 - 20lbs/100lbs | | |

Potential sources of petroleum product spills could include the following:

1. Leaking or ruptured fuel drums
2. Fuel transfer operations between storage drums, equipment and aircraft, due to broken supply pipes, hoses or associated valves
3. Slinging of fuel drums by helicopter
4. Aircraft or equipment involved in accidents
5. Leaks and drips from machinery, pumps, motors and other equipment

Spill kits will be positioned at the following locations:

- Fuel storage areas and smaller caches
- Fuelling areas
- Generators and pump stations

# 6 – RESOURCE INVENTORY

## 6.1 SPILL KIT CONTENTS

A variety of spill kit sizes with various contents are available. Details of the spill kit contents from a typical vendor are summarized in Table 6.1 and are shown on Figure 6.1.

**Table 6.1 Spill Kit Contents**

| Kit No./Details | Contents | Quantity | |
|---|---|---|---|
| **1, 2, or 3 Quick Response Kits** Absorbs up to 28 liters | Sorbent Pads | 25 | |
| | Sorbent Socks | 3 | |
| | Nitrile Gloves (pair) | 1 | |
| | Disposal Bags | 2 | |
| **4 20 Gallon Lab Pack** Absorbs up to 93 liters | Sorbent Pads | 100 | |
| | Sorbent Socks | 4 | |
| | Sorbent Pillows | 4 | |
| | Nitrile Gloves (pair) | 2 | |
| | Disposal Bags | 3 | |
| | Repair Putty Stick | 1 | |
| **5 Portable Response Kit** 240 liter Rollout Cart absorbs up to 350 liters 360 liter Rollout cart absorbs up to 500 liters | | **240L Cart** | **360L Cart** |
| | Sorbent Pads | 400 | 400 |
| | Sorbent Socks | 4 | 8 |
| | Sorbent Pillows | 4 | 8 |
| | Sorbent Boom (5” diameter x 10’ long) | 0 | 4 |
| | Xsorb Granular Absorbent (2L bags) | 3 | 4 |
| | Nitrile Gloves (pair) | 2 | 2 |
| | Tyvek Gloves (pair) | 2 | 2 |
| | Splash Resistant Goggles | 2 | 2 |
| | Disposal Bag | 4 | 4 |
| | Drain Cover | 1 | 2 |
| **6 Spill Chest** Absorbs up to 560 liters | Sorbent Pads | 200 | |
| | Sorbent Socks | 8 | |
| | Sorbent Pillows | 8 | |
| | Sorbent Boom (5” diameter x 10’ long) | 4 | |
| | Sorbent Roll | 1 | |
| | Xsorb Granular Absorbent (25 pound bags) | 1 | |
| | Nitrile Gloves (pair) | 2 | |
| | Tyvek Gloves (pair) | 2 | |

| Kit No./Details | Contents | Quantity |
|---|---|---|
| | Splash Resistant Goggles | 2 |
| | Disposal Bag | 4 |
| | Drain Cover | 1 |
| | Repair Putty Stick | 1 |
| | Barricade Tape (roll) | 1 |
| **7**<br>**Heavy Duty Drum Kit**<br>Absorbs up to 300 liters | Sorbent Pads | 200 |
| | Sorbent Boom (5” diameter x 10’ long) | 1 |
| | Xsorb Granular Absorbent (25 pound bags) | 1 |
| | Nitrile Gloves (pair) | 2 |
| | Tyvek Gloves (pair) | 2 |
| | Splash Resistant Goggles | 2 |
| | Disposal Bag | 4 |
| | Drain Cover | 1 |

**NOTES:**

1. SPILL KIT DETAILS COURTESY OF VERSATECH PRODUCTS INC. (VERSATECH, 2012).


**Figure 6.1 Spill Kits (from Versatech, 2012)**

## 6.2 PROPOSED SPILL KIT LOCATIONS

Spill kits will be placed at key locations at each of the Project sites according to where fuel will be stored and handled.

The following spill kits will be placed at the Armshow South site:

- Kit 4 - At each of the water pump station, incinerator, drill rig site, tents and emergency shelter
- Kit 7 - At each of the fuel drum storage area and generator

The following spill kits will be located at the Jaynes Inlet site:

- Kit 4 - At each of the water pump station, drill rig site and emergency shelter
- Kit 7 - At the fuel cache

This section of the revised Plan will be updated if equivalent spill kits from another vendor are used.

## 7 – TRAINING AND EXERCISES

Field personnel will receive training on how to respond to a spill and take preventative measures to mitigate any potential effects. All materials and this Plan will be posted at the camps and all individuals will be familiar with its contents.

## 8 – REFERENCES

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## 9 – CERTIFICATION

This report was prepared, reviewed and approved by the undersigned.

Prepared:

Ryan Weir, E.I.T.
Geological Engineering

Reviewed:

Richard Cook, B.Sc.
Senior Scientist

Approved:

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Managing Principal, North Bay

## APPENDIX A

## MATERIAL SAFETY DATA SHEETS (MSDS)

| | |
|---|---|
| Appendix A1 | Aviation Fuel |
| Appendix A2 | Calcium Chloride Flake |
| Appendix A3 | CP-43 Diesel |
| Appendix A4 | EZ-MUD PLUS |
| Appendix A5 | Gasoline |
| Appendix A6 | Jet A |
| Appendix A7 | Lubtac Rod Grease |
| Appendix A8 | Tellus T32 Oil |

# APPENDIX A1

# AVIATION FUEL

(Pages A1-1 to A1-13)

# Material Safety Data Sheet

## 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

| | | |
|---|---|---|
| **Material Name** | : | **AVGAS 100LL** |
| **Recommended Uses** | : | Low lead content aviation gasoline fuel for piston engined aircraft |
| **Other names** | : | GASOLINE |
| **Product Code** | : | 002D0717 |
| **Manufacturer/Supplier** | : | **The Shell Company of Australia Limited**<br>(ABN 46 004 610 459)<br>8 Redfern Road<br>Hawthorn East<br>Victoria 3123<br>Australia |
| **Telephone** | : | +61 (0)3 9666 5444 |
| **Fax** | : | +61 (0)3 8823 4800 |
| **Emergency Telephone Number** | : | 1800 651 818 (within Australia only) +61 3 9663 2130 (International) |

## 2. HAZARDS IDENTIFICATION

HAZARDOUS SUBSTANCE. DANGEROUS GOODS.
Classified as hazardous according to the criteria of NOHSC, and as Dangerous Goods according to the Australian Dangerous Goods Code.

| | | |
|---|---|---|
| **Symbol(s)** | : | F+ Extremely flammable.<br>T Toxic.<br>N Dangerous for the environment. |
| **R-phrase(s)** | : | R45 May cause cancer.<br>R46 May cause heritable genetic damage.<br>R63 Possible risk of harm to the unborn child.<br>R65 Harmful: may cause lung damage if swallowed.<br>R67 Vapours may cause drowsiness and dizziness.<br>R38 Irritating to skin.<br>R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.<br>R20/21/22 Harmful by inhalation, in contact with skin and if swallowed.<br>R12 Extremely flammable.<br>R33 Danger of cumulative effects. |
| **S-phrase(s)** | : | S2 Keep out of reach of children.<br>S29 Do not empty into drains.<br>S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).<br>S53 Avoid exposure. Obtain special instructions before use.<br>S61 Avoid release to the environment. Refer to special instructions/Safety data sheets.<br>S62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label. |
| **Health Hazards** | : | Harmful by inhalation. Vapours may cause drowsiness and |

| | | |
|---|---|---|
| | | dizziness. Slightly irritating to respiratory system. Harmful in contact with skin. Irritating to skin. Moderately irritating to eyes. Harmful if swallowed. Harmful: may cause lung damage if swallowed. Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Blood-forming organs. Peripheral nervous system. May cause heritable genetic damage. Possible risk of harm to the unborn child. Danger of cumulative effects. A component or components of this material may cause cancer. This product contains benzene which may cause leukaemia (AML acute myelogenous leukaemia). |
| **Signs and Symptoms** | : | Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Eye irritation signs and symptoms may include a burning sensation and a temporary redness of the eye. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Damage to blood-forming organs may be evidenced by: a) fatigue and anaemia (RBC), b) decreased resistance to infection, and/or excessive bruising and bleeding (platelet effect). Peripheral nerve damage may be evidenced by impairment of motor function (incoordination, unsteady walk, or muscle weakness in the extremities, and/or loss of sensation in the arms and legs). Auditory system effects may include temporary hearing loss and/or ringing in the ears. |
| **Aggravated Medical Condition** | : | Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Blood-forming organs. Peripheral nervous system. Skin. |
| **Safety Hazards** | : | Extremely flammable. Electrostatic charges may be generated during handling. Electrostatic discharge may cause fire. Liquid evaporates quickly and can ignite leading to a flash fire, or an explosion in a confined space. |
| **Environmental Hazards** | : | Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.<br>May cause long-term adverse effects in the environment. |
| **Additional Information** | : | This product contains tetraethyl lead which may accumulate in the human body. There are indications from human epidemiological studies that excessive prenatal exposure to tetraethyl lead may cause developmental and neurobehavioural effects in children. This product is intended for use in closed systems only. |
| **SUSDP Schedule** | : | S6 |

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| | | |
|---|---|---|
| **Preparation description** | : | Complex mixture of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons with carbon |

numbers predominantly in the C4 to C12 range. Includes benzene at 0.1 - 5% v/v. Contains lead alkyl anti-knock additives. Maximum lead concentration: 0.56 g/l. Maximum tetraethyl lead content is 0.125% w/w. May also contain several additives at <0.1% v/v each. This product is dyed for grade identification.

**Hazardous Components**

| Chemical Identity | CAS | EINECS | Symbol(s) | R-phrase(s) | Conc. |
|---|---|---|---|---|---|
| Gasoline, low boiling point naphtha | 86290-81-5 | 289-220-8 | F+, Xi, T, Xn, N | R12; R38; R45; R46; R63; R65; R67; R51/53 | 99.00 - 100.00 % |
| Tetraethyl lead | 78-00-2 | 201-075-4 | T+, N | R26/27/28; R61; R62; R33; R50/53 | 0.00 - 0.125 % |

**Additional Information** : Contains Benzene, CAS # 71-43-2. Contains Toluene, CAS # 108-88-3. Contains Ethylbenzene, CAS # 100-41-4. Contains n-Hexane, CAS # 110-54-3. Contains Xylene (Mixed Isomers), CAS # 1330-20-7. Contains Naphthalene, CAS # 91-20-3. Contains Cyclo-hexane, CAS# 110-82-7.
Contains Tri-methyl-benzene (all isomers), CAS# 25551-13-7. Dyes and markers can be used to indicate tax status and prevent fraud. Refer to chapter 16 for full text of EC R-phrases.

## 4. FIRST AID MEASURES

**Inhalation** : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

**Skin Contact** : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

**Eye Contact** : Flush eyes with water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision, or swelling persist, transport to the nearest medical facility for additional treatment.

**Ingestion** : 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. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (37° C), shortness of breath, chest congestion or continued coughing or wheezing.

**Advice to Physician** : The concentration of lead alkyl compounds present is not significant in the context of treating acute poisoning unless the person had excessive and prolonged exposure to the material. Treat symptomatically.

## 5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

| | | |
|---|---|---|
| **Specific Hazards** | : | Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water. |
| **Suitable Extinguishing Media** | : | 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. |
| **Protective Equipment for Firefighters** | : | Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space. |
| **Additional Advice** | : | Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways. |

## 6. ACCIDENTAL RELEASE MEASURES

Avoid contact with skin, eyes and clothing. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly. If contamination of sites occurs remediation may require specialist advice. Take precautionary measures against static discharges. Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Observe all relevant local and international regulations.

| | | |
|---|---|---|
| **Protective measures** | : | Vapour can travel for considerable distances both above and below the ground surface. Underground services (drains, pipelines, cable ducts) can provide preferential flow paths. Do not breathe fumes, vapour. Take measures to minimise the effects on groundwater. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. |
| **Clean Up Methods** | : | 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.<br>For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, 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. |
| **Additional Advice** | : | 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. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26. |

### 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| **General Precautions** | : | Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material 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. Air-dry contaminated clothing in a well-ventilated area before laundering. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Prevent spillages. Turn off all battery operated portable electronic devices (examples include: cellular phones, pagers and CD players) before operating gasoline pump. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse. For comprehensive advice on handling, product transfer, storage and tank cleaning refer to the product supplier. Do not use as a cleaning solvent or other non-motor fuel uses.<br>Maintenance and Fuelling Activities - Avoid inhalation of vapours and contact with skin. |
| **Handling** | : | When using do not eat or drink. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Never siphon by mouth. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Avoid exposure. Obtain special instructions before use. |
| **Storage** | : | Drum and small container storage: Keep containers closed when not in use. Drums should be stacked to a maximum of 3 high. Use properly labelled and closeable containers. Packaged product must be kept tightly closed and stored in a diked (bunded) well-ventilated area, away from, ignition sources and other sources of heat. Take suitable precautions when opening sealed containers, as pressure can build up during storage. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions. |
| **Product Transfer** | : | Electrostatic charges may be generated during pumping. |

Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. During aircraft re-fueling and all other operations extreme care must be taken to avoid any source of ignition from igniting vapour. When filling tanks there is always a danger of static discharge leading to explosion. This is particularly hazardous when switch loading tanks. Product transfer may give rise to light hydrocarbon vapour in the headspace of tanks. This vapour may explode if there is a source of ignition such as static discharge. Partly filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling activities need special care.

**Recommended Materials** : For containers, or container linings use mild steel, stainless steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. Examples of suitable materials are: high density polyethylene (HDPE), polypropylene (PP), and Viton (FKM), which have been specifically tested for compatibility with this product. For container linings, use amine-adduct cured epoxy paint. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.

**Unsuitable Materials** : Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene.; However, some may be suitable for glove materials.

**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. Gasoline containers must not be used for storage of other products.

**Additional Information** : Ensure that all local regulations regarding handling and storage facilities are followed. In the interests of air safety, aviation fuels are subject to strict quality requirements and product integrity is of paramount importance. For one source of information on international standards for the quality assurance of aviation fuels, see www.jointinspectiongroup.org.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Occupational Exposure Limits**

| | | | | | |
|---|---|---|---|---|---|
| Tetraethyl lead | AU OEL | TWA | | 0.1 mg/m3 | as Pb |

| | | | | | |
|---|---|---|---|---|---|
| | AU OEL | SKIN_DES | | | Can be absorbed through the skin.<br>as Pb |
| 1,3,5-Trimethyl benzene | AU OEL | TWA | 25 ppm | 123 mg/m3 | |
| Ethylbenzene | AU OEL | TWA | 100 ppm | 434 mg/m3 | |
| | AU OEL | STEL | 125 ppm | 543 mg/m3 | |
| n-Hexane | AU OEL | TWA | 20 ppm | 72 mg/m3 | |
| Benzene | AU OEL | TWA | 1 ppm | 3.2 mg/m3 | |
| | | TWA | 0.5 ppm | 1.6 mg/m3 | |
| | | STEL | 2.5 ppm | 8 mg/m3 | |
| Toluene | AU OEL | TWA | 50 ppm | 191 mg/m3 | |
| | AU OEL | STEL | 150 ppm | 574 mg/m3 | |
| | AU OEL | SKIN_DES | | | Can be absorbed through the skin. |
| Xylene | AU OEL | TWA | 80 ppm | 350 mg/m3 | |
| | AU OEL | STEL | 150 ppm | 655 mg/m3 | |
| Cyclohexane | AU OEL | TWA | 100 ppm | 350 mg/m3 | |
| | AU OEL | STEL | 300 ppm | 1,050 mg/m3 | |
| Naphthalene | AU OEL | TWA | 10 ppm | 52 mg/m3 | |
| | AU OEL | STEL | 15 ppm | 79 mg/m3 | |

**Additional Information** : Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes.
SHELL IS is the Shell Internal Standard.

| **Material** | **Source** | **Hazard Designation** |
|---|---|---|
| Benzene | AU OEL | Confirmed human carcinogen. |

**Exposure Controls** : 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: Use sealed systems as far as possible. Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.

**Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers. AS/NZS 1337: Eye protectors for industrial applications. AS/NZS 2161: Occupational protective gloves - Selection, use and maintenance. AS/NZS 1715: Selection, use and maintenance of respiratory protective devices. AS/NZS 1716: Respiratory protective devices.

**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 suitable, select an appropriate combination of mask and filter. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. All respiratory protection equipment and use must be in accordance with local regulations. |
| **Hand Protection** | : | 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. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable. (Breakthrough time of > 240 minutes.) For incidental contact/splash protection Neoprene, PVC gloves may be suitable. |
| **Eye Protection** | : | Chemical splash goggles (chemical monogoggles). |
| **Protective Clothing** | : | Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing). |
| **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. |
| **Environmental Exposure Controls** | : | Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| Appearance | : | Blue. Clear, bright liquid. |
| Odour | : | Hydrocarbon |
| pH | : | Data not available |
| Initial Boiling Point and Boiling Range | : | 25 - 170 °C / 77 - 338 °F |
| Freezing/melting point | : | Data not available |
| Flash point | : | < -40 °C / -40 °F |
| Lower / upper Flammability or Explosion limits | : | Data not available |
| Auto-ignition temperature | : | > 250 °C / 482 °F |
| Vapour pressure | : | 380 - 490 hPa at 37.8 °C / 100.0 °F |
| Specific gravity | : | Data not available |
| Density | : | Typical 0.700 g/cm3 at 15 °C / 59 °F |
| Solubility in other solvents | : | Data not available |
| n-octanol/water partition coefficient (log Pow) | : | 2 - 7 |
| Kinematic viscosity | : | 0.5 - 0.75 mm2/s at 40 °C / 104 °F |
| Vapour density (air=1) | : | Data not available |

## 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| **Stability** | : | Stable under normal conditions of use. |
| **Conditions to Avoid** | : | Avoid heat, sparks, open flames and other ignition sources. |
| **Materials to Avoid** | : | Strong oxidising agents. |
| **Hazardous Decomposition Products** | : | Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation. |

## 11. TOXICOLOGICAL INFORMATION

| | | |
|---|---|---|
| **Basis for Assessment** | : | Information given is based on product data, a knowledge of the components and the toxicology of similar products. |
| **Acute Oral Toxicity** | : | Low toxicity:LD50 >2000 mg/kg, Rat<br>Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal. |
| **Acute Dermal Toxicity** | : | Low toxicity:LD50 >2000 mg/kg, Rabbit |
| **Acute Inhalation Toxicity** | : | Low toxicity: LC50 >5 mg/l / 4 h, Rat<br>High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death. |
| **Skin Irritation** | : | Irritating to skin. |
| **Eye Irritation** | : | Moderately irritating to eyes (but insufficient to classify). |
| **Respiratory Irritation** | : | Based on human experience, breathing of vapours or mists may cause a temporary burning sensation to nose, throat and lungs. |
| **Sensitisation** | : | Not a skin sensitiser. |
| **Repeated Dose Toxicity** | : | Kidney: caused kidney effects in male rats which are not considered relevant to humans<br>Blood-forming organs: repeated exposure affects the bone marrow. (Benzene)<br>Peripheral nervous system: repeated exposure causes peripheral neuropathy in animals. (n-Hexane) |
| **Mutagenicity** | : | May cause heritable genetic damage. (Benzene)<br>Mutagenicity studies on gasoline and gasoline blending streams have shown predominantly negative results. |
| **Carcinogenicity** | : | Known human carcinogen. (Benzene)<br>May cause leukaemia (AML - acute myelogenous leukemia). (Benzene)<br>Inhalation exposure to mice causes liver tumours, which are not considered relevant to humans. |
| **Reproductive and Developmental Toxicity** | : | Causes foetotoxicity at doses which are maternally toxic. (Toluene)<br>Causes adverse effects on the foetus based on animal studies. (Toluene)<br>Many case studies involving abuse during pregnancy indicate that toluene can cause birth defects, growth retardation and |

learning difficulties. (Toluene)
This product contains tetraethyl lead which may cause harm to the unborn child. Exposure to tetraethyl lead is associated with developmental effects which include reduced birth weight, reduced gestational age and neurobehavioral effects.

**Additional Information** : Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest.
Prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss. (Toluene)
Abuse of vapours has been associated with organ damage and death. (Toluene)
Myelodysplastic syndrome (MDS) was observed in individuals exposed to very high levels (50 ppm to 300 ppm range) of benzene over a long period of time in the workplace. The relevance of these results to lower levels of exposure is not known. (Benzene)

## 12. ECOLOGICAL INFORMATION

Fuels are typically made from blending several refinery streams. Ecotoxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

**Acute Toxicity** : Toxic:LL/EL/IL50 1-10 mg/l(to aquatic organisms)(LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract).

**Mobility** : Floats on water. Evaporates within a day from water or soil surfaces. Large volumes may penetrate soil and could contaminate groundwater. Contains volatile constituents.

**Persistence/degradability** : Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment. The volatile constituents will oxidize rapidly by photochemical reactions in air.

**Bioaccumulation** : Contains constituents with the potential to bioaccumulate.

**Other Adverse Effects** : Films formed on water may affect oxygen transfer and damage organisms.

## 13. DISPOSAL CONSIDERATIONS

**Material Disposal** : 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. 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. Do not dispose into the environment,

| | | |
|---|---|---|
| | | in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. |
| **Container Disposal** | : | Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not, puncture, cut, or weld uncleaned drums. Send to drum recoverer or metal reclaimer. Do not pollute the soil, water or environment with the waste container. |
| **Local Legislation** | : | 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. |

## 14. TRANSPORT INFORMATION

**ADG**

| | |
|---|---|
| UN number | 1203 |
| Proper shipping name | GASOLINE |
| Class | 3 |
| Packing group | II |
| Hazchem Code | 3YE |

**IMDG**

| | |
|---|---|
| Identification number | UN 1203 |
| Proper shipping name | PETROL |
| Technical name | (leaded) |
| Class / Division | 3 |
| Packing group | II |
| Marine pollutant: | Yes |

**IATA (Country variations may apply)**

| | | |
|---|---|---|
| UN No. | : | 1203 |
| Proper shipping name | : | Gasoline |
| Technical name | : | (leaded ) |
| Class / Division | : | 3 |
| Packing group | : | II |

## 15. REGULATORY INFORMATION

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

| | | |
|---|---|---|
| **SUSDP Schedule** | : | S6 |
| AICS | : | All components are listed or exempt |
| **Other Information** | : | National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011] List of Designated Hazardous |

Substances [NOHSC:10005]. Approved Criteria for Classifying Hazardous Substances [NOHSC:1008]. Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003]. Australian Dangerous Goods Code. Standard Uniform Scheduling of Drugs and Poisons.

National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011] List of Designated Hazardous Substances [NOHSC:10005]. Approved Criteria for Classifying Hazardous Substances [NOHSC:1008]. Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003]. Australian Dangerous Goods Code. Standard Uniform Scheduling of Drugs and Poisons.

## 16. OTHER INFORMATION

**Additional Information** : This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.

R-phrase(s)

| | |
|---|---|
| R12 | Extremely flammable. |
| R20/21/22 | Harmful by inhalation, in contact with skin and if swallowed. |
| R26/27/28 | Very toxic by inhalation, in contact with skin and if swallowed. |
| R33 | Danger of cumulative effects. |
| R38 | Irritating to skin. |
| R45 | May cause cancer. |
| R46 | May cause heritable genetic damage. |
| R50/53 | Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| R51/53 | Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| R61 | May cause harm to the unborn child. |
| R62 | Possible risk of impaired fertility. |
| R63 | Possible risk of harm to the unborn child. |
| R65 | Harmful: may cause lung damage if swallowed. |
| R67 | Vapours may cause drowsiness and dizziness. |

**MSDS Version Number** : 1.0

**MSDS Effective Date** : 19.03.2010

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

**MSDS Regulation** :

**Uses and Restrictions** : This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.
Not to be used as a fuel for automotive vehicles.

## Material Safety Data Sheet

| | | |
|---|---|---|
| | | This product is not to be used as a solvent or cleaning agent; for lighting or brightening fires; as a skin cleanser. |
| **MSDS Distribution** | : | The information in this document should be made available to all who may handle the product. |
| **Disclaimer** | : | This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. |

**APPENDIX A2**

**CALCIUM CHLORIDE FLAKE**

(Pages A2-1 to A2-3)

# MSDS - Calcium Chloride Flake

**Rev. January 2011**

## Section 1. Product Information

| | |
|---|---|
| T.D.G. Classification: | Not regulated |
| UN Number | Not applicable |
| CAS #: | 10035-04-8 |
| Packing Group: | Not applicable |
| Product Name: | Flake Calcium Chloride, Powdered Calcium Chloride |
| WHMIS Classification: | This is not a controlled product |
| Chemical Formula: | $CaCl_2.2H_2O$ |
| Chemical Family: | Not applicable |
| Product Use: | Delcer, dust control, mud drilling lubricant, freeze-proofing of ores and aggregates, thawing agent, concrete conditions |
| Available Packaging: | 20kg, 40kg |

Emergency Phone: (Canutec) 613-996-6666

Distributed by: Pestell Minerals & Ingredients, New Hamburg, ON Canada

## Section 2. Hazardous Ingredients

| | |
|---|---|
| Hazardous Ingredients: | Not applicable |
| Percentage: | Not applicable |
| LD/50, Route, Specie | 1000 mg/kg (Oral, Rat) 1940 mg/kg (Oral, Mouse) |
| LC/50, Route, Specie | Not applicable |

## Section 3. Physical Data

| | |
|---|---|
| Physical State | Flakes |
| Appearance and Odour: | Small white flakes, very hygroscopic |
| Odour Threshold: | Odourless |
| Specific Gravity: | Not applicable |
| Vapour Pressure: | Not applicable |
| Vapour Density: | Not applicable |
| Evaporation Rate: | Slow <0.3 Fast >3.0 Medium 0.3 - 3.0 |
| Boiling Point: | Not applicable |
| Melting Point: | 176°C |
| pH: | Neutral to slightly Alkaline |

## Section 4. Fire or Explosion Hazards

| | |
|---|---|
| Hazardous Conditions: | Reacts violently with bromine triflouride (BrF3), or a mixture of boron trioxide and calcium oxide (B2O3+CaO). Sulfuric acid yields hydrogen chloride gas, which is corrosive, irritating and reactive. Water-reactive materials such as sodium causes an exothermic reaction. Methyl vinyl ether starts runaway polymerization reaction. Zinc as in galvanized iron yields hydrogen gas with solutions, which may explode under these conditions. |
| Fire Extinguishing Procedures: | Use extinguishing media appropriate for surrounding fire. For fire fighting, wear NIOSH approved self contained breathing apparatus. |
| Flash Point: | Not applicable |
| Upper Flammable Limit: | Not applicable |
| Lower Flammable Limit: | Not applicable |
| Auto-Ignition Temperature: | Not applicable |
| Hazardous Combustion Products: | Not applicable |
| Sensitivity to Static Discharge: | Not applicable |
| Sensitivity to Mechanical Impact: | Not applicable |
| Hazardous Decomposition Products: | Not applicable |

## Section 5. Reactivity Data

| | |
|---|---|
| Chemical Stability: | Stable under normal conditions |
| Hazardous Polymerization: | Will not occur |
| Conditions of Reactivity: | Not applicable |
| Hazardous Decomposition: | Chloride Fumes are given off at temperatures above 1600°C |

## Section 6. Toxicological Properties

| | |
|---|---|
| Route of Entry: | Not applicable |
| Effects of Acute Exposure: | Moderately toxic LD50 (oral, rat); 1000 mg/kg |
| Effects of Chronic Exposure: | Not applicable |
| Exposure Limits: | OML TWAEV for nuisance particulate 10 mg/m3 |
| Irritancy of Product: | Not applicable |
| Sensitization of Product: | Not applicable |
| Carcinogenicity of Product: | Not applicable |
| Reproductive Toxicity: | Not applicable |
| Teratogenicity: | Not applicable |
| Mutagenicity: | Not applicable |
| Synergistic Effects: | Not applicable |

## Section 7. Preventive Measures

| | |
|---|---|
| | A2-2 of 3 |

| | |
|---|---|
| Respiratory Protection: | For dusty/misty conditions, wear NIOSH approved dust/mist respirator |
| Eyes and Face: | For dusty/misty conditions, or handling solutions if there is probability of eye contact, wear chemical safety goggles and hard hat. Under these conditions do not wear contact lenses. |
| Hands, Arms, Body: | As a minimum wear long sleeved shirt, trousers, rubber boots and gloves for routine product use. Cotton gloves permitted for dry product, impervious gloves when using solutions. |
| Specific Engineering Controls: | Provide general and/or local exhaust ventilation to maintain dust or fume levels below exposure limits. Eye wash facility should be provided in storage and general work area. |
| Spill/Leak Procedures: | Shovel up dry chemical and place in metal drum with cover. Cautiously spray residue with plenty of water. Avoid waterways. |
| Storage Needs: | Cool, dry area. Prolonged storage may cause product to cake and become wet from atmospheric moisture. |
| Handling: | Avoid contact with eyes, skin or clothing. Avoid breathing dust. |

## Section 8. First Aid Measures

| | |
|---|---|
| Eye Contact: | Immediately flush eyes with running water for at least 15 minutes. Get medical attention |
| Skin Contact: | Remove contaminated clothing. Wash with soap and water. Seek attention if irritation persists. |
| Ingestion: | If conscious, immediately give 2-4 glasses of water. Induce vomiting under medical supervision. |
| Inhalation: | Promptly remove to fresh air. Get medical attention. |

**Disclaimer**

This information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Pestell Minerals & Ingredients makes no warranty of any kind, expressed or implied, concerning the safe use of this material in your process or combination with any other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. This material may be released from gas, liquid or solid materials made directly or indirectly from it. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards.

Return to previous page

**APPENDIX A3**

**CP-43 DIESEL**

(Pages A3-1 to A3-7)

# Avjet Holding Inc.

## Material Safety Data Sheet

Effective Date: 2009-12-09
Supersedes: 2009-09-02

Class B3 Combustible Liquid

Class D2B Other Toxic Effects - Skin Irritant

## 1. PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|---|
| PRODUCT: | **LOW SULPHUR DIESEL CP-43** |
| SYNONYMS: | Diesel<br>Automotive Gas Oil |
| PRODUCT USE: | Fuel Solvent |
| MSDS Number: | 320-043 |

| **MANUFACTURER** | **TELEPHONE NUMBERS** | |
|---|---|---|
| **Avjet Holding Inc.** | **Avjet Emergency Number** | 1-866-472-0007 |
| 900, Lemire Boulevard<br>Drummondville, QC Canada<br>J2C 7W8 | For general information:<br>For MSDS information: | (819) 479-1000<br>(819) 479-1000 |

This MSDS was prepared by the Toxicology and Product Stewardship Section of Avjet Holding Inc.

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

| **Component Name** | **CAS Number** | **% Range** | **WHMIS Controlled** |
|---|---|---|---|
| Fuels, Diesel, No. 2 | 68476-34-6 | 100 | Yes |

See Section 8 for Occupational Exposure Guidelines.

## 3. HAZARDS IDENTIFICATION

**Physical Description:** Liquid Clear To Yellow Hydrocarbon Odour

**Routes of Exposure:** Exposure will most likely occur through skin contact or inhalation.
**Hazards:**

Vapour concentrations above the recommended exposure level are irritating to the eyes and respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects.
Combustible Liquid.
Irritating to skin.
Vapours are moderately irritating to the eyes.
Ingestion may result in vomiting. Avoid aspiration of vomitus into lungs as small quantities may result in aspiration pneumonitis.
Vapours are moderately irritating to the respiratory passages.

**Handling:** Eliminate all ignition sources.
Avoid prolonged exposure to vapours.
Wear suitable gloves and eye protection.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.

For further information on health effects, see Section 11.

## 4. FIRST AID

**Eyes:** Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.

**Skin:** Wash contaminated skin with mild soap and water for 15 minutes. If irritation occurs and persists, obtain medical attention.

**Ingestion:** DO NOT INDUCE VOMITING! OBTAIN MEDICAL ATTENTION IMMEDIATELY. Guard against aspiration into lungs by having the individual turn on to their left side. If vomiting occurs spontaneously keep head below hips to prevent aspiration of liquid into the lungs. Do not give anything by mouth to an unconscious person.

**Inhalation:** Remove victim from further exposure and restore breathing, if required. Obtain medical attention.

**Notes to Physician:** The main hazard following accidental ingestion is aspiration of the liquid into the lungs producing chemical pneumonitis. If more than 2.0 mL/kg has been ingested, vomiting should be induced with supervision. If symptoms such as loss of gag reflex, convulsions or unconsciousness occur before vomiting, gastric lavage with a cuffed endotracheal tube should be considered.

## 5. FIRE FIGHTING MEASURES

**Extinguishing Media:** Dry Chemical
Carbon Dioxide
Foam
Water Fog

**Firefighting Instructions:** Caution - Combustible. Do not use a direct stream of water as it may spread fire. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Vapour forms a flammable/explosive mixture with air between upper and lower flammable limits. Vapours may travel along ground and flashback along vapour trail may occur. Avoid inhalation of smoke. Product will float and can be reignited on surface of water. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure.

**Hazardous Combustion Products:** A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon dioxide, carbon monoxide and unidentified organic compounds may be formed upon combustion.

## 6. ACCIDENTAL RELEASE MEASURES

Issue warning "Combustible". Eliminate all ignition sources. Isolate hazard area and restrict access. Handling equipment must be grounded. Try to work upwind of spill. Avoid direct contact with material. Wear appropriate breathing apparatus (if applicable) and protective clothing. Stop leak only if safe to do so. Dike and contain land spills; contain water spills by booming. Use water fog to knock down vapours; contain runoff. Absorb residue or small spills with absorbent material and remove to non-leaking containers for disposal. Recommended materials: Clay or Sand Flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations. Notify appropriate environmental agency(ies).

## 7. HANDLING AND STORAGE

**Handling:** Combustible. Avoid excessive heat, sparks, open flames and all other sources of ignition. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Vapours are heavier than air and will settle and collect in low areas and pits, displacing breathing air. Extinguish pilot lights, cigarettes and turn off other sources of ignition prior to use and until all vapours are gone. Vapours may accumulate and travel to distant ignition sources and flashback. Do not cut, drill, grind, weld or perform similar operations on or near containers. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Do not pressurize drum containers to empty them. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Launder contaminated clothing prior to reuse. Use good personal hygiene.

**Storage:** Store in a cool, dry, well ventilated area, away from heat and ignition sources. Keep container tightly closed.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**THE FOLLOWING INFORMATION, WHILE APPROPRIATE FOR THIS PRODUCT, IS GENERAL IN NATURE. THE SELECTION OF PERSONAL PROTECTIVE EQUIPMENT WILL VARY DEPENDING ON THE CONDITIONS OF USE.**

**OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):**

Diesel fuel, as total hydrocarbons: 100 mg/m3
Skin Notation: Absorption through skin, eyes and mucous membranes may contribute significantly to the total exposure.

**Mechanical Ventilation:** Concentrations in air should be maintained below the recommended threshold limit value if unprotected personnel are involved. Use explosion-proof ventilation as required to control vapour concentrations. Make up air should always be supplied to balance air exhausted (either generally or locally). For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere. Local ventilation recommended where mechanical ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit.

**PERSONAL PROTECTIVE EQUIPMENT:**

**Eye Protection:** Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes. Provide an eyewash station in the area.

**Skin Protection:** Impervious gloves (viton, nitrile) should be worn at all times when handling this material. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn. Safety showers should be available for emergency use.

**Respiratory Protection:** If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Use a NIOSH-approved chemical cartridge respirator with organic vapour cartridges or use a NIOSH-approved supplied-air respirator. For high airborne concentrations, use a NIOSH-approved supplied-air respirator, either self-contained or airline breathing apparatus, operated in positive pressure mode.

## 9. PHYSICAL DATA

| | |
|---|---|
| **Physical State:** | Liquid |
| **Appearance:** | Clear To Yellow |
| **Odour:** | Hydrocarbon Odour |
| **Odour Threshold:** | Not available |
| **Freezing/Pour Point:** | Cloud Point-43 °C |
| **Boiling Point:** | 150 - 330 °C |
| **Density:** | < 850 kg/m3 @ 15 °C |
| **Vapour Density (Air = 1):** | Not available |
| **Vapour Pressure (absolute):** | Not available |
| **pH:** | Not available |
| **Flash Point:** | Pensky-Martens CC > 40 °C |
| **Lower Explosion Limit:** | 1 % (vol.) |
| **Upper Explosion Limit:** | 6 % (vol.) |
| **Autoignition Temperature:** | 250 °C |
| **Viscosity:** | 1.3 - 2.1 cSt @ 40 °C |
| **Evaporation Rate (n-BuAc = 1):** | Not available |
| **Partition Coefficient (log $K_{ow}$):** | Not available |
| **Water Solubility:** | Insoluble |
| **Other Solvents:** | Hydrocarbon Solvents |

## 10. STABILITY AND REACTIVITY

| | |
|---|---|
| **Chemically Stable:** | Yes |
| **Hazardous Polymerization:** | No |
| **Sensitive to Mechanical Impact:** | No |
| **Sensitive to Static Discharge:** | Yes |

| | |
|---|---|
| **Hazardous Decomposition Products:** | Thermal decomposition products are highly dependent on combustion conditions. |
| **Incompatible Materials:** | Avoid strong oxidizing agents. |
| **Conditions of Reactivity:** | Avoid excessive heat, open flames and all ignition sources. |

## 11. TOXICOLOGICAL INFORMATION

| **Ingredient (or Product if not specified)** | **Toxicological Data** |
|---|---|
| Fuels, Diesel, No. 2 | LD50 Dermal Rabbit > 5000 mg/kg<br>LD50 Oral Rat = 9000 mg/kg |

| | |
|---|---|
| **Routes of Exposure:** | Exposure will most likely occur through skin contact or inhalation. |
| **Irritancy:** | This product is expected to be irritating to skin but is not predicted to be a skin sensitizer. |
| **Acute Toxicity:** | Vapour concentrations above the recommended exposure level are irritating to the eyes and respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. |
| **Chronic Effects:** | Prolonged and repeated contact with skin can cause defatting and drying of the skin resulting in skin irritation and dermatitis. Prolonged exposure to high vapour concentration can cause headache, dizziness, nausea, blurred vision and central nervous system depression. |
| **Pre-existing Conditions:** | Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product. |
| **Carcinogenicity and Mutagenicity:** | The International Agency for Research on Cancer (IARC) considers that this product is not classifiable as to its carcinogenicity to humans. Middle distillates have caused skin cancers in laboratory animals when applied repeatedly and left in place between applications. This effect is believed to be caused by the continuous irritation of the skin. Good personal hygiene should be maintained to avoid this risk. The American Conference of Governmental Industrial Hygienists (ACGIH) has classified this product as A3 - confirmed animal carcinogen with unknown relevance to humans. |

## 12. ECOLOGICAL INFORMATION

Do not allow product or runoff from fire control to enter storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. Provincial regulations require and federal regulations may require that environmental and/or other agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities. May cause physical fouling of aquatic organisms.

| | |
|---|---|
| **Biodegradability:** | Not readily biodegradable. |
| **Bioaccumulation:** | Potential for bioaccumulation. |
| **Partition Coefficient (log $K_{ow}$):** | Not available |

**Aquatic Toxicity**

May be harmful to aquatic life.

| **Ingredient:** | **Toxicological Data** |
|---|---|
| **Fuels, Diesel, No. 2** | EL50 - growth rate Algae (72hr) 10 - 100 mg/L.<br>EL50 Daphnia Magna (48hr) 10 - 100 mg/L.<br>LL50 (WAF method) Rainbow Trout (96hr) 10 - 100 mg/L. |

**Definition(s):** LL and EL are the lethal loading concentration and effective loading concentration respectively. The concentration represents the amount of substance added to the system to obtain a toxic concentration. They replace the traditional LC and EC for low solubility substances.
WAF is the water accommodated fraction. A slightly soluble hydrocarbon is stirred into water and the insoluble portions are removed. The remaining solution is the water accommodated fraction.

## 13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery (cement kilns, thermal power generation), 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority.

## 14. TRANSPORTATION INFORMATION

**Canadian Road and Rail Shipping Classification:**

| | |
|---|---|
| UN Number | UN1202 |
| Proper Shipping Name | DIESEL FUEL |
| Hazard Class | Class 3 Flammable Liquids |
| Packing Group | PG III |
| Additional Information | Not Regulated in Containers Less Than or Equal to 450 Litres. |
| Shipping Description | DIESEL FUEL Class 3 UN1202 PG III<br>Not Regulated in Containers Less Than or Equal to 450 Litres. |

## 15. REGULATORY INFORMATION

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

| | |
|---|---|
| **WHMIS Class:** | Class B3 Combustible Liquid<br>Class D2B Other Toxic Effects - Skin Irritant |
| **DSL/NDSL Status:** | This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act. |
| **Other Regulatory Status:** | No Canadian federal standards. |

## 16. ADDITIONAL INFORMATION

**LABEL STATEMENTS**

| | |
|---|---|
| **Hazard Statement :** | Combustible Liquid.<br>Irritating to skin. |
| **Handling Statement:** | Eliminate all ignition sources.<br>Avoid prolonged exposure to vapours.<br>Wear suitable gloves and eye protection.<br>Bond and ground transfer containers and equipment to avoid static accumulation.<br>Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames. |
| **First Aid Statement :** | Wash contaminated skin with soap and water.<br>Flush eyes with water.<br>If overcome by vapours remove to fresh air.<br>Do not induce vomiting.<br>Obtain medical attention. |
| **Revisions:** | This MSDS has been reviewed and updated.<br>Changes have been made to:<br>Section 1<br>Section 3<br>Section 5<br>Section 8<br>Section 9<br>Section 12 |

**APPENDIX A4**

**EZ-MUD PLUS**

(Pages A4-1 to A4-6)

HALLIBURTON

# MATERIAL SAFETY DATA SHEET

**Product Trade Name:** **EZ-MUD® PLUS**

**Revision Date:** 04-Jan-2011

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Trade Name:** EZ-MUD® PLUS
**Synonyms:** None
**Chemical Family:** Blend
**Application:** Additive

**Manufacturer/Supplier**
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

**Prepared By**
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

| Substances | CAS Number | PERCENT | ACGIH TLV-TWA | OSHA PEL-TWA |
|---|---|---|---|---|
| Hydrotreated light petroleum distillate | 64742-47-8 | 10 - 30% | 200 mg/m$^3$ | Not applicable |

## 3. HAZARDS IDENTIFICATION

**Hazard Overview**
May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed.

## 4. FIRST AID MEASURES

**Inhalation**
If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

**Skin**
Wash with soap and water. Get medical attention if irritation persists. Remove contaminated shoes and discard.

**Eyes**
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Ingestion**
Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

**Notes to Physician**
Not Applicable

## 5. FIRE FIGHTING MEASURES

| | |
|---|---|
| **Flash Point/Range (F):** | Not Determined**Min:** > 200 |
| **Flash Point/Range (C):** | Not Determined**Min:** > 93 |
| **Flash Point Method:** | PMCC |
| **Autoignition Temperature (F):** | Not Determined |
| **Autoignition Temperature (C):** | Not Determined |
| **Flammability Limits in Air - Lower (%):** | Not Determined |
| **Flammability Limits in Air - Upper (%):** | Not Determined |

**Fire Extinguishing Media** Water fog, carbon dioxide, foam, dry chemical.

**Special Exposure Hazards** Decomposition in fire may produce toxic gases. Use water spray to cool fire exposed surfaces.

**Special Protective Equipment for Fire-Fighters** Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

**NFPA Ratings:** Health 2, Flammability 1, Reactivity 0
**HMIS Ratings:** Health 2, Flammability 1, Reactivity 0

## 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment.

**Environmental Precautionary Measures** Prevent from entering sewers, waterways, or low areas.

**Procedure for Cleaning / Absorption** Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

**Storage Information** Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 12 months.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** A well ventilated area to control dust levels. Local exhaust ventilation should be used in areas without good cross ventilation.

**Personal Protective Equipment** If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection** Organic vapor respirator with a dust/mist filter.

**Hand Protection** Impervious rubber gloves.

**Skin Protection** Rubber apron.

**Eye Protection** Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions** Eyewash fountains and safety showers must be easily accessible.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **Physical State:** | Liquid |
| **Color:** | White to gray |
| **Odor:** | Mild hydrocarbon |
| **pH:** | Not Determined |
| **Specific Gravity @ 20 C (Water=1):** | 1.0 |
| **Density @ 20 C (lbs./gallon):** | 8.3 |
| **Bulk Density @ 20 C (lbs/ft3):** | Not Determined |
| **Boiling Point/Range (F):** | 347 |
| **Boiling Point/Range (C):** | 175 |
| **Freezing Point/Range (F):** | Not Determined |
| **Freezing Point/Range (C):** | Not Determined |
| **Vapor Pressure @ 20 C (mmHg):** | Not Determined |
| **Vapor Density (Air=1):** | Not Determined |
| **Percent Volatiles:** | 70 |
| **Evaporation Rate (Butyl Acetate=1):** | < 1 |
| **Solubility in Water (g/100ml):** | Partially soluble |
| **Solubility in Solvents (g/100ml):** | Not Determined |
| **VOCs (lbs./gallon):** | Not Determined |
| **Viscosity, Dynamic @ 20 C (centipoise):** | Not Determined |
| **Viscosity, Kinematic @ 20 C (centistrokes):** | Not Determined |
| **Partition Coefficient/n-Octanol/Water:** | Not Determined |
| **Molecular Weight (g/mole):** | Not Determined |

## 10. STABILITY AND REACTIVITY

| | |
|---|---|
| **Stability Data:** | Stable |
| **Hazardous Polymerization:** | Will Not Occur |
| **Conditions to Avoid** | Keep away from heat, sparks and flame. |
| **Incompatibility (Materials to Avoid)** | Strong oxidizers. |
| **Hazardous Decomposition Products** | Ammonia. Oxides of nitrogen. Carbon monoxide and carbon dioxide. |
| **Additional Guidelines** | Not Applicable |

## 11. TOXICOLOGICAL INFORMATION

| | |
|---|---|
| **Principle Route of Exposure** | Eye or skin contact, inhalation. |
| **Inhalation** | May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness. |
| **Skin Contact** | May cause skin irritation. |
| **Eye Contact** | May cause eye irritation. |
| **Ingestion** | Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions. |
| **Aggravated Medical Conditions** | Lung disorders. |

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 1% are chronic health hazards.

**Other Information** None known.

**Toxicity Tests**

| | |
|---|---|
| **Oral Toxicity:** | Not determined |
| **Dermal Toxicity:** | Not determined |
| **Inhalation Toxicity:** | Not determined |
| **Primary Irritation Effect:** | Not determined |
| **Carcinogenicity** | Not determined |
| **Genotoxicity:** | Not determined |
| **Reproductive / Developmental Toxicity:** | Not determined |

## 12. ECOLOGICAL INFORMATION

**Mobility (Water/Soil/Air)** Not determined

**Persistence/Degradability** Not determined

**Bio-accumulation** Not determined

### Ecotoxicological Information

| | |
|---|---|
| **Acute Fish Toxicity:** | Not determined |
| **Acute Crustaceans Toxicity:** | TLM48: 98 mg/l (Acartia tonsa) |
| **Acute Algae Toxicity:** | EC50: 16.70 mg/l (Skeletonema costatum) |

**Chemical Fate Information** Not determined

**Other Information** Not applicable

## 13. DISPOSAL CONSIDERATIONS

**Disposal Method** Disposal should be made in accordance with federal, state, and local regulations.

**Contaminated Packaging** Follow all applicable national or local regulations.

## 14. TRANSPORT INFORMATION

### Land Transportation

**DOT**
Not restricted

**Canadian TDG**
Not restricted

**ADR**
Not restricted

## Air Transportation

**ICAO/IATA**
Not restricted

## Sea Transportation

**IMDG**
Not restricted

## Other Shipping Information

**Labels:** None

## 15. REGULATORY INFORMATION

## US Regulations

| | |
|---|---|
| **US TSCA Inventory** | All components listed on inventory or are exempt. |
| **EPA SARA Title III Extremely Hazardous Substances** | Not applicable |
| **EPA SARA (311,312) Hazard Class** | Acute Health Hazard |
| **EPA SARA (313) Chemicals** | This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372). |
| **EPA CERCLA/Superfund Reportable Spill Quantity** | Not applicable. |
| **EPA RCRA Hazardous Waste Classification** | If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA. |
| **California Proposition 65** | All components listed do not apply to the California Proposition 65 Regulation. |
| **MA Right-to-Know Law** | Does not apply. |
| **NJ Right-to-Know Law** | Does not apply. |
| **PA Right-to-Know Law** | Does not apply. |

## Canadian Regulations

| | |
|---|---|
| **Canadian DSL Inventory** | All components listed on inventory. |
| **WHMIS Hazard Class** | D2B Toxic Materials |

## 16. OTHER INFORMATION

**The following sections have been revised since the last issue of this MSDS**
Not applicable

**Additional Information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

**APPENDIX A5**

**GASOLINE**

(Pages A5-1 to A5-11)

# MATERIAL SAFETY DATA SHEET

## 1. Product and Company Identification

**Product Name** **Regular Gasoline**

**Synonym(s)** Natural gasoline
Automotive gasoline

**CAS #** Mixture

**Product use** Fuel

**Manufacturer** Irving Oil Refining G.P.
Box 1260
Saint John, NB E2L 4H6 CA
Phone: (506) 202-2000
Refinery: (506) 202-3000
Emergency Phone: 1-800-424-9300 (CHEMTREC)

## 2. Hazards Identification

**Emergency overview** DANGER
Flammable liquid - may release vapors that form flammable mixtures at or above the flash point. Containers may explode when heated.
CONTAINS MATERIAL WHICH MAY CAUSE CANCER.
Contains potential teratogens.
May cause chronic toxic effects.
EYE AND SKIN IRRITANT.

**Potential short term health effects**

**Routes of exposure** Eye, Skin contact, Skin absorption, Inhalation, Ingestion.

**Eyes** Causes irritation.

**Skin** Causes irritation.

**ACGIH - Threshold Limit Values - Skin Notations**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Skin - potential significant contribution to overall exposure by the cutaneous route |
| N-Hexane | 110-54-3 | Skin - potential significant contribution to overall exposure by the cutaneous route |

**Inhalation** Excessive intentional inhalation may cause respiratory tract irritation and central nervous system effects (headache, dizziness). Aspiration of material into lungs can cause chemical pneumonitis.

**Ingestion** Harmful if swallowed. May cause stomach distress, nausea or vomiting.

**Target organs** Blood. Eyes. Kidney. Liver. Respiratory system. Skin.

**Chronic effects** Prolonged or repeated overexposure can cause liver and kidney damage.
Peripheral nerve damage has been observed following occupational exposure to hexane.

**Signs and symptoms** Symptoms may include redness, edema, drying, defatting and cracking of the skin.
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

**OSHA Regulatory Status** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**Potential environmental effects** See section 12.

## 3. Composition / Information on Ingredients

| Ingredient(s) | CAS # | Percent |
|---|---|---|
| Gasoline | 8006-61-9 | 60 - 100 |
| Toluene | 108-88-3 | 5 - 10 |
| Xylene | 1330-20-7 | 5 - 10 |
| N-Hexane | 110-54-3 | 1 - 5 |
| Benzene | 71-43-2 | 0.1 - 1 |

**Composition comments** *Contains a variety of aromatic and aliphatic hydrocarbons including: benzene, n-hexane, toluene and xylene
Gasoline is a complex mixture of hydrocarbons. Its exact composition depends on the source of the crude oil from which it was produced and the refining methods used. Gasoline contains hundreds of individual organic chemicals. This section identifies only some of the well-known chemical constituents.

## 4. First Aid Measures

**First aid procedures**

| | |
|---|---|
| **Eye contact** | If irritation occurs, flush eyes with lukewarm, gently flowing fresh water for at least 10 minutes. Obtain medical attention if irritation persists. |
| **Skin contact** | Quickly and gently blot away excess chemical. Gently remove contaminated clothing and shoes. Wash gently and thoroughly with water and non-abrasive soap. Obtain medical attention. |
| **Inhalation** | If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately. |
| **Ingestion** | Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention. |
| **Notes to physician** | Symptoms may be delayed. |
| **General advice** | Keep away from sources of ignition. No smoking. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Avoid contact with eyes and skin. Keep out of reach of children. |

## 5. Fire Fighting Measures

| | |
|---|---|
| **Flammable properties** | Flammable by WHMIS/OSHA criteria. Vapors may travel to a source of ignition and flash back. Containers may explode when heated. |
| **Extinguishing media** | |
| **Suitable extinguishing media** | Carbon dioxide. Dry chemical. Foam. |
| **Unsuitable extinguishing media** | Not available |
| **Protection of firefighters** | |
| **Specific hazards arising from the chemical** | Container may explode in heat of fire.<br>Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back.<br>Cool containers with flooding quantities of water until well after fire is out. |
| **Protective equipment for firefighters** | Firefighters should wear full protective clothing including self contained breathing apparatus. |
| **Hazardous combustion products** | May include and are not limited to: Oxides of carbon. Oxides of nitrogen. Aromatic and aliphatic hydrocarbons |
| **Explosion data** | |
| **Sensitivity to mechanical impact** | Not expected to be sensitive to mechanical impact. |
| **Sensitivity to static discharge** | Vapor: Yes. |

## 6. Accidental Release Measures

| | |
|---|---|
| **Personal precautions** | Keep unnecessary personnel away. Do not touch or walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep people away from and upwind of spill/leak. |
| **Environmental precautions** | Do not discharge into lakes, streams, ponds or public waters. |
| **Methods for containment** | Stop leak if you can do so without risk. Prevent entry into waterways, sewers, basements or confined areas. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. |
| **Methods for cleaning up** | Before attempting clean up, refer to hazard data given above. Small spills may be absorbed with non-reactive absorbent and placed in suitable, covered, labelled containers. Prevent large spills from entering sewers or waterways. Contact emergency services and supplier for advice. Never return spills to original containers for re-use. |
| **Other information** | Keep unnecessary personnel away. |

## 7. Handling and Storage

| | |
|---|---|
| **Handling** | Non-sparking equipment. Explosion-proof ventilation. Intrinsically safe electrical equipment.<br>Use good industrial hygiene practices in handling this material. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.<br>NEVER siphon gasoline by mouth. |

**Storage**

Store in a cool well-ventilated area. Consider leak detection and alarm equipment for storage area. Do not store in direct sunlight.

Shipping: Load at normal temperature (up to 38°C) and pressure. Bond and ground containers for transfer.

## 8. Exposure Controls / Personal Protection

**Exposure limits**

| Ingredient(s) | Exposure Limits |
|---|---|
| Benzene | **ACGIH-TLV**<br>TWA: 0.5 ppm<br>STEL: 2.5 ppm<br>**OSHA-PEL**<br>TWA: 10 ppm<br>STEL: 5 ppm<br>Ceiling: 25 ppm |
| Gasoline | **ACGIH-TLV**<br>Not established<br>**OSHA-PEL**<br>Not established |
| N-Hexane | **ACGIH-TLV**<br>TWA: 50 ppm<br>STEL: 1000 ppm<br>**OSHA-PEL**<br>TWA: 500 ppm |
| Toluene | **ACGIH-TLV**<br>TWA: 20 ppm<br>Skin: 50 ppm<br>**OSHA-PEL** TWA:<br>200 ppm Ceiling:<br>300 ppm |
| Xylene | **ACGIH-TLV**<br>TWA: 100 ppm<br>STEL: 150 ppm<br>**OSHA-PEL**<br>TWA: 100 ppm |

**Engineering controls**

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

**Personal protective equipment**

**Eye / face protection**

Face shield or chemical goggles.

**Hand protection**

Tychem™ BR/LV. Tychem™ TK. Tychem™ Responder™. Viton™.

**Skin and body protection**

Use of protective coveralls and long sleeves is recommended.
If clothing or footwear becomes contaminated with the product, remove it and completely decontaminate it before re-use, or discard it.

**Respiratory protection**

For confined spaces, wear a NIOSH-approved (or equivalent) full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.
Respirator should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134), CAN/CSA-Z94.4 and ANSI's standard for respiratory protection (Z88.2).

**General hygiene considerations**

Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.

## 9. Physical and Chemical Properties

**Appearance**

Clear.

| | |
|---|---|
| **Color** | Clear to Yellow |
| **Form** | Liquid |
| **Odor** | Characteristic |
| **Odor threshold** | ~ 0.1 ppm |
| **Physical state** | Liquid |
| **pH** | Not applicable |
| **Melting point** | Not available |
| **Freezing point** | < -112.00 °F (< -80 °C) |
| **Boiling point** | 84.20 - 422.60 °F (29 - 217 °C) |
| **Pour point** | Not available |
| **Evaporation rate** | Rapid. ~4. (BuAc = 1) |
| **Flash point** | -45.40 °F (-43 °C) Closed Cup |
| **Auto-ignition temperature** | 494.60 °F (257 °C) (Typically) |
| **Flammability limits in air, lower, % by volume** | 1.4 % (Typically) |
| **Flammability limits in air, upper, % by volume** | 7.6 % (Typically) |
| **Vapor pressure** | 400 - 775 Mm Hg @ 20°C |
| **Vapor density** | 2.5 - 3.7 @ 15°C (Air = 1) |
| **Specific gravity** | 0.72 - 0.76 @ 15°C (Typically) |
| **Octanol/water coefficient** | Expected to be >1 |
| **Percent volatile** | Not available |

## 10. Stability and Reactivity

| | |
|---|---|
| **Reactivity** | This product may react with strong oxidizing agents. |
| **Possibility of hazardous reactions** | Hazardous polymerization does not occur. |
| **Chemical stability** | Stable under recommended storage conditions. |
| **Conditions to avoid** | Heat, open flames, static discharge, sparks and other ignition sources. Do not mix with other chemicals. |
| **Incompatible materials** | Acids. Oxidizers. |
| **Hazardous decomposition products** | May include and are not limited to: Oxides of carbon. Oxides of nitrogen. Aromatic hydrocarbons. |

## 11. Toxicological Information

**Component analysis - LC50**

| Ingredient(s) | LC50 |
|---|---|
| Benzene | 13700 ppm rat; 13700 mg/l/4h rat |
| Gasoline | Not available |
| N-Hexane | 38500 mg/l/4h rat |
| Toluene | 12.5 mg/l/4h rat |
| Xylene | Not available |

**Component analysis - Oral LD50**

| Ingredient(s) | LD50 |
|---|---|
| Benzene | 690 mg/kg rat; 4700 mg/kg mouse |
| Gasoline | 13600 mg/kg rat |
| N-Hexane | 28710 mg/kg rat |
| Toluene | 636 mg/kg rat |
| Xylene | 4300 mg/kg rat |

**Effects of acute exposure**

| | |
|---|---|
| **Eye** | Causes irritation. |

**Skin** Causes irritation.

**ACGIH - Threshold Limit Values - Skin Notations**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Skin - potential significant contribution to overall exposure by the cutaneous route |
| N-Hexane | 110-54-3 | Skin - potential significant contribution to overall exposure by the cutaneous route |

**Inhalation** Excessive intentional inhalation may cause respiratory tract irritation and central nervous system effects (headache, dizziness). Aspiration of material into lungs can cause chemical pneumonitis.

**Ingestion** Harmful if swallowed. May cause stomach distress, nausea or vomiting.

**Sensitization** Non-hazardous by WHMIS/OSHA criteria.

**Chronic effects** Peripheral nerve damage has been observed following occupational exposure to hexane. Prolonged or repeated overexposure can cause liver and kidney damage.

**Carcinogenicity** See below.

**ACGIH - Threshold Limit Values - Carcinogens**

| | | |
|---|---|---|
| Benzene | 71-43-2 | A1 - Confirmed Human Carcinogen |
| Toluene | 108-88-3 | A4 - Not Classifiable as a Human Carcinogen |
| Xylene | 1330-20-7 | A4 - Not Classifiable as a Human Carcinogen |

**IARC - Group 1 (Carcinogenic to Humans)**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Monograph 100F [in preparation]; Supplement 7 [1987]; Monograph 29 [1982] |

**IARC - Group 2B (Possibly Carcinogenic to Humans)**

| | | |
|---|---|---|
| Gasoline | 8006-61-9 | Monograph 45 [1989] (overall evaluation upgraded from 3 to 2B with supporting evidence from other relevant data) |

**IARC - Group 3 (Not Classifiable)**

| | | |
|---|---|---|
| Toluene | 108-88-3 | Monograph 71 [1999]; Monograph 47 [1989] |
| Xylene | 1330-20-7 | Monograph 71 [1999]; Monograph 47 [1989] |

**NTP (National Toxicology Program) - Report on Carcinogens - Known Human Carcinogens**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Known Human Carcinogen |

**U.S. - California - Proposition 65 - Carcinogens List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | carcinogen, initial date 2/27/87 |

**Mutagenicity** The mutagenicity of benzene has been extensively studied in rats and mice using inhalation and oral exposure techniques. Positive results have been obtained for many tests including and not limited to chromosome aberrations, micronuclei, sister chromatid exchanges, point mutations, DNA adducts, DNA repair, DNA damage, aneuploidy and sperm head abnormalities.

**Reproductive effects** Non-hazardous by WHMIS/OSHA criteria.

**Teratogenicity** Toluene (benzene, methyl-) has caused fetotoxicity (reduced fetal weight), behavioural effects (effects on learning and memory) and hearing loss (in males). These effects have been observed in the offspring of rats exposed by inhalation to 1200 or 1800 ppm toluene. These effects were observed in the absence of maternal toxicity.
Xylene is considered fetotoxic in humans, based on observations of reduced fetal weight, delayed ossification and persistent behavioural effects in animal studies in the absence of maternal toxicity.

**Name of Toxicologically Synergistic Products** Other petroleum hydrocarbons and other chemicals that cause CNS depression or other neurological effects can be expected to produce additive or synergistic effects.

# 12. Ecological Information

**Ecotoxicity** Components of this product have been identified as having potential environmental concerns.

**Ecotoxicity - Freshwater Algae - Acute Toxicity Data**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 72 Hr EC50 Pseudokirchneriella subcapitata: 29 mg/L |
| Gasoline | 8006-61-9 | 72 Hr EC50 Pseudokirchneriella subcapitata: 4700 mg/L |
| Toluene | 108-88-3 | 96 Hr EC50 Pseudokirchneriella subcapitata: >433 mg/L; 72 Hr EC50 Pseudokirchneriella subcapitata: 12.5 mg/L [static] |

**Ecotoxicity - Freshwater Fish - Acute Toxicity Data**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 96 Hr LC50 Pimephales promelas: 10.7-14.7 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 5.3 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 22.49 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 28.6 mg/L [static]; 96 Hr LC50 Pimephales promelas: 22330-41160 µg/L [static]; 96 Hr LC50 Lepomis macrochirus: 70000-142000 µg/L [static] |
| Gasoline | 8006-61-9 | 96 Hr LC50 Oncorhynchus mykiss: 56 mg/L |
| N-Hexane | 110-54-3 | 96 Hr LC50 Pimephales promelas: 2.1-2.98 mg/L [flow-through] |
| Toluene | 108-88-3 | 96 Hr LC50 Pimephales promelas: 15.22-19.05 mg/L [flow-through] (1 day old); 96 Hr LC50 Pimephales promelas: 12.6 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 5.89-7.81 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 14.1-17.16 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 5.8 mg/L [semi-static]; 96 Hr LC50 Lepomis macrochirus: 11.0-15.0 mg/L [static]; 96 Hr LC50 Oryzias latipes: 54 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 28.2 mg/L [semi-static]; 96 Hr LC50 Poecilia reticulata: 50.87-70. |
| Xylene | 1330-20-7 | 96 Hr LC50 Pimephales promelas: 13.4 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 2.661-4.093 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 13.5-17.3 mg/L; 96 Hr LC50 Lepomis macrochirus: 13.1-16.5 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 19 mg/L; 96 Hr LC50 Lepomis macrochirus: 7.711-9.591 mg/L [static]; 96 Hr LC50 Pimephales promelas: 23.53-29. |

**Ecotoxicity - Water Flea - Acute Toxicity Data**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 48 Hr EC50 Daphnia magna: 8.76 - 15.6 mg/L [Static]; 48 Hr EC50 Daphnia magna: 10 mg/L |
| N-Hexane | 110-54-3 | 24 Hr EC50 Daphnia magna: >1000 mg/L |
| Toluene | 108-88-3 | 48 Hr EC50 Daphnia magna: 5.46 - 9.83 mg/L [Static]; 48 Hr EC50 Daphnia magna: 11.5 mg/L |
| Xylene | 1330-20-7 | 48 Hr EC50 water flea: 3.82 mg/L; 48 Hr LC50 Gammarus lacustris: 0.6 mg/L |

**Persistence / degradability** Not available

**Bioaccumulation / accumulation** Not available

**Mobility in environmental media** Not available

**Environmental effects** Not available

**Aquatic toxicity** Not available

**Partition coefficient** Expected to be >1

**Chemical fate information** Not available

**Other adverse effects** Not available

# 13. Disposal Considerations

**Disposal instructions** Review federal, provincial, and local government requirements prior to disposal.

**Waste from residues / unused products** Not available

**Contaminated packaging** Not available

# 14. Transport Information

**U.S. Department of Transportation (DOT)**

**Basic shipping requirements:**

| | |
|---|---|
| **Proper shipping name** | Gasoline |
| **Hazard class** | 3 |
| **UN number** | UN1203 |
| **Packing group** | II |
| **Additional information:** | |
| **Special provisions** | 139, B33, B101, T8 |
| **Packaging exceptions** | 150 |
| **ERG number** | 128 |


**Transportation of Dangerous Goods (TDG - Canada)**

**Basic shipping requirements:**

| | |
|---|---|
| **Proper shipping name** | GASOLINE |
| **Hazard class** | 3 |
| **UN number** | UN1203 |
| **Packing group** | II |
| **Additional information:** | |
| **Special provisions** | 17 |


# 15. Regulatory Information

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

**Canada - CEPA - High Priority Chemicals as Identified by DSL Categorization**

| | | |
|---|---|---|
| N-Hexane | 110-54-3 | Batch 4, published November 17, 2007 |

**Canada - CEPA - Schedule I - List of Toxic Substances**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |

**Canada - WHMIS - Ingredient Disclosure List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 0.1 % |
| Gasoline | 8006-61-9 | 1 % |
| N-Hexane | 110-54-3 | 1 % |
| Toluene | 108-88-3 | 1 % |

**WHMIS status** Controlled

**WHMIS classification** Class B - Division 2 - Flammable Liquid, Class D - Division 2A, 2B

**WHMIS labeling**

**Occupational Safety and Health Administration (OSHA)**

**29 CFR 1910.1200 hazardous chemical** Yes

**US Federal regulations**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 10 Lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule) |
| N-Hexane | 110-54-3 | 5000 Lb final RQ; 2270 kg final RQ |
| Toluene | 108-88-3 | 1000 Lb final RQ; 454 kg final RQ |
| Xylene | 1330-20-7 | 100 Lb final RQ; 45.4 kg final RQ |

**U.S. - CERCLA/SARA - Section 313 - Emission Reporting**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 0.1 % de minimis concentration |
| N-Hexane | 110-54-3 | 1.0 % de minimis concentration |
| Toluene | 108-88-3 | 1.0 % de minimis concentration |
| Xylene | 1330-20-7 | 1.0 % de minimis concentration |

**U.S. - CWA (Clean Water Act) - Hazardous Substances**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |
| Toluene | 108-88-3 | Present |
| Xylene | 1330-20-7 | Present |

**U.S. - CWA (Clean Water Act) - Priority Pollutants**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |
| Toluene | 108-88-3 | Present |

**U.S. - CWA (Clean Water Act) - Toxic Pollutants**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |
| Toluene | 108-88-3 | Present |

**CERCLA (Superfund) reportable quantity**

Xylene: 100.0000
Toluene: 1000.0000
Hexane: 5000.0000
Benzene: 10.0000

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

**Section 302 extremely hazardous substance**

No

**Section 311 hazardous chemical**

Yes

**Clean Air Act (CAA)**

Not available

**Clean Water Act (CWA)**

Hazardous substance
Priority pollutant
Toxic pollutant

**State regulations** See below

**U.S. - California - 8 CCR Section 339 - Director's List of Hazardous Substances**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |
| Gasoline | 8006-61-9 | Present (exempt when used as fuel) |
| Toluene | 108-88-3 | Present |
| Xylene | 1330-20-7 | Present |

**U.S. - California - Proposition 65 - Carcinogens List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | carcinogen, initial date 2/27/87 |

**U.S. - California - Proposition 65 - Developmental Toxicity**

| | | |
|---|---|---|
| Benzene | 71-43-2 | developmental toxicity, initial date 12/26/97 |
| Toluene | 108-88-3 | developmental toxicity, initial date 1/1/91 |

**U.S. - California - Proposition 65 - Reproductive Toxicity - Female**

| | | |
|---|---|---|
| Toluene | 108-88-3 | female reproductive toxicity, initial date 8/7/09 |

**U.S. - California - Proposition 65 - Reproductive Toxicity - Male**

| | | |
|---|---|---|
| Benzene | 71-43-2 | male reproductive toxicity, initial date 12/26/97 |

**U.S. - Connecticut - Carcinogenic Substances**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |

**U.S. - Illinois - Toxic Air Contaminant Carcinogens**

| | | |
|---|---|---|
| Benzene | 71-43-2 | ACGIH Carcinogen; IRIS A Carcinogen |
| Gasoline | 8006-61-9 | IARC Carcinogen |

**U.S. - Illinois - Toxic Air Contaminants**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |
| N-Hexane | 110-54-3 | Present |
| Toluene | 108-88-3 | Present |
| Xylene | 1330-20-7 | Present |

**U.S. - Louisiana - Reportable Quantity List for Pollutants**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 10 Lb final RQ (received an adjusted RQ of 10 lb based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lb based on potential carcinogenicity in an August 14, 1989 final rule) |
| N-Hexane | 110-54-3 | 5000 Lb final RQ; 2270 kg final RQ |
| Toluene | 108-88-3 | 1000 Lb final RQ; 454 kg final RQ |
| Xylene | 1330-20-7 | 100 Lb final RQ; 45.4 kg final RQ |

**U.S. - Massachusetts - Right To Know List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Carcinogen; Extraordinarily hazardous |
| Gasoline | 8006-61-9 | Present |
| N-Hexane | 110-54-3 | Present |
| Toluene | 108-88-3 | Present |
| Xylene | 1330-20-7 | Present |

**U.S. - Michigan - Critical Materials List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 100 Lb Annual usage threshold |
| Toluene | 108-88-3 | 100 Lb Annual usage threshold |
| Xylene | 1330-20-7 | 100 Lb Annual usage threshold (all isomers) |

**U.S. - Minnesota - Hazardous Substance List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Carcinogen |
| Gasoline | 8006-61-9 | Present |
| N-Hexane | 110-54-3 | Present |
| Toluene | 108-88-3 | Skin |
| Xylene | 1330-20-7 | Present (including all isomers) |

**U.S. - New Jersey - Right to Know Hazardous Substance List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | sn 0197 |
| Gasoline | 8006-61-9 | sn 0957 |
| N-Hexane | 110-54-3 | sn 1340 |
| Toluene | 108-88-3 | sn 1866 |
| Xylene | 1330-20-7 | sn 2014 |

**U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 10 Lb RQ (air); 1 lb RQ (land/water) |
| N-Hexane | 110-54-3 | 1 Lb RQ (air); 1 lb RQ (land/water) |
| Toluene | 108-88-3 | 1000 Lb RQ (air); 1 lb RQ (land/water) |
| Xylene | 1330-20-7 | 1000 Lb RQ (air); 1 lb RQ (land/water) |

**U.S. - North Carolina - Control of Toxic Air Pollutants**

| | | |
|---|---|---|
| Benzene | 71-43-2 | 0.00012 mg/m3 (carcinogens) |
| N-Hexane | 110-54-3 | 1.1 mg/m3 (chronic toxicants) |
| Toluene | 108-88-3 | 4.7 mg/m3 (chronic toxicants); 56 mg/m3 (acute irritants) |
| Xylene | 1330-20-7 | 2.7 mg/m3 (chronic toxicants); 65 mg/m3 (acute irritants) |

**U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Present |

**U.S. - Pennsylvania - RTK (Right to Know) List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Environmental hazard; Special hazardous substance |
| N-Hexane | 110-54-3 | Present |
| Toluene | 108-88-3 | Environmental hazard |

| | | |
|---|---|---|
| Xylene | 1330-20-7 | Environmental hazard |

**U.S. - Rhode Island - Hazardous Substance List**

| | | |
|---|---|---|
| Benzene | 71-43-2 | Toxic (skin); Flammable (skin); Carcinogen (skin) |
| Gasoline | 8006-61-9 | Toxic; Flammable |
| N-Hexane | 110-54-3 | Toxic; Flammable |
| Toluene | 108-88-3 | Toxic (skin); Flammable (skin) |
| Xylene | 1330-20-7 | Toxic (skin); Flammable (skin) |

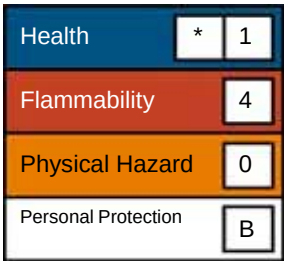
**Inventory name**

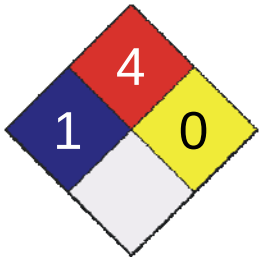
| Country(s) or region | Inventory name | On inventory (yes/no)* |
|---|---|---|
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | Yes |

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

## 16. Other Information

| LEGEND HMIS/NFPA | |
|---|---|
| Severe | 4 |
| Serious | 3 |
| Moderate | 2 |
| Slight | 1 |
| Minimal | 0 |

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**Issue date** 20-Oct-2011

**Effective date** 15-Oct-2011

**Expiry date** 15-Oct-2014

**Prepared by** Dell Tech Laboratories Ltd. (519) 858-5021

**Other information** For an updated MSDS, please contact the supplier/manufacturer listed on the first page of the document.

# Regular Gasoline

Flammable liquid. May cause chronic toxic effects. Eye and skin irritant.

Keep away from sources of ignition. No smoking. Avoid contact with eyes and skin. Wear rubber gloves and safety glasses with side shields. Keep out of reach of children.

EYE: If irritation occurs, flush eyes with lukewarm, gently flowing fresh water for at least 10 minutes. Obtain medical attention if irritation persists.

SKIN: Quickly and gently blot away excess chemical. Gently remove contaminated clothing and shoes. Wash gently and thoroughly with water and non-abrasive soap. Obtain medical attention.

INHALATION: If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately.

INGESTION: Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention.

READ MATERIAL SAFETY DATA SHEET BEFORE USING PRODUCT

==========

Liquide inflammable. Il peut causer des effets toxiques chroniques. Irritant pour les yeux et la peau.

Conserver à l'écart de toutes sources d'ignition. Ne pas fumer. Éviter le contact avec les yeux et la peau. Porter des gants en caoutchouc et des lunettes de sécurité pourvues de protections latérales. Tenir hors de la portée des enfants.

YEUX: En cas d'irritation, rincer les yeux avec de l'eau tiède, laisser couler doucement pendant au moins 10 minutes. Obtenir de l'attention médicale si l'irritation persiste.

PEAU: Sécher rapidement et doucement l'excès du produit chimique. Enlever les vêtements et les chaussures contaminés. Laver à fond, en frottant doucement avec de l'eau et du savon non abrasif. Obtenir de l'attention médicale.

INHALATION: En cas de symptômes, placer la victime à l'air frais. Si les symptômes persistent, obtenir de l'attention médicale. Si la victime ne respire pas du personnel qualifié devrait immédiatement commencer la réanimation cardio-pulmonaire.

INGESTION: Ne pas faire vomir. Si le vomissement se produit spontanément, incliner la victime vers l'avant pour réduire le risque d'inhalation. Ne jamais rien faire boire ou avaler à une victime inconsciente, ou si la victime a des convulsions. Appeler un médecin.

LIRE LA FICHE SIGNALÉTIQUE AVANT D'UTILISER CE PRODUIT

**Irving Oil Refining G.P.**

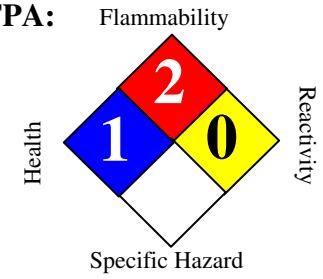
**APPENDIX A6**

**JET A**

(Pages A6-1 to A6-9)

# Material Safety Data Sheet
# Jet Fuel

**NFPA:**




**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** : Jet Fuel

**Synonyms** : Jet Fuel - A, B, A-I, A-50, High Sulfur, Military, Jet A & B Aviation Turbine Fuel, Jet A-I, Jet A; Avjet For Blending; Jet Q Turbine Fuel, Aviation Fuel; Turbine Fuel; JP-4; JP-5; JP-8, Av-Jet, 888100004452

**MSDS Number** : 888100004452 **Version** : 2.12

**Product Use Description** : Fuel

**Company** : For: Tesoro Refining & Marketing Co.
19100 Ridgewood Parkway, San Antonio, TX 78259

**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** : Harmful or fatal if swallowed. Harmful by inhalation. Irritating to eyes, respiratory system and skin. Affects central nervous system. Flammable.

### Potential Health Effects

**Eyes** : Severe eye irritant. Contact may cause stinging, watering, redness, swelling, and eye damage.

**Skin** : Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

**Ingestion** : Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death may occur.

**Inhalation** : Inhalation of fumes or mist may result in respiratory tract irritation and central

nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death. WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

**Chronic Exposure** : Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

**Target Organs** : Eyes, Skin, Respiratory system, Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash)

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Component | CAS-No. | Weight % |
|---|---|---|
| **Kerosene (petroleum)** | 8008-20-6 | 100% |
| **Naphthalene** | 91-20-3 | 0 to 3% |
| **Ethyl Benzene** | 100-41-4 | 0 to 1% |
| **Trimethy Benzene** | 95-63-6 | 0 to 1% |
| **Ethyl Benzene** | 100-41-4 | 0 to 1% |
| **Diethylene Glycol Monomethyl Ether** | 111-77-3 | 0 to 0.15% |
| **Alkyl Dithiothiadiazole** | N/A | 0 to 15% |

## SECTION 4. FIRST AID MEASURES

**Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. 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.

**Eye contact** : In case of eye contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical attention immediately.

**Ingestion** : Do NOT induce vomiting. Do not give liquids. Seek medical attention immediately. If vomiting does occur naturally, keep head below the hips to reduce the risks of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

**Notes to physician** : Symptoms: Aspiration may cause pulmonary edema and pneumonitis. Treatment: Do not induce vomiting, use gastric lavage only. Remove from further exposure and treat symptomatically.

## SECTION 5. FIRE-FIGHTING MEASURES

| | | |
|---|---|---|
| **Form** | : | Liquid |
| **Flash point** | : | 38 °C (100 °F) minimum |
| **Auto Ignition temperature** | : | 210 °C (410 °F) |
| **Lower explosive limit** | : | 0.7 %(V) |
| **Upper explosive limit** | : | 5.0 %(V) |
| **Suitable extinguishing media** | : | Carbon dioxide (CO2), Water spray, Dry chemical, Foam, Keep containers and surroundings cool with water spray., Do not use a solid water stream as it may scatter and spread fire., Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers. |
| **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. Sealed containers may rupture when heated. Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back. |
| **Special protective equipment for fire-fighters** | : | Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. |
| **Further information** | : | Exposure to decomposition products may be a hazard to health. Standard procedure for chemical fires. |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| **Personal precautions** | : | ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN if applicable. 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. |
| **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. |
| **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). |

## 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 |
| | Ethyl Benzene | 100-41-4 | PEL | 100 ppm 435 mg/m3 |
| **ACGIH** | Naphthalene | 91-20-3 | TWA | 10 ppm |
| | | 91-20-3 | STEL | 15 ppm |
| | Kerosene (petroleum) | 8008-20-6 | TWA | 200 mg/m3 |
| | Ethyl Benzene | 100-41-4 | TWA | 100 ppm 434 mg/m3 |
| | | | STEL | 125 ppm 543 mg/m3 |

**Protective measures** : Keep out of reach of children.

**Engineering measures** : Use only intrinsically safe electrical equipment approved for use in classified areas. Emergency eye wash capability should be available in the vicinity of any potential splash exposure.

| | | |
|---|---|---|
| **Eye protection** | : | Goggles and face shield as needed to prevent eye and face contact. |
| **Hand protection** | : | Gloves constructed of nitrile, neoprene, or PVC are recommended. |
| **Skin and body protection** | : | Chemical protective clothing such as DuPont TyChem ®, Barricade or equivalent, recommended based on degree of exposure. Consult manufacturer specifications for further information. |
| **Respiratory protection** | : | NIOSH/MSHA approved positive-pressure self-contained breathing apparatus (SCBA) or Type C positive-pressure supplied air with escape bottle must be used for gas concentrations above occupational exposure limits, for potential of uncontrolled release, if exposure levels are not known, or in an oxygen-deficient atmosphere. |
| **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** | : | Light yellow to white |
| **Odor** | : | Characteristic Petroleum distillate |
| **Flash point** | : | 38 °C (100 °F) minimum |
| **Auto Ignition temperature** | : | 210 °C (410 °F) |
| **Thermal decomposition** | : | No decomposition if stored and applied as directed. |
| **Lower explosive limit** | : | 0.7 %(V) |
| **Upper explosive limit** | : | 5.0 %(V) |
| **pH** | : | Not applicable |
| **Specific gravity** | : | 0.8 (H20=1) |
| **Freezing point** | : | -45°C to -62°C (-50°F to -80°F) |
| **Boiling Range** | : | 160 - 300 °C(320 - 572 °F) |
| **Vapor Pressure** | : | 6.9 hPa<br>at 20 °C (68 °F) |
| **Relative Vapor Density** | : | 4.5 |
| **Density** | : | 0.8 g/cm3 |
| **Water solubility** | : | Insoluble |
| **Viscosity, kinematic** | : | 1.6 mm2/s<br>at 40 °C (104 °F) |

| | | |
|---|---|---|
| **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<br>Ultra Low Sulfur Diesel (ULSD) without conductivity additive: 0 pS/m to 5 pS/m<br>ULSD at terminal load rack with conductivity additive: At least 50 pS/m but conductivity may decrease from environmental factors such as temperature drop.<br>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. |
| **Materials to avoid** | : | Keep away from strong oxidizers such as nitric and sulfuric acids. |
| **Hazardous decomposition products** | : | Risk of explosion. In case of fire hazardous decomposition products may be produced such as: Smoke. Hydrocarbons. Carbon Monoxide and Carbon Dioxide. |
| **Thermal decomposition** | : | No decomposition if stored and applied as directed. |
| **Hazardous reactions** | : | Stable under normal conditions of use; however, incompatible with strong acids and strong oxidizers. |

## SECTION 11. TOXICOLOGICAL INFORMATION

**Carcinogenicity**

| | | |
|---|---|---|
| **NTP** | : | Naphthalene (CAS-No.: 91-20-3) |
| **IARC** | : | Kerosene is not listed as carcinogenic by NTP, OSHA, and ACGIH. IARC has listed kerosene as a probable human carcinogen.<br>naphthalene (CAS-No.: 91-20-3)<br>Kerosene (petroleum) (CAS-No.: 8008-20-6) |
| **CA Prop 65** | : | WARNING! This product contains a chemical known to the State of California to cause cancer.<br>Naphthalene (CAS-No.: 91-20-3) |
| **Skin irritation** | : | Irritating to skin. |
| **Eye irritation** | : | Irritating to eyes. |
| **Further information** | : | Kerosene does not have a measurable effect on human reproduction or development.<br>Kerosene is not listed as carcinogenic by NTP, OSHA, and ACGIH. IARC has listed kerosene as a probable human carcinogen.<br>Some petroleum distillates have been found to cause adverse reproductive effects in laboratory animals.<br>Acute and chronic exposure to kerosene may result in CNS effects including irritability, restlessness, ataxia, drowsiness, convulsions, coma and death. The most common health effect associated with chronic kerosene exposure is dermatitis. |

**Component**:

| | | |
|---|---|---|
| **Kerosene (petroleum)** | 8008-20-6 | Acute oral toxicity: LD50 rat<br>Dose: 5 mg/kg<br><br>Acute dermal toxicity: LD50 rabbit<br>Dose: 2,001 mg/kg |

| | | |
|---|---|---|
| | | Acute inhalation toxicity: LC50 rat<br>Dose: 5.28 mg/l<br>Exposure time: 4 h<br><br>Skin irritation: Classification: Irritating to skin.<br>Result: Skin irritation |
| **Naphthalene** | 91-20-3 | Acute oral toxicity: LD50 rat<br>Dose: 2,001 mg/kg<br><br>Acute dermal toxicity: LD50 rat<br>Dose: 2,501 mg/kg<br><br>Acute inhalation toxicity: LC50 rat<br>Dose: 101 mg/l<br>Exposure time: 4 h<br><br>Skin irritation: Classification: Irritating to skin.<br>Result: Mild skin irritation<br><br>Eye irritation: Classification: Irritating to eyes.<br>Result: Mild eye irritation<br><br>Carcinogenicity: N11.00422130 |

## SECTION 12. ECOLOGICAL INFORMATION

**Additional ecological information** : Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems. U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802. Naphthalene (91-20-3) one of the ingredients in this mixture is classified as a Marine Pollutant.

**Component:**

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

## SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal** : Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility.
Processing, use or contamination of this product may change the waste management options.
State and local disposal regulations may differ from federal disposal regulations.
Dispose of container and unused contents in accordance with federal, state and local requirements.

## SECTION 14. TRANSPORT INFORMATION

**CFR**

| | |
|---|---|
| Proper shipping name | : Fuel, aviation, turbine engine |
| UN-No. | : 1863 |
| Class | : 3 |
| Packing group | : III |

**TDG**

| | |
|---|---|
| Proper shipping name | : Fuel, aviation, turbine engine |
| UN-No. | : UN1863 |
| Class | : 3 |
| Packing group | : III |

**IATA Cargo Transport**

| | |
|---|---|
| UN UN-No. | : UN1863 |
| Description of the goods | : Fuel, aviation, turbine engine |
| Class | : 3 |
| Packaging group | : III |
| ICAO-Labels | : 3 |
| Packing instruction (cargo aircraft) | : 366 |
| Packing instruction (cargo aircraft) | : Y344 |

**IATA Passenger Transport**

| | |
|---|---|
| UN UN-No. | : UN1863 |
| Description of the goods | : Fuel, aviation, turbine engine |
| Class | : 3 |
| Packaging group | : III |
| ICAO-Labels | : 3 |
| Packing instruction (passenger aircraft) | : 355 |
| Packing instruction (passenger aircraft) | : Y344 |

**IMDG-Code**

| | |
|---|---|
| UN-No. | : UN 1863 |
| Description of the goods | : Fuel, aviation, turbine engine |
| Class | : 3 |
| Packaging group | : III |
| IMDG-Labels | : 3 |
| EmS Number | : F-E S-E |
| Marine pollutant | : Yes |

## SECTION 15. REGULATORY INFORMATION

| | |
|---|---|
| OSHA Hazards | : Toxic by inhalation.<br>Highly toxic by ingestion<br>Moderate skin irritant<br>Severe eye irritant<br>Combustible |
| 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<br>Chronic Health Hazard<br>Fire Hazard |

**CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIROMENT)**

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil. Fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as the Clean Water Act may still apply**.**

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.

**Template** : GWU mbH
**Prepared by** Birlenbacher Str. 18
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Germany

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**Revision Date** : 01/27/2011

40, 41, 42, 43, 44, 45, 60, 113, 137, 138, 139, 140, 141, 142, 263, 285, 1048, 1117, 1137, 1138, 1546

**APPENDIX A7**

**LUBTAC ROD GREASE**

(Pages A7-1 to A7-4)

**PERTH**
Tel (08) 9249 7599
Fax (08) 9249 7699
**BRISBANE**
Tel (07) 3271 5900
Fax (07) 3271 5907

Southern Exploration & Drilling Supplies

**MELBOURNE**
Tel (03) 9545 1277
Fax (03) 9545 1299
**INTERNATIONAL**
Tel +61 (8) 9249 7599
Fax +61 (8) 9249 7699

**PO Box 148,**
**Kingsway WA 6065**

Material Safety Data Sheet

# Lubtac Rod Grease

HDD MINING & WATERWELL

Driltech Mission SANDVIK

Down hole hammers & bits
Top hole hammer equipment

BOART LONGYEAR

Diamond drilling
Three cone rotary drill bits
(TCI or Mill Tooth)
Geological supplies
Radio communications
Drag & blade bits
Drilling fluids
Drilling rigs - all types
Elgi air compressors
Augers, teeth,
ground engaging tools
Drill pipe & subs
Geotechnical drilling supplies
International procurement
Machinery parts & equipment

A Smith/Schlumberger Company

M-I Australia Pty Ltd, 11/251 Adelaide Tce, Perth, WA, 6000
Tel: 08 9325 4822 Fax: 08 9325 1897

HEALTH SAFETY ENVIRONMENTAL HSE





AUSTRALIAN DRILLING INDUSTRY ASSOCIATION MEMBER

# ENVIRONMENTAL AND SAFETY DATA SHEET

## 1. PRODUCT IDENTIFICATION

TRADE NAME: **LUBTAC ROD GREASE**

GENERIC DESCRIPTION: **A MIXTURE OF INORGANIC INERT VISCOSIFIERS, TACKIFIERS, HYDROCARBON OILS AND VEGETABLE OILS.**

## 2. HAZARDOUS INGREDIENTS

| MATERIAL OR COMPONENT | % | DATA |
|---|---|---|
| **NONE** | | |

## 3. PHYSICAL DATA

BOILING POINT : **120 $^{o}$C**

MELTING POINT : **NA**

FREEZING POINT : **< 0 $^{o}$C**

pH : **7-8**

SPECIFIC GRAVITY : **0.99**

APPEARANCE AND : **DARK BROWN STRINGY GREASE**

## 4. FIRE AND EXPLOSION DATA

FLASH POINT $^{o}$C: (AUTO IGNITION TEMPERATURE) **> 200 $^{o}$C**

EXTINGUISING MEDIA : **USE EXTINGUISHER USED FOR EXTINGUISHING HYDROPHOBIC MATERIALS**

## 5. HEALTH HAZARD INFORMATION

ROUTES OF EXPOSURE AND EFFECTS

EYES : **MODERATE TO SEVERE IRRITATION**

INHALATION : **NO IRRITATING FUMES ARE PRODUCED AT NORMAL TEMPERTURES**

INGESTION : **MAY CAUSE NAUSEA**

SKIN : **MAY BE IRRITATING TO SENSITIVE SKINS ON PROLONGED EXPOSURE**

## 6. EMERGENCY AND FIRST AID PROCEDURES

EYES : **WIPE OUT WITH DRY CLOTH. USE EYE DROPS IF NECESSARY. OBTAIN MEDICAL ATTENTION IF NECESSARY**

INHALATION : **NO IRRITATING FUMES ARE PRODUCED AT NORMAL TEMPERATURES**

INGESTION : **WASH MOUTH WITH WATER. INDUCE VOMITING. OBTAIN MEDICAL ADVICE AS SOON AS POSSIBLE**

SKIN : **WASH WITH SOAPY WATER. IF DEGREASING OF SKIN HAS OCCURED, APPLY MOISTURISING CREAM**

## 7. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY: **EXTREME HEAT**

INCOMPATABILITY: **NONE**

HAZARDOUS DECOMPOSITION PRODUCTS: **CAN PRODUCE HYDROCARBON DECOMPOSITION PRODUCT ON BURNING.**

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERISATION: **WILL NOT OCCUR**

## 8. SPILL OR LEAK PROCEDURES

**CONTAIN SPILL. SCRAPE UP EXCESS PRODUCTS WITH A SPADE. THROW SAND OR WOOD SHAVINGS OVER CONTAMINATED AREA AND SCRAPE UP WITH ASPADE. CONTAMINATED WOOD SHAVINGS OR SAND CAN BE DISCARDED IN ANY RUBBISH STORAGE AREA.**

## 9. INDUSTRIAL HYGEINE CONTROL MEASURES

VENTILATION: **NORMAL**

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

| | | |
|---|---|---|
| RESPIRATORY: | | **NONE** |
| EYES | : | **NONE** |
| GLOVES | : | **YES** |
| OTHER | : | **CLOTHING PROTECTOR AS REQUIRED TO PROTECT CLOTHES FROM GREASE WHICH IS DIFFICULT TO REMOVE.** |

## 10. SPECIAL PRECAUTIONS

**NONE**

## 11. OTHER HANDLING AND STORAGE REQUIREMENTS

**NONE**

# APPENDIX A8

## TELLUS T32 OIL

(Pages A8-1 to A8-8)

# Material Safety Data Sheet

## 1. MATERIAL AND COMPANY IDENTIFICATION

**Material Name** : **Shell Tellus Oil T 32**
**Uses** : Hydraulic oil

**Manufacturer/Supplier** : **SOPUS Products**
PO BOX 4427
Houston, TX 77210-4427
USA
**MSDS Request** : 877-276-7285

**Emergency Telephone Number**
**Spill Information** : 877-242-7400
**Health Information** : 877-504-9351

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

## 3. HAZARDS IDENTIFICATION

**Emergency Overview**

**Appearance and Odour** : Amber. Liquid at room temperature. Slight hydrocarbon.

**Health Hazards** : High-pressure injection under the skin may cause serious damage including local necrosis.
**Safety Hazards** : Not classified as flammable but will burn.
**Environmental Hazards** : Not classified as dangerous for the environment.

**Health Hazards** : Not expected to be a health hazard when used under normal conditions.

**Health Hazards**
**Inhalation** : Under normal conditions of use, this is not expected to be a primary route of exposure.
**Skin Contact** : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
**Eye Contact** : May cause slight irritation to eyes.
**Ingestion** : Low toxicity if swallowed.
**Other Information** : High-pressure injection under the skin may cause serious damage including local necrosis. Used oil may contain harmful impurities.
**Signs and Symptoms** : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection. Ingestion may result in nausea, vomiting and/or diarrhoea.

| | | |
|---|---|---|
| **Aggravated Medical Condition** | : | Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin. |
| **Environmental Hazards** | : | Not classified as dangerous for the environment. |
| **Additional Information** | : | Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200. |

## 4. FIRST AID MEASURES

| | | |
|---|---|---|
| **General Information** | : | Not expected to be a health hazard when used under normal conditions. |
| **Inhalation** | : | No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice. |
| **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. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop. Obtain medical attention even in the absence of apparent wounds. |
| **Eye Contact** | : | Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention. |
| **Ingestion** | : | In general no treatment is necessary unless large quantities are swallowed, however, get medical advice. |
| **Advice to Physician** | : | Treat symptomatically. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential. |

## 5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

| | | |
|---|---|---|
| **Flash point** | : | Typical 210 °C / 410 °F (COC) |
| **Upper / lower Flammability or Explosion limits** | : | Typical 1 - 10 %(V)(based on mineral oil) |
| **Auto ignition temperature** | : | > 320 °C / 608 °F |
| **Specific Hazards** | : | Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. |

| | | |
|---|---|---|
| **Suitable Extinguishing Media** | : | 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. |
| **Protective Equipment for Firefighters** | : | Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space. |

## 6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe all relevant local and international regulations.

| | | |
|---|---|---|
| **Protective measures** | : | Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. |
| **Clean Up Methods** | : | Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly. |
| **Additional Advice** | : | Local authorities should be advised if significant spillages cannot be contained. |

## 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| **General Precautions** | : | Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. 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. |
| **Handling** | : | Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. |
| **Storage** | : | Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50 °C / 32 - 122 °F |
| **Recommended Materials** | : | For containers or container linings, use mild steel or high density polyethylene. |
| **Unsuitable Materials** | : | PVC. |
| **Additional Information** | : | Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion. |

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Occupational Exposure Limits**

| Material | Source | Type | ppm | mg/m3 | Notation |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Oil mist, mineral | ACGIH | TWA(Mist.) | | 5 mg/m3 | |
| Oil mist, mineral | ACGIH | STEL(Mist.) | | 10 mg/m3 | |

**Exposure Controls** : 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: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

**Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

**Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. 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 suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].

**Hand Protection** : 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: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, 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** : Wear safety glasses or full face shield if splashes are likely to occur.

**Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes.

**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.

**Environmental Exposure Controls** : Minimise release to the environment. An environmental assessment must be made to ensure compliance with local

environmental legislation.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| Appearance | : | Amber. Liquid at room temperature. |
| Odour | : | Slight hydrocarbon. |
| pH | : | Not applicable. |
| Initial Boiling Point and Boiling Range | : | > 280 °C / 536 °F estimated value(s) |
| Pour point | : | Typical -39 °C / -38 °F |
| Flash point | : | Typical 210 °C / 410 °F (COC) |
| Upper / lower Flammability or Explosion limits | : | Typical 1 - 10 %(V) (based on mineral oil) |
| Auto-ignition temperature | : | > 320 °C / 608 °F |
| Vapour pressure | : | < 0.5 Pa at 20 °C / 68 °F (estimated value(s)) |
| Density | : | Typical 872 kg/m3 at 15 °C / 59 °F |
| Water solubility | : | Negligible. |
| n-octanol/water partition coefficient (log Pow) | : | > 6 (based on information on similar products) |
| Kinematic viscosity | : | Typical 32 mm2/s at 40 °C / 104 °F |
| Vapour density (air=1) | : | > 1 (estimated value(s)) |
| Evaporation rate (nBuAc=1) | : | Data not available |

## 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| **Stability** | : | Stable. |
| **Conditions to Avoid** | : | Extremes of temperature and direct sunlight. |
| **Materials to Avoid** | : | Strong oxidising agents. |
| **Hazardous Decomposition Products** | : | Hazardous decomposition products are not expected to form during normal storage. |

## 11. TOXICOLOGICAL INFORMATION

| | | |
|---|---|---|
| **Basis for Assessment** | : | Information given is based on data on the components and the toxicology of similar products. |
| **Acute Oral Toxicity** | : | Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat |
| **Acute Dermal Toxicity** | : | Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit |
| **Acute Inhalation Toxicity** | : | Not considered to be an inhalation hazard under normal conditions of use. |
| **Skin Irritation** | : | Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis. |
| **Eye Irritation** | : | Expected to be slightly irritating. |
| **Respiratory Irritation** | : | Inhalation of vapours or mists may cause irritation. |
| **Sensitisation** | : | Not expected to be a skin sensitiser. |
| **Repeated Dose Toxicity** | : | Not expected to be a hazard. |
| **Mutagenicity** | : | Not considered a mutagenic hazard. |
| **Carcinogenicity** | : | Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC). Other components are not known to be associated with carcinogenic |

effects.

| | | |
|---|---|---|
| **Reproductive and Developmental Toxicity** | : | Not expected to be a hazard. |
| **Additional Information** | : | Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed. |

## 12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

| | | |
|---|---|---|
| **Acute Toxicity** | : | Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l. |
| **Mobility** | : | Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile. |
| **Persistence/degradability** | : | Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment. |
| **Bioaccumulation** | : | Contains components with the potential to bioaccumulate. |
| **Other Adverse Effects** | : | Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential. |

## 13. DISPOSAL CONSIDERATIONS

| | | |
|---|---|---|
| **Material Disposal** | : | 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. Do not dispose into the environment, in drains or in water courses. |
| **Container Disposal** | : | Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. |
| **Local Legislation** | : | Disposal should be in accordance with applicable regional, national, and local laws and regulations. |

## 14. TRANSPORT INFORMATION

**US Department of Transportation Classification (49CFR)**
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

**IMDG**
This material is not classified as dangerous under IMDG regulations.

**IATA (Country variations may apply)**
This material is not classified as dangerous under IATA regulations.

## 15. REGULATORY INFORMATION

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

**Federal Regulatory Status**

**Notification Status**

| | |
|---|---|
| EINECS | All components listed or polymer exempt. |
| TSCA | All components listed. |
| DSL | All components listed. |

**SARA Hazard Categories (311/312)**
No SARA 311/312 Hazards.

**State Regulatory Status**

**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

## 16. OTHER INFORMATION

| | | |
|---|---|---|
| **NFPA Rating (Health, Fire, Reactivity)** | : | 0, 1, 0 |
| **MSDS Version Number** | : | 1.1 |
| **MSDS Effective Date** | : | 06/30/2009 |

| | | |
|---|---|---|
| **MSDS Revisions** | : | A vertical bar (\|) in the left margin indicates an amendment from the previous version. |
| **MSDS Regulation** | : | The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200. |
| **MSDS Distribution** | : | The information in this document should be made available to all who may handle the product. |
| **Disclaimer** | : | The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product. |

# APPENDIX B
# SPILL REPORTING FORM

(Page B-1)

# 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: MONTH – DAY – YEAR | REPORT TIME | ☐ ORIGINAL SPILL REPORT, OR | REPORT NUMBER |
| B | OCCURRENCE DATE: MONTH – DAY – YEAR | OCCURRENCE TIME | ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT | ____-_____ |

| | | |
|---|---|---|
| C | LAND USE PERMIT NUMBER (IF APPLICABLE) | WATER LICENCE NUMBER (IF APPLICABLE) |
| D | GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION | REGION ☐ NWT ☐ 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 | QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES | U.N. NUMBER |
| | SECOND PRODUCT SPILLED (IF APPLICABLE) | 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 STATION OPERATOR | EMPLOYER | LOCATION CALLED YELLOWKNIFE, NT | REPORT LINE NUMBER (867) 920-8130 |

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC

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 | | | |